Reasons or Principles: What makes for a better decision?

The effect of decision strategy on well-being:
An experimental investigation into *deciding by reasons* versus *deciding by principle*.
With questionnaires on strategy satisfaction, decision style, and decision categorization.

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Abstract

The main interest of this dissertation is in two deliberative decision strategies, *deciding by reasons* and *deciding by principle*, and their potential to lead to a good decision.

These two strategies are adopted from the philosophical literature, specifically the debate between particularists and generalists in moral philosophy. Accordingly, this dissertation includes philosophical as well as psychological work.

The first part, *Theoretical*, focuses on the underlying argument using philosophical methods. After thoroughly scrutinizing the main terms used in decision sciences and in this dissertation (chap. 1), the subsequent chapters examine what is decision quality (chap. 2), theories of well-being and utility (chap. 3), and introduce the distinction between deciding by reasons and deciding by principle as well as ways to measure well-being (chap. 4). The whole argument is then summarized in chapter *Consolidation: The Argument*. The part is concluded by delineating previous psychological research (chap. 5) and introducing the present empirical research (chap. 6).

The second part, *Empirical* includes three endeavors: the Pilot Study (chap. 7 and 8), questionnaires (chap. 9), and experiments (chap. 10). The Pilot Study has received a prominent position, because due to very little previous research on the matter, piloting was important to pave the way for this research. The Pilot Study established the feasibility of conducting this research as planned, as well as it spurred further inquiries besides the main topic.

The chapter *Questionnaires* (chap. 9) is largely an acknowledgment of the importance of these further topics motivated by the Pilot Study. It includes the construction and first validation of the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ). Furthermore, it had become evident that what I call *the effect of content* is something to be calculated with: Studying decisions necessitates (fictional) decisions for participants to work with – but these decisions come with specific contents and the contents matter. Yet, there is no taxonomy of decision situations which would allow to contextualize or even partially control content. Accordingly, the last part of the chapter is devoted to eight Decision Categorization Scales (DCSs), categorizing decisions. Among these, one newly constructed scale based on textbook material, the Characteristics of Decision Situations Scale, proved especially interesting.

The chapter *Reasons vs. Principles* (chap. 10) then is devoted to the question whether it is using reasons or principles for decision making that leads to greater satisfac-

tion. Three experiments are reported, two use a well-researched paradigm (the Trolley paradigm, the MADM paradigm), and one is a field experiment. The Trolley Experiment came with the additional mandate to show that the distinction between deciding by reasons and deciding by principle is psychologically not the same as deciding as a consequentialist or a deontologist, which could be shown analyzing participants' string variables. The MADM Experiment is a very straightforward experiment (of several further ones not reported, cf. Table Ad.1 on page 769 within the Appendix) testing the effect of the two decision strategies on satisfaction together with a control condition – and does not find a difference. Taken together with the already weak and eclectic results of decision strategy on satisfaction in both the Pilot Study and the Trolley Experiment, another approach was due. Therefore, a field experiment was conducted where participants were to use the two deliberative strategies and a control strategy for real decisions in their own life at least 10 times during one week (between subjects). The Field Experiment did indeed find differences of decision strategy for immediate and global satisfaction – however entirely conditioned upon gender (which had not been expected).

All empirical results are thoroughly discussed within their own sections. Furthermore, all results are then summarized in chapter *Consolidation: The Results*.

The third part, *Concluding* involves two enterprises. On the one hand, since this research project has spanned such a long time from conception to conclusion, and such little empirical research could be relied on when the project was conceived, another thorough and systematic literature search was conducted, documented, and according literature was reviewed (chap. 11 and 12). Relevant literature was then discussed in the light of results and non-results of the present research, and conclusions were drawn as to the possibility of effects of decision strategy on measures of satisfaction. The part concludes with an evaluation of the present research and an answer to the question posed in the introduction (chap. 13).

Keywords: Decision making, Decision strategy, Decision quality, Deliberation, Reasons, Reason-based, Principle, Rule-based, Well-being, Happiness, Satisfaction, Particularism, Generalism, Moral Psychology, Aristotle, Strategy satisfaction, Decision Style, Decision categorization.

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Introduction

You have a decision to make. It is not life-changing (like emigrating to a foreign country), and it is not trivial (like having pizza or pasta), but well in between: a "medium-sized" decision. Imagine, old friends of yours from the US traveling through Europe ask you to meet up in Paris for a weekend. Unfortunately, you also have a deadline approaching and money is tight right now. But it is a rare opportunity to see them which will not happen soon again. On the other hand, the deadline is tied to a project you really want and you need the time to produce a proposal of good quality. – This or the like you might reason. These aspects indeed are *reasons*: for and against one or the other option. Maybe a pros and cons list might help?

Let's say you made a pros and cons list, but you don't feel like you can decide. Accordingly you wonder whether there are other ways to reach a decision. That is, you ponder your decision strategy. What other ways of looking at this decision problem come to mind?

While reasons usually refer to aspects and details, one alternatively might want to look at things more globally. You could ask yourself: What in general is really important to me in my life? Is it connections to other human beings, spending time with friends and family? Or is it my career, improving my skills, having a good job and good money? – Following a general directive like that in cases of conflict is making use of a *principle*.

This little example entails most of the aspects important to the present research endeavor: deciding by reasons, deciding by principle, and the question which decision strategy to prefer.

I base the distinction between deciding by reasons versus deciding by principle on the relatively recent debate in moral philosophy between generalists and particularists, asking whether adherence to (moral) principles or rather focusing on the particular (moral) reasons present in an individual situation will lead to a better (moral) decision.

The perceived quality of a decision in moral terms will largely depend on one's inclination towards one or the other normative ethical theory and according value theory: a proponent of consequentialist deliberation and a proponent of deontological deliberation might gravely disagree in critical situations.

The present research, however, is not about moral decisions, but about decisions *simpliciter*. These are usually *prudential* decisions, the goal being to choose what is best for the chooser (the agent). What is the criterion here to determine decision quality? Traditionally, normative theories of (expectancy-)value maximization or accuracy-effort trade-off stipulating what is rational or adaptive have provided such criteria for preferential choice and inference. Decision quality accordingly is a function of adherence to these normative models – exactly as it is in the moral case.

While the systematic deviation from the predictions and prescriptions of expected utility theory and rational choice found in empirical studies gave rise to descriptive (the heuristics and biases program) or partially descriptive (the fast and frugal heuristics program) accounts, one basic defining aspect is undisputed: the quality of preferential decisions (a.k.a. value-based decisions) also critically depends on the decision maker's (subjective) goals.

Referring to the above example situation a goal could be to be a good friend, or to take no chances with your career. These goals would be intrinsically realized by choosing one or the other option. A goal could also be to have a good time or to not regret your choice afterwards. The realization of these outcome-related goals, however, could only be determined afterwards. Here it is important to beware of outcome bias: it is not the actual empirical goal attainment that makes a decision a good decision, but the likelihood (used here bare of any technical meaning) that your choices and actions will lead to the realization of your goal(s). In other words: a common understanding is that good decisions are those where you choose appropriate means to achieve your desired ends.

I will stipulate that when comparing two decisions, the better decision is the one that leads to the *well-being* of the decision maker.

Now, well-being can be different things: hedonistic pleasure, the satisfaction of your desires (as alluded to above), or *eudaimonia* (flourishing/happiness).

In this research, after having scrutinized what is a good decision and having distinguished theories of well-being and utility, *satisfaction* will be chosen as an appropriate derivative of 'happiness'.

Let's look back at the example situation. A decision is to be made and the two options seem rather incommensurable, the decision is difficult. The decision maker thus wonders which decision strategy to employ in order to reach a state of satisfaction:

Which decision strategy – deciding by reasons or deciding by principle – will lead to greater satisfaction? This is the main research question.[1]

[1] Further questions will be investigated: How to measure satisfaction with the strategy specifically, how to measure relevant trait variables of decision makers, and how to categorize differences between decision situations? However, the investigation of these questions is meant to facilitate the study of the main research question.

General Structure of the Thesis

This thesis is structured into the three parts *Theoretical* (Part I), *Empirical* (Part II), and *Concluding* (Part III).

The theoretical part will unfold the general argument this research is based on. Theoretical foundations will be scrutinized thoroughly. In doing so, I will mostly draw on philosophical literature. The full argument is summed up in chapter *Consolidation: The Argument* on page 141.

The psychological research will be presented in the empirical part. All of it is largely exploratory in that it puts together several aspects in a different light than previous research did: Deciding by reasons and deciding by principle are established as decision strategies, decision strategy is manipulated as the independent variable, and the dependent variable is satisfaction. All three of these aspects are new or barely researched.

Accordingly, the *Pilot Study* probed the feasibility of this research endeavor. It identified several obstacles that were separately investigated in the *Questionnaires* chapter. Finally, the main research question is tackled in the *Reasons vs. Principles* chapter. A summary of all results and insights from the empirical part is provided in chapter *Consolidation: The Results* on page 450.

The discussion part will include an updated systematic literature search and review and a discussion of the findings in the light of my own findings, as well as a discussion of limitations and possible future research.

I recommend reading this manuscript digitally in pdf format, such that the hyperlinks may facilitate navigation.

I Theoretical

Overview

This part, *Theoretical* (Part I), provides the theoretical underpinnings. It is very theoretical indeed and mostly draws on philosophical literature.

The first chapter, *Conceptual Clarifications* (chap. 1), is concerned with the main concepts important to decision sciences. It finds that many concepts, even the most fundamental ones such as 'judgment', 'choice', and 'decision', have not been and still are not used consistently. It also finds that many of these terms are rather complex. The purpose of this chapter is to gain an understanding of that complexity in order to reach both a consistent terminology and an awareness of their intricate relationships and implications.

Chapters *Decision Quality* (chap. 2), *Well-Being and Utility* (chap. 3), and *Decision Strategy and Happiness* (chap. 4) provide the main argument. The 'argument' is supposed to end with the conclusion that the satisfaction of the decision maker is a relevant criterion for the quality of a decision, and that decision quality conventionally is understood to be the result of following a certain procedure. The argument goes like this: What is decision quality, that is: what makes a decision a good decision? The adherence and correct application of the axioms and formula of utility theory and the principle of maximization. What is supposed to be maximized? Something of value to a person. What is of ultimate value to a person? Well-being. How can well-being be measured? Satisfaction.

So satisfaction is the desired end result. Utility theory is supposed to guarantee it. But I am interested in reasons and principles as decision strategies: 'deciding by reasons' (the particularist's strategy) versus 'deciding by principle' (the generalist's strategy) is an important meta-ethical distinction. And if this is an important distinction for moral decision making, it just might be as well for conventional (i.e. prudential) decision making.

The full argument is summed up in chapter *Consolidation: The Argument* on page 141.

Last, I review *Previous Research* (chap. 5) and delimit *This Research* (chap. 6) as presented here.

1 Conceptual Clarifications

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The present chapter *Conceptual Clarifications* (chap. 1) is concerned with some very basic groundwork: five of the most basic terms within decision sciences and research – among them: decision making, judgment, and choice – will be critically defined and discussed from both a psychological as well as philosophical perspective.

1.1 Introduction: Which terms need precision?

According to Fischhoff and Broomell (2020) in their article "Judgment and Decision Making" in the 2020 *Annual Review of Psychology*, judgment, preference, and choice are "the essential elements of all decisions" (p. 348). Böttcher and Meisert (2013) demand "it has to be clarified which processes are exactly described by the term 'decision-making'." (p. 482). Early on, the lack of a clear distinction between judgment and choice was mentioned and demurred (cf. e.g. in chronological order Einhorn, Kleinmuntz, & Kleinmuntz, 1979, p. 479; Einhorn & Hogarth, 1981, p. 73; Billings & Scherer, 1988, p. 1; Westenberg & Koele, 1994, p. 66-67; Iverson & Luce, 1998, p. 47). Pfister, Jungermann, and Fischer (2017, p. 237) note that there is no consistent use of the terms "rule" and "strategy".

These examples show that fundamental concepts[2] within the decision sciences vary in scope and area of application – both historically as well as to date.

For present purposes, conceptual clarifications will be useful for the following concepts: decision making, decision situation, judgment, choice, decision strategy/rule, and decision.

Further fundamental terms that are *not* in need of a precise definition right away are these:[3] option/alternative, attribute/characteristic/cue, deliberation, preference, task, utility, information search, prediction, decision problem, weighing, trade-off, belief, desire, pleasure, rationality, welfare.

Since several related terms shall be specified, they may come up within each other's definitions.[4] Accordingly, it will be helpful to stipulate provisional *working definitions* which will be provided in the next short section. Thereafter, each term will be analyzed.

[2] "Concept" and "term" will be used interchangeably.

[3] For each term, at least two of the following reasons hold: the term's application is not prone to misunderstanding, the term is not central to this research, an analysis of the term will come up later at more length or during the discussion of related concepts, the term's history and conceptual analysis is too complex for present purposes.

[4] A word on *definitions*: I take definitions here to explicate *concepts* or terms. The question whether it is really possible to strictly define a concept and what it would mean to "strictly define a concept" opens up a whole universe of philosophical problems centering around the ontological and structural status of concepts (cf. Margolis & Laurence, 2023 for an overview) which I cannot follow up on here. However, without much theorizing the following quote affords a glimpse of these problems: "It may be [argued] that every concept must have an extension, that there must be a definite totality of objects that fall under the concept. If this is right then a predicate is meaningful – it expresses a concept – only if the predicate necessarily demarcates the world sharply into those objects to which it applies and those to which it does not apply. [...] [This] rules out many ordinary and apparently meaningful predicates (e.g., 'bald')." (Gupta, 2021, §2.8). In fact, referencing an important experiment by Labov (1973), it is a classic textbook content from cognitive psychology that even for very ordinary things such as cups there is no strict demarcation of what does and what does not belong to this category: category boundaries are vague (Anderson, 2001, p.161). This is the problem of extension. (And there are many more, cf. Margolis & Laurence, 2023.)

1.1.1 Working Definitions

Decision making:	the whole process
Decision situation:	the wider context
Judgment:	the appraisal of certain attributes/characteristics and commitment to according beliefs
Choice:	the selection among options/alternatives
Decision strategy:	the way of arriving at a decision

In this list, the term "decision" is missing. It has no unique place: either it is synonymous to *decision making*, i.e. the whole process (as e.g. defined by Pfister et al., 2017, p. 3-4), or it is synonymous to *choice*, i.e. the endpoint and result of said process. For now, I will commit to the latter, small-scope definition of "decision".

1.2 Specification and Analysis of the Basic Concepts

In the upcoming sections, for each of the five terms, I will first present definitions from decision sciences literature (section title: *Psychological*). Second, I will add a discussion informed by philosophical conceptual analysis and/or a short overview of the treatment of the term in analytic philosophy (section title: *Philosophical*). Last, I will add further stipulations, addenda to the core definition, or remind of synonyms, as well as summarize (section title: *Summarizing*).

1.2.1 Decision Making

1.2.1.1 Psychological

Decision making is a *process* that involves judgment, evaluation, and choice (Pfister et al., 2017, p. 3, on "decision"). It is based on personal values and goals, and in the case of uncertainty, it includes expectations about future events or outcomes (Hastie & Dawes, 2010, p. 24). Decision making requires that there are at least two alternatives to choose from (cf. e.g. Brust-Renck, Weldon, & Reyna, 2021; Hastie & Dawes, 2010; Pfister et al., 2017, and everyone else); the alternatives/options in a decision making situation may be objects or actions (e.g. Pfister et al., 2017, p. 2). Decision making may be automatic, intuitive, unconscious – or deliberate and (partially) controlled (e.g. Weber & Johnson, 2009).[5]

1.2.1.2 Philosophical

It follows from the above that decision making is pervasive. Since it may be automatic or deliberate, *and* importantly only requires there to be more than one possible course of action, it becomes difficult to come up with instances where decision making is not involved. *Force* is an obvious candidate, but it is hard to imagine a force (e.g. being

[5] A dual process view is possible, but not necessary; for an overview cf. e.g. Evans, 2008.

held at gunpoint) that would forestall even automatic/unconscious decisions and tiny deliberate/controlled decisions (like whether to make a big step or a small one).

In a similar vein, one may stipulate that there is no *action* where decision making is not involved. Cases of (unwilling) bodily movements (like sneezing) and physical interaction without decision making are merely *behavior*. For a more refined picture, cf. Pettit (2010) and critically Frankfurt (1978). Conceptually, the relationship of (deliberate) decision making and intentional action needs elaboration (cf. e.g. Hastie & Dawes, 2010; Pettit, 2010; Shepherd, 2015b).

While according to (a simple reading of) the so-called Humean theory of motivation, where belief and desire are necessary and sufficient cause for action (Pete wants a Coke [*desire*] and remembers that there is one in the fridge [*belief*], so [*causal connection*] he gets up to get it [*action*]; cf. e.g. Leffler, 2022; Smith, 1987), both belief and desire are mental states that we cannot deliberately choose. There is no deliberate decision making in the formation of belief and desire: we cannot choose our beliefs ("I now decide to believe that the moon is made from cheese!"), and we cannot choose our desires ("I herewith decide to want to be an astronaut!").[6]

In the case of belief, this is the philosophical debate regarding *doxastic (in)voluntarism* with the mainstream consensus agreeing on so-called indirect doxastic voluntarism (cf. e.g. Vitz, 2023), stating that we may decide to (likely) acquire certain beliefs *indirectly* (e.g. by searching for according information), but not directly (as in the example above).[7]

As concerns the origin of (intrinsic) desire, the classic position of (genetic) psychological hedonism states that there is only one ultimate intrinsic desire, namely pleasure (cf. e.g. T. Schroeder, 2020; Tilley, 2012). While hedonism in its various forms is subject to philosophical debate indeed since many centuries (cf. e.g. A. Moore, 2013; Tilley,

[6] I treat "to desire" and "to want" synonymously. This identification can, of course, be (partially) disputed (cf. e.g. L. Grant & Phillips-Brown, 2020), but it is the default understanding (cf. e.g. Gregory, 2021; Hazlett, 2019).

[7] For more extreme positions cf. e.g. Alston (1988) arguing that beliefs are not under our voluntary control, and Steup's (2011) counterargument concluding that belief is just as intentional as action. Further interesting or important contemporary reads on the matter include e.g. Bennett (1990); Boyle (2009); Gendler (2008); Hieronymi (2006, 2008); Pettit and Smith (1996); Strawson (2003); Williams (1973).

2012),[8] there is also work from neuroscience partially pointing to the above conclusion (cf. e.g. Katz, 2016; Morillo, 1990; T. Schroeder, 2006a).[9]

Even without diving further into practical reasoning, practical rationality, and a theory of action, it should be evident that these are serious concerns: The Humean theory of motivation/action entails an epistemic component (belief) and a conative component (desire) – as does the basic decision theoretical model of expected utility (cf. e.g. Dreier, 1996; Hájek & Pettit, 2004; E. Jackson, 2021; Mellers, Schwartz, & Cooke, 1998; Steele & Stefánsson, 2020). Now, if these two constitutive components are not under our volitional control, where does this leave decision making?

I cannot follow up on this here, also because there are intricate connections to questions of determinism versus freedom of the will (within the philosophy of action and metaphysics[10]) as well as the debate on mental causation (within the philosophy of mind).[11]

1.2.1.3 Summarizing

The process[12] that is *decision making* is further elaborated by Pfister et al. (2017) (`www.DeepL.com` trans.):

> This process begins either when a person perceives a situation as a decision situation (the person recognizes that there are at least two options) or when there is a discrepancy between the given state and a desired state, prompting a search for options that could bridge this discrepancy. The process ends when a person commits by choosing an option, or with the actual implementation of the choice

[8] The debate about ethical hedonism seems to be more intense than the debate about psychological hedonism. Whereas the latter, as described above, makes a claim about human nature, ethical hedonism is a normative ethical theory (as is utilitarianism, deontology etc.) and claims that "the moral rightness of an act derives from the pleasure the act produces" (Tilley, 2012, p. 566). Discussed within the terminology of normative reasons for action, it is immediately plausible that the "conclusion, that only desires provide reasons, can be seen as a kind of threat to morality" (Heathwood, 2011, p. 80). The literature on desire, pleasure, intrinsic value thereof, and good reasons for action is large, and the debate is ongoing (cf. e.g. Feldman, 1997; Heathwood, 2006, 2011; Jian, 2021; Pianalto, 2009; Shaw, 2021).

[9] Cf. Smythe (2016) for his demonstration that "most of the desires we form are not of our own choosing" (p. 104); cf. T. Schroeder (2020) for an overview of positions including the marginal view that desires may be acquired by reasoning (Smith, 1994), as well as the more modern view that desires are formed by learning experiences based on reward and punishment (T. Schroeder, 2004, 2006b). Another interesting move is the conceptualization of desire as "desire-as-belief" as recently defended by Gregory (2021; for the original formulation cf. Lewis (1988, 1996), and for an early positive account cf. e.g. Hájek and Pettit (2004)).

[10] As to the philosophical disciplines as well as the according adjectives I will treat 'metaphysics' and 'ontology' as synonymous. However, I prefer the latter term and will use it more often.

[11] Cf. also Schmitz (2011) for this demarcation.

[12] If "decision making" refers to said process, of course, the term "decision making process" is tautological in part (similar to "PIN number"). It will nevertheless be used sometimes, the justification being (a) that the procedural character is thereby emphasized and (b) that the use of the latter term is common and not irritating. Furthermore, the progressive form "deciding" as a noun will be used synonymously to "decision making", also referring to the process.

> made. This is often followed by a retrospective evaluation of the decision, whether it was a good one or rather not. (p. 4)

In sum, the term *decision making* is to refer to the whole process from recognition to action, and involves a number of mental operations (many of them, in part or whole, unconscious or automatic).

Decision making is pervasive, and there is no action where decision making is not involved. If the constitutive elements of (rational) decision making to produce action are belief and desire, there is the counterintuitive conundrum that (according to mainstream understanding) the direct formation of both of these mental states is not under our volitional control.

1.2.2 Decision Situation

1.2.2.1 Psychological

According to the above quote from Pfister et al. (2017, p. 4) a situation is recognized as a decision situation by a person if *either* the person becomes aware that there is a set of options from which one must be chosen, *or* the person becomes aware that there is a discrepancy between what she *wants to be the case* and what *is the case* (the status quo) such that she is motivated to end this discrepancy.

Decision situations can be described by characteristics they possess (cf. e.g. Pfister et al., 2017, p. 2, p. 22ff.): given vs. open set of options, single-stage vs. multi-stage, one-time vs. recurring, by description vs. by experience, one person vs. several persons, certain vs. uncertain consequences.[13] The term "decision situation" thus refers to the contextual factors and the conditions under which the decision making is to take place.

1.2.2.2 Philosophical

It follows that decision situations are a special sub-group of situations simpliciter. What distinguishes them from situations simpliciter is that a person recognizes them as such.[14] There is no decision situation without a person who finds that someone has to make a decision; that someone need not be the same person (for example: "You have to make a decision!" – "I don't think so, there is only one course of action, I have no choice.").

Earlier, regarding the process that is decision making, we said that it may be *entirely* unconscious ("I have no idea why I just said that!") or entirely automatic (e.g. changing the gear in your car or hitting the break when you see a kid come running), such that really almost anything (apart from your bowel movements, but certainly moving your arm to scratch your nose) must count as a result from decision making. But if the concept of a decision situation requires that there is according recognition (although not necessarily, but surely usually: recognition by the to-be decision maker), then there is a lot of decision making going on *outside of* decision situations.

[13] A characterization of these characteristics is presently not necessary.

[14] That said, this does *not* commit me to some form of empiricism or constructivism as a position in epistemology and ontology.

This is a good thing. Because there is a reason that textbooks on decision making like to point out that they will rather be concerned with deliberate decision making; e.g. Hastie and Dawes (2010) state that while "we probably want to call some highly automatic mental processes decisions as well [...] for the most part we focus on more deliberate, controlled decision processes" (p. 24). Pfister et al. (2017) make a much more elegant move (`www.DeepL.com` trans.):

> [...] often decisions are also made quickly, automatically and without prolonged thought, for example when the problem is trivial and therefore not worth prolonged consideration, or when the problem is well known and its solution has already become habitual or routine. In this book, we are primarily concerned with such situations in which there is "decision consciousness", i.e., someone knows that he is in a decision situation and consciously makes a decision. This does not mean, of course, that he is aware of the components and processes that characterize decision making. Even when we decide intuitively, that is, when we rely on our "gut feeling", we are aware that we are making a decision. Just as, after all, we speak consciously without being aware of the process of speech production. (p. 3)[15]

This latter idea, to tie the scope of what is to be talked about to *consciousness that decision making is happening* rather than to consciousness per se or even deliberateness or control has the advantage that it corresponds nicely to what we commonly think of deciding or decision making – namely that it is something that *involves us* and not just so happens – on the one hand. On the other hand, furthermore, this conceptualization does not run into the difficulty of (i) having to exclude from what is to be called "decision making" both choices and actions that do not involve (much) deliberation or conscious control (e.g. choosing lemon ice cream as always; also cf. e.g. Aarts & Dijksterhuis, 2000) as well as the large body of decision making literature concerned with automatic/intuitive/heuristic deciding (cf. e.g. Glöckner & Betsch, 2008a, for a short overview), and (ii) having to disentangle the consciously controlled processes termed "decision making" from their underlying unconscious mental processes and operations, and moreover conceptualize what "conscious control" really means (regarding the notion of "conscious control" cf. Shepherd, 2013, 2015a).

1.2.2.3 Summarizing

Advancing their connectionist framework, Glöckner and Betsch (2008a) adamantly claim that "understanding human decisions requires that both automatic and deliberate processes be considered" (p. 215), since "Decisions can occur without deliberate mental control. The core operations of the decision process – information integration and the selection of a behavioral option – are often quickly performed by the automatic system" (p. 221).

Even without specifically committing to this view, it seems wise to let the term "decision making" be maximally inclusive and have it entail both automatic and deliberate processes. At the same time, it is helpful to also have a term that connects well with

[15] Cf. also Schmitz (2011, p. 95) distinguishing a "state of consciousness" versus a "state one is conscious of being in".

everyday ordinary language use, stressing our (assumed) conscious or deliberate *holding*, our *ownership* of our decisions. This aspect shall be found in the term "decision situation". Accordingly, referring back to the above quote from Pfister et al. (2017, p. 3), a decision situation will always involve *decision consciousness*.

1.2.3 Judgment

1.2.3.1 Psychological

According to Hastie and Dawes (2010, p. 46), judgment is "the human ability to infer, estimate, and predict the character of unknown events", the focus being "judgment processes where the goal of the judgment is to infer the nature of some condition that does or could exist in the external world", while the term may also refer to "judgments of internal mental events associated with evaluated consequences and personal values" (p. 46).

Pachur and Bröder (2013, p. 665) add that the process of judging often is identified with *inductive inference*:[16] "A key characteristic of judgment is [...] that it is based on fallible indicators – or cues – that are probabilistically related to the to-be-judged dimension" (p. 665).[17] In a similar vein, according to Fischhoff and Broomell (2020) judgment more specifically is concerned with "predicting the outcomes of choosing possible options" (p. 333).[18]

Furthermore, judgments "can be expressed in different ways; these can be comparative ('X is more agreeable than Y'), quantitative ('X is very agreeable'), or categorical ('X is agreeable') statements" (Pachur & Bröder, 2013, p. 666).

According to Einhorn and Hogarth (1981, p. 74) being deliberative is an essential characteristic of judgment (cf. also Einhorn et al., 1979).[19]

A Judgment and Preference Inferences "typically have objectively verifiable answers", whereas preferences "involve value judgments and are therefore subjective" (Weber & Johnson, 2009, p. 54). Thus, there are two classes of judgment: *inferential judgments* and *preferential judgments*.[20] [21]

[16] Inductive inference is inference "from the observed to the unobserved, or to general laws" (Henderson, 2022, §0), where "the truth of the premises [only] provides some *degree of support* for the truth of the conclusion" (Hawthorne, 2021, §0, original italics).

[17] This description seems to be closely tied to respective experimental tasks, e.g. the *city-size task* (cf. e.g. Glöckner & Betsch, 2008a), where participants are to decide which city is larger based on so-called "cues" (i.e.: attributes/characteristics) such as 'having an airport', 'having a university', etc.

[18] Inference, prediction, and forecasting from the perspective of experimental task setup may denote one and the same, cf. e.g. Marewski and Link (2014), p. 49.

[19] This is not the mainstream understanding nowadays, cf. e.g. Glöckner and Betsch (2008a).

[20] The term "preferential judgment" is uncommon. I use it for reasons of symmetry. It will be used synonymously to "value judgment" (Weber & Johnson, 2009) or "evaluative judgment" (Einhorn et al., 1979). In contrast, the pair "preferential *choice*" vs. inference as short for "inferential choice" is commonly used (cf. e.g. Marewski & Link, 2014).

[21] According to Pachur and Bröder (2013) "[t]he distinction between [inferential] judgment and preference is also reflected in their rather independent research traditions" (p. 665).

Furthermore, "judgment often precedes preference" (Pachur & Bröder, 2013 p. 666).[22]

B Corollary: Preference and Choice In their 2009 *Annual Review of Psychology* review article, Weber and Johnson (2009) pointedly present this two-fold definition of preference: "in economics, inferred from choices and assumed to reflect utilities. In psychology, thought to be constructed in order to make a choice" (p. 55). Steele and Stefánsson (2020) stress preference being a *comparative attitude* where preference is "a kind of judgment that explains, as opposed to being identical with, choice dispositions and resultant choice behaviour" (§1).[23]

Accordingly, regarding the ontological status of preference, the behaviorist interpretation of standard economic theory is a reductionist account, where preference is reduced to choice, whereas upon the mentalist interpretation prevalent in psychology (capitalizing on the intuition that preferences are mental states whereas choices are actions) preferences are prior to and may cause choices (cf. Hansson & Grüne-Yanoff, 2022, §5.3).[24]

Thus, preference either *is* choice or at least it is something like *the* mental representation of choice (including no additional information) – or it is a special kind of comparative value judgment that precedes choice, but does not guarantee a *specific* choice.[25]

C Judgment and Choice It has been voiced repeatedly that judgment and choice "have not always been clearly distinguished in the decision-making literature" (Billings & Scherer, 1988, p. 1), or that the distinction itself "is less clear than it might seem"

[22] On a simple reading, what Pachur and Bröder (2013) mean is: '*value* judgment often precedes preference'. However, this (a) is contrary to the point from Weber and Johnson (2009), which the authors cite just a few lines before (namely that preferences *involve* value judgments; i.e.: value judgments are necessary precursors of preferences), or (b), still contrary to Weber and Johnson (2009), the authors decidedly make the point that often enough there is preference *without* previous value judgment.

On an alternative, more complex reading, what Pachur and Bröder (2013) mean is: '*inferential* judgment often precedes preference' (while agreeing with Weber & Johnson, 2009, on the necessary involvement of value judgment in preference construction). This then amounts to: 'inferential judgment often precedes value judgment which in turn is the basis for the construction of preference'.

The authors also give an example: "before constructing a preference regarding an option (e.g., a dessert after dinner), one often first has to judge the relevant attributes (e.g., calories, expected taste)" (Pachur & Bröder, 2013, p. 665). However, this example can be read both ways: 'judging the relevant attributes' could mean to descriptively judge e.g. how many calories the dessert has (inference) or it could mean to evaluatively judge the value that a low-calorie dessert has for me.

[23] "Roughly speaking, when we [...] say that an agent 'prefers' the 'option' A over B we mean that the agent takes A to be more desirable or choice-worthy than B" (Steele & Stefánsson, 2020, §1).

[24] If, on the psychological/mentalist account, preferences are 'a kind of judgment' (Steele & Stefánsson, 2020), is this judgment *identical* to the value judgment that is 'involved' in preference according to Weber and Johnson (2009)? That is, *is* preference simply *that* value judgment? Cf. for comparison: upon a "mentalist conception of preferences [...], preferences are understood as mental states expressed by psychological judgments. These judgments express value rankings after all things relevant for the ranking of alternatives have been considered." (Messerli & Reuter, 2023, p. 95).

[25] If preference is supposed to *not* simply be the mental counterpart to choice, then it must be possible to have a preference A > B and still contrariwise choose B.

(Iverson & Luce, 1998, p. 47; cf. also Einhorn et al., 1979; Maule, 2001; Westenberg & Koele, 1994).[26]

However, similar to Payne (1982, p. 389) referring to judgment and choice as "not equivalent tasks", it seems that a distinction resting on *response mode*[27] should leave little room for confusion:

> Judgment and choice are used to refer to the explicit response mode required by the task. Judgment requires an explicit evaluation of each alternative, typically using a continuous or multilevel scale. A choice response, in contrast, requires only that one alternative be selected and the rest rejected. (Billings & Scherer, 1988, p. 1-2)

Ganzach (1995) adds a further distinction:

> An important difference between judgment and choice is that choice involves commitment to a course of action [...]. People have to live with the outcome of their choices but not with the output of their judgments. (p. 114)

1.2.3.2 Philosophical

In philosophy, theories of judgment are found in analytical as well as continental philosophy, from Aristotle through Descartes, Locke, Hume, Kant, Frege, Husserl, Russel,

[26] Here are a few quotes:
"[...] note that evaluative judgments are generally made to aid choice (Einhorn & Hogarth, 1978). Therefore, although judgment is not synonymous with choice, under certain conditions choice will be based closely on evaluative judgment" (Einhorn et al., 1979, p. 479);
"Is judgment synonymous with choice? The normative model treats them as equivalent in that alternative x will be chosen over y if and only if u(x) > u(y); i.e evaluation is necessary and sufficient for choice. However, from a psychological viewpoint, it may be more accurate to say that while judgment is generally an aid to choice, it is neither necessary nor sufficient for choice. That is, judgments serve to reduce the uncertainty and conflict in choice by processes of deliberative reasoning and evaluation of evidence." (Einhorn & Hogarth, 1981, p. 73);
"The research reviewed so far supports the conclusion by Einhorn and Hogarth (1981) that the kinds of evaluation processes associated with judgment are often related to choice behavior but that judgment and choice are not equivalent tasks. The nature of this task difference needs further explication." (Payne, 1982, p. 389);
"Multi-attribute evaluations are usually classified as either choosing or judging (Einhorn et al., 1979). Judging involves the evaluation of each single alternative, choosing the selection (or rejection) of one or more alternatives. Of course, in principle a choice must be preceded by a judgement, but it will appear that there are evaluation processes leading to a choice without all alternatives being judged. For that reason, we explicitly define judging as an evaluation of all alternatives and choice as an evaluation of at least one alternative, leading to the selection or rejection of at least one alternative." (Westenberg & Koele, 1994, p. 66 f.).

[27] There is a large and famous literature on so-called response mode effects (not always under this name) along with effects of stimulus context, environment, and framing (cf. e.g. Mellers et al., 1998, p. 455), empirically demonstrating the violation of procedural and descriptive invariance assumed by normative models. These effects are not central to my research and will not be further elaborated. But cf. e.g. the 1992 *Annual Review of Psychology* article by Payne, Bettman, and Johnson (1992) as a still important review.

Wittgenstein, and many more. However, in the late 20th century "the topic fell out of favour, with belief becoming the primary target of investigation" (Ball, 2019, p. 1).[28]

With the goal of arriving at a short contemporary philosophical inquiry into judgment, an excursus on belief and desire as propositional attitudes will be helpful.

A Excursus: Propositional Attitudes In philosophy, a standard (but not entirely uncontested) view is that a *proposition* is a sharable content expressed by a that-clause, e.g. "that snow is white" (cf. e.g. McGrath & Frank, 2020).[29] A propositional *attitude*[30] is the stance that an agent takes toward a proposition, thereby making the proposition its object. Belief and desire (plus some propositional content) are paradigm cases of propositional attitudes (e.g. Lindeman, 2023; Oppy, 2016; Schwitzgebel, 2021); for example, the belief that there is a beer in the fridge ("Steve believes that there is a beer in the fridge") and the desire to drink a beer ("Steve wants to drink a beer").[31] [32] Examples of further propositional attitude verbs – some more, some less controversial – are: hope, expect, fear, intend, know, judge, perceive, wish, love, suspect (cf. e.g. Duignan, 2009; Lindeman, 2023; Rey, 2023).

Belief and desire (among other mental phenomena) are *mental states*, and propositional attitudes are a special kind of mental state, namely *intentional* mental states, which here simply means that they are directed at something (cf. e.g. Lindeman, 2023, §1.a) – namely the propositional content they refer to (e.g.: the belief *that snow is white*).[33] Thereby, belief and desire not only are paradigm cases of propositional attitudes, but "the rest of the propositional attitudes are thought to divide into two broad camps: the belief-like and the desire-like, or the *cognitive* ones and the *conative* ones" (Lindeman, 2023, §1.a, original italics). These two types of propositional attitudes are distinguished by the direction of their intentionality, termed their *direction of fit*.[34] The

[28] This shift of interest is still very noticeable: For example, none of the big philosophical encyclopedias (*The Stanford Encyclopedia of Philosophy*, *The Internet Encyclopedia of Philosophy*, *The Routledge Encyclopedia of Philosophy Online*) entails an entry on "Judgment", but all of them entail an entry on "Belief". A quick search on Google Scholar returned 552.000 hits for "belief" and 228.000 for "judgment" (search string refined based on "judgment" and used the same on "belief": [philosophy theory "judgment" -clinical -Kant -moral -psychology -aggregation], date of search: Aug. 6, 2023).

[29] Furthermore, a proposition may be true or false (it is the "primary bearer[] of truth-value", McGrath & Frank, 2020, §0), but this important attribute is not of importance here.

[30] Please note that "attitude" here is neither entirely different nor entirely the same as the concept/construct used in (social) psychology, where important characteristics of attitudes are their relative stability and their tripartite structure including affect, behavior, and cognition, as well as commonly a focus on evaluation (cf. e.g. Rokeach, 1968, for a historical as well as definitional summary of the construct). These characteristics are not part of the philosophical concept discussed here.

[31] Sentences like "A wants to ϕ" are easily reformulated and mean the same as "A desires that A ϕ"; in this case: "Steve desires that he himself drink a beer", cf. Rey (2023).

[32] Sentences revealing propositional attitudes (like the above examples in quotation marks) are called propositional attitude *reports* (cf. e.g. Lindeman, 2023; Nelson, 2023).

[33] The word "intentional" may have several layers: in the simple meaning used here, that which is intentional is object-directed. A fuller meaning of "intentional" – which also corresponds more with our everyday understanding of the word – includes the notion that which is intentional is *agential* or *volitional*, cf. e.g. Ball (2019), p. 6.

[34] The distinction was established by Anscombe (1957) with the exact term in different context first used by Austin (1952), as e.g. noted by Humberstone (1992).

direction of fit of belief is "world-to-mind" and that of desire is "mind-to-world": our beliefs must conform to the world to be true (truth condition) and the world must conform to our desires for them to be satisfied (satisfaction condition; cf. e.g. Lindeman, 2023):

> "Beliefs aim at the true, and their being true is their fitting the world; falsity is a decisive failing in a belief, and false beliefs should be discarded; beliefs should be changed to fit with the world, not vice versa. Desires aim at realization, and their realization is the world fitting with them; the fact that the indicative content of a desire is not realised in the world is not yet a failing in the desire, and not yet any reason to discard the desire; the world, crudely, should be changed to fit with our desires, not vice versa. (Platts, 1997, p. 256-257)"

Now, is judgment a propositional attitude, a mental state akin or even identical to belief – or is it something else? Oftentimes, the term *judgment* is implicitly or explicitly offered as an alternative to *belief* (cf. e.g. Bird, 2007; Hazlett, 2019; Papineau, 1999; Schwitzgebel, 2021), showing that there are many contexts where the similarity rather than the difference counts. Let's call this *the simple view*. A prominent alternative to the simple view is understanding judging as a mental act (cf. e.g. Ball, 2019; Geach, 1957; Shah & Velleman, 2005; Shoemaker, 2009).[35]

Lindeman (2023) contrasts both views:

> Judging [...] might be better construed [i.e.: better than as a propositional attitude] as an action or act (and so an event),[36] rather than a state. Accordingly, some theorists distinguish between propositional attitudes and acts, where acts include not only judging, but also saying, asserting, entertaining, and hypothesizing. However, most theorists, it should be noted, do not draw this distinction. In fact, some identify occurrent beliefs[37] and judgments [...]. (§5.b)

Hanna (2022), too, distinguishes two classes of judgment theories and terms them *cognitive* versus *practical*. He characterizes the first as "object-representing, thought-expressing, truth-apt" and the second as "act-representing, choice-expressing, evaluation-apt" (§0).[38]

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[35] The question whether judgment, if an act/action, is an *intentional* action will not be discussed here. A contemporary defendant of judgment being an intentional action is Sosa (2015). The mainstream understanding, however, seems to be that judgment, if an act, is not intentional (cf. e.g. Ball, 2019).

Mind the ambiguity in the term "intentional" as spelled out in footnote 33: Judgment may be intentional upon the simple meaning of being object-directed qua being an intentional mental state; judgment may be non-intentional upon the full meaning of being agential/volitional qua not being an intentional action.

[36] Cf. e.g. Lehmann (2021) for a short overview on the differences between propositions and events/states-of-affairs from a linguistic perspective.

[37] For the difference between occurrent and dispositional belief cf. e.g. Schwitzgebel, 2010, 2021.

[38] Cf. also Fassio (2023) who contrasts the idea that "(flat-out) assertion is the verbal counterpart of a judgment, and a judgment is a form of occurrent (outright) belief" (§3) with the idea that "judgment, like an assertion, can be considered an act involving a commitment to the truth of what is adjudged" (§1.c). Cf. furthermore Bird (2007) who summarizes: "On one view belief relates to action while judgment is closer to assertion. On another judgments are themselves actions, typically subject to the will, while sometimes believing seems to be something that simply happens to us. Related to both of these is the thought that judgment is a matter of intellectual assent to a proposition while

Yet, there is a third view where judgment is understood as an *ability* (cf. e.g. Brown, 1988; Siegel, 2004). The construal of judgment as an ability or capacity is prominent in theories of *moral* judgment (cf. e.g. Cullity, 2016).[39] [40] [41]

A compelling forth view is put forward by Moltmann (2013) who distinguishes between *actions* and *products*, where for all propositional attitudes the gerund (e.g. judging) is an action, whereas the nominalization (e.g. judgment) is the product:

> Attitudinal objects, entities like judgments, beliefs, and claims, are not states or actions, but rather their (spatio-temporally coincident) products [...] (p. 679)
> The distinction between actions and products comprises not just the familiar distinction between an action and its enduring physical product, such as an act of writing and the writing (the written work), an act of drawing and the drawing, and act of folding and the fold. It also comprises a less familiar distinction between a mental action or state and its nonenduring mental product, such as a state of believing and a belief, and an act of claiming and a claim, an act of thinking and a thought, an act of judging and a judgment, a state of desiring and a desire, an act of deciding and a decision, and an act of instructing and an instruction. (p. 685)

In sum, these are the four views: (i) judgment is a mental state (like belief), (ii) judgment is a mental act/ion (like supposition),[42] (iii) judgment is an ability/capacity, (iv) judgment is the product of the act of judging.

According to Ball (2019), "the standard view nowadays is that propositions are the objects [...] of belief and judgment" (p. 10); furthermore he identifies as standard an "act-object analysis" (p. 9) of judgment where "judgment, like other intentional acts and attitudes, consists in a relation between a subject and an object" (p. 7). In the sentence "A judges that p", upon this semantic analysis, A is the subject/the judge, "'judges' denotes the mental act of judging" (p. 7), and p is the object: a proposition.

Philosophically, we will leave it at that.[43]

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belief carries with it degrees of conviction that are more visceral and which may conflict with the intellectual assent of judgment." (p. 97); later on he stresses this latter point: "we are happy with degrees of belief but not degrees of judgment" (p. 101).

[39] This third view might be assimilated to the two-fold view, (i) if the two-fold view (as e.g. characterized by Hanna, 2022, above) is understood not only to point to two possible conceptualizations of judgment in general, but rather understood to delineate a distinction between two types of judgment, namely theoretical versus practical judgment (which is how Ball, 2019, p. 3, understands it), and (ii) if judgment-as-capacity is subsumed under practical judgment.

[40] According to Ball's (2019, p. 6) interpretation, theoretical and practical judgment become somewhat intertwined in Sosa's (2015) account. Similarly, in the pragmatism of Dewey (1916), judgments of valuation are *not* of a different kind to theoretical judgments: "valuation [...] [is] simply a mode of judgment like any other form of judgment, differing in that its subject-matter happens to be a good or a bad instead of a horse or planet or curve" (XIV.I, p. 355). Cf. e.g. Caspary (1990) for an introduction to Dewey's take on value judgments.

[41] The literature on *moral* judgment cannot be further explored here.

[42] Cf. e.g. O'Brien (2009) for categorizing supposition as a prototypical mental act.

[43] Of course, there are so many more accounts, analyses, and debated details, historically as well as contemporary, which are out of reach of this work. – Besides Sosa (2015) and Ball and Schuringa (2019) another noteworthy contemporary treatment of judgment is to be found in Martin (2006). Cf. e.g. Boyle (2009) for the relationship between judgment and belief, arguing that judgment presup-

1.2.3.3 Summarizing

In both psychological as well as philosophical theorizing the concept *judgment* seems difficult to grasp. From a psychological perspective, the inferential character of judgment is its most important aspect, its goal being the truth (which is where most philosophers would agree). Furthermore, in decision sciences, judgment needs to be distinguished from both preference and choice. The former delimitation latches onto a distinction between inductive judgments (inferential) and value judgments (preferential), which may be identical to the distinction between theoretical and practical judgment in philosophy. The latter delimitation between judgment and choice in decision sciences research may most easily be drawn by attaching the terms judgment vs. choice to different response modes classically employed in respective empirical studies.

Philosophically I will settle on the (rather mainstream) view that judging is a mental act which produces a belief. As with belief, I think that (direct) judgment is not under our voluntary control.[44]

The following rather uncontested central characteristics of judgment as listed by Martin (2006) in the introduction to his *Theories of Judgment* may serve as a further summary from the perspective of philosophy:

- When we judge we somehow reach a conclusion in response to evidence. (p. 2)
- [J]udging need not involve any *experienced* duration, nor does it require that I explicitly or deliberately review evidence in order to be responsive to it. (p. 2)
- Judgment occupies a place in both theory and practice. The formation of judgments is involved both in deciding what to believe, and in deciding what to do. (p. 2) [45] [46]

1.2.4 Choice

1.2.4.1 Psychological

Several points concerning choice have already been made in the section on *Judgment* (section 1.2.3 on page 14), where choice was distinguished from both preference and judgment, as well as in the section on *Decision Making* (section 1.2.1 on page 9).

Here is a summary of what was said so far about choice:

- choice is an essential element of decision making (cf. e.g. Fischhoff & Broomell, 2020; Pfister et al., 2017);
- "choosing [involves] the selection (or rejection) of one or more alternatives" (Westenberg & Koele, 1994, p. 66 f.);

poses belief, which is contrary to the more common view that judgment is the act of belief formation (e.g. Shah & Velleman, 2005).

[44] For an introduction to the debate cf. the literature given in footnote 7 on page 10.

[45] Martin (2006) makes one forth point, which I left out as not central to the present inquiry. The point is: "[...] the claim to authority is a central part of what is involved in passing judgment" (p. 2).

[46] The use of the term *decision* in Martin's (2006) explications invites the question how judgment is to be distinguished from decision. I will briefly refer to this point in section 1.2.6 on page 28.

– choice in economics is identified with preference upon the concept of *revealed preference* (cf. e.g. Hansson & Grüne-Yanoff, 2022; Weber & Johnson, 2009);
– choice is generally aided by judgment, which may precede it (cf. e.g. Einhorn & Hogarth, 1981; Einhorn et al., 1979; Westenberg & Koele, 1994);
– choice refers to a different response mode than judgment (cf. e.g. Billings & Scherer, 1988; Payne, 1982).

Choice, indeed, may be the least illusive of the concepts discussed here. According to the *Oxford English Dictionary* choice is "the act of choosing; preferential determination between things proposed; selection, election". That is: here, too, an intimate relationship to preference is recorded.

While I think that choice is accurately and sufficiently defined as the act of selecting one out of at least two competing options, thereby concluding a decision making process, I still want to have a look at two contexts in which the term is classically used in decision making and behavioral economics literature.

A Excursus I: Preferential Choice vs. Probabilistic Inference These two designations delimit two research traditions, may come with different response modes, different task environments, and have a differing relation to judgment (types?), accuracy/truth, and satisfaction. Cf. Table 1.1 for a comparison on these and further aspects, as well as according literature.

Table 1.1 Preferential Choice vs. Probabilistic Inference

Aspect	Preferential Choice	Probabilistic Inference	Literature
Synonyms	preference, value-based decision making	(inductive) inference, judgment	Pachur & Bröder, 2013; Busemeyer, Gluth, Rieskamp, & Turner, 2019
Research Tradition	cost-benefit frameworks (e.g. the adaptive decision maker: Payne)	ecological approaches (the fast-and-frugal-heuristics framework: Gigerenzer)	Pachur & Bröder, 2013; Marewski & Link, 2014
Task Environment	gambling/ lotteries, consumer decisions	e.g. success in sales of different brands, city-size task	Marewski & Link, 2014; Glöckner & Betsch, 2008
Response Mode	"A choice response [...] requires only that one alternative be selected and the rest rejected." (p.2)	"Judgment requires an explicit evaluation of each alternative, typically using a continuous or multilevel scale." (p.2)	Billings & Scherer, 1988
Relation to Judgment	preference identical to "value judgment"; "under certain conditions choice will be based closely on evaluative judgment" (p.479);	identical to "inferential judgment"	Messerli & Reuter, 2023; Pachur & Bröder, 2013; Einhorn et al., 1979
Relation to Accuracy/Truth, Satisfaction	"involve value judgments and are therefore subjective" (p.54); aims at satisfaction (like desire)	"typically have objectively verifiable answers" (p.54); aims at accuracy/truth	Weber & Johnson, 2009; Marewski & Link, 2014; Lindeman, 2023; Fassio, 2023
Commitment	involves commitment	does not involve commitment	Ganzach, 1995; Einhorn & Hogarth, 1981
Philosophically	choice is an act; preference is "a kind of judgment" (§1); practical judgment	judgment is an act with a proposition as its object; theoretical judgment	Ball, 2019; Steele & Stefánsson, 2020; Hanna; 2022

The conceptualization, proposed inter-relationship and use of the terms "choice", "preference", "value judgment",[47] "inference", "judgment", and "decision" differs gravely within the large and diverse decision making literature, and rarely do authors take

[47] Close synonyms of "value judgment" seem to be: value-based judgment, evaluative judgment, evaluation, valuation, and practical judgment.

the time to really think through the conceptual consequences of their use of these and related terms.[48] [49]

Therefore, even if choice in itself may be relatively uncontroversial conceptually, its relation to preference and value judgment complicates the matter.

B Excursus II: Rational Choice *Rational Choice (Theory)* is a superset that includes several more specific theories:

> There is social and public choice theory, Gary Becker's "economic" approach to human behavior, and praxeology in the Austrian tradition, as well as cardinal and ordinal utility theory in microeconomics. There is revealed preference theory [...], game theory, expected utility theory [...], and subjective expected utility theory [...], among others. Those variants exist in contemporary economics (e.g., Mas-Colell 1995; Varian 2010) and 'rational choice theory' has been used as an umbrella term for all of them. (Herfeld, 2020, p. 330)

[48] The conceptual issues surrounding "judgment" have already been treated in the section on *Judgment* (section 1.2.3 on page 14). An exemplary attempt at clarification has been made in footnote 22 on page 15 regarding the relationship of inferential judgment, value judgment, and preference in Pachur and Bröder (2013). Cf. also footnote 24 on page 15 for an explication of the mentalist account of preference.

[49] Often enough the word "process" is added, leading to even more confusion: choice process (e.g. Payne, Bettman, Coupey, & Johnson, 1992; Shoval, Karsh, & Eitam, 2022), judgment process (e.g. Billings & Scherer, 1988; Westenberg & Koele, 1994), decision (making) process (e.g. Busemeyer, Gluth, Rieskamp, & Turner, 2019; Fischhoff & Broomell, 2020).

For example: let choice be the act of selecting an option, thereby concluding a decision problem (cf. e.g. Pfister et al., 2017, p. 4). Surely there are mental processes leading up to this choice, and it seems *prima facie* reasonable to term the process leading up to a choice "choice process". But it seems also reasonable to flesh out specific aspects of this process, e.g. with the view that judgment and preference/evaluation lead to choice (cf. Fischhoff & Broomell, 2020, p. 333, p. 337; Pfister et al., 2017, p. 3). This would make judgment and preference part of the "choice process". But what does "judgment process" then refer to? On this view, it would have to refer to some sub-process, namely the sub-process leading to judgment which in turn is part of the process leading to choice. And what about "decision (making) process"? I proposed to have "decision making" refer to the whole thing, namely the process from recognition of a decision situation (alpha) to choice (omega), thereby making the word "process" obsolete (just as the word "decision"). Putting this together would make "decision making" and "choice process" synonyms. But what about decision making that does not result in a choice, but in an inferential judgment? In that case, "judgment process" would be synonymous to "decision making". Taken together, there is then "judgment process^b" in case of inference referring to the whole thing from recognition to result, and "judgment process^a" in case of valuation referring to a sub-process of the process leading to choice. While complicated, this setup would still be consistent. Yet I doubt that this is a standard understanding. I rather tend to believe that all terms combined with the word "process" are generally taken to be the same; that is: decision (making) process = judgment process = choice process. Does this – by means of cancellation – mean: decision (making) = judgment = choice? Some have held this view, and cf. the criticism by Billings & Scherer, 1988, p. 2, and Maule, 2001, p. 93.

In sum, the decision making universe is conceptually overpopulated, but underdefined.

As an umbrella term it entails both theories for individual decision making as well as theories for interactional, collective, or public decision making. The term is most used in economics and much less so in psychology. [50] [51]

1.2.4.2 Philosophical

Regarding individual choice, one philosophical task is to distinguish *rational* choice from *moral* choice.[52] Another task is to clarify its relation to preference.[53] An especially vibrant topic is the analysis of so-called *hard choices*/comparisons, defined as choices where the three traditional value relations – 'better than', 'worse than', and 'equal to' – fail, maybe due to "parity" (R. Chang, 2002), incomparability, or incommensurability:[54] How in these cases is a rationally justified choice still possible? Furthermore, choice, of course, figures in debates on free will/determinism, in/compatibilism, causes vs. reasons in action theory, as well as control and responsibility (cf. e.g. Clarke, Capes, & Swenson, 2021 for an overview).

The mainstream view is that choices are actions (cf. e.g. Hansson & Grüne-Yanoff, 2022).[55]

1.2.4.3 Summarizing

Choice – when ignoring its relation to preference and judgment – is the least controversial term in both psychology and philosophy: Choice is the act(tion) of selecting one of at least two options.

1.2.5 Decision Strategy

1.2.5.1 Psychological

Based on Payne, Bettman, Coupey, and Johnson (1992), Riedl, Brandstätter, and Roithmayr (2008) define a decision strategy "as a sequence of operations used to transform

[50] In a loose sense, the philosophical counterpart to rational choice is *practical reason(ing)*.

[51] It was noted earlier that authors from (psychological) decision sciences lamented a lack of conceptual clarity regarding basic concepts. Interestingly, according to Herfeld (2020) the same is the case in social sciences and economics regarding rational choice theory: "RCT [i.e.: rational choice theory] comes in nearly as many versions and denotes as many theoretical concepts as there are philosophers and social scientists talking about it. [...] [I]ndeed, scholars disagree about the nature and epistemic role of RCT, its major conceptual ingredients, and its methodological status." (p. 330); "[C]onfusion also exists with respect to RCT's core concepts such as rationality, utility, and preferences and how they are to be interpreted." (p. 336).

[52] Cf. e.g. Briggs (2019): "The expected-utility-maximizing version of consequentialism is not strictly speaking a theory of *rational* choice. It is a theory of moral choice, but whether rationality requires us to do what is morally best is up for debate." (§4.2, original italics).

[53] Cf. e.g. Hansson and Grüne-Yanoff (2022), §5.3.

[54] Cf. e.g. Andreou (2015); Boot (2009); R. Chang (2005, 2012); J. Gert (2004); Herlitz (2019); Levi (1986); Raz (1986); Reuter and Messerli (2017); Santos (2020); van Hees, Jitendranath, and Luttens (2021).

[55] Harper, Randall, and Sharrock (2016) and Hausman (2012) may serve as contemporary reads on choice.

an initial stage of knowledge into a final goal state of knowledge in which the decision maker feels that the decision problem is solved" (p. 797).[56] Pfister et al. (2017) note that there is no consistent usage of or distinction between the terms "strategy", "rule" and "heuristic" over authors and research traditions (p. 237).[57] Furthermore, there are two *levels* at which a strategy/rule might operate: Does it refer to the way by which the decision maker arrives at *a choice of an option* – or the way by which the decision maker arrives at *a choice of a way* of arriving at a choice of an option?[58] In what follows, the term "strategy" will be used for both cases.[59]

Several decision strategies have been distinguished. Both Pfister et al. (2017, p. 241) and Hastie and Dawes (2010, p. 219 f.) name four major dimensions on which (different) decision strategies can be characterized (three of which are identical):[60] (1) compensatory (= across-attribute trade-offs) vs. non-compensatory, (2) amount of information processed: exhaustive vs. partial, (3) information search and integration: alternative-based (= summary evaluation per option) vs. attribute-based, (4a) quantitative (e.g. addition and multiplication) vs. qualitative evaluations (e.g. cut-off according to *satisficing* à la Simon, 1956) / (4b) amount of cognitive effort.

[56] Cf. also this classic definition by Beach and Mitchell (1978, p. 439): "A decision strategy consists of (1) the set of procedures that the decision maker engages in when attempting to select among alternative courses of action and (2) a decision rule that dictates how the results of the engaged in procedures will be used to make the actual decision.".

[57] The same holds for some of the strategies/rules themselves, as can be seen in Table 1.2 on the following page.

[58] To avoid this confusion of level of reference, Pfister et al. (2017) reserve the term "strategy" for the latter and use the term "rule" for the first. That is, according to them, a decision strategy leads to a choice between rules, whereas a decision rule leads to a choice between options. NB: I will not follow this terminology, but rather I will employ the term "strategy" at both levels. This will not be too confusing, because I will not be much concerned with strategies of strategy selection, but rather I will be concerned with strategies of option selection.

[59] Also note that due to the (in part) synonymous use of "decision" and "choice" over time, authors, and traditions, e.g. Hastie and Dawes (2010) have no entry for "decision strategy" or "decision rule", but rather speak of "choice strategies" and "choice rules" (p. 218). Furthermore they seem to use "strategy" and "rule" interchangeably, as well as they contend that "*choice strategies* [...] are analogous to [...] judgment heuristics" (p. 218, original italics).

[60] Riedl et al. (2008, p. 797) name nine dimensions.

Table 1.2 Decision Strategies in Decision Sciences

Pfister, Jungermann, & Fischer, 2017, p.105 *14 strategies*	**Riedl, Brandstätter, & Roithmayr, 2008, p.797-798** *13 strategies*	**Hastie & Dawes, 2010, p.221-223** *8 strategies*	**Major Strategies According to Three Early Papers**
--	recognition heuristic (REC)	recognition	
additive difference (ADD)	additive difference strategy (ADD)	additive difference	3 votes (Dhar, 1996; Todd & Benbasat, 1991; Westenberg & Koele, 1994)
conjunction (CON)	--	--	3 votes (Dhar, 1996; Todd & Benbasat, 1991; Westenberg & Koele, 1994)
criterion dependent choice (CDC)	majority of confirming dimensions strategy (MCD)	--	
disjunction (DIS)	disjunctive strategy (DIS)	disjunctive	1 vote (Westenberg & Koele, 1994)
dominance (DOM)	dominance strategy (DOM)	dominance	
elimination by aspects (EBA)	elimination-by-aspects strategy (EBA)	elimination by aspects	2 votes (Todd & Benbasat, 1991; Westenberg & Koele, 1994)
equal weights (EQW)	equal weights strategy (EQW)	--	
least important minimum (LIM)	least important minimum heuristic (LIM)	--	
least variance (LVA)	least variance heuristic (LVA)	--	
lexicographic order (LEX)	lexicographic strategy (LEX)	lexicographic	2 votes (Dhar, 1996; Westenberg & Koele, 1994)
majority (MAJ)	majority strategy (MAJ)	--	
multi-attribute decision field theory (MDFT)	--	--	
multi-attribute utility (MAU)	multi-attribute utility model (MAU)	additive linear	3 votes (Dhar, 1996; Todd & Benbasat, 1991; Westenberg & Koele, 1994)
satisficing (SAT)	satisficing heuristic (SAT)	"satisficing" (conjunctive)	

Note. Column-wise, for three publications the table is sorted according to number of strategies (descending). The forth and last column points to the most important and most researched strategies as of the 1990s. Row-wise, the table is sorted alphabetically according to the first column. All names and abbreviations of strategies are exact quotes from the three publications.

Table 1.2 presents an overview of classic strategies from decision sciences. Note that while these are classic strategies from decision making research in economics and (social) psychology still prevalent today, there is another and a little younger research tradition domiciled in cognitive psychology, cognitive science and neuroscience. Apart from being purely descriptive and having no potential or ambition for normative or prescriptive claims, cognitive micro-theories[61] play on another *level of explanation* (Dennett, 1969). The processes they describe and the way they describe them might be rather located on a *sub-personal* than on a *personal* level of explanation and description.[62] Rooted

[61] Pfister et al. (2017, p. 363) use this term.

[62] The distinction between a personal and a sub-personal level of explanation (due to Dennett, 1969; for a short introduction cf. e.g. Elton, 2000b) has been criticized for being referenced extensively, but imprecisely (e.g. Drayson, 2012, 2014; Elton, 2000a; Hornsby, 2000). I base my understanding here on the following description by Frankish (2009): "Personal-level states and events are ones that are properly attributed to a person or creature as a whole, rather than to some organ or subsystem. [...] Now, we can make a personal-subpersonal distinction in the mental realm. Everyday 'folk-psychological' mental concepts are typically personal-level ones: it is people who have thoughts, feelings, and desires, and who recall events, work things out, and make decisions. [...] Not all mental states and events are personal ones, however. Modern cognitive psychology posits a vast array of subpersonal mental states and processes, which are invoked to explain personal-level phenomena. [...] In the case of mental *processes* at least, the distinction between personal and subpersonal corresponds roughly with that between conscious and nonconscious. We are typically conscious of our personal mental processes, but not of our subpersonal ones." (p. 2-3, original italics). Accordingly, cognitive-psychological models of decision strategies relying heavily on basic processes such as per-

in that tradition, e.g. Pachur and Bröder (2013) list *evidence accumulation*, *exemplar processing*, and *parallel constraint satisfaction* as major models of strategies.[63] Since this research is concerned purely with a personal level of description and evaluation, cognitive process theories on a sub-personal level will further be of no concern.[64]

Another strand of research and literature which will be of no concern for present purposes is the question which factors influence strategy selection.[65]

An aspect however very relevant to the present research is the question whether a decision strategy is deliberate. This touches on previous considerations: the amount of cognitive effort involved and the personal/sub-personal or conscious/unconscious distinction. The latter aspects posit a dichotomy, whereas the amount of cognitive effort is a continuous variable. Another, and the most prevalent dichotomy in this respect is the distinction between so-called *System 1* and *System 2*, where the former represents "intuition" (fast, parallel, automatic, effortless, associative, slow-learning, emotional) and the latter represents "reasoning" (slow, serial, controlled, effortful, rule-governed, flexible, neutral), cf. Kahneman (2003, p. 698), also Kahneman (2011).[66] Just as the talk of two systems is a metaphor, the implied dichotomy is a huge simplification, too: each system has several dimensions (e.g. as listed above) and each of these dimensions

---

ception, attention, or some sophisticated internal steps of accumulation and calculation that remain unconscious and undescribable from a first person view, surely are descriptions and explanations on a sub-personal level. Cf. the humorous article of Gazzaniga (2010) regarding the question which is *[T]he correct level of explanation for understanding mind*, as well as e.g. Potochnik (2010) and Rolls (2021) for integrative views. The distinction between cognitive-level and neural-level explanations is thoroughly discussed e.g. in Coltheart (2012).

[63] In total, Pachur and Bröder (2013, p. 670) list seven models, the above three and further: *recognition heuristic*, *take-the-best*, *tallying*, and *weighted additive*. These latter four are not on the same level of explanation and generality as the former three. Also, in spite of being termed differently, these strategies are very similar to, an instantiation of, or even identical to strategies from Table 1.2 on the preceding page: take-the-best is a lexicographic strategy (i.e.: $TTB \subseteq LEX$), tallying is similar to equal weights (i.e.: $tallying \approx EQW$), and weighted-additive is identical to multi-attribute utility (i.e.: $WADD = MAU$). The terms and abbreviations as used here stem from the *adaptive decision maker* research program by Payne and colleagues (e.g. Payne, Bettman, & Johnson, 1993) and the *fast and frugal heuristics* research program by Gigerenzer and colleagues (e.g. Gigerenzer & Selten, 2002; Gigerenzer, Todd, & ABC Research Group, 1999).

[64] The ultimate test for this distinction for me is the question: Could a person be instructed and trained to employ a specific strategy – could the strategy's procedure be executed under conscious control? Yes for the strategies in Table 1.2 on the previous page (apart from multi-attribute decision field theory which belongs with the cognitive-psychological theories), no for the further three models named by Pachur and Bröder (2013) above (maybe apart from exemplar processing).

[65] Important theories are those of Beach and Mitchell (1978) and Payne et al. (1993). Important determinants are, of course, characteristics of the decision problem and environment, as well as characteristics of the decision maker – which is stressed by Beach and colleagues. Furthermore, (personal level) decision strategies vary in terms of accuracy realized and effort needed, with these two dimensions having a positive linear relationship such that an accuracy-effort trade-off must be made – a point stressed by Payne and colleagues. An assumption shared by both teams of researchers is that people strive to minimize costs (here: cognitive effort) and maximize utility (here: accuracy/quality). For an overview, cf. e.g. Jungermann et al. (2005, chap. 7.3) or Marewski and Link (2014).

[66] For an overview of dual-processing accounts within both cognitive and social psychology, cf. Evans (2008).

is in fact continuous, that is: "[C]ognitive and affective processes can be arranged on a continuum from automatic-unconscious to controlled-conscious" (Pfister et al., 2017, p. 345). What then is a deliberate decision strategy? For present purposes it will suffice to stick with the dichotomous view as described here:

> In somewhat simplified terms, System 2 stands for our conscious, awake state, in which we think about the world and make conscious "free" decisions; System 2 represents the reflective, self-aware "I". System 1 stands for all those processes that we normally do not perceive or of which we are at most aware of the result [...], but we cannot perceive or say anything about the process that led to it. (Pfister et al., 2017, p. 346)

Accordingly, a deliberate decision strategy is one where I am self-aware of the steps that lead to my choice. For example, if I make a pros and cons list and decide accordingly, this will count as a deliberate decision strategy.[67]

1.2.5.2 Philosophical

"Decision strategy" is not a term common to philosophical inquiry, and philosophers are not much concerned with decision strategies/rules as listed in Table 1.2 on page 25. A term used instead in moral theory and practical reasoning is "decision procedure" – implying a wider scope and less specificity. In moral theory it has become important to distinguish between the decision *criterion* and the decision *procedure* as provided by a theory in normative ethics. For example, in the case of consequentialism/utilitarianism the maximization of overall utility is the decision *criterion* that makes an action right. But is the maximization of overall utility also to be the action-guiding decision *procedure* that the agent should adhere to in order to do the right thing? In spite of the initial attractiveness of identifying the two – criterion and procedure – most utilitarians would not agree (cf. e.g. Hooker, 2023, §4), as, indeed, neither did the forefathers of utilitarianism, Bentham, Mill, and Sidgwick (cf. Sinnott-Armstrong, 2022, §4).

In sum, if philosophers are interested in decision procedures, this interest plays within normative ethics, as J. Driver (2005, p. 31) points out:

[67] Of course, every conscious, self-aware mental state or process will entail underlying unconscious, automatic processes down to neural activity in the brain. Just as every voluntary bodily movement – such as lifting my arm to scratch my nose – involves automatic contractions of an array of muscles that I do not control consciously. That is, although nowadays we commonly understand the functioning of our bodies and the animate environment in a materialistic/physicalist/naturalistic way, where a *reduction* to the lowest level of explanation – neurons, molecules, atoms,... – is deemed principally possible, our understanding of what we do, think, and decide *must* play – and does play – on another level, namely on a level accessible to self-awareness and consciousness.

The understanding I allude to here may be categorized as belonging with so-called *non-reductive physicalism*. Cf. e.g. Van Gulick (2022): "[O]ne can believe that all economic facts are physically realized without thinking that the resources of the physical sciences provide all the cognitive and conceptual tools we need for doing economics [...]." (§8.2); "[U]nderstanding the natural world requires us to use a diversity of conceptual and representational systems that may not be strictly intertranslatable or capable of being put into the tight correspondence required by the older deductive paradigm of interlevel relations [...]." (§5.3).

> 'Normative ethics' is an enormous field. It is concerned with the articulation and the justification of the fundamental principles that govern the issues of how we should live and what we morally ought to do. Its most general concerns are providing an account of moral evaluation and, possibly, articulating a decision procedure to guide moral action. Though both these aims rely on articulating the correct set of moral principles that govern evaluation and that can also be used in articulating a decision procedure or rule, they are not coextensive. Recent critical work, especially on the part of particularists and virtue ethicists, has generated more pressure to clearly separate the two. (J. Driver, 2005, p. 31)

More generally, philosophical inquiry concerning practical reasoning, agency, and rationality does, of course, relate to normative theories of rational choice and descriptive decision theory, especially (subjective) expected utility theory[68] (cf., as an eclectic selection, e.g. Broome, 1991; R. Chang, 2016; Collins, 2015; Dreier, 1996; Hausman & McPherson, 2007; E. Jackson, 2021; F. Jackson, 1991; Kraus & Coleman, 1987; Lewis, 1974; McClennen, 2010; Pettit, 1995, 2010; Thoma, 2021), but the discussion is diverse and does not solely focus on the decision procedure (here: the maximization of utility by means of expectancy-value calculations) prescribed.

1.2.5.3 Summarizing

In sum, a decision strategy is a procedure following describable rules and processes that enables a decision maker to solve a decision problem. Several classic decision strategies have been distinguished and intensely researched. The approaches taken by economic/social psychological decision sciences versus cognitive psychology, cognitive science, and neuroscience can be distinguished by their level of explanation. Explanations focusing on a sub-personal level as well as factors of strategy selection will not be of further concern here. In spite of being a simplification, the distinction between System 1 and System 2 has been used to define deliberate decision strategies which is what this research will be about. In philosophy, the term decision strategy has no special place. Instead, within normative ethics decision processes as distinct from decision criteria are subject to investigation.

1.2.6 Corollary: Decision

As pointed to above (section 1.1.1 on page 9), in the present set-up, there is no unique place for the term "decision" – it is either co-extensional with "decision making" or with "choice". According to the Oxford English Dictionary, even an identification of the three terms *decision*, *judgment*, and *choice* is possible. A definition of "decision" is given there as follows:

> The action, fact, or process of arriving at a conclusion regarding a matter under consideration; the action or fact of making up one's mind as to an opinion, course of action, etc.; an instance of this.

[68] For "*subjective* expected utility" versus "expected utility" simpliciter cf. footnote 107 on page 40 from section 2.4.

> The result of this action or process; that which has been decided; a conclusion, a judgement, a resolution; a choice.

Contrary to Pfister et al. (2017) I will *not* treat "decision" as coextensional to "decision making" (i.e. the process), but rather conceive of it as a conclusion or resolution as above. I do not think that "decision" should be identified with "judgment" or "choice" in a scientific context, where it seems wise to set certain central terms as *termini technici*. Neither do I think that "decision" really is identified with "judgment" or "choice" in natural language. Consider the following expressions:

> He acted against his better judgment.
>
> He acted against his better decision.
>
> He acted against his better choice.

Here, clearly, "judgment" cannot be substituted with one of the other terms.

> I thought about it and I made a decision.
>
> I thought about it and I made a choice.
>
> I thought about it and I made a judgment.

Here, a substitution of "decision" is possible, but the two alternative sentences receive a notably different flavor.

In sum, I will treat decision, judgment, and choice as distinct. "Judgment" and "choice" both received an intensive treatment above. "Decision" will be used more flexibly.

1.3 Summary

In this chapter I analyzed the most important terms within decision research consulting both psychological as well as philosophical literature.

Let's compare the working definitions from section 1.1.1 on page 9 with the new, refined conceptual analyses:

Decision making	refers to the whole process from recognition to action, and involves a number of mental operations (many of them, in part or whole, unconscious or automatic).
A decision situation	always involves *decision consciousness*. This is a major difference to 'decision making' which may be entirely automatic/unconscious.
Judgment	has an inferential character. Judgment needs to be distinguished from preference: There are two kinds of judgment: inductive judgments (inferential) and value judgments (preferential), which parallels the distinction between theoretical and practical judgment

	in philosophy. Judgment furthermore needs to be distinguished from choice: in empirical research, 'judgment' and 'choice' should be taken to simply designate two different response modes. Philosophically, judging is a mental act which produces a belief.
Choice	is the act(tion) of selecting one of at least two options.
A Decision strategy	is a procedure following describable rules and processes that enables a decision maker to solve a decision problem. Several classic decision strategies have been distinguished and intensely researched. Decision strategies are looked at from a personal as well as a sub-personal level of explanation. The distinction between System 1 and System 2 can be used to delimit deliberate decision strategies. Decision strategy is not a common term in (practical) philosophy.

Furthermore, this chapter provided a comparison between characteristics of preferential choice versus probabilistic inference (cf. Table 1.1 on page 21), and a list of classic decision strategies under certainty (cf. Table 1.2 on page 25).

In sum, this chapter offered a conceptual introduction to decision sciences.

2 Decision Quality

Contents

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The present chapter *Decision Quality* (chap. 2) gets to the bottom of the classic understanding of decision quality. Thereby, utility theory will be explicated and utility maximization will be discussed. The chapter ends with a terminological summary of another set of indispensable terms: utility, preference, preference satisfaction, and utility maximization.

2.1 Introduction: What makes a decision a *good* decision?

Our common sense evaluations of (past) decisions may be biased by outcome. Remember the scenario from the beginning, where you were asked to decide whether you meet your old friends from overseas in Paris or stay at home to finish a project proposal

important to your career. Let's say you stayed at home and thus were able to add some important aspects to the proposal. Some time later your proposal gets accepted and you learn that it was these additional aspects you added that swayed the expert consultants. Will this result make you think you made the "right" decision? – Say you stayed at home and added those aspects, but your proposal got rejected anyway. Will you regret having stayed at home, maybe thinking 'with this result, I just as well could have traveled to Paris'?

It is commonly assumed that it is wrong to judge decision quality by outcome:

> I start from a very familiar elementary point. A good decision cannot guarantee a good outcome. All real decisions are made under uncertainty. A decision is therefore a bet, and evaluating it as good or not must depend on the stakes and the odds, not on the outcome. (Ward Edwards in Vlek, 1984, p. 7)

> Rational decision theories and theories of moral responsibility stipulate that people should be evaluated by their a priori contributions to a harmful event rather than by the a posteriori consequences of their actions. (Alicke et al., 1994, p. 303-304)[69]

> Information that is available only after a decision is made is irrelevant to the quality of the decision. (J. Baron & Hershey, 1988, p. 569)[70]

So what does legitimately determine decision quality? Three quotes from the classic textbook by Hastie and Dawes (2010) and one from Pfister et al. (2017) will set the stage:

> [I]t is the potential outcomes, their probabilities, and their value to the decision maker *at the time the decision is made* that lead us to judge a particular choice to be wise or foolish. [...] [G]ood decisions are those that choose means, available in the circumstances, to achieve the decision maker's goals. (Hastie & Dawes, 2010, p. 16, original italics)

> This logic for assessing the quality of judgments has been dubbed the *correspondence framework* for accuracy [...]. However, we also talk about irrationality or *incoherence* in judgments when it is not obvious that a correspondence test can be applied. [...] We evaluate the judgments with reference to their consistency with the laws of logic and probability theory, which we accept as a standard of rational reasoning. (Hastie & Dawes, 2010, p. 168, original italics)

> [I]t is [important] to specify exactly what an actor's goals are in a situation, [since] most rational analysis requires knowing what the actor is trying to "maximize" to define a rational standard for evaluation. (Hastie & Dawes, 2010, p. 169, original quotation marks)

[69] This quote noticeably references *moral* judgment, that is (here): the ascription of moral praise or moral blame regarding an agent's action.

[70] However, in this classic article J. Baron and Hershey (1988, p. 571) also point out conditions under which it is appropriate to use outcome information for the evaluation of decision quality.

> What is an accurate or good decision – especially in the case of uncertainty – can never be gauged from the real outcome, but only from the *process* of decision making. (Pfister et al., 2017, p. 246, my italics, www.DeepL.com trans.)

Accordingly, these are the topics the following sections will be concerned with:[71] [72] the criterion of correspondence/accuracy and coherence/consistency (section 2.2), the utility of true belief (section 2.3 on page 35), and the utility of utility maximization (section 2.4 on page 37). The chapter will include a summary of the main terms (section 2.4.3.1 on page 52) and end with a discussion of the parallelism between the quality criteria for inferential versus preferential choice (section 2.5 on page 53).

2.2 Correspondence/Accuracy vs. Coherence/Consistency

The criterion for the evaluation of decision quality is correspondence/accuracy *or* coherence/consistency.[73] This distinction is related to the distinction between inferential vs. preferential judgment[74] (or: probabilistic inference vs. preferential choice), as spelled out in section A on page 14 within 1.2.3.1 and Table 1.1 on page 21.

The quality criterion of accuracy can only be used in decision situations or tasks where there is a correct answer out in the world: accuracy is understood as *correspondence* to a fact, a true state of affairs.[75] Such correspondence to a fact in the world conceptually cannot happen in the case of preferential choice: "Decision science has no accuracy criterion for preferences. People can prefer whatever they want" (Fischhoff & Broomell, 2020, p. 336). But it may be the case in inference tasks and forecasting tasks,[76] where there is a "measurable criterion event or condition [...] that is the target of the judgment" (Hastie & Dawes, 2010, p. 168). Yet, not all inference tasks allow for the use of the correspondence criterion. As an example to that effect, Hastie and Dawes (2010) cite the so-called Linda Problem:[77] while the laws of probability theory dictate the correct

[71] After the previous chapter *Conceptual Clarifications* (chap. 1) made an effort to be super clear about basic terms such as decision, judgment, preference, and choice, the usage of these terms over the gathered quotations seems like a mumbo-jumbo. It is not practicable to comment every quote – now and later – with a "translation" into the usage proposed within *Conceptual Clarifications*. Therefore, it will be necessary to understand the points made by various authors *without* assuming that they use the same terminology, even if it may seem so.

[72] Just to be clear, in the following I will likewise loosen up my terminology.

[73] Authors seem to use "coherence" and "consistency" interchangeably (cf. e.g. David Over, 2004, p. 6). But cf. Hausman (2012, p. 129) for a contextualized comparison, pleading for the use of the term *coherence*. In the following I will use both terms and treat them as interchangeable.

[74] Cf. footnote 20 on page 14 for the term.

[75] I apologize to the occasional philosopher reading this and cringing at the thought of a correspondence theory of truth (cf. M. David, 2022 for an overview).

[76] "Inference tasks [...] are no different from forecasting tasks, with a natural measure of accuracy being a simple counter of how many of the forecasts made [...] are actually correct, and how many are not" (Marewski & Link, 2014, p. 10).

[77] A famous task employed to elicit the so-called *conjunction fallacy* as part of the Heuristics and Biases program by Tversky, Kahneman and colleagues: There is a description of Linda's personality and

answer here, there is no fact in the world that could correspond to that answer, Linda does not exist. Accordingly, the correspondence/accuracy criterion is strictly meant to refer to the world – and not meant to refer to the accurate application of e.g. probability theory.[78]

The quality criterion of coherence/consistency can be employed both in cases of inferential as well as preferential judgment. What is meant is that a judgment or choice is supposed to *cohere* with or *be consistent* with normative theories, namely logic and probability theory, or the axioms of expected utility theory. The Linda Problem presented above was an example of an inferential judgment requiring the application of probability theory. On the other hand, "[p]references should follow the utility theory axioms" (Fischhoff & Broomell, 2020, p. 336). Among these axioms famously established by von Neumann and Morgenstern (1944) and Savage (1954), as well as others (cf. e.g. Briggs, 2023 for a short overview) three (e.g. Bell & Farquhar, 1986) or four (e.g. Pfister et al., 2017, p. 177f.) have been deemed the most important ones for (subjective) expected utility theory:[79] completeness/comparability, transitivity, independence, and continuity (cf. section 2.4.1.2 on page 41 for an explication). Meeting the requirements implied by these axioms is held to produce a "rational choice" (Hastie & Dawes, 2010, p. 16), due to the identification of the alternative with "the highest expected outcome" (Hastie & Dawes, 2010, p. 31).

In sum, *correspondence* with reality or *coherence* with probability theory or (subjective) expected utility theory[80] are understood to determine decision quality. The question however is, of course, *why*. What is the promise of true belief to me, and what is the promise of expected utility theory? That is: why should I care?

Why should I agree that a good judgment or choice is one that either produces true belief (correspondence) or picks out the option with the highest expected value as based on a preference order dictated by utility theory (coherence)? The answer to both is:

---

interests and two critical response items (hidden within further items) suggesting possible current employments and activities of Linda's – to be ranked by probability. Probability theory dictates one answer (the bigger set being more probable), but respondents mostly choose the other one more consistent with Linda's character. Here is the Linda Problem as quoted by Kahneman (2003): "Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student she was deeply concerned with issues of discrimination and social justice and also participated in antinuclear demonstrations.". The two critical items read: "Linda is a bank teller" versus "Linda is a bank teller and active in the feminist movement" and are to be ranked by probability.

[78] One could subsume correspondence (to the world) and coherence/consistency (with normative theories) under the umbrella of "accuracy": Under this conception, decisions/judgments could be accurate in terms of correspondence *or* they could be accurate in terms of coherence/consistency. In this case "accuracy" would be the overall criterion for all instances of decision problems. Marewski and Link's (2014, p. 10) description is based on that understanding, as is Pachur and Bröder's (2013, p. 666). However, for now I will stick with the twofold understanding as e.g. articulated by Fischhoff and Broomell (2020, p. 336) and quoted above.

[79] For "*subjective* expected utility" versus "expected utility" simpliciter cf. footnote 107 on page 40 from section 2.4.

[80] – or, in the case of certainty, coherence with the multi-attribute utility (MAU) model, cf. Pfister et al. (2017, p. 242).

utility. And maximization.

Accordingly, the upcoming two sections will deal with *The Utility of True Belief* (section 2.3) and *The Utility of Utility Maximization* (section 2.4 on page 37). Before, a working definition of "utility" – to be qualified later – is in order:

Utility is a currency that signifies the *value* or *desirability* that some state of affairs has to me (cf. e.g. Pfister et al., 2017, p. 38; Steele & Stefánsson, 2020, §0).[81] [82]

2.3 The Utility of True Belief

The utility of true belief can be very plausibly looked at from an evolutionary perspective: If I am able to infer and forecast consequences and events rather accurately, I might not get eaten by a tiger that easily. True belief is useful for survival, and survival is desirable.[83] [84] Gigerenzer and collegues (e.g. Gigerenzer & Gaissmaier, 2011; Gigerenzer, Hertwig, & Pachur, 2011; Gigerenzer & Selten, 2001; Gigerenzer et al., 1999) famously locate the argument for their *adaptive toolbox* from their *fast and frugal heuristics* program within evolutionary psychology. As noted above,[85] this research program was mostly concerned with inference rather than preference. The main point here is that super-precise decision strategies that look at all information and integrate all information (like e.g. MAU/WADD) are too costly in terms of cognitive effort and time to be adaptive,[86] whereas simple heuristics lead to a sufficiently accurate judgment.

[81] What about usefulness? Could something that has a high utility for me simply be something that is highly useful to me? Often, authors stress that "utility" is not to be confused with an everyday understanding of the term (e.g. Pfister et al., 2017, p. 40). However, a translation with "usefulness" is viable, it simply needs qualification: What does it mean that something is useful to me? Well, it may mean that what is useful to me is something that is valuable or desirable for me. (We will suppress the question for now of what "valuable" and "desirable" may mean.)

[82] Hastie and Dawes (2010, p. 201, original italics) claim: "Out preferred term is *personal value* – to the decision maker".

[83] The question may be put the other way around: "If our minds are products of evolution like those of other animals, why suppose that the beliefs they produce are true, rather than merely useful?" (Wilkins & Griffiths, 2013, p. 1; a point traced back to Plantinga, 1993, however in a different context). This perspective leaves space for the idea that there exist classes of non-true beliefs that are adaptively useful. I agree (cf. below), but my point here really focuses on the reverse perspective, namely that true belief usually is, indeed, useful.

[84] There is a lively debate in epistemology regarding the additional value of *knowledge* over mere true belief, cf. e.g. Pritchard, Turri, and Carter (2022) for an overview. This distinction might be made useful for the point at hand: maybe knowledge is even more useful to survival than mere true belief. However, the complexities of the matter are not useful right now, so we content ourselves with "mere" true belief.

[85] Cf. Table 1.1 on page 21 and footnote 21 on page 14, as well as Marewski and Link (2014, p. 10) and Pfister et al. (2017, p. 250).

[86] To be precise, the four characteristics of being costly are: compensatory trade-offs, exhaustive information processing, alternative based information search and integration, and quantitative evaluations, cf. section 1.2.5.1 on page 24.

That is: (sufficient) accuracy of belief is a requirement for adaptivity.[87]

On the other hand, there are plenty of situations and knowledge about how delusions (in a wide sense) or incorrect and biased attitudes, beliefs, and expectations are helpful in one or the other way. First, there are findings that depressed people are more realistic about themselves and the world (the so-called "depressive realism" hypothesis; cf. the classics Alloy & Abramson, 1979, 1988; Taylor & Brown, 1988, as well as recent reviews M. T. Moore & Fresco, 2012; Ratnayake, 2022), which implies that if you are less realistic you might be less depressed. Second, according to psychodynamic theorizing, defense mechanisms such as repression, denial, or rationalization are in place for good (innerpsychic) reasons, namely to save a person from painful or frightening realizations and inner conflicts (e.g. Bowins, 2004; Cramer, 1998; T. R. Rice & Hoffman, 2014). Last, it is commonly advised to enter into competitive situations (like a basketball match or a job interview) only after having made an effort to convince yourself, that you are going to do great – with the idea that "self efficacy" (Bandura, 1977), which essentially is a multi-dimensional positive bias, aids performance (cf. e.g. Bandura & Locke, 2003; Neck, Neck, Manz, & Godwin, 1999; Schunk, 1995; Zourbanos et al., 2016).

Further arguments from within evolutionary psychology against the utility of truth – or for the utility of non-truth – can be found e.g. in Haselton and Nettle (2006); McKay and Dennett (2009); Petersen, Osmundsen, and Tooby (2021); Sperber (2001).

2.3.1 Summary

In sum, on the one hand, there is a strong argument that speaks in favor of true belief: making sufficiently accurate inferences about the world enables you to react in adequate ways which may ensure your survival in the short run and the species' adaptivity in the long run (i.e. the argument from evolutionary psychology). On the other hand, there are examples showing that it may be conducive to mental health and personal success to be optimistic rather than realistic, to forget, deny and explain away, or even to intentionally try to be positively biased in favor of yourself and your abilities (i.e. the argument from well-being).[88] Accordingly, it is not as clear as it might seem that "the truth"[89] always is the best for a person.[90]

[87] Further defendants of evolution favoring the formation of true belief include e.g. Papineau (2000) and Tooby and Cosmides (1990), as well as Stephens (2001), who argues a middle position "that the answer to this question is *neither yes nor no*" (p. 182, original italics), as does Pinker (2005, p. 17-19) reacting to Fodor (2000), a unanimous defendant at the time. Furthermore, the so-called *pragmatic theory of truth* with its early proponents Peirce (e.g. Peirce, 1878), James (e.g. W. James, 1907), and Dewey (e.g. Dewey, 1941) deserves mention for the more fundamental proposal that "truth be defined in terms of utility" (Capps, 2023, §0). For (further) critical voices cf. below.

[88] Note that what is *well-being* has not been spelled out yet. This will be the topic of the next chapter 3 on page 55.

[89] Cf. footnote 134 on page 54 for an explanation of the quotation marks.

[90] However, truth is still the ideal – that which belief strives for (cf. e.g. Hazlett, 2019) – and we could not want it any other way. Only while aiming at the truth in general we can afford to stray a little in favor of other goods (like feeling fine). Otherwise, how would the world look like if everyone's beliefs first and foremost strove for personally feeling fine? This would be a world populated by isolated,

2.4 The Utility of Utility Maximization

Utility maximization is a more complicated matter than true belief. Whereas true belief has only two theoretic dependencies – namely the concept of belief and the concept of truth – utility maximization has several layers: There is utility theory (section 2.4.1) and utility maximization (section 2.4.2 on page 43). The ingredients of utility theory are a formula calculating overall utilities (section 2.4.1.1 on page 39) and axioms determining the behavior of preferences (section 2.4.1.2 on page 41). To understand utility maximization, first the relation between utility and preference needs to be understood (section 2.4.2.1 on page 43), and subsequently the relation between utility maximization and preference satisfaction (section 2.4.2.2 on page 47). – The conceptual insights will be gathered in the summary (section 2.4.3 on page 52).

2.4.1 Utility Theory

Utility Theory is an umbrella term that encompasses theories that are concerned with utility. The set of these theories is quite large, because of a rather long (and productive) historical tradition as well as continued interest (for recounts of utility theory over the course of its history cf. e.g. Fishburn, 1968; Juster, 1990; Moscati, 2019; Stigler, 1950a, 1950b, as well as more recent handbooks such as Keren & Wu, 2015b; Koehler & Harvey, 2004). There are the three famous early forefathers Bernoulli (1896 [1738]), Pareto (1906), and Bentham (1907 [1789]),[91] that partly already included the notion of *expected* value/utility. That is, utility theory – as far as it is concerned with probable, but not certain states, future events, or outcomes – is closely tied to expectation, conceptualizing the idea of more or less likely states of affairs or futures. Along the lines of *expected* utility, the classic most important figures are von Neumann and Morgenstern (1944) and Savage (1954) for their axiomatizations, and Edwards (1954, 1961) for the model of *subjective* expected utility (cf. e.g. Pfister et al., 2017, p. 175 and p. 177, for these attributions; for a dated, but still interesting tabulated overview of classic expected utility theories including their formulas cf. Schoemaker, 1982, p. 538).

deluded individuals, each of them living in their own world most conducive to their feeling fine. I would believe I am king and you would believe you are a pop star. There would be no common ground to even talk to each other. The common ground for any communication – and cooperation – is best found in something neutrally factual: that which is the case, reality, "the truth". [I am painfully aware that I am glossing over very complicated matters here.] Communication and cooperation is essential for survival (and mental health, well-being, 'feeling fine') – not only in a prehistoric world inhabited by man-eating tigers. Accordingly, as regards belief, even if there are other goods besides truth (like feeling fine), a general orientation towards truth/reality is a sine qua non.

[91] Some authors (e.g. Keren & Wu, 2015a, p. 3) include *Pascal's Wager* (Pascal, 1941 [1670]) as the earliest written argument for an expected utility calculation (cf. e.g. Hájek, 2022, for a critical discussion of the wager argument).

A thorough analysis of the historical roots of utility theory would include (a) an explication of the difference in concepts between *expected utility* and *expected value* (cf. e.g. Domurat & Tyszka, 2004; Fox, Erner, & Walters, 2015, for a short overview), and (b) a discussion of similar conceptualizations, such as *Expectancy Value Theories* (cf. e.g. Lin, Ettekal, & Simpkins, 2016 for an overview). For reasons of time, length, and scope I cannot follow up on either.

An important distinction is between decision problems of certainty, risk, and uncertainty.[92]

While it seems odd that in real life decision situations of certainty should even exist, they are indeed quite common: ordinary consumer decisions are of this kind. If you want to buy a new car, its attributes are known to you for sure, such as prize, brand, color, horse power, amount of gimmicks.[93] The ingredients of such situations are: options (e.g. cars), attributes (e.g. price), and attribute values (e.g. 30.000 EUR).[94] These ingredients can easily be depicted in tabular format, and indeed this is exactly how it is done in magazines and on websites providing consumers with comparisons of products (cf. e.g. Pfister et al., 2017, p. 33; these tables are called attribute matrices). This is multi-attribute decision making, and *multi-attribute utility theory* (MAUT) is its normative ideal.

The distinction between risk and uncertainty is not important for now.[95] Of importance is the difference between risk & uncertainty on the one hand and certainty on the other hand. The difference is that in cases of risk/uncertainty there is a novel parameter: probability of occurrence. Decision situations of risk/uncertainty within classic utility theory are understood as entirely *consequentialist*: the only thing that matters are the *consequences* of the options – which are usually courses of action.[96]

These consequences/outcomes occupy the place of the attribute values in the certainty case. That is, they are depicted within the cells of the matrix (cf. Table 2.2 on page 41 for a depiction based on J. Baron, 2004, p. 22). However, you do not know their realization for sure, there is only a *probability* that they occur. These probabilities are attached to so-called *states of the word* (e.g. J. Baron, 2004; Steele & Stefánsson, 2020), a concept based on Savage (1954).[97] These states of the world are conceptualized as happenings (events) or already obtaining states that are beyond our control (a classic example is, of course, the weather).[98] Accordingly, in this setup we have: options (just as before), states/events (as opposed to attributes), and outcomes (as opposed to attribute values).[99] The normative ideal to deal with such situations is *(subjective)*

[92] You can find definitions of these terms in footnote 370 on page 263 within the empirical part (Part II).

[93] Of course, there are always also attributes which you do not know for sure, for example total lifetime or time to first repair. But within this model they shall be ignored.

[94] Please be reminded that most of these terms have technical synonyms: options = alternatives, attributes = characteristics = (value) dimensions, attribute values = attribute levels.

[95] The reason for that is to be found in footnote 101 on the next page.

[96] A frequent technical synonym to consequence is *outcome*.

[97] The technical synonym to "state" is the (more frequently used) term *event*.

[98] Cf. J. Baron (2004): "This view makes a sharp distinction between events that we control (options) and events that we do not control (states)" (p. 22).

[99] An example given by Pfister et al. (2017, p. 175) involves the decision to move to one of two cities, one expensive, but pretty, the other one less expensive and less pretty: these are the options. The states are to either receive a grandfatherly inheritance or not receive it – with probabilities p and 1-p respectively. The four possible outcomes are being rich or poor in an expensive and exciting city versus being rich or poor in a less expensive and less exiting city. An example given by J. Baron (2004, p. 22) is this: "The decision could be which of two trips to take, and the states could be

expected utility theory (SEUT).[100] [101]

The upcoming exposition will concentrate on (subjective) expected utility theory, because the discussion of utility maximization usually evolves around the axiomatization of von Neumann and Morgenstern (1944) who were concerned with expected utility, i.e.: utility theory in the case of risk. However, both the MAU and the SEU formula shall be presented.[102]

Furthermore, I will stipulate that the major ingredients of utility theory are *The formula* and *The axioms*, and this exposition will proceed accordingly.[103]

2.4.1.1 The Formula

This is the formula of multi-attribute utility (MAU):

$$U_{MAUT(A)} = \Sigma\, u_{aj}\, w_j$$

To be read: the overall utility U for option A within the MAUT framework equals the sum of the products of (i) the utility u per option a and attribute j (i.e.: the utility per attribute value/outcome) and (ii) the weight w per attribute j, signifying its importance to the decision maker.

That is, once you have an attribute matrix you will first assign standardized weights to each attribute: For example, standardizing to $\{0, 1\}$, you assign $w_{j1} = 0.7$ to the attribute "price" in the car case, because price is quite important to you. Second, you assign standardized utilities per attribute value/outcome: For example, standardizing

the various possibilities for what the weather will be, for example. The outcomes could describe the entire experiences of each trip in each weather state".

[100] What is the difference between *subjective* expected utility and expected utility simpliter? The formula is the same, the difference is conceptual: subjective expected utility theory takes the probabilities calculated with to be subjective (meaning: person-dependent, a mere human estimate). Note that (expected) utility had always been treated as a subjective measure (of e.g. "personal value", cf. e.g. Hastie & Dawes, 2010, p. 18) – which indeed is its distinctive feature as compared to expected value (cf. footnote 91 on page 37). Von Neumann and Morgenstern (1944) were concerned with expected utility (i.e.: subjective utilities and objective probabilities), whereas Savage (1954) was concerned with subjective expected utility (i.e.: subjective utilities and subjective probabilities). Cf. also G. Wu, Zhang, and Gonzalez (2004): "[...] SEU is the natural generalization of EU from risk to uncertainty" (p. 401). Edwards (1961) points out that anything else but subjective conceptualizations of both parameters make no sense: "No existing behavioral model seriously asserts that people attempt to maximize the sum of products of objective value and objective probability" (p. 474).

Accordingly, I will not make a difference between SEU and EU. I will mostly use the expressions "(subjective) expected utility" or simply "expected utility", and in both cases both the ascription of utilities as well as the ascription of probabilities are understood to be "subjective".

[101] Why is the distinction between risk and uncertainty unimportant? Because from the perspective of a SEU theorist, it really makes no difference: even objective probabilities are understood to be subjectively estimated by the decision maker.

[102] Further – even very important – advancements of expected utility theory, e.g. *Prospect Theory* and *Cumulative Prospect Theory* (Kahneman, 1979; Tversky & Kahneman, 1992), will not be considered.

[103] Cf. also footnote 107 on the following page regarding the definition of expected utility theory.

to $\{0, 10\}$, you assign $u_{a1j1} = 8$ to the attribute value "30.000 EUR", which is the specific price on attribute $j1$ of the first car in the table (i.e. option $a1$), whereas you assign $u_{a2j1} = 1$ to the attribute value "90.000 EUR" for the second car in your table. Higher utilities indicate higher desirability or personal value.[104]

In sum, while we said that the multi-attribute decision situation merely included options (a), attributes (j) and attribute values,[105] the multi-attribute utility formula additionally includes weights w, partial utilities u, and, as its result, overall utility U. CF. Table 2.1 for a matrix visualization of the car example.

Table 2.1 MAU Car Example

	Price $w_{(prize)} = 0{,}7$	Brand $w_{(brand)}$	Color $w_{(color)}$	Horse Power $w_{(power)}$	Gimmicks $w_{(gimmicks)}$	n $w_{(n)}$
Car 1	Outcome (Car 1, Price) = 30.000 u (Outcome (Car 1, Price)) = 8					
Car 2	Outcome (Car 2, Prize) = 90.000 u (Outcome (Car 2, Price)) = 1					
Car 3						
Car n						

Note. Only that which was explicated in the example is given in the table, namely the weight for attribute j1 (price) and the outcomes and their utilities for option a1 and option a2 regarding attribute j1. Furthermore, for ease of terminology, the *attribute values* are termed *outcomes*.

	Attribute (MAU) / State (SEU) J1 $w_{j1\,(MAU)}$ / $p_{j1\,(SEU)}$	Attribute (MAU) / State (SEU) J2 $w_{j2\,(MAU)}$ / $p_{j2\,(SEU)}$	Attribute (MAU) / State (SEU) J3 $w_{j3\,(MAU)}$ / $p_{j3\,(SEU)}$
Option A1	Outcome a1j1 u (x_{a1j1})	Outcome a1j2 u (x_{a1j2})	Outcome a1j3 u (x_{a1j3})
Option A2	Outcome a2j1 u (x_{a2j1})	Outcome a2j2 u (x_{a2j2})	Outcome a2j3 u (x_{a2j3})
Option A3	Outcome a3j1 u (x_{a3j1})	Outcome a3j2 u (x_{a3j2})	Outcome a3j3 u (x_{a3j3})

The classic formula of (subjective) expected utility (SEU) is:[106] [107]

$$U_{SEUT(A)} = \Sigma\, u_{aj}\, p_j$$

To be read: the overall utility U for option A within the SEUT framework equals the sum of the products of (i) utility u per option a and state/event j (i.e.: the utility per outcome) and (ii) the probability p per state/event j, signifying the subjective likelihood of its occurrence.

It is easy to see that the SEUT formula is basically identical to the MAUT formula: what was weight now is probability. Cf. Table 2.2 on the following page for a depiction of the comparison of MAU and SEU in matrix format.

[104] Of course, if you're looking for an expensive car, and a "cheap" car would be undesirable to you, you may assign your utilities accordingly.

[105] We could assign x to these, which would make the formula $U_A = \Sigma\, u(x_{aj})\, w_j$.

[106] Edwards (1954, 1961), whom the model is mainly attributed to, called it the "subjectively expected utility maximization model" (1961, p. 474).

[107] Here is a verbalized definition: "Expected utility theory consists of three components. The first is a utility function that assigns real numbers to consequences. The second is a probability function that assigns real numbers between 0 and 1 to every possible event. The final component is an 'aggregation norm' that holds that the value of an act is its expected utility value relative to these two functions, and that rational preferences track expected utility value [...]" (Buchak, 2022, §0).

Table 2.2 Parameters of MAU / SEU

	Attribute (MAU) / State (SEU) J_1 $w_{j_1\,(MAU)}$ / $p_{j_1\,(SEU)}$	Attribute (MAU) / State (SEU) J_2 $w_{j_2\,(MAU)}$ / $p_{j_2\,(SEU)}$	Attribute (MAU) / State (SEU) J_3 $w_{j_3\,(MAU)}$ / $p_{j_3\,(SEU)}$
Option A_1	Outcome a_1j_1 $u(x_{a_1j_1})$	Outcome a_1j_2 $u(x_{a_1j_2})$	Outcome a_1j_3 $u(x_{a_1j_3})$
Option A_2	Outcome a_2j_1 $u(x_{a_2j_1})$	Outcome a_2j_2 $u(x_{a_2j_2})$	Outcome a_2j_3 $u(x_{a_2j_3})$
Option A_3	Outcome a_3j_1 $u(x_{a_3j_1})$	Outcome a_3j_2 $u(x_{a_3j_2})$	Outcome a_3j_3 $u(x_{a_3j_3})$

Note. Both attribute values (MAU) and consequences (SEU) are termed "outcomes".

Again, the sum of these (either by importance or probability) weighted partial utilities identifies the overall utility U of an option. In both cases, this calculation accordingly has to be done *for each option* of a decision problem. Each option will receive a real number, and the higher the number, the higher the overall utility.

The decision maker should then choose the option with the highest overall utility. This "should" is a prudential one: choosing the option with the highest utility is deemed to be the *rational* choice (e.g. Hastie & Dawes, 2010, p. 16 and p. 31).[108]

This is the *principle of utility maximization*. But what is the justification of this principle? – To be able to answer this question, a closer look at the utility theory axioms is indicated.

2.4.1.2 The Axioms

What does coherence/consistency with utility theory mean? It means first and foremost adherence to the *axioms* of utility theory already mentioned in section 2.2 on page 33. These axioms determine the behavior of preferences. They intuitively seem reasonable and are deemed "rational" (cf. e.g. Pfister et al., 2017, p. 181 and Hastie & Dawes, 2010, p. 257).

In this section I will first spell out in a non-technical way what each axiom means, I will then add an example, and last mention a critical consequence.[109]

Here is the background story: I am looking for a new job. I prefer a job that challenges my creativity (A) over a job that brings me lots of money (B). Furthermore I prefer the job that brings me lots of money (B) over a job that comes with a fair and reliant

[108] Cf. also e.g. Briggs (2023): "Expected utility theory is an account of how to choose rationally when you are not sure which outcome will result from your acts. Its basic slogan is: choose the act with the highest expected utility" (§0).

[109] The selection and description of these axioms is based on Pfister et al. (2017, p. 177-181) and Hastie and Dawes (2010, p. 244-259) who base them on von Neumann and Morgenstern (1944).

boss (C).[110]

Completeness requires that I am able to compare any two options and prefer one over the other or be indifferent. That is, I either prefer the creative job (A) over the lucrative job (B) or the other way around, or they are both the same to me. Accordingly, incommensurability (the idea that it is possible that two entities cannot be reduced to a common measure for comparison, cf. e.g. Hsieh & Andersson, 2021) is denied.

Transitivity requires that if I prefer A over B and B over C, I also must prefer A over C. So if I prefer the creative job (A) over the lucrative job (B), and the lucrative job (B) over the fair boss (C), I also must prefer the creative job (A) over the fair boss (C). That is, the one-dimensional chain that results from my ranking of pairs of options (e.g. options A through E) should determine all further preferential relations between two not yet compared elements of that chain.

Independence requires that additional attributes that are the same for both options are irrelevant: If I prefer the creative job (A) over the lucrative job (B), and I have to decide between a creative job that also comes with a fair boss (A+C) and a lucrative job that also comes with a fair boss (B+C), I still have to prefer A+C to B+C. That is, the attributes are conceptualized to be independent of each other, they are supposed to not affect each other: there cannot be any interaction, interference, or emergent property. For example, a fair boss (C) at a lucrative job (B) cannot make the package (B+C) more attractive than the package (A+C), if I already prefer the creative job (A) over (B).

Continuity requires that, given the preference order A>B>C, it is possible to find a probability p that makes the combination of A+C (with p(A) and 1-p(C)) just as attractive as B (with B for certain), such that the decision maker is indifferent. That is, the situation is that I can be certain that (B) is a lucrative job, and on the other hand there is a job (A+C) that comes with the probability p that it is creative and the probability 1-p that the boss is fair. The axiom states that there exists a probability p such that I would be indifferent between B and p(A) + 1-p(C). This means that there does not exist any infinitely important, valuable or dreaded outcome that could not be weighed up by according very high or very low probabilities.

These axioms have been criticized on many accounts (cf. Luce & Raiffa, 1957, as a classic). Yet, they remain the hallmark and starting point of any decision theoretic discussion of choosing "rationally", as well as the reference for alternative axiomatization attempts.

A more thorough discussion of the axioms as presented above including a thorough distinction of their exact origin and/or formalization is not necessary for present purposes. Yet, it is worthwhile to note that the "classic" theories and axiomatizations of von

[110] This is obviously a very shortened depiction. It is based on Pfister et al. (2017, p. 178-179), but even further shortened. The long version is: There are three jobs (options) and there are three states (A = creativity, B = money, C = boss) with probabilities p, q, and r. Each of the three options is strong regarding one state where the others are not. In referring to (A), (B) and (C), this is a mixture of option and dominant state.

Neumann and Morgenstern (1944), Savage (1954), and Jeffrey (1983) do show substantive differences, both formally as well as regarding their conceptual preliminaries (cf. e.g. Steele & Stefánsson, 2020, for a short overview). Especially Jeffrey (1983) affords a quite different application.

Yet, the overarching purpose was to (i) provide a coherent normative theory of rational decision making, that (ii) is nevertheless somewhat applicable to real world situations. The latter requirement is not the same as to devise a descriptive decision theory, but it does impose restrictions on artificiality as well as it demands the consideration of intuitions about and practices of choosing "rationally" outside the realm of respective axiomatizations.[111]

The next section, *Utility Maximization* (section 2.4.2) will trace the question where and how – based on the SEU formula and the axioms as presented here – utility *maximization* comes into play.

2.4.2 Utility Maximization

2.4.2.1 Utility and Preference

Neither the preference for nor the choice of the option with the highest expected utility follows from the axioms or the SEU formula itself. The SEU formula only calculates the utilities per option, but in itself says nothing about what to do with these numbers. The axioms only say how preferences should behave, but again are silent about the relationship of preference and utility. Are they?

> One often assumes that utilities and probabilities are prior to preference, and that decision theory says that you should prefer an act with a higher expected utility over any act with a lower expected utility. And this is how the theory of expected utility is often applied in practical contexts. However, according to the orthodox theory, there is no normative requirement, but rather a conceptual necessity! What it is to have probabilities and utilities just is to have preferences that line up with the resulting expected utilities. If an actual agent's preferences don't line up with the calculations, then the preferences and utilities one is calculating with just aren't those of the agent. (Easwaran, 2014, p. 2)[112]

That is, it is not the case that utility theory based on the axioms of von Neumann and Morgenstern (1944) and Savage (1954) and the SEU model of Edwards (1954, 1961) directly provides the action guiding principle of utility maximization. Rather, it is the other way around: *If* a decision maker conforms to the axioms and makes a choice it can be *assumed* that he maximized his utility (i.e. chose the option with the highest

[111] Unfortunately, an analysis of *rationality* cannot be undertaken here.

[112] Cf. also Peterson (2004): "In an ex post approach the decision maker does not prefer one risky act to another *because* the expected utility of the former exceeds that of the latter. Instead, the well-organized structure of the decision maker's preferences among alternative acts implies that she can be described *as if* she were acting from this principle. The utility and probability functions are on the output side of the theory, not on the input side" (p. 361, original italics).

utility).[113]

In other words:

> If a person's preferences obey the axioms of expected utility theory, then she can *be represented* as having degrees of belief that obey the laws of the probability calculus [and a utility function such that she prefers acts with higher expected utility]. (Briggs, 2023, §2.2, my italics).

That is:

> A probability function and a utility function together represent a set of preferences just in case the following formula holds for all values of A and B in the domain of the preference relation: $EU(A) > EU(B)$ *if and only if A is preferred to B* (Briggs, 2023, §2.2).[114]

The relation "if and only if" – or abbreviated "iff" by logicians – is symbolized by the double arrow: $\iff$. It expresses equivalence: $EU(A) > EU(B) \iff A >_{pref} B$ equals $((EU(A) > EU(B) \implies A >_{pref} B)\ AND\ (A >_{pref} B \implies EU(A) > EU(B)))$.

In more ordinary words, according to Briggs (2023), "[c]ontemporary decision theorists typically interpret utility as a measure of preference, so that to say that A has greater utility than B (for an agent) is simply to say that the agent prefers A to B" (§1.2).

[113] Cf. also Pfister et al. (2017): "Only if certain axioms [...] are empirically satisfied, it is possible and justified to interpret and reconstruct observed choices as expressions of the principle that people choose the option that has the highest subjectively expected utility" (p. 177, `www.DeepL.com` trans.).

[114] These two quotes provide a formulation for the idea of *Representability*. Briggs (2023) extends Zynda's (2000) account to fit both probabilities and utilities, whereas Zynda (2000) focuses on probabilities only. The square brackets in the first quote indicate this addition.

Representability is what so-called representation theorems prove mathematically. Briggs (2023) includes four "most influential" (§2.2) representation theorems in his overview: Ramsey (2016 [1926]), von Neumann and Morgenstern (1944), Savage (1954), and Bolker (1966) & Jeffrey (1983), and compares them on several dimensions, including their "order of construction" (§2.2.5), revealing substantive differences.

The premise of *Representability*, along with two further premises, *The Rationality Condition* and *The Reality Condition* (cf. Zynda, 2000, p. 51), forms an "argument for expected utility theory" (Briggs, 2023, §2.2), that is, an argument "based on representation theorems, which suggest that certain rational constraints on preference *entail* that all rational agents maximize expected utility" (Briggs, 2023, §2, my italics).

The premises of this argument can and have been criticized every step of the way; for details cf. both Briggs (2023) and Zynda (2000) as well as Buchak (2022) for an overview, but furthermore e.g. (including constructive alternative accounts): Easwaran (2014); Peterson (2008a, 2008b).

According to Briggs (2023), in total there are only two "sources of justification" (§2) (that is: types of argument) for maximizing expected utility: (1) the above argument based on representation theorems, and (2) an argument based on the *laws of large numbers*: the so-called "long-run argument" pointing to "evidence that expected-utility maximization is a profitable policy in the long term" (§2).

I will leave this second argument aside, because I do not find it too convincing (cf. also Buchak, 2022, §1.2.3, for a similar assessment). Accordingly, the justification of maximizing expected utility lies with the argument based on *Representability*.

That is, if the above equivalence relation[115] between utility and preference holds, a higher utility is preferred over a lower one, and accordingly the maximum utility is preferred the most. Choosing the most preferred option is utility maximization.[116]

A The Historical Definition of Preference in Terms of Utility To quantitatively measure preference by means of numerical utility exactly was the aim of von Neumann and Morgenstern (1944):[117]

> "[W]e wish to describe the fundamental concept of individual preferences by the use of a rather far reaching notion of utility." (p. 16)

However, while von Neumann and Morgenstern's (1944) (operational) definition of preference in terms of utility (or: the equivalence of utility and preference) is stated indirectly several times, they do not provide a formal verbal definition to that effect. Yet, they give a name to the conception in a footnote: they call it "[t]he utility concept of 'preference"' (p. 23, fn. 5, original quotation marks).

Furthermore, von Neumann and Morgenstern (1944) compare the measurability of preference by means of utility to the measurability of heat by means of e.g. temperature – which may count as an attempt at naturalization:

> It is clear that every measurement – or rather every claim of measurability – must ultimately be based on some immediate sensation, which possibly cannot and certainly need not be analyzed any further. [fn.1: Such as the sensations of light, heat, muscular effort, etc., in the corresponding branches of physics.] In the case of utility the immediate sensation of preference – of one object or aggregate of objects

[115] With "equivalence relation" I do not mean to say that utility is *identical* to preference in any strict sense. Rather, the expression is simply meant to refer to what was stated above, namely that a higher numerical utility indicates a higher ranked preference.

[116] I stipulate herewith that utility maximization means *choosing* the most preferred option. Alternatively, one might hold that utility maximization means *preferring* the option with the highest utility. (Side note: Upon the principle of revealed preference this distinction would be obsolete.) But preferring the option with the highest utility already follows from the equivalence relation between utility and preference. Furthermore, "maximization" should be an act (as is choosing), not a mental state (as is preferring).

[117] In fact, von Neumann and Morgenstern (1944) were so much more interested in what was later to be called "game theory" (they themselves do not use that term in their 1944/1947 (2nd. ed.)/1953 (3rd ed.) publication): In their 632-page long work they already switch to the *Extension to All Participants* on page 33. The actual axioms take up all of two pages (pp. 26-27) plus less than two pages with additional remarks (pp. 28-29). That was the extent of their interest in what was then called a *Robinson Crusoe economy*: "an economy of an isolated single person or otherwise organized under a single will" (cf. p. 9ff.), which they found to simply be "an ordinary maximum problem" (p. 10).

Indeed, von Neumann and Morgenstern (1944) state their non-focus on the single person perspective very clearly: "The conceptual and practical difficulties of the notion of utility, and particularly of the attempts to describe it as a number, are well known and their treatment is not among the primary objectives of this work. We shall nevertheless be forced to discuss them in some instances [...]. Let it be said at once that the standpoint of the present book on this very important and very interesting question will be mainly opportunistic. We wish to concentrate on one problem – which is not that of the measurement of utilities and of preferences – and we shall therefore attempt to simplify all other characteristics as far as reasonably possible" (p. 8).

> as against another – provides this basis. [...] All this is strongly reminiscent of the conditions existent at the beginning of the theory of heat: that too was based on the intuitively clear concept of one body feeling warmer than another, yet there was no immediate way to express significantly by how much, or how many times, or in what sense. [...] It turned out that heat permits quantitative description not by one number but by two: the quantity of heat and temperature. (pp. 16-17)

That is: just as there is the sensation of heat which turned out to be quantitatively measurable by temperature, there is the sensation of preference, which may well turn out to be quantitatively measurable by utility.

B The Entailment of Utility Maximization A statement such as the following is very common in the literature: "certain rational constraints on preference entail that all rational agents maximize expected utility" (Briggs, 2023, §2). The 'constraints on preference' are the axioms of von Neumann and Morgenstern (1944) and Savage (1954). According to the quote, these axioms *entail* that all agents maximize expected utility. Since the axioms are deemed rational (e.g. Hastie & Dawes, 2010), the entailed maximization of utility is rational, too.

In this short section I want to scrutinize that which is entailed, and my contention is that it is *not* utility maximization.

I already argued for the point that utility maximization is *choosing the option preferred the most* (cf. footnote 116 on the previous page). That is:

$$\textit{utility maximization} \overset{\text{def}}{=} \textit{choosing the most preferred option}$$

Do the axioms presented above (cf. section 2.4.1.2 on page 41) entail choosing the most preferred option? Let's recapitulate:

(i) The axioms establish an equivalence relation between preference and utility, i.e.: the measurability of preference by utility.

(ii) Upon this equivalence relation of "higher utility = higher ranked preference", the highest utility indicates the highest ranked preference.

(iii) Looking at a chain of preferences and asked which is my preference simpliciter, the highest ranked preference *is* my preference simpliciter.[118] That is:

$$\textit{maximum utility} \overset{\text{def}}{=} \textit{preference}$$

That is, the axioms first and foremost *entail* that maximum utility *is* preference. That is, they entail that all agents *prefer the option with the highest utility*. The quote therefore should be adjusted such:

[118] Cf. also footnote 119 on page 48.

Adjusted entailment statement:
Certain rational constraints on preference entail that all rational agents prefer the option with the highest utility.

Now, the attribution of "rationality" is a separate claim. To spell it out more clearly, let's look at a formalized version: The sentence is a conditional, $F(x) \longrightarrow F(y)$, F being the attribute "is rational". That is:

$$\textit{rational (axioms)} \longrightarrow \textit{rational (max. utility = preference)}$$

That is: If the axioms are rational, then it is rational that the maximum utility is your preference. Or, in other words: If the axioms are rational, then it is rational that you prefer the option with the highest utility.

I think this seems quite reasonable, even trivial. Accordingly, whatever you *choose* is an entirely different thing. And, most importantly, you are not right away irrational if you choose that which you do not prefer (the most). To establish such a claim would require another normative premise, namely:

If you prefer an option, you must choose that option.

The 'must' is a prudential one.
In sum, it seems worthwhile to distinguish preferring and choosing, preference and choice. Of course, there are plenty of authors who get this point straight:

> The orthodox normative decision theory, expected utility (EU) theory, essentially says that, in situations of uncertainty, one should *prefer the option with greatest expected desirability or value*." (Steele & Stefánsson, 2020, §0, my italics)

This is exactly what I argued for. Accordingly, *utility maximization* as defined above is neither entailed nor rational without further assumptions.

2.4.2.2 Preference Satisfaction

Historically, it was the declared aim of von Neumann and Morgenstern (1944) to make preference numerically measurable by means of utility. Briggs (2023) contends that this is also the mainstream contemporary understanding: utility "is [...] an indicator" of preference rank (Hausman, 2012, p. 14). Based on this equivalence relation between utility and preference, the maximum utility indicates the highest preference. If further we assume that rational agents choose the option they prefer most, then rational agents are utility maximizers, as choosing the most preferred option *is* utility maximization.

However, the discussion of the value or utility of utility maximization is not yet complete. We said that utility is a measure of preference. Accordingly, a choice based on

utility maximization simply is (optimal) *preference satisfaction*.[119]

The argument is as follows:

(i) Utility maximization is choosing the most preferred option.
(ii) The most preferred option is the highest ranked preference.
(iii) Preference satisfaction is the realization of preference.
(iv) The realization of preference is choosing what is preferred.
(v) Preference simpliciter is the highest ranked preference.
(→) Preference satisfaction is the realization of the highest ranked preference.
(→) Preference satisfaction is choosing the most preferred option.
(→) Preference satisfaction is utility maximization.[120]

That is, the value of utility maximization can be explained by the value of preference satisfaction. And, since the rationality of utility maximization *does not* follow from the rationality of the axioms (the result from section B on page 46), the potential rationality of preference satisfaction, too, needs further argument.[121]

[119] According to Hansson and Grüne-Yanoff (2022), for a treatment of "preference" it makes sense to conceive of it as a "subjective comparative evaluation" (§1). But what is the satisfaction of an evaluation? Accordingly, with the talk of *preference satisfaction* it makes sense to also consider other explications. The standard definition by the Oxford English Dictionary reads: "a greater liking for one alternative over another or others; predilection". This definition is two-fold: either preference is 'a greater linking' of one option over another/others (comparative) *or* it is 'predilection', i.e.: liking one option the most (superlative). In case of a finite amount of options and a uni-dimensional overall evaluation – where you cannot say "Among the five apartments (= options) I prefer A for its light and B for its location", but you can only say, tout court "I prefer apartment C" – the preference for option C indeed means that you like it better than all the other options (comparative), but the preference for option C also means that you like it best (superlative).

You may have a preference order among all five apartments and in that sense you have several preference relations (or just: preferences) within this ordered list. With respect to this ordered list, *preference satisfaction* could reasonably refer to the satisfaction of any of these preferences, which would include all apartments apart from the one at the bottom of the list: the least preferred option is not a preference – but all others are. As long as you do not get what you want/like *the least*, some preference has been satisfied. But this is not what *preference satisfaction* should mean. And indeed, once there is talk of "preference" tout court, it picks out the option highest up on the ranking: When I say "It is my preference to stay at home tonight", this among all options is the one I want to see realized. Accordingly, *preference satisfaction* should mean that what gets satisfied/realized is the option highest up on my ranking, i.e.: the option I prefer *the most*.

Therefore, in the main text, the "optimal" in parentheses is obsolete: Upon the equivalence hypothesis (max. utility = preference), utility maximization (= choosing the option with the highest overall utility) *is* preference satisfaction.

[120] I was excited to find that Kraus and Coleman (1987) share my analysis: "All reference to utility maximization can, in fact, be replaced with preference satisfaction" (p. 715, fn.1).

[121] The value and rationality of preference satisfaction will be treated in the upcoming chapter 3 on page 55.

A Excursus: Preference vs. Desire Most authors implicitly treat preference satisfaction and desire satisfaction as equivalent in terms of them being a theory of value.[122] But what about preference and desire itself: is it the same?

For sure, there is a structural difference: "[P]references are comparative in that they express the evaluation of an item X relative to another item Y. This distinguishes them from monadic concepts like 'good', 'is desired', etc. which only evaluate one item" (Hansson & Grüne-Yanoff, 2022, §1). Furthermore, preference and desire populate different debates (cf. e.g. T. Schroeder, 2020: "Talk of preference, rather than desire, tends to dominate the literature of decision theory", §3.3), however, T. Schroeder (2020) contends that decision theory generally is well compatible with theories of desire. Yet, there is one major point of dispute, namely the question which one, preference or desire, is more basic, conceptually as well as psychologically (cf. T. Schroeder, 2020, for a short overview and further literature). At any rate, if not equivalent, desire and preference both are so called "pro-attitudes" (e.g. Hazlett, 2019; T. Schroeder, 2020), i.e.: mental states expressing a positive stance toward their object (but cf. Sehon, 2013, for a critical discussion of the term).

To further compare preference and desire, here is what was said about *desire* in section 1.2.1.2 on page 9 and section A on page 17 within 1.2.3.2:

(i) Desire is a mental state (as is belief).

(ii) Just as belief, desire cannot be deliberately chosen (of course, this is a contention under heavy debate, but cf. footnote 9 on page 11 regarding desire, and footnote 7 on page 10 regarding belief).

(iii) According to psychological hedonism and some insights from neuroscience, *pleasure* is the one and only ultimate intrinsic desire.

(iv) Together with belief, desire is the basic ingredient of the *Humean theory of motivation*. Belief is the epistemic component, whereas desire is the so-called conative component. The same components are to be found in expected utility theory (probability and utility).

(v) Desire (as well as belief) is a propositional attitude; its direction of fit is mind-to-world (whereas the direction of fit of belief is world-to-mind).

Now, do all of these points hold for preference just as well?

Items (i), (iv), and (v) are straightforward: here, 'desire' can be substituted with 'preference' without provoking any odd consequences. Item (iii), however, is problematic: If it is *pleasure* that preference ultimately seeks out, the two conceptions of utility – which will be spelled out in section 3.3 on page 66 – end up being conflated. We will return to this aspect later. Item (ii) is a point that warrants further discussion: Is it the case that preference, too, cannot be deliberately chosen?

[122] Cf. e.g. Mason (2023): "[...] the view that value consists in preference or desire satisfaction" (§3.4), or Sinnott-Armstrong (2023a): "A related position rests on the claim that what is good is desire satisfaction or the fulfillment of preferences; and what is bad is the frustration of desires or preferences" (§3), or Shaver (2023): "Preference or desire accounts identify self-interest with the satisfaction of one's desires" (§1).

A.a Can preference be deliberately chosen? While posing the question like that is uncommon to behavioral economics, it belongs within the research on *preference construction*. This research resulted from the irritation about empirical findings of non-stable preferences, preference change, the violation of procedural invariance and preference reversals (the classic: Lichtenstein & Slovic, 1971), and the violation of descriptive invariance and framing effects (the classic: Tversky & Kahneman, 1981, 1986). It is a basic and mainstream assumption in psychological decision research that preferences are constructed (cf. e.g. Pfister et al., 2017, p. 28, and p. 227-236 for a short overview) versus simply dormantly existent and then 'elicited' (an assumption once prominent in economics, cf. e.g. Sunstein, 2006), and respective context factors have been extensively researched (cf. e.g. the 800-page handbook edited by Lichtenstein & Slovic, 2006a). While it is agreed that apart from 'external' context factors, surely there are internal precursors to preference (construction) such as personal values or tastes,[123] within the prevalent cognitive perspective, all of these factors are seen as input data to an information processing system.[124] This sub-personal perspective of information processing is very different from asking whether on a personal level of explanation I have conscious control over (the formation of) my preferences.[125]

The according reference within a cognitive framework is cognitive effort (cf. e.g. the ordinal categorization of decision situations along this dimension by Svenson, 1990) and most importantly the distinction between System 1 and System 2 (cf. footnote 66 on page 26; Kahneman, 2003, 2011; Stanovich & West, 2000) and their relative involvement in differently demanding decisions. Accordingly, the amount of "conscious control" exercised in the decision process – including the formation of preferences – will depend on the complexity of the decision problem, its importance and the decision maker's motivation (cf. e.g. Pfister et al., 2017, p. 345-348). For example, the plan to acquire an expensive and purposive object, say, a car, usually inspires extensive information search, deliberation and careful consideration of attributes and preferences: System 2 is very much involved.

But still: Could you *make* yourself prefer one car over the other? Could you *make* yourself prefer one ice cream flavor over another? Could you willingly prefer a Harry Potter-style jelly bean flavored 'vomit' over a jelly bean flavored 'strawberry'? – The simple answer to this simple thought experiment is: 'no'. You cannot will yourself to

[123] Cf. e.g. Lichtenstein and Slovic (2006b, p. 1): "We do, of course, carry a myriad of preferences in our memory. We were born with some of them, such as a fondness for sweets, avoidance of pain, and, perhaps, fear of snakes. Moreover, we spend our lives, particularly in childhood and adolescence, building preferences from our experiences and our wants, needs, and desires. Some of these learned preferences are broad, such as preferring more money to less; others are quite specific, such as liking a particular flavor of ice cream. These well-established preferences are readily available for use."

[124] Cf. e.g. Lichtenstein and Slovic (2006b, p. 39-40): "We started this chapter with preference reversals and showed how the study of reversals has metamorphized from a curious phenomenon observed with simple gambles in laboratory settings to a method for documenting a broad, encompassing view of human behavior that has come to be known as 'the construction of preference'. What has emerged is a portrait of human information processing that is rich and complex and relevant to all of the important decisions in life."

[125] Regarding "conscious control" cf. e.g. Schmitz (2011); Shepherd (2015a); regarding the personal/sub-personal distinction cf. Dennett (1969) and footnote 62 on page 26.

prefer something that you do not prefer – just as you cannot will yourself to desire something that you do not desire. Preference cannot be deliberately chosen.[126] This is also the mainstream philosophical answer, often discussed in the context of the criticizability of preference (cf. Hansson & Grüne-Yanoff, 2022, §8, for an overview): according to the prominent Humean position, intrinsic preferences – just as desires – cannot be criticized, because reasoning cannot influence them.[127]

A.b Summary and Conclusion From the above it seems that preference and desire – apart from their structural difference – can be construed as similar or even interchangeable regarding the aspects considered. Accordingly, for ease of terminology, I will concede that *preference satisfaction* and *desire satisfaction* can be used synonymously.

As regards preference and desire themselves their structural difference already forbids a simple identification. Furthermore, in ordinary language the two are not used interchangeably.[128] At the very least, to account for the comparative character of preference, "[d]efine 'preference' as 'desiring more"' (Brandt, 1998, p. 63).[129]

[126] Cf. e.g. Jeffrey (1974, p. 378): "for the most part we do not simply choose our preferences, any more than we choose our beliefs". The comparison with belief rather than desire is no coincidence: In fact, the example the author gives in the following is very much an example of *indirect doxastic voluntarism* (cf. section 1.2.1.2 on page 9 for the term). Cf. also footnote 9 on page 11 for referencing the desire-as-belief hypothesis.

[127] Philosophically, it is an interesting move to consider second-order desires/preferences (cf. e.g. Frankfurt, 1971; Jeffrey, 1974) which indeed afford an evaluative assessment of first-order desires/preferences.

[128] For example, say, you offer me some fruit: "Would you like some fruit?" – "Sure." – "Do you prefer an apple or a pear?" – "I'll have an apple.". Saying I prefer an apple over a pear, is that really the same as desiring an apple? You could ask me: "How strong is your desire for an apple?" and I could say: "Well, it is not very strong indeed. But if I'll have fruit and can choose between apple and pear, I prefer the apple.". You could continue asking: "Which fruit do you really desire?", and I might say "I'm craving mango!". That is, I desire (to eat) a mango tout court. As regards my (over all fruit) preference ranking, it is accordingly: mango $>$ apple $>$ pear. But in the mango-free context, my preference is an apple – which I desire more than a pear. But really I desire a mango.

I think, what this shows is (i) that preference is more bound to context than desire, whereas desire ranges free, and (ii) that the identification of preference and desire needs desire to come in degrees.

And even so, granted (i) and (ii), imagine someone proclaiming: "It is my greatest desire to become an astronaut!". Now compare to: "It is my preference to become an astronaut!". This does not sound the same. There is the sizzling of desire in the first sentence, but the second is just a statement.

[129] Yet, it shall be noted that the editors of "Preferences", a 1998 collection of essays, in their introduction (which, by the way, also includes an extensive structured and commented bibliography) explicitly state that they will use the following terms interchangeably to preference: "'aim', 'desire', 'end', 'project', 'want', 'wish', or 'liking"' (Fehige & Wessels, 1998, p. xxi). Yet, I will agree with Hausman (2012, p. x) that "[p]references and desires are not the same". His pointed argument goes like this: "Preferences and desires are not the same. The most important difference is that preferences, unlike desires, are *comparative*. To prefer something is always to prefer it to something else. If there are only two alternatives, one can desire both, but one cannot prefer both. Because they are comparative, preferences, unlike desires, require that one weigh alternatives. They are thus more cognitive, more like judgments, than are desires" (p. x).

2.4.3 Summary

The utility of utility maximization is preference satisfaction (section 2.4.2.2 on page 47). The equivalence of utility maximization and preference satisfaction follows from the equivalence relation between utility and preference (section 2.4.2.1 on page 43) and the concept of preference itself (cf. footnote 119 on page 48). The equivalence relation between utility and preference is mathematically established by representation theorems (footnote 114 on page 44), at the heart of which are the axioms of utility theory (section 2.4.1.2 on page 41). In combination with the SEU formula (section 2.4.1.1 on page 39) these axioms constitute (subjective) expected utility theory.

2.4.3.1 Terminological Summary

This chapter plays in the normative realm: Explicating decision quality, that is, answering the question what makes a decision a *good* decision, is a normative enterprise. And in that it is normative, it is theoretical, not empirical. And in being theoretical, it is conceptual: terms need to be explicated in terms of other terms. Accordingly, it is important to be precise.

Here is a listed summary in note form of what has been established so far about utility, preference, preference satisfaction, and utility maximization.

A Utility

(i) a currency that signifies the *value* or *desirability* that some state of affairs has to me (working definition 2.2 on page 35)

(ii) measure of preference (section 2.4.2.1 on page 43)

B Preference

(i) a subjective comparative evaluation (footnote 119 on page 48); a comparative (value) judgment (section B on page 15 within 1.2.3.1)[130]

(ii) the option someone prefers *the most* (footnote 119 on page 48)

(iii) the option with maximum utility (corollary from [A.ii] and [B.ii])[131]

C Preference Satisfaction

(i) satisfaction of preference, i.e. realization/choice of *the most preferred option* (footnote 119 on page 48 and [B.ii])

[130] In section B on page 15 within 1.2.3.1 a behaviorist and a mentalist account of preference was distinguished. Within the behaviorist account once popular in economic theory, preference holds no additional information to choice: what is chosen is what is preferred (i.e., choices are 'revealed preferences'). Within the mentalist account preferred by psychologists and philosophers, preferences are mental states and more specifically they can be conceptualized as comparative value judgments.

[131] If utility is a measure of preference [a.ii] where greater utility signifies higher-ranked preference (section 2.4.2 on page 43 with preference understood as in [a.i]), AND preference is the option someone prefers *the most* [b.ii], THEN preference refers to *the option with maximum utility*.

D Utility Maximization

(i) calculating overall utilities per option according to the SEU formula AND choosing the option with the highest numerical utility (footnote 116 on page 45)

(ii) choosing the most preferred option (corollary from [D.i] and [B])

(iii) preference satisfaction (footnote 119 on page 48 and [C.i], [D.ii])[132]

2.5 Summary & Discussion

Let's take stock. The overarching question of this chapter is: What is a good decision? We established that the quality of a decision is either established by the criterion of *correspondence/accuracy* or the criterion of *coherence/consistency*. Whether it is one or the other depends on whether there exists an objective criterion like "the truth" or not. The latter – 'not' – is always the case in cases of preferential choice – where accordingly a decision/choice is evaluated against the normative standard of (subjective) expected utility theory. Table 2.3 visualizes this comparison.

Table 2.3 Correspondence vs. Consistency

Correspondence with	**Consistency with**
↓	↓
the Truth	NORMATIVE Theories e.g. SEU Theory (= Axioms + SEU Formula)
↓	↓
expressed by	expressed by
↓	↓
TRUE BELIEF	Utility Maximization

The table also shows that what needs justification is either the value of *true belief* or the value of *utility maximization*. This point was already made (in terms of 'utility' rather than 'value') by the two respective section headings entitled *The Utility of True Belief* (section 2.3 on page 35) and *The Utility of Utility Maximization* (section 2.4 on page 37).[133]

[132] That is, it is NOT *utility* that is preference satisfaction, but *utility maximization*.

[133] No doubt, the latter phrasing sounds odd. However, the play with words was intentional, as it expresses the suspicion that utility theory comes with a circular element.

What the table visualizes is the idea that the relation of true belief to "the truth"[134] may be understood as analogous to the relation of utility maximization to utility theory. That is, utility theory occupies the same space as "the truth" and provides the ultimate normative standard of correctness.[135] Whether some judgment *corresponds with* "the truth" is expressed by, that is: shown by, proven by – true belief. Correspondingly, whether some action *is consistent with* utility theory is shown by utility maximization. "The truth" requires – in this representation – its output to be true belief, as utility theory requires its output to be utility maximization.

[134] Truth and theories of truth, as well as ontological commitments such as realism, naturalism, idealism, constructivism and the like – are too rich and complicated to not put "the truth" into quotation marks. For an introduction into the philosophy of science and a defense of *scientific realism* cf. e.g. Godfrey-Smith (2003).

[135] Cf. also footnote 78 on page 34 to the point of having "accuracy" be the umbrella for both correspondence and coherence.

3 Well-Being and Utility

Contents

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The foregoing chapter showed that the normative ideal of utility theory finds its implementation in utility maximization. It was also established that at first approximation utility is the property of something good, something valuable, something desirable. But

what is that, what is that which is of ultimate value to a person? The present chapter *Well-Being and Utility* (chap. 3) answers this question in a two-tiered way: there are theories of well-being and theories of utility. These are two-thirds overlapping, but they come with a differing historical background and, most importantly, they are received differently by the academic disciplines concerned with them: philosophy, psychology, and economics. Theories of utility and the concept of utility will be especially scrutinized, as the concept of utility is classically of such central importance to the question of good decision making: it turns out to be more complex than one might think. – The chapter will end with a summary discussing the relationship of utility and well-being.

3.1 Introduction: What is of value for a person?

It is the philosophical discipline of *Value Theory* that deals with this question and its underpinnings: "Value theory, or axiology, concerns which things are good or bad, how good or bad they are, and, most fundamentally, what it is for a thing to be good or bad" (Hirose & Olson, 2015, p. 1).[136]

There is a distinction between "good" and "good for" (cf. e.g. Hurka, 1987; M. Schroeder, 2021). The *good for* a person[137] is called *prudential value* and is usually identified with *well-being* (cf. e.g. Tiberius, 2015), a "correlate term" being *self-interest* (Crisp, 2021, §0). Accordingly, theories of prudential value are theories of well-being and self-interest.[138]

Furthermore, it goes without saying that an inquiry into what is good for a person – or good for human beings in general – is concerned with what is *intrinsically* good. That which is *instrumentally* good is good only in virtue of being a means to an end – the end being the intrinsic good, that which is good in itself.

[136] The term *value theory* can be applied in broader or narrower senses (cf. e.g. M. Schroeder, 2021), and while within philosophy the subject matter belongs with the disciplines of practical philosophy, it is not confined to *moral* philosophy in a narrow sense.

Furthermore: (a) One may distinguish by domain: moral value, prudential value, and aesthetic value, which are the most often named categories, plus epistemic value (cf. e.g. Hazlett, 2016, but cf. e.g. S. M. Campbell, 2013, for more categories). (b) An inquiry into value is a *normative* enterprise, since it is concerned with what is good. It is customary to divide *the normative* into *the evaluative* ("the good") and *the deontic* ("the right"), where value theory is concerned with the former (cf. e.g. Berker, 2022, p. 23, who also argues for a third category). (c) Value theory is both broader than moral philosophy as well as it "cross-cuts" (M. Schroeder, 2021, §0) the distinction between meta-ethics and normative ethics.

[137] Cf. e.g. Tiberius, 2015, p. 158, for the use of the expression "the *good for* a person".

[138] Once more a note on terminology: I will use the term "well-being" as the most general term referencing that which is good for a person. Well-being is usually at least indirectly identified with "welfare" in that authors use both terms in expressions such as "welfare or well-being" (cf. e.g. Hausman, 2021, §6.1; M. Schroeder, 2021, §1). Crisp (2021, §1) calls welfare a "closely allied term[...]". Welfare is a term that rather belongs to economics, whereas well-being is more common in philosophy. Both terms are used in a (relatively) theory-neutral sense and as the first step toward saying what is good for a person. The next step is saying more specifically what welfare/well-being consists in – and candidates populating respective theories are: pleasure, desire satisfaction, eudaimonia/flourishing. We will shortly look at these. Cf. also footnote 142 on page 58.

Last, there is the distinction between monist and pluralist theories of value: Is there only one ultimate value or are there several not further reducible ones? Different theories have found differing answers (cf. e.g. Mason, 2023, for an overview).

In the following, we will be concerned with *prudential intrinsic value*.

3.2 Theories of Well-Being

Philosophical theories about well-being classically fall into three categories: (i) hedonism, (ii) desire or preference satisfactionism/desire theories for short, and (iii) objective list theories, especially eudaimonism/perfectionism[139] (cf. e.g. Crisp, 2021; Haybron, 2020; the distinction is due to Parfit, 1984).[140] [141] [142]

[139] Another note on terminology: The second category has many names: desire theories (e.g. Crisp, 2021), desire fulfillment theories (e.g. Fletcher, 2013; Parfit, 1984), desire satisfactionism (e.g. Heathwood, 2006), and preferentialism (e.g. Adler & Posner, 2008). Maybe there are even more. My preference is "desire/preference satisfactionism" to be clear what it is about, but I will also use "desire theory" for short.

[140] Cf. also Parfit (1984): "What would be best for someone, or would be most in this person's interests, or would make this person's life go, for him, as well as possible? On *Hedonistic Theories*, what would be best for someone is what would make his life happiest. On *Desire-Fulfillment Theories*, what would be best for someone is what, throughout his life, would best fulfil his desires. On *Objective List Theories*, certain things are good or bad for us, whether or not we want to have the good things, or to avoid the bad things" (p. 493, original italics).

Here, it is important to note that well-being/prudential value is usually not considered to be about singular decisions or a short-term time frame only, but – just as the quote suggests – about *what makes life go well for someone* (cf. also e.g. Tiberius, 2015).

[141] In *The Routledge Handbook of Philosophy of Well-Being* (Fletcher, 2016c), the part on theories of well-being includes the following chapters/essays: Hedonism, Perfectionism, Desire-fulfillment theory, Objective list theories, Hybrid theories, Well-being and subject dependence, and Eudaimonism. This does not signify disagreement with the above three-fold classification, but it may show which variants of theories are important (perfectionism and eudaimonism as representatives of objective list theories), as well as which developments (hybrid theories of desire fulfillment and objective list theories), and which criticisms (the lack of subject dependence as an objection to objective list theories).

[142] For the term "happiness" cf. Haybron (2020), who points out that there are two senses of the term, one of which is co-extensive to well-being: "In the second case, our subject matter is a kind of *value*, namely what philosophers nowadays tend to call *prudential value* – or, more commonly, *well-being*, *welfare*, *utility* or *flourishing*" (§1.1, original italics). The other sense of 'happiness' and the according philosophical theories of happiness center around *states of mind* (i.e.: mental states; §1.2, my italics). Cf. also Haybron (2016) for the claims that (a) "well-being research focusing on mental states is frequently couched as 'happiness' research", and (b) regarding these mental states, the "literature tends to focus on three sorts: pleasure, emotional well-being, and life satisfaction" (p. 347).

That is, the three theories of well-being (hedonism, desire theories, and objective list theories; Crisp, 2021) and the three theories of happiness in the mental states sense (hedonism, emotional state view, life satisfaction; Haybron, 2020) are overlapping regarding hedonism, but otherwise not co-extensional. Interestingly, in spite of the fact that desire/preference is a mental state, too (cf. section A on page 49 within 2.4.2.2), the mental state theories of *happiness* do not include desire/preference satisfactionism.

However, of course one can argue that desire theories collapse into hedonism, since what is desired simply is pleasure (cf. e.g. Haybron, 2020, §4.3, and Crisp, 2021, §4.2: "It is worth pointing out here

Crisp (2021) distinguishes between substantive and formal theories of well-being. Substantive theories of well-being specify what constitutes well-being or the good for a person. Formal theories of well-being specify what it is that makes those constituents good. Substantive theories of well-being may also be called *enumerative*, since they enumerate the one or several items that have prudential value (i.e.: make up well-being); formal theories may also be called *explanatory*, since they explain why something is prudentially good (i.e.: they designate the 'good-maker'; cf. e.g. Rodogno, 2015, esp. fn. 7).

A theory of well-being may include both, a formal and a substantive claim, but it is not necessary that it includes both (cf. e.g. Fletcher, 2013, p. 209). Regarding the three theories detailed below, hedonism and objective list theories are certainly substantive theories of well-being, but can be understood as being formal theories, too. On the other hand, desire theories are mainly formal theories (cf. e.g. Rodogno, 2015). Also, it is possible to combine the respective formal and substantive claims over categories of theories.

3.2.1 Hedonism

> Nature has placed mankind under the governance of two sovereign masters, *pain* and *pleasure*. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all we think: every effort we can make to throw off our subjection, will serve but to demonstrate and confirm it. (Bentham, 1907 [1789], §1, original italics)

These are the famous first sentences of Bentham's (1907 [1789]) *An Introduction to the Principles of Morals and Legislation* – providing both the basic view of so called *prudential hedonism* (cf. e.g. Crisp, 2021, §4.1) as well as a foundation to *utilitarianism* as a theory in normative ethics. The idea of prudential hedonism is that well-being consists in as much pleasure and as little pain as possible for a person. The idea of utilitarianism is "the view that the morally right action is the action that produces the most good" (cf. J. Driver, 2022, §0), where in its classic form (Bentham, Mill, Sidgwick) the good is identified with pleasure. A major difference is that prudential hedonism is about the well-being of a single person. In utilitarianism on the other hand "one ought to maximize the overall good – that is, consider the good of others as well as one's own good".

Certainly, there are several objections to prudential hedonism as a theory of well-being, a strong and well-known one of which is Nozick's (1974, p. 42 f.) thought experiment of the *experience machine* which would simulate any experience you think pleasurable without you remembering that you plugged in or you being able to discern

that if one characterizes pleasure as an experience the subject wants to [i.e.: desires to] continue, the distinction between hedonism and desire theories becomes quite hard to pin down").

the deception. The thought experiment stimulates the intuition that this is not well-being – and that accordingly there must be more to well-being than the experience of pleasure.

For a short overview of further objections and amendments cf. e.g. Crisp (2021, §4.1). However, a final objection to prudential hedonism has not yet been put forward.

As a substantive theory of well-being, prudential hedonism says that well-being consists of *pleasure* and the absence of pain (on two dimensions). As a formal theory of well-being, prudential hedonism may claim that what makes pleasure good is *pleasantness* (cf. e.g. Crisp, 2021, §4.2).

Hedonism is a monistic theory.

3.2.2 Satisfactionism

There is desire satisfactionism and preference satisfactionism, which we will treat as synonyms (cf. section A.b on page 51 within 2.4.2.2).[143] Desire satisfactionism can react to the experience machine thought experiment in claiming that your desires remain unfulfilled, since it is (usually) not your desire to *have the experience* of something you (seem to) do, but to really *do* the thing (like e.g. climbing the Mount Everest).

Crisp (2021, §4.2) diagnoses that desire satisfactionism is currently the dominant theory of well-being and owes this prominence to the predominance of welfare economics. For welfare economics, desire theories solve a measurability problem that mental state theories come with – if (i) desire is preference, and (ii) preference is revealed by choice.

Most importantly, if desire fulfillment/preference satisfaction/utility maximization (cf. e.g. footnote 120 on page 48 for preference satisfaction = utility maximization) *is* well-being, that is: *the* good for a person, prudential value – then this is the justification for utility maximization: Utility maximization is preference satisfaction, and preference satisfaction is well-being.

However, to make desire theories at all plausible, there is quite some artificiality to be mixed in, the result being so-called *informed desire theory*: only the desires that you would have if you were 'fully informed' are the ones the satisfaction of which constitutes your well-being.[144] Fun fact: if you fail to have an according desire (say, to be a doctor) the realization of this would-be-desire (to be a doctor) will not contribute to your well-being (cf. Crisp, 2021, §4.2).

I consent with Crisp (2021) regarding desire satisfaction as a formal theory of well-being: "The idea that desire-satisfaction is a 'good-making property' is somewhat odd. [...] we desire things, such as writing a great novel, because we think those things are independently good; we do not think they are good because they will satisfy our desire for them" (§4.2). In other words: desire theories may simply be "mistaken in their reversal of the relation between desire and what is good" (Crisp, 2021, §4.3).

Preference satisfactionism is a monistic view, too.

[143] In the philosophical literature this category of theories is usually termed *desire theories*. However, I prefer *satisfactionism*, because it keeps the terminology close to *preference satisfaction*.

[144] The concept of being a "fully informed", idealized agent is clearly problematic, cf. e.g. Rosati (1995).

3.2.3 Objective List Theories

"Objective list theories are usually understood as theories which list items constituting well-being that consist neither merely in pleasurable experience nor in desire-satisfaction" (Crisp, 2021, §4.3). Here are four examples of lists of basic prudential goods as gathered by Fletcher (2016a, p. 149):[145]

(i) life, knowledge, play, aesthetic experience, sociability (friendship), practical reasonableness, religion (Finnis, 1980)

(ii) achievement, friendship, happiness, pleasure, self-respect, virtue (Fletcher, 2017)

(iii) life, knowledge, aesthetic experience, excellence in play and work, excellence in agency, inner peace, friendship and community, religion, happiness (Murphy, 2001)

(iv) moral goodness, rational activity, development of abilities, having children and being a good parent, knowledge, awareness of true beauty (Parfit, 1984)

These theories above are clearly pluralistic, and Fletcher (2016a) calls objective list theories entailing this feature "paradigmatic", but concedes that this is not a necessary attribute in terms of how the term is used in the literature (cf. p. 158). However, "what *is* essential to objective list theories is a rejection of the idea that something is good for someone only if that person has some pro-attitude towards it" (p. 158, original italics).[146] That is, if e.g. *knowledge* is on the list, the idea is that it is part of what constitutes well-being for you, even if you don't like knowledge, don't desire it, or don't prefer it to having fun.[147]

The lists of objective list theories are the substantive claim regarding well-being, what is the 'good-maker' (i.e. the formal claim) depends on the specific theory (cf. e.g. Crisp, 2021, §4.3). (I will come back to this later.)

The two largest criticisms of objective list theories include questioning the specific items on a list and their foundation, as well as the seeming paternalism and person-independence due to the fact that a pro-attitude toward the listed items is not required. Of course, there are ways to meet these objections; for an overview, cf. e.g. Fletcher (2016a).

Within this classification, Aristotelian virtue ethics, or *eudaimonism*, is an objective list theory, too (cf. e.g. Crisp, 2021, §0). Since my interest is with Aristotle, I will focus on his theorizing in the following.

[145] Another well-known list is Martha Nussbaum's (cf. e.g. Nussbaum, 2000, 2008); it includes: life, bodily health, bodily integrity, senses, imagination, and thought, emotions, practical reason, affiliation, other species, play, control over one's environment (Appendix B, p. 110 in Nussbaum, 2008). As a related strand of theorizing see the so-called *capability approach* (e.g. Sen, 1993). The capability approach entails a theory of well-being, but is less individualistic and rather comes with a societal and political entitlement.

[146] Remember, pro-attitudes are mental states expressing a positive stance toward their object, cf. section A on page 49 within 2.4.2.2. Desire and preference are pro-attitudes. "Pro-attitude" *is not* short for "propositional attitude" (for the concept of propositional attitudes cf. section A on page 17 within 1.2.3.2).

[147] Is that really so strange? How would parenting work, if everything that were good for a kid would depend on that kid's pleasure or desire/preference? In that case, it would probably be good for only very few kids to brush their teeth, go to school, or play computer games in moderation.

3.2.3.1 Aristotelian Eudaimonism

First a few words on terminology:

- As a theory, the following will be treated as synonymous: Aristotelian virtue ethics, Aristotelian eudaimonism, Aristotelian perfectionism.[148]
- Eudaimonism is both a theory in normative ethics as well as a theory of well-being/ prudential value.
- The term "perfectionism" was popularized by Hurka (1993, p. 3), and he discusses it as a moral theory, largely based on Aristotle. However, among its synonyms, this term seems to have become the preferred term within the literature on well-being.[149]
- The best translation for *eudaimonia*, of course, is under debate. The most common translations are "happiness", "well-being", and "flourishing".

It is safe to say that in the past few decades interest in virtue ethics or (Neo-)Aristotelian ethics and its according conception of happiness/well-being in philosophy as well as psychology and happiness research has soared (cf. e.g. Ryan & Deci, 2001; Veenhoven, 2013).

On Aristotle's account, happiness – i.e.: *eudaimonia*, most often translated as *flourishing*[150] – is men's highest good and final end (cf. Aristoteles, 2017, e.g. 1097a26, 1097b1, 1097b20),[151] and the highest good is taken to be an "activity of soul in accordance with virtue" (1098a17); 'the good life' is the virtuous life (cf. e.g. Hursthouse & Pettigrove, 2023).

Interestingly however, while the virtues of character ('ethical virtues') can and must be built by training (1103a14-18), virtue alone is not sufficient for *eudaimonia*, high virtue is not even attainable without some *luck* in life (e.g. 1099a31-b8, 1153b17–19): 'external goods' (namely: friends, wealth, power and good birth, good children, beauty) and the lack of bad strokes of fate/misfortunes are important for flourishing.[152]

Eudaimonia's lack of immunity to luck is thus one reason why in contemporary terminology eudaimonism is called an objective list account: there is a *list* of goods deemed necessary for human flourishing. Furthermore, the attribute *objective* here is due to the fact that according to Aristotle, virtuous activity is the 'human function' (1098a14), which means that virtuous activity is everyone's purpose, an all-human nature – and

[148] Since I will not be concerned with other versions, I will hence leave out the adjective "Aristotelian". I will mostly use the term *eudaimonism*.

[149] On terminology, Hurka (1993) says: "I call this moral theory *perfectionism* and its distinguishing ideal that of *human perfection*. Other terms are available: 'naturalism', 'humanism', and 'eudaimonism' for the theory, 'flourishing' and 'self-realization' for the ideal." (p. 3, original italics).

[150] I will use the terms 'eudaimonia' and 'flourishing' exclusively to refer to Aristotle's notion of happiness.

[151] In the following, where Aristotle's *Nicomachean Ethics* is concerned, I will only provide line number citations (and *not* cite the author, too), which is the common citation format for ancient texts and their translations.

[152] Cf. e.g. in book I: 1099a30 f., 1100b24 f., 1101a10 f.; in book X: 1178b1 f., 1178b30 f.; and the passages on torture in book VII: 1153b18 f.

what is needed to cultivate it, is needed by everyone: The 'good-maker' in eudaimonism is human nature.

With eudaimonism as a theory of well-being, there is a debate on whether *eudaimonia* is a dominant or an inclusive end.[153] That is, does eudaimonia *contain* all the listed intrinsic goods (such as knowledge), such that "happiness is a plurality" (Kraut, 2016, p. 25), or does eudaimonia *consist in* all the listed intrinsic goods and is thus the only item on the list (monistic)? Kraut (2016) advocates the latter.[154]

A Excursus: Aristotle on Decision Making In his *Nicomachean Ethics* Aristotle extensively treats the topics of deliberation and decision making. According to him, decision is "deliberational desire for things that depend on us" (1113a10). The decision for an action is based on deliberation, which is a rational and analytic process: given a goal, we reason backwards from there to the first step we can carry out as a means towards that goal. Interestingly, for Aristotle deliberation and deciding is exclusively about *means*, never about *ends*:

> But we deliberate, not about ends, but about what forwards those ends. For a doctor does not deliberate about whether he'll make his patients healthy, nor a public speaker about whether he'll persuade his audience, nor a political expert about whether he'll bring about good government – and neither do any of the others deliberate about the end, but rather they take the end for granted and examine how and by what means it will come about; and if it appears as coming about by more than one means, they look to see through which of them it will happen most easily and best." (1112b10-1112b20, trans. Aristotle, 2002).

In the context of his virtue ethics, one possible interpretation for this curiosity is Aristotle's claim that the highest good and final end for all humans is *eudaimonia*, that is: *happiness* or *flourishing* (e.g. 1097a26, 1097b1, 1097b20). This end is a given and cannot be decided otherwise; thus all intermediate goals are means to that end.

3.2.4 Summary & Discussion

Hedonism, satisfactionism (desire fulfillment), and eudaimonism (objective list) are the three candidates that explicate what is well-being. According to the first, well-being is pleasure and pleasure only. According to the second, well-being is desire/preference satisfaction and desire/preference satisfaction only. According to the last, well-being is eudaimonia and eudaimonia only. That is, we can use a monist interpretation for all of these theories. The good-maker in hedonism is pleasantness, in satisfactionism it is desire/preference satisfaction, and in eudaimonism it is human nature.

The strongest objection to hedonism is the thought experiment of the experience machine, the strongest objection to satisfactionism is having it backwards, and the strongest objection to eudaimonism is its person-independence.

[153] Cf. e.g. Fletcher (2013): "There is of course debate about whether the enumerative part is monistic (the 'dominant end' conception) or pluralistic (the 'inclusive end' conception)" (p. 209, fn.8).

[154] Accordingly, eudaimonism is not a paradigmatic objective list theory à la Fletcher (2016a).

Both hedonism and satisfactionism in their answer to what is prudential value, the *good for* a person, appeal to subjective states – pleasure and desire/preference. That is, they claim that what is of value depends on a person's pleasures and desires/preferences. This is the main source of criticism towards both theories and the difference to objective list theories which claim that "[s]ome things are good even if they don't cause pleasure, and are independent of our desires and/or preferences" (J. Driver, 2005, p. 34).

In passing, Crisp (2021, §4.3) makes two very interesting points that I wish to bring together for an argument in favor of eudaimonism: First, there is the point that hedonism may well be conceived of a monistic objective list theory, which makes satisfactionism and eudaimonism the only competitors. Second, there is the point that satisfactionism really has it backwards regarding desire and what is good (cf. section 3.2.2 on page 59 for the quote),[155] which pins the debate between hedonism and eudaimonism. Taken together, this makes objective list theories the winner – with the debate being between pleasure and eudaimonia.

The section on *Satisfactionism* (section 3.2.2) also included the answer to the question what justifies utility maximization/preference satisfaction. And the answer was: it is desire/preference satisfaction being the 'good-maker'. That is: What is prudential value? It is well-being. – What is well-being (substantively)? It is desire/preference satisfaction. – What makes desire/preference satisfaction good (formally)? Desire/preference satisfaction.

That is, desire/preference satisfaction gets used twice, both in the substantive and the formal claim.[156] In hedonism, too, the substantive and formal claim are very close to each other with 'pleasure' (on the list) and 'pleasantness' (as the good-maker).

In both cases, at the very least, this does not seems very informative, even circular (cf. also footnote 133 on page 53): Why is pleasure good for a person? Because it is pleasant. Why is utility maximization/preference satisfaction good for a person? Because it fulfills desire/satisfies preference. Eudaimonism, however, is informative: Why is eudaimonia good for a person? Because it realizes human nature.

Surely, this exposition of theories of well-being was very brief and limited, especially as regards arguments for and objections against each theory. It will suffice for the present enterprise, but see the footnote below for further literature.[157]

[155] The point that desire/preference satisfactionism has it backwards is a quite common critique, cf. e.g. J. Driver (2005, p. 34).

[156] But cf. e.g. Crisp (2021) for the point that a desire theorist may alternatively agree with the hedonist regarding the substantive claim being "pleasurable experiences" (§4.2).

[157] Cf. Kraut (2008) for a super-short 4-page but informative history of the philosophical inquiry into well-being. A contemporary prominent scholar of well-being, prudential value, and objective list theories and perfectionism is Guy Fletcher as editor and author (e.g. the books *The Routledge Handbook of Philosophy of Well-Being*, Fletcher, 2016c; *The Philosophy of Well-Being: An Introduction*, Fletcher, 2016b). For an overview on well-being in psychology from a philosophical perspective cf. e.g. Rodogno (2015). The question whether virtue as a *moral* activity/habit is at odds or harmonious with well-being as self-interest can be found addressed e.g. in Baril (2016). For a recent

3.2.4.1 Excursus: "Three Methods of Ethics"

I said that prudential value is distinct from moral value and that value theory is wider than moral philosophy (cf. footnote 136 on page 56). However, the relationship between the three theories of well-being (hedonism, satisfactionism, objective list theories) and the big *Three Methods of Ethics* (as the seminal discussion between M. W. Baron, Pettit, & Slote, 1997, was entitled), namely Kantian ethics/deontology, consequentialism/utilitarianism, and virtue ethics – deserves a comment.[158]

First, I already pointed out that Aristotelian eudaimonism is both a theory of well-being as well as a theory in normative ethics, more precisely: in virtue ethics.[159] *Second*, the classic utilitarians (Bentham, Mill, Sidgwick) were "hedonists about value" (cf. J. Driver, 2022, §0; they are now classified as 'hedonistic act consequentialists', cf. Sinnott-Armstrong, 2022, §1). Of course, utilitarianism/consequentialism has many variants, and even within act-utilitarianism, one need not identify the good with pleasure, there are plenty of other options. One of these options is, *third*, preference utilitarianism. Relying on a preference theory of value, desire/preference satisfaction is what is aimed at here (cf. e.g. Sinnott-Armstrong, 2022, §3). This version of utilitarianism is clearly the counterpart to desire/preference satisfactionism as a theory of well-being.[160] These analogies are depicted in Table 3.1 on the following page.

Hedonism and satisfactionism both matching to a version of utilitarianism once more stresses their likeness (cf. also the the last paragraph of footnote 142 on page 58).

defense of a hybrid theory of well-being cf. e.g. Lauinger (2021). Defenses of objective list theories are numerous, but cf. e.g. C. M. Rice (2013).

[158] There are further important normative ethical theories that deserve independent mention, especially intuitionism (e.g. famously Ross, 2002 [1930]; cf. Stratton-Lake, 2020, for an overview) and contractualism (e.g. famously Rawls, 1971; cf. e.g. Ashford & Mulgan, 2018, for an overview). However, the distinction into only three classes of theories is still prevalent; intuitionism and contractualism are deontological theories (cf. e.g. J. Driver, 2005).

[159] Are 'virtue ethics' and 'objective list theories' co-extensional on the whole? I couldn't say. It does not matter for now.

[160] A note on utilitarianism versus consequentialism: "Since the early 20th Century utilitarianism has undergone a variety of refinements. After the middle of the 20th Century it has become more common to identify as a 'Consequentialist' since very few philosophers agree entirely with the view proposed by the Classical Utilitarians, particularly with respect to the hedonistic value theory" (J. Driver, 2022, §5). That is, while consequentialism sounds as if it had a wider scope than utilitarianism, the emergence of the term is rather due to the desire to set oneself apart from classic utilitarianism. Accordingly, consequentialism and utilitarianism can be used synonymously. Cf also: "In actual usage, the term 'consequentialism' seems to be used as a family resemblance term to refer to any descendant of classic utilitarianism that remains close enough to its ancestor in the important respects" (Sinnott-Armstrong, 2022, §2).

Table 3.1 Theories of Well-Being vs. Theories in Normative Ethics

Theories of Well-Being	Theories in Normative Ethics
Hedonism (pleasure, pleasantness)	Hedonic Act-Utilitarianism
Desire / Preference Satisfactionism (desire / preference satisfaction, *ditto*)	Preference Utilitarianism
Aristotelian Eudaimonism (eudaimonia, human nature)	Aristotelian Eudaimonism

Note. In the left hand side column, underneath the names of the three theories of well-being, in parenthesis is given: 'the good' (substantive claim), 'the good maker' (formal claim). In satisfactionism the two may be the same.

The analogy is such that both domains of theories (well-being versus normative ethics) share the respective theory of value. Theories of well-being identify the respective values (pleasure, desire/preference, eudaimonia) as *prudential* value; theories in normative ethics identify the respective values as *moral* value. Whereas the theories of well-being (which just is a synonym to prudential value) are just this: theories of prudential value, in case of the theories in normative ethics, their respective theory of value (or: axiology) is just part of what identifies them. Furthermore, the theories of well-being are about what is good for one single person in terms of that person's self-interest, whereas the question of normative ethics, what act/activity is *morally* best/virtuous, must take into account other people, animals, nature, and maybe even further realms of value such as aesthetics.

Now, from the three methods of ethics (Kantian ethics/deontology, consequentialism/utilitarianism, virtue ethics) we have found two to be counterparts to the three theories of well-being. But what about Kantian ethics, is there no counterpart?[161]

Indeed, there is not. The reason is that it seems that Kantian ethics is not based on a theory of value (cf. e.g. Pettit in M. W. Baron et al., 1997). In other words, in Kantian ethics the right is not grounded in the good: "The received view is that Kant's moral philosophy [...] denies that right and wrong are in some way or other functions of goodness or badness" (Johnson & Cureton, 2022, §14); the classic reading is that "the authority of moral demands must come simply from their being the demands of a rational will" (§14).

[161] Regarding the term 'Kantian ethics' I stick with Baron: "The term 'Kantian ethics' is used rather loosely to refer not only to Kant's ethics but also to an array of contemporary ethical theories that rely on key ideas in Kant's ethics" (M. W. Baron et al., 1997, p. 3). Accordingly, I will treat 'Kantian ethics' and 'deontology' as synonymous.

Why not appoint e.g. *rationality* as the monistic value of a value theory fitting Kant's ethics? Indeed such accounts have been put forward: for example, according to Herman (1993), Kant's moral philosophy could be understood such that the rightness of an action is grounded in rational agency, which again is a value (cf. Johnson & Cureton, 2022, §14). In fact, it seems that contemporary philosophical thinking is quite interested on grounding Kantian ethics on a value theory, cf. e.g. Ridge (2009) on *Consequentialist Kantianism*.

At any rate, there is no theory of well-being that could be associated with Kantian ethics upon the received view. It might be possible, even easy to construct one based on a teleological readings of Kant, but this, of course, is beyond the scope of this work.

3.3 Theories of Utility

This section is about *substantive* theories of utility. What does that mean? It means – similar to the use of the term regarding the theories of well-being – that a substantive theory of utility says what instantiates utility. The classic candidates are once more: pleasure and preference satisfaction. Utility as an indicator of preference rank (e.g. Hausman, 2012, p. 14) is *not* a substantive account of utility.[162]

Are theories of utility at all different from theories of well-being? Well, it is not entirely the same mixture of academic disciplines and thus not entirely the same authors drawing the same connections who are concerned with these matters. But formally they should be the same: If utility denotes something like personal value (e.g. Hastie & Dawes, 2010), we need to look at theories for personal value, that is: prudential value (since obviously, decision theory is not about moral value, cf. also footnote 136 on page 56). And theories of prudential value are theories of well-being.

However, interestingly, there are usually only *two* theories of utility explicated: Benthamite utility and the conception favored by neo-classical economics, preference satisfaction (cf. e.g. Morewedge, 2015; Moscati, 2019; Read, 2007). This again shows that these debates are not led by the same people – because as regards content *and* form, there is no reason why the third class of theories of well-being, objective list theories/ perfectionism, should not be considered as a substantive theory of utility, too.[163]

[162] Cf. also Broome (1991, p. 3-4): "[...] a person's utility, as officially defined, has no necessary connection with her good. So nothing in the definition suggests that the preferred alternative is necessarily better for her" (p. 4). The official definition is, according to Broome, such: "utility is *that which represents a person's preferences*" (p. 3, original italics). – That is exactly what is meant by *non*-substantive. In fact, Broome (1991) in this famous article argues for assigning *exclusively* a non-substantive meaning to 'utility' as the technical term it is, and concludes with the somewhat funny words: "I therefore propose that this second meaning for 'utility' should be prohibited. 'Utility' should be used only for a representation of preferences." (p. 11).

[163] And indeed objective list theories are officially in the game with the capabilities approach (in fact a hybrid theory) in the writings of Nussbaum and Sen – which is rather well-received, but apparently has not made it (yet) into the canonical list of theories of utility. Likely, because it rather offers an alternative to the customary understanding of utility.

In the following I will stray from the classic chronological order, and I will start with the second theory, desire/preference satisfaction, before I will refer to Bentham and the classic utilitarians. This will not be too confusing, since Benthamite utility (although not under this name) has already been explicated in the section on *Hedonism* (section 3.2.1 on page 58) as a theory of well-being. For now, let's remember that Benthamite utility has to do with (the experience of) pleasure and pain. However, it is also often referred to as "happiness", even by Bentham himself.[164] Bentham's concept of utility will be treated in section 3.3.2 on page 77.

3.3.1 The 2nd Theory: Desire/Preference Satisfaction

As opposed to the conception of utility as based on the classic utilitarians (Bentham, Mill, Sidgwick), it is surprisingly difficult to trace the origin of this second conception, let alone find an authoritative formulation.

Here a few quotes – with none of them providing a historical reference for the claim:

> In the standard economic framework, the preference satisfaction view is the predominant theory of welfare. (Binder & Witt, 2011, p. 4)

> Welfare economics and neoclassical economic theory often presuppose an understanding of welfare in terms of preference satisfaction. (Grenholm, 2011, p. 42)

> What unites positive and normative economics is the theory of rationality and the identification of preference satisfaction with welfare. (Hausman, 2018, p. 201)

> In the theory of rational choice the equation of well-being with utility (preference-satisfaction) has achieved the status of an unquestioned axiom [...]. (L. W. Sumner, 1996, p. 122)

> We label the second feature of neoclassical economics methodological instrumentalism: all behaviour is preference-driven or, more precisely, it is to be understood as a means for maximising preference-satisfaction. [fn.2: Not to be confused with actual, psychological satisfaction. In this sense, homo economicus may maximise his preference satisfaction while feeling suicidal.] (Arnsperger & Varoufakis, 2006, p. 8)

Accordingly I will venture an historical excursus.

3.3.1.1 The Historical Traces of Utility as Desire/Preference Satisfaction

Read (2007) traces the renunciation of Benthamite utility to the emergence of marginal utility theory and subsequently the so-called ordinal revolution: "This *ordinal* utility function, therefore, represents a complete departure from Benthamite utilitarianism"

[164] This is just a cautionary note, because "happiness" is very ambiguous, and I personally like to reserve it as a characterization of eudaimonia. Thus, I will try to avoid using "happiness" to refer to Benthamite utility, but of course the term comes up in the literature.

(p. 49, original italics). However, Read (2007) does not elaborate on the conceptualization of utility as preference satisfaction.

Morewedge (2015) refers to "a reconceptualization of utility by economists of the Austrian School, including Menger, Wieser, and Böhm-Bawerk" (p. 296). She continues in pointing to marginal utility, too: "They argued that utility is not a property inherent in a good or an experience; it is determined by the importance of the desire that an additional unit of that good or experience would satisfy" (p. 296), citing McCulloch (1977). Morewedge (2015) mentions the satisfaction of desire, but again does not elaborate on the conceptualization of (overall/total) utility as the desire/preference satisfaction kind of well-being/welfare.

Crisp (2021) claims that "the reason for the current dominance of desire theories lies in the emergence of welfare economics" (§4.2). More precisely, what is meant is the transition from old to new welfare economics in the 1930s and 1940s (Backhouse, Baujard, & Nishizawa, 2021): "A key element in this transition was the rejection of interpersonal utility comparisons, and therefore of utilitarianism, in favour of a Paretian welfare economics that required as inputs no more than ordinal utilities or preferences" (p. 2). According to Backhouse et al. (2021), Samuelson was one of the major figures of the new welfare economics and it is him (Samuelson, 1947) whom the principle of revealed preferences is attributed to. Black (2017) recounts this part of the history of economic theory such:

> In the 1930s most economists became increasingly uncomfortable with the idea of measurement and interpersonal or intergroup comparisons of utility. In 1934, in a famous article entitled 'A Reconsideration of the Theory of Value', Hicks and Allen used the technique of indifference curves originated by Edgeworth and developed by Walras's successor at Lausanne, Vilfredo Pareto, in presenting a theory of consumer behaviour involving only ordinal comparisons of satisfaction. A few years later a further step towards eliminating what were now considered dubious psychological assumptions from that theory was taken by treating consumer behaviour solely on the basis of revealed preference. (p. 5-6)

In sum, Benthamite utility was understood cardinally, but economists grew unsatisfied with it. As a consequence, they turned to (i) ordinal utility, and (ii) the principle of revealed preferences. Ordinal utility does not possess a higher level of measurement than preferences themselves, accordingly there is no measurement advantage with [i] and no measurement problem with [ii]. In fact, ordinal utilities simply *are* preferences (cf. also the quoted passage from Backhouse et al., 2021, p. 2, above, equating the two).[165]

The problem of measurement, interpersonal comparison, the air of 'dubious psychology', and an ambition to set economics apart from utilitarianism and hedonism as theories in normative ethics may all have contributed to the turn to ordinal utility.[166]

[165] Cf. Bruni and Sugden (2007) for a thorough and well-informed interpretation of the 'Paretian turn' that contextualizes it within the intellectual climate at the time.

[166] Cf. Bruni and Sugden (2007): "This shift [i.e.: the 'Paretian turn'], initiated by Vilfredo Pareto and completed in the 1930s and 1940s by John Hicks, Roy Allen and Paul Samuelson, eliminated

Ordinal utility/preference is *formally* not the same as Bentham's cardinal utility of pleasure/pain. Accordingly, just as the above authors (Backhouse et al., 2021; Black, 2017; Crisp, 2021; Morewedge, 2015; Read, 2007) claim, this indeed is the point in time where economic theorizing departed from the utilitarian conception of utility – formally.

But what about the substantive interpretation of utility? None of the above pinpoints the emergence of utility as desire/preference satisfaction. We will therefore look at some original writing from that time.

A Desire Satisfaction at the Beginning of the 20th Century: An Example Jacob Viner, a praised expert for the history of economic thought, in Viner (1925) quotes "the meaning of utility from a widely-used text" (p. 652) from 1920 (R. T. Ely, *Outlines of Economics*):

> Anything that is capable of satisfying a human want is a good, and possesses utility. We need here to guard against a misunderstanding which the word 'utility' might suggest. Utility is the power to satisfy wants, not the power to confer benefits. Cigars are as 'useful' in the economic sense as bread or books, for all three satisfy wants. Economic wants may be serious, frivolous, or even positively pernicious, but the objects of these wants all alike possess utility in the economic sense. (Viner, 1925, p. 652, quoting R. T. Ely, 1920, *Outlines of Economics*, p. 105)

That is: *utility = power to satisfy wants/desires.*

Further, Viner (1925) states that "[t]he welfare economist, if he is of the utility school, generally defines and measures welfare in subjective terms of utility" (p. 640) and "utility theorists as a rule take welfare to mean satisfaction" (p. 647, also p. 638).

That is: *welfare = utility = satisfaction (of wants/desires).*[167] [168]

According to these quotes it would seem that in 1925 the understanding of utility as desire satisfaction was already quite common.[169]

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psychological concepts from economics by basing economic theory on principles of rational choice" (p. 146).

[167] As the parentheses would suggest, the qualification of "satisfaction" to mean "satisfaction *of wants/desires*" is mine. I find it warranted by context and by Viner (1925) himself (cf. e.g. p. 639 for the expression "maximum satisfaction of wants"), but really he usually refers to 'satisfaction' tout court.

[168] The definition of utility as 'the power to satisfy wants' and 'the satisfaction of wants', of course, is not the same. Interestingly, the two formulations parallel a distinction in the understanding of Benthamite utility, where the correct reading seems to be 'X', which, however, mostly got simplified to 'Y', cf. section 3.3.2 on page 77.

[169] However, cf. the following longer quote which suggests that there really was no clear mainstream understanding of utility at the time:

"The welfare economist, if he is of the utility school, generally defines and measures welfare in subjective terms of utility. But there pervades the utility economics a threefold ambiguity in the use of the term 'utility', whose persistence is facilitated by the lingering traces of psychological hedonism in its analysis and by the lack of clearly-defined dividing lines in its organization between

A.a Desire vs. Satisfaction Viner (1925) spends a large part of his investigation campaigning for a distinction between *desire* and *satisfaction* (of desire) and claims: "To assume the lack of disparity between desire and satisfaction is arbitrarily and unwisely to limit the scope of welfare economics" (p. 649).

The distinction between *desire* and *satisfaction* apparently remained an important one such that more than half a century later Sen (1984) clarifies: "the more dominant schools of utilitarianism today take a 'desire' view of utility rather than the 'satisfaction' view, and put value on the fulfilment of what is desired rather than on the amount of satisfaction it generates" (p. 77).[170]

Both, Viner (1925) and Sen (1984) quote the same passage from Pigou (1920, p. 24), where Pigou argues against such a disparity: "It is fair to suppose that most commodities, especially those of wide consumption that are required, as articles of food and clothing are, for direct personal use, will be wanted as a means to satisfaction, and will, consequently, be desired with intensities proportioned to the satisfactions they are expected to yield" (Pigou, 1920, p. 24, §2). Viner (1925) finds this correlation rightly implausible on several grounds.[171]

A.b Two Interpretations How to make sense of this?

On the one hand, it seems that the interpretation of utility as 'the power to satisfy wants' – that is: desire satisfaction – was already dominant much earlier than the mentioned 'transition' of the 1930s and 1940s: If this understanding was portrayed in a "widely-used text" (Viner, 1925, p.652) from 1920 – then this was not a new idea, but

price problems and welfare problems. Utility is sometimes used to signify satisfaction, pleasure, happiness, or whatever the stuff of welfare is thought to be;[fn. 6: Cf. Alfred Marshall, *Principles of Economics*, 6th ed., p. 93: "The total utility of a thing to anyone (that is, the total pleasure or other benefit it yields him)..."] at other times to signify the capacity of goods to contribute to welfare, or to yield satisfactions. [fn.7: Cf. F. A. Fetter, *Economic Principles* (New York, 1915), pp. 25, 509.] In recent years there has been a tendency to confine its meaning to 'capacity to satisfy desire' or 'desiredness', and then to abandon it, because of its ambiguity, for the latter term. [fn.8: Cf. A. C. Pigou, *The Economics of Welfare* (London, 1924), p. 23: "For this meaning of the word 'utility', 'capacity to excite or induce desire' would be preferable, as less ambiguous, than 'capacity to satisfy desire'.] [...] Among welfare economists of the utility school it has been the general tendency to take satisfaction (in some cases, pleasure) as the unit of welfare" (Viner, 1925, p. 640-41).

[170] Sen (1984) seems not to distinguish here between 'desire' and 'desiredness' since a few lines later he refers to "the 'satisfaction' view and the 'desiredness' view of utility" (p. 77).

[171] Viner's (1925) argumentation in favor of the 'disparity' between desire and satisfaction has several aspects, some of which more economic in nature, which I will ignore (e.g.: "Now price, if it measures any subjective quantity, measures desire, and is a measure of satisfaction only to the degree in which desire is an accurate reflection of satisfaction. [...] A welfare economist who accepts satisfaction as the content of welfare cannot, therefore, accept price as a measure of welfare unless he accepts desire as an accurate, or at least approximate, measure of satisfaction", p. 647-648). A very easy to follow rather philosophical argument, however, is his point made as a direct comment on the quote from Pigou (Viner, 1925, p. 648-649): expectations of satisfaction from the fulfillment of a desire may be "grossly mistaken" (p. 648), desires for food and clothing may be not just about physical needs, but "a whole set of cultural values" (p. 648, fn.18), and one might desire something out of habit, but due to some change cease to be satisfied from it.

an established one.

On the other hand, maybe 'the power to satisfy wants' and especially 'satisfaction' tout court *is not* the same as desire satisfaction/fulfillment. There are several points that speak in favor of this latter interpretation:

First, there is the above quote from Sen (1984) where the point is that the 'desire view' (i.e.: desire fulfillment/satisfaction) is the contemporary mainstream understanding, whereas the 'satisfaction view' fell out of favor. Accordingly, it stands to reason that the old 'satisfaction view' was probably related to Benthamite utility/hedonism. Maybe 'satisfaction' was equated with 'pleasure', that is: 'satisfaction' was supposed to be understood hedonistically.

Further indicators of the correctness of this second interpretation are these: Samuelson (1938) states:

> Although much of the discussion has not gone beyond a quasi-philosophical defense or rejection of the utility concept, it is nevertheless possible to discern clear lines of development in the literature. First, there has been a steady tendency toward the removal of moral, utilitarian, welfare connotations from the concept. Secondly, there has been a progressive movement toward the rejection of hedonistic, introspective, psychological elements. These tendencies are evidenced by the names suggested to replace utility and satisfaction – ophélimité, desirability, wantability, etc. (Samuelson, 1938, p. 344)

Sen (1987) claims in a section titled *Utility as Pleasure and Happiness*:

> It is only in a very broad sense that pleasure can possibly be seen as something like 'happiness' (and provide the basis of Bentham's 'the greatest happiness principle'). Marshall's and Pigou's use of the term 'satisfaction' is equally broad (Marshall 1949: Book 3; Pigou 1952: Chapter 2). (Sen, 1987, p. 7)

In Frey and Stutzer (2000) the most revealing formulation is to be found:

> The initiators of the modern analysis of decision-making (Bernoulli and Bentham) understood utility as satisfaction, referring to the hedonic quality in terms of pleasure and pain. (Frey & Stutzer, 2000, p. 147)

Even more clear is the point in Little (2002 [1950]) on Benthamite utility:

> Utility was a power in objects which would normally create satisfaction, and a man's happiness was the sum total of his satisfactions. (Little, 2002 [1950], p. 7)[172]

In sum, it seems the term *satisfaction* or even *satisfaction of wants* (cf. footnote 167 on page 69) – at that time before the so-called transition from old to new welfare economics in the 1930s and 1940s – was meant to refer to Benthamite utility having a 'hedonic quality'. That is, the 'power to satisfy wants' from the 1920 textbook was used synonymously to 'the power to create satisfaction' which was Bentham's conception of utility according to Little (2002 [1950]) (and several further authors, e.g. Broome, 1991; Mongin & D'Aspremont, 1998).

[172] This quote also speaks to footnote 168 on page 69, and will be taken up later.

A.c Conclusion This clearly makes room for immense confusion in terminology: The new and current understanding of utility as *desire fulfillment*[173] is almost indistinguishable from the formulation of utility/welfare as *satisfaction of wants* – which could rightly be abbreviated to "desire satisfaction". Accordingly, here, because of the use of the term 'satisfaction' with hedonistic reference, "desire fulfillment" is *not* the same as "desire satisfaction" – as I claimed it should be understood and gets used nowadays (cf. footnote 139 on page 57).

A historic guess is that the *idea* of desire satisfaction (as understood today) was already there quite early, but got confused and mixed up with a hedonic use of the term 'satisfaction'. Furthermore, desire satisfactionism and hedonism are indeed conceptually quite similar (as has been pointed out in the last paragraph of footnote 142 on page 58), so that a mix-up is quite plausible.

3.3.1.2 Criticism of the Terminology

The terminological chaos I stumbled upon during my attempt to find an origin of desire/preference satisfactionism[174] has been noted and criticized by others as well – although not widely, it seems.

Two notable exceptions are Broome (1991) and Mongin and D'Aspremont (1998). Both essentially argue that the *substantive* understanding of "utility" as desire/preference satisfaction somewhat accidentally cropped up and then came to overshadow and – what is worse – became mixed up with the *technical* axiomatic notion of utility as a representation of preference.[175] The distinction between a substantive and a technical notion rather got lost.[176]

Broome's 1991 argumentation becomes very clear in the following quotes:

> [...] This is by now the official definition of utility in economics. For brevity, let us say: *utility is that which represents a person's preferences.* [...] But a person's utility, as officially defined, has no necessary connection with her good. So nothing in the definition suggests that the preferred alternative is necessarily better for her. However, many economists adopt the official definition of 'utility', while at the same time also using the word to stand for a person's good. Because an alternative preferred by a person is defined to have a higher utility for her, they take it for granted that it must be better for her. They suppose, then, that a person always prefers what is better for her.
>
> We may call a person who always prefers what is better for herself 'self-interested'. [...] Simply by muddling the different meanings of a 'utility', many economists find

[173] Cf. once more the quote from Sen (1984) already given above: "the more dominant schools of utilitarianism today take a 'desire' view of utility rather than the 'satisfaction' view, and put value on the fulfilment of what is desired rather than on the amount of satisfaction it generates" (p. 77).

[174] Which, by the way, I obviously failed to achieve. But alas, I am no historian of science, much less a historian of economic thought.

[175] I think the same point is made by Hausman (2012).

[176] I use here the characterization 'substantive versus technical' to denote the two notions/conceptions of utility. This is *not* exactly the same distinction as 'substantive versus formal' as used by Crisp (2021) in the discussion of theories of well-being (cf. section 3.2 on page 57).

> themselves committed to the view that people are necessarily self-interested in this strong sense. [...]
>
> The first principle of economics is, I take it, utility theory. And modern, axiomatic utility theory makes no assumption that people are self-interested. All it assumes is that people's preferences conform to a number of axioms: roughly, they simply need to be consistent. They can conform to the axioms without being self-interested. Yet the muddle over 'utility' leads many economists to forget this important discovery. (Broome, 1991, p. 3-4)
>
> It may turn out that common opinion is incorrect. Altruism and imprudence may not exist, and everyone may always prefer what is best for themselves. Utility, defined to represent a person's preferences, may indeed turn out also to represent her good. All this is arguable. One argument, for instance, is that a person's good actually *consists* in the satisfaction of her preferences, so that, of two alternatives, the one she prefers cannot fail to be better for her. But at least the argument needs to be made. It is a substantive question whether or not preferences are necessarily self-interested. If, though, you use 'utility' to stand for a representation of a person's preferences, and at the same time for the person's good, you cannot even express the question. You will say: by definition, what a person prefers has more utility for her, so how can it fail to have more utility for her? The ambiguity is intolerable. (Broome, 1991, p. 5)

Broome (1991) in the end is sufficiently exasperated by the 'muddle over utility' that he demands outright that the substantive meaning of utility should be "prohibited" (p. 11, cf. also footnote 162 on page 66).

The criticism in Mongin and D'Aspremont (1998) is more difficult to trace and less of an argument than a historical account. It goes like this:

(1) The standard interpretation of utility is that "the utility of a thing or an action reflects the extent to which that thing or action is preferred to others, and has no meaning beyond that" (p. 382).

(2) The "technical turn" (p. 385) made preference a "distinctive technical entity" (p. 385). As compared to Benthamite utility, the utility concept is no longer primitive, but the notion of preference is "the true primitive" (p. 383).

(3) The discipline of welfare economics "needs a concept of good: officially it is 'welfare' or 'well-being"' (p. 387).

(4) "[I]t would appear that welfare economics should interpret utility functions as measuring individual welfare or well-being [...]" (p. 387).

(5) "At least after Paretian economics established its grip on the field, the definition of utility effectively used in welfare economics, as against the official definition, went in terms of actual preference satisfaction" (p. 387).

(C) "[W]elfare economics *assumes* that the relevant agents' conceptions of well-being are conveyed by a description of their actual preferences. This is a strongly loaded claim, and it is undefended within welfare economics itself" (p. 387-388, original italics).

In terms of a history of ideas, it is quite obvious that there is a gap between [4.] and [5.]: How did it happen that "preference satisfaction" became the 'definition' of utility?

At any rate: both Broome (1991) and Mongin and D'Aspremont (1998) make a sharp distinction between the technical (utility = representation of preference) and the substantive (utility = preference satisfaction) meaning of utility and advocate caution when operating with these formally very different notions.

3.3.1.3 Summary & Discussion

In sum, the question of how exactly in the history of economic thought the substantive interpretation of utility as preference satisfaction (section 3.3.1 on page 67) came to prevail will remain partially unanswered. What is important, however, is (i) the fact that its emergence and codification is difficult to pinpoint (section 3.3.1.1 on page 67), (ii) the general complexity and ambiguity in terminology as already present in the beginning of the 20th century (section A on page 69), and (iii) the criticism of the unwise and mixed-up use of both the technical and the substantive notion of utility (section 3.3.1.2 on page 72).

Table 3.2 depicts the conceptual landscape:

Table 3.2 Substantive vs. Formal vs. Technical Notion of Utility – the Problematic Version.

Substantive Theory of Well-Being / Utility	**Formal Theory of Well-Being / Utility**	**Technical Notion of Utility**
↓	↓	↓
the prudential good	the good-maker	axiomatic definition
=	=	↓
utility	utility	utility
=	=	=
desire / preference satisfaction ?	desire / preference satisfaction	measure / indicator / representation of preference
		Corollary:
=	=	utility maximization
utility maximization ?	utility maximization ?	=
		preference satisfaction

Note. The question marks in the last row behind "utility maximization" point to the inconsistency where in the first and second column *utility* would be identified with *utility maximization*. The question mark behind "desire/preference satisfaction" in the first column references the remark by Crisp (2021) that desire theories of well-being are rather *formal* theories than *substantive* ones.

First, there is the identification that utility is well-being. Second, according to Crisp (2021), theories of well-being can be *substantive* (the prudential good) or *formal* (the good-maker). Third, upon Broome (1991) and Mongin and D'Aspremont (1998), it makes sense to furthermore distinguish the *technical* notion of utility where based on

representation theorems (cf. also footnote 114 on page 44 within 2.4.2.1) utility is the measure/indicator/representation of preference. Moreover, based on the technical notion of utility and the concept of preference, I already established that *utility maximization* should be identified with *preference satisfaction* (cf. section 2.4.2.2 on page 47).

The depiction by Table 3.2 on the previous page poses the question whether these theories and notions can be made consistent with each other – and it suggests that no. If I rightly reasoned that upon the technical road preference satisfaction *is* utility maximization (cf. also footnote 119 on page 48), the (substantive and formal) theories of well-being/utility run into the difficulty that utility = preference satisfaction = utility maximization, that is: utility = utility maximization – which cannot be. Or, stated differently: utility = preference = preference satisfaction, that is: preference = preference satisfaction – which is nonsensical, too.

Are there ways to mend that? Could some identity relation be denied?

On a meta-level, of course, one may deny that the technical notion of utility representing preference must at all be brought into accordance with utility in the context of theories of well-being and/or utility as a *good*. One might try to argue that these are two different domains of explanation and that they can happily coexist without being consistent overall.

I don't think that this would be the best way to go – both Mongin and D'Aspremont (1998) and especially Broome (1991) lament the imprecision and inconsistency as intolerable.

The core problem seems to be that upon the technical notion *utility = preference*, whereas upon the well-being notion *utility = preference satisfaction*. There is no way that the technical definition of utility as a representation of preference could be changed (which is what Broome (1991) believes, too). And on the technical side, the identification of utility maximization and preference satisfaction is sound, too. Accordingly, the possibility for change must be found elsewhere.

I believe, the root of the problem is the idea that well-being/welfare is (overall) *utility*. What should be identified is well-being/welfare and *utility maximization*, that is: *choosing* the option with the highest overall utility (cf. section 2.4.3.1 on page 52 for the definition of utility maximization). That is, what should be the case is:

$$\textit{well-being/welfare} = \textit{utility maximization} = \textit{preference satisfaction} \text{ and}$$

$$\textit{utility} = \textit{preference}.$$

This makes the point that it is not the overall utility of an option itself that is well-being/welfare, but *choosing* that option, *obtaining* that which has the highest utility for you, that is: satisfying your preference, maximizing your utility. Once you think about it like that, I find that the idea that utility itself – that is: the number that gets assigned to an option signifying its overall evaluation based on the utility formula – *is*

well-being really makes no sense. Obtaining/realizing the option with the highest utility being well-being, however, is at least conceptually sound.

Let's settle on well-being being utility maximization. There is still the question open whether this is a formal or substantive theory of well-being: is utility maximization the good-maker or the prudential good – or both? Could it even be both at the same time?

According to Crisp (2021), desire theories are rather formal theories of well-being which would make utility maximization the good-maker. That is, utility maximization would make it good that whatever is the good is indeed good. Compare hedonism: pleasantness (formal) is what makes pleasure (substantive) the prudential good/well-being. The quality or the character of pleasantness makes pleasure good. What is the quality or character of utility maximization? It is, that you get what you wanted. That you get what you wanted makes something good. The prudential good could be utility maximization again. Then it is: that you get what you wanted (formal) makes utility maximization (substantive) the prudential good/well-being. That should work. But does it not sound hollow? Pleasantness indeed comes with a quality in the full meaning of the term, it is something you can *experience*. Getting what you want – does this have its own quality? But does it need to? It it the advantage of desire theories over hedonism to not have to confront the experience machine counterexample: you do not desire the *experience* of writing a novel, but *writing a novel*; the experience machine could not fulfill your desires (cf. section 3.2.2 on page 59).

I will leave it at that. The system of theories is sound with well-being/welfare consisting in utility maximization and desire/preference satisfaction respectively – while importantly *utility* $\neq$ *well-being*. I am not at all convinced by desire/preference satisfactionism as a theory of well-being as I already hinted at (cf. section 3.2.2 on page 59), but a thorough critical evaluation is not needed here. A quick criticism of the theory based on the existence of altruism and imprudence can also be found in Broome (1991).

It is just important to keep in mind that "The 2nd Theory" as treated in this section is not a theory of utility, but a theory of utility *maximization*. The question posed at the end of section 2.2 on page 33: *why should I care about utility maximization*, *what justifies utility maximization* – has already been answered in the summary given in section 3.2.4 on page 62, namely that desire/preference satisfaction is the good-maker within a formal theory of well-being. Now we can officially phrase the same point in terms of utility maximization (i.e.: utility maximization is the good-maker of utility maximization as the prudential good).

The point is, if this theory of well-being is the favorite and standard theory of well-being in welfare economics, then it follows that welfare economics *does not have a (substantive) theory of utility*, but only has a (substantive) theory of utility *maximization*.[177] Table 3.3 on the next page depicts a consistent version of a substantive/formal

[177] "Substantive" as used here is not meant to be contrasted with "formal", but with "technical", as used by Broome (1991) and Mongin and D'Aspremont (1998); cf. also footnote 176 on page 72.

theory of well-being as utility maximization on the one hand and the technical notion of utility on the other hand.

Table 3.3 Substantive vs. Formal vs. Technical Notion of Utility/Utility Maximization.

Substantive Theory of Well-Being	Formal Theory of Well-Being	Technical Notion of Utility
↓	↓	↓
the prudential good	the good-maker	axiomatic definition
=	=	↓
utility maximization	**utility maximization**	**utility**
=	=	=
desire / preference satisfaction	desire / preference satisfaction	measure / indicator / representation of preference

Desire/preference satisfactionism is thus a utility maximization theory of *well-being*. There is no according theory of *utility*, just the axiomatic definition of utility, and well-being ≠ utility.

3.3.2 The 1st Theory: Two Readings of Benthamite Utility

The first theory of utility is based on the conception(s) of the classic utilitarians, Bentham, Mill, and Sidgwick – with Bentham (1907 [1789]) providing the original formulation. Sinnott-Armstrong (2022) describes classic utilitarianism such:

> Classic utilitarians held hedonistic act consequentialism. *Act consequentialism* is the claim that an act is morally right if and only if that act maximizes the good, that is, if and only if the total amount of good for all minus the total amount of bad for all is greater than this net amount for any incompatible act available to the agent on that occasion. [...] *Hedonism* then claims that pleasure is the only intrinsic good and that pain is the only intrinsic bad. (Sinnott-Armstrong, 2022, §1, original italics)

Act utilitarianism is a theory in normative ethics, the focus is on the 'moral right' as above (cf. also section 3.2.4.1 on page 64 on *Three Methods of Ethics*). Hedonism in the formulation above is hedonism about value: "this is the thesis that anything has non-instrumental value if and only if it is an instance of pleasure, and has non-instrumental disvalue if and only if it is an instance of pain or displeasure" (A. Moore, 2013, §2).

Based on the classic quote from Bentham (1907 [1789]) already given in section 3.2.1 on page 58, and the understanding of subsequent utilitarians, utility became *identified with pleasure*. Let's call this *the simple view*.

Here is a quote from Mill (2003 [1861]) that suggests exactly that understanding:

> Those who know anything about the matter are aware that every writer, from Epicurus to Bentham, who maintained the theory of utility, meant by it, not something to be contra-distinguished from pleasure, but pleasure itself, together with exemption from pain [...]. (Mill, 2003 [1861], p. 185)

Several authors (cf. e.g. Broome, 1991; Little, 2002 [1950]; Mongin & D'Aspremont, 1998) claim that the simple view is mistaken and point to a quote from Bentham (1907 [1789]) just a few lines after the classic opening sentence (given in section 3.2.1 on page 58):

> By utility is meant that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness, (all this in the present case comes to the same thing) or (what comes again to the same thing) to prevent the happening of mischief, pain, evil, or unhappiness to the party whose interest is considered: if that party be the community in general, then the happiness of the community: if a particular individual, then the happiness of that individual. (Bentham, 1907 [1789], §3)

Let's call this quote *Definition 1*. The important difference here is that in this quote Bentham does not simply identify utility with pleasure or happiness, but makes it out to be the 'property in any object' which 'tends to produce benefit' such as pleasure/ happiness. That is, utility is not an experiential mental state of a person, but (i) the attribute of an option[178] which (ii) is only probabilistically related to the production of e.g. pleasure.[179]

Regarding the *principle of utility*[180] Bentham (1907 [1789]) states:

> By the principle [fn.2] of utility is meant that principle which approves or disapproves of every action whatsoever, according to the tendency which it appears to have to augment or diminish the happiness of the party whose interest is in question: or, what is the same thing in other words, to promote or to oppose that happiness. (Bentham, 1907 [1789], §2)

Let's call this quote *Definition 2*. It further corroborates that two different readings are possible: It is either:

$$\textit{utility} = \textit{pleasure/happiness} \text{ (the simple view) or}$$

$$\textit{utility} = \textit{the tendency to promote pleasure/happiness} \text{ (the non-simple view).}$$

Some authors (e.g. Mongin & D'Aspremont, 1998) find the distinction to be important – the reasons for and consequences of which I cannot further discuss here.

However, let's see how the two readings fare within the utility calculus: Thinking of the utility formula (cf. section 2.4.1.1 on page 39), it is abundantly clear that overall utility is something that is attached to an option. Accordingly, you can e.g. say, "Option A has a utility of $U_A = 5$". However, saying "Option A has an amount of pleasure of

[178] I will assume that 'object' may be both an object as well as an action.

[179] The probabilistic aspect is very interesting and warrants further scrutiny as well as a comparison with (subjective) expected utility theory. Is Bentham's utility *probability x pleasure*? Sadly, I cannot follow up on this here.

[180] As synonymous Bentham (1907 [1789]) later uses the term 'the greatest happiness principle'.

$Pleasure_A = 5$" makes no sense at all. The option does not *have* the pleasure – but the option can *lead to* some amount of pleasure *for a person*. It is the person who has the pleasure, not the option.

So I believe Bentham was aware of this semantically more sound formulation when talking of 'producing benefit', and since he was not naive, he added that an option only ever comes with a 'tendency' of said production, since there is no guarantee that you foresaw and calculated everything just right.[181]

In sum, I believe that trivially the non-simple view is correct.

3.3.2.1 Pleasure, Pain, and Happiness

A few clarifications regarding pleasure, pain, and happiness are in order.

A Pleasure & Pain Is pleasure and pain on one dimension? It seems that hedonism often is understood such, but it shouldn't be: pleasure and pain are two dimensions.

> Some moral theorists seek a single simple basic principle because they assume that simplicity is needed in order to decide what is right when less basic principles or reasons conflict. This assumption seems to make hedonism attractive. Unfortunately, however, hedonism is not as simple as they assume, because hedonists count both pleasures and pains. Pleasure is distinct from the absence of pain, and pain is distinct from the absence of pleasure, since sometimes people feel neither pleasure nor pain, and sometimes they feel both at once. Nonetheless, hedonism was adopted partly because it seemed simpler than competing views. (Sinnott-Armstrong, 2022, §3)

As regards Bentham, the more complex view is certainly correct, since in Chap. IV, § V of *An Introduction to the Principles of Morals and Legislation* Bentham (1907 [1789]) gives a detailed account of how to gather and sum up the value of each pleasure *and* each pain.

That is, there is not only an intrinsic good (pleasure), but also an intrinsic bad (pain), cf. also e.g. J. Driver (2022), §2.1.

B The Quantity of a Pleasure or a Pain Bentham gives four plus two 'circumstances' (i.e.: factors) that determine the 'value' (i.e.: the weight or quantity) of a pleasure or a pain (Bentham, 1907 [1789], Chap. IV, § II-III). The first four are properties of a pleasure/pain itself and determine its value, namely: *intensity*, *duration*, *certainty/uncertainty*, *propinquity/remoteness*. The further two are "properties only of the act [...] by which such pleasure or pain has been produced" (Chap. IV, § III), namely *fecundity*

[181] M. Warnock (2003) cautions that with the talk of 'tendency', Bentham referred to classes of acts, not singular acts: "Bentham, being primarily interested in law, was naturally concerned with the types of actions that should be criminalized, because of their 'tendency' to maximize pain and minimize pleasure. The language of 'tendency' which Bentham constantly employs makes no sense when applied to a single act" (p. 11). I think it does make sense for single acts, too, if understood probabilistically.

and *purity*, designating the likelihood that a sensation of the same or opposite kind succeeds after the first instance of pleasure and pain respectively.

These six 'circumstances' are meant to be dimensions of pleasure and pain and the basis of the according 'felicific calculus'.[182] Bentham did not believe that this calculus should be applied in every (moral) deliberation (cf. e.g. J. Driver, 2022, §2.1), it was rather to be understood as an ideal (cf. e.g. Crimmins, 2023, §3.2).

C Happiness In *Definition 1* as quoted in section 3.3.2 on page 77, Bentham (1907 [1789]) offers 'happiness' as an alternative to pleasure, the principle of utility gained as a synonym the designation 'the greatest happiness principle' (cf. footnote 180 on page 78), and the slogan 'the greatest happiness for the greatest number' is attributed to classic utilitarianism (cf. Sinnott-Armstrong, 2022, §1).

In the more than 100 years after *An Introduction to the Principles of Morals and Legislation* when not focusing on this specific terminology, the synonymous use of 'pleasure' and 'happiness' in the domains of utilitarianism and hedonism was generally continued. However, 'happiness' is used in other philosophical contexts, too, for example as a translation for Aristotelian eudaimonia (cf. section 3.2.3.1 on page 61) – which is a very different entity to pleasure. I tend to agree with Nussbaum (2008) who argues for a richer (more Aristotelian) understanding of 'happiness'. Yet, be this as it may, for now it is simply important to be aware of the several contexts and uses of 'happiness' – there are, of course, further uses in empirical psychology – and not confuse them.

3.3.2.2 Excursus: The Principle of Maximization and 'the Good'

Is maximization included in Bentham's conception of 'the good', too (as it is in desire/preference satisfactionism as concluded in section 3.3.1.3, cf. Table 3.3 on page 77)?[183] Based on *Definition 2*, say, *utility* is the tendency of an option to 'augment or diminish' happiness, and *the principle of utility* approves of augmentation and disapproves of diminution. Arguably (but far from clearly), the principle of utility is the principle of maximization (cf. e.g. Gustafsson, 2018) and it is separate from the conception of utility itself. But is it *utility* that is 'the good' and/or 'the good-maker' or is it *the principle of utility*?

I think it's safe to say that for Bentham 'the good' is not utility maximization/the principle of utility. Yet, a formulation of what is 'the good', depends on the view of utility.[184]

[182] For the utilitarian calculus concerning more than one person, a seventh dimension, 'extent', is needed.

[183] A disclaimer: This excursus does not try provide a comprehensive interpretation of Bentham's understanding of 'the good' – which, of course, would require a far-reaching and extensive dive into his works. In this excursus I simply look at his probably most cited publication *An Introduction to the Principles of Morals and Legislation* and his explication of utility there (i.e.: the quote I termed *Definition 1*) – and I will reason from there.

[184] In both cases I will assume 'good' as used by Bentham = 'the good'.

A The Simple View of Utility Upon the simple view *utility = pleasure*. Now, within *Definition 1*, the term 'good' comes up and is introduced as an alternative to pleasure. Accordingly, we need a second assumption that all the alternatives given can be (quasi) identified with each other, especially *pleasure = (the) good*. Thus, utility = pleasure = the good: utility can be substituted by 'the good'.

B The Non-Simple View of Utility Let's start over with *Definition 1*: there is utility on the one side and benefit, advantage, pleasure, good, and happiness on the other side. That is: utility is the property of an object whereby it tends to produce good $\iff$ good is what by tendency is produced by an object having utility. Accordingly, 'good' is rather what is the probable consequence of utility as an attribute of an option. This is not the same as a simple identification of utility = (the) good.

C The Consequence As a result, there are three views of 'the good'.

There is *the very simple view of the good*: utility = 'the good'.

Then there is *the mixed view of the good* resulting from plugging in the simple view into *Definition 1*: 'the good' is the tendency of an option to produce pleasure/happiness.

And last, there is *the uninformative view of the good*: 'the good' is the probable consequence of an option having utility.

None of these views is entirely satisfying and the matter certainly deserves further scrutiny – which I cannot provide here.

I will opt for *the uninformative view of the good*, because it is most warranted by *Definition 1*. In this (but really in any) case 'the good' in Benthamite versus welfarist accounts is crucially different by *form*: while for Bentham 'the good' may be realized by an option having a certain property, namely: utility, in welfarist accounts 'the good' is the *maximization* of said utility: *choosing* the option preferred the most (which was the conclusion from section 3.3.1.3).

However, in order for an option to realize anything, someone must choose it and act accordingly. Let's recapitulate: Bentham's original quote said: "By utility is meant that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness" (Bentham, 1907 [1789], §3), and, solving for (the) good, the statement becomes something like '(the) good is by tendency produced by an object having the property of utility'. I stipulated further that 'an object' should be an option. Yet, an option in itself, just by merely existing, produces nothing. Accordingly, what should be said is: 'the good is by tendency produced when *choosing* an option having the property of utility'.

Is then 'the good' = utility maximization for Bentham, too? No, it is not! While in welfarist accounts, the good is utility maximization which again is choosing the option

with the highest utility, here the good is (a likely result of) choosing an option *with just some utility*.

Thus, as a corollary, it seems that Bentham is not a maximizer.

In fact, this is a heavily debated aspect, and many authors claim on good grounds that Bentham defends "a satisficing, rather than maximizing, version of utilitarianism, where an act is right as long as it produces more pleasure than pain" (Gustafsson, 2018, p. 87; yet, Gustafsson interprets Bentham as holding a maximizing version of utilitarianism).

In sum, it follows from *Definition 1* and the further stipulations explicated above that:

the good = (likely result of) choosing *an option having (some) utility.*

It seems, in this case we can easily substitute 'the good' with well-being/welfare: *well-being/welfare is (the likely result of) choosing an option having utility.* However, we *cannot* substitute 'utility' with well-being/welfare in *Definition 1*, which would then say: well-being/welfare is the "property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness". Here, substituting 'utility' with well-being/welfare seems to result in a mistake in categories: well-being is not the type of thing that is the attribute of an option. It also does not *produce* pleasure, good, happiness, but rather belongs in line with those things that are produced.

Accordingly, upon *Definition 1*, the good/well-being $\neq$ utility, but the good/well-being = *consequence* of U_A. The relation is not identity, but causation.

Let's call this *the causal theory of well-being*: well-being is caused by (choosing) an option having utility. I think this causal type of relation is different to both a formal and substantive theory of well-being (as differentiated by Crisp, 2021). From the perspective of utility let's call it *the potency theory of utility*, because utility is the potential of an object/option to effectuate "benefit, advantage, pleasure, good, or happiness". And what is utility substantively? It is just that: a potential to produce good.

What about prudential hedonism claiming that pleasure is the only intrinsic good (e.g. Sinnott-Armstrong, 2022)? Whereas I claimed that the non-simple view leads to a causal relation where 'the good' $\neq$ utility and pleasure $\neq$ utility and well-being $\neq$ utility, but all of these = (likely) consequences of U_A, an option having utility. It is easy to see that this setup is still consistent with prudential hedonism.[185]

In sum, this excursus yielded the following points: (i) Bentham was probably not a maximizer, (ii) well-being is not utility, but caused by choosing an option having (some) utility, and (iii) utility substantively is the potential to produce good/pleasure/happiness.[186]

[185] Regarding well-being, cf. e.g. Collard's (2006) analysis of Bentham's own use of the term 'well-being'.

[186] For reasons of time and space I cannot further relate these claims to the extensive body of research on Bentham. For further inquiries, you may be referred to the *Journal of Bentham Studies*, `https://uclpress.scienceopen.com/collection/d9fd23f6-7bde-4c1d-bfb4-052943bdf955`.

3.3.2.3 Kahneman's '*Two Selves*'

Whatever the correct precise view on Benthamite utility (the simple view versus the non-simple view), it has to do with pleasure and pain – and pleasure and pain have experiential quality (cf. e.g. Hall, 1967). This conception was much later revived by Kahneman and colleagues (Kahneman, Wakker, & Sarin, 1997), who termed it *experienced utility*.

In his 2011 popular science book "Thinking, Fast and Slow" (Kahneman, 2011) Kahneman dedicates four chapters to questions of happiness/well-being. The research he presents attests to quite surprising judgments and preferences of participants, much in the same line as his heuristics and biases program (together with Amos Tversky). The explanation of the reviewed research relies crucially on the distinction between *two selves*, the 'experiencing self' and the 'remembering self' – which is analogous to his distinction between 'experienced utility' and 'remembered utility' (e.g. Kahneman, 2011; Kahneman et al., 1997).

According to Kahneman (2011), the remembering self evaluates past experiences and makes decisions upon these evaluations (cf. e.g. p. 408f.). However, the evaluation of the remembering self is not based on a "duration weighted" (p. 409) perspective on past experiences, on the contrary, its evaluation is governed by two very specific principles – the 'peak-end rule' and 'duration neglect' (p. 380) – and thus "the memory that the remembering self keeps [...] is a representative moment, strongly influenced by the peak and the end" (p. 383).[187]

Kahneman (2011) provides several examples, both thought experiments and empirical evidence, that make decisions by the remembering self – i.e.: the authority that usually makes decisions *and* makes these decisions based on the two above principles, the peak-end-rule and duration neglect – seem rather unreasonable, even irrational. For example, most participants in an ice water experiment chose to repeat a longer sequence of pain over a shorter sequence of pain once the long sequence had a positive ending – due the ice water being heated up by one degree centigrade such that there was a just noticeable pleasant change. Kahneman (2011) evaluates said experiment such:

> The cold-hand study showed that we cannot fully trust our preferences to reflect our interests [...]. An inconsistency is built into the design of our minds. We have strong preferences about the duration of our experiences of pain and pleasure. We want pain to be brief and pleasure to last. But our memory, a function of System 1, has evolved to represent the most intense moment of an episode of pain or pleasure (the peak) and the feelings when the episode was at its end. A memory that neglects duration will not serve our preference for long pleasure and short pains. (Kahneman, 2011, p. 384-385)

[187] Kahneman (2011) explicates: "The neglect of duration combined with the peak-end rule causes a bias that favors a short period of intense joy over a long period of moderate happiness. The mirror image of the same bias makes us fear a short period of intense but tolerable suffering more than we fear a much longer period of moderate pain. Duration neglect also makes us prone to accept a long period of of mild unpleasantness because the end will be better, and it favors giving up an opportunity for a long happy period if it is likely to have a poor ending" (p. 409).

> The experiencing self does not have a voice. The remembering self [...] is the one that keeps score and governs what we learn from living, and it is the one that makes decisions. What we learn from the past is to maximize the qualities of our future memories, not necessarily of our future experience. This is the tyranny of the remembering self. (Kahneman, 2011, p. 381)

Kahneman is aware that to argue such he needs a normative claim, and he provides it in Kahneman et al. (1997). To do so, Kahneman et al. (1997) distinguish several novel types of utility.

A Kahneman's Six Utilities Kahneman et al. (1997) announce "two concepts of utility" (p. 376), but introduce six. The first layer is *experienced utility* versus *decision utility*. The former is identified with "Bentham's concept" where "utility refers to pleasure and pain" (p. 375) – accordingly, Kahneman et al. (1997) adhere to the simple view (as distinguished in section 3.3.2 on page 77). The latter is identified with "the modern usage" (p. 375), which importantly is meant to include the principle of revealed preferences ("utility is inferred from observed choices and is in turn used to explain these choices", p. 375).[188]

Furthermore, there is *instant utility* (the intensity of the experience – as regards pleasure and pain – you have right now), *remembered utility* (the memory of a past experience in terms of total pleasure/displeasure), *predicted utility* (the belief about the total pleasure/displeasure of a future experience), and *total utility* (a time-weighed aggregate of the previous three).

The whole setup indeed is a little tricky, which is why Morewedge (2015) uses a timeline to disentangle it.[189]

However, for present purposes only *total utility* matters which Kahneman et al. (1997) claim to be a "normative concept [...] which is constructed from temporal profiles of instant utility according to a set of normative rules" (p. 376). At the base of this construct are so-called *temporally extended outcomes* (p. 376) where the experienced utility of any chosen action (e.g. having dinner; cf. Morewedge, 2015, p. 302, Figure 10.2 as a proxy) can be subdivided into anticipation (= predicted utility), experience (= instant utility), and memory (= remembered utility) with (i) each phase spanning some percentage of time of the whole experience and (ii) each phase coming with a sub-total of pleasure and pain that is in principle measurable.

[188] I do no think that it is necessary that the concept of 'decision utility' includes the identification of preference and choice (i.e.: the principle of revealed preference). I will understand 'decision utility' such that it is the overall evaluation of an option by a real number resulting from the utility formula as referenced in section 2.4.1.1 on page 39. In subsequent publications Kahneman unties this knot and makes 'decision utility' out to be "utility as a representation of preference" (Kahneman & Sugden, 2005, p. 161).

[189] "The complexity and fuzzy boundaries between these categories and their assessments requires distinguishing between several components of the temporal sequence of an experience. Figure 10.1 illustrates the time course of an experience that is chosen at t0, anticipated during t1, had during t2, and remembered during t3" (Morewedge, 2015, p. 298).

Total utility then integrates justly the three sub-totals of pleasure and pain weighed by their relative duration.[190]

B The Normative Claim Behind Total Utility The valid criticism of 'total utility' as voiced by e.g. Morewedge (2015, p. 301 f.) is mostly based on contradicting empirical evidence and the measurement problem. In this section, however, I want to take a look at the normative assumptions coming with the concept.

As already mentioned, Kahneman et al. (1997) do point out that 'total utility' is a normative concept being based on normative rules (p. 376). These normative rules are time-neutrality and duration-weighing: "Our analysis of total utility assumes a time-neutral perspective and emphasizes duration as a feature of outcomes" (p. 393). In the same paragraph entitled *Normative Issues* Kahneman et al. (1997) mean to justify these rules, but their argument is not strong. In both cases – time neutrality as well as the weighing of durations – their main point is that calculating total utility like that is consistent with intuitions about "actions that produce immediate benefits and long-term costs, a category that includes many self-destructive practices" (p. 393) and addiction (p. 394)[191]

The appeal to common sense normative intuitions is legitimate and indeed even normative ethical theories (as opposed to theories of well-being/prudence as debated here) are often challenged by counterexamples of how they lead to counterintuitive commitments, or fostered by showing how well they can account for normative intuitions (cf. e.g. Dancy, 2004, p. 2; Margolis & Laurence, 2023, §2.1). However, I am missing a proper argument for why time-neutrality and duration-weighing regarding pleasure and pain is supposed to be prudentially better for me than the hard-wired setup of our minds where duration matters less than peaks and ends, and memories matter more than experiences.

Let's therefore go back to the quote from Kahneman (2011, p. 384-385, cf. section 3.3.2.3 on page 83) where he says that we cannot 'trust our preferences to reflect our interests'. I think this quote entails Kahneman's normative commitments.

These are the main claims and what follows from them conceptually:

(i) "We want pain to be brief and pleasure to last." / We have a "preference for long pleasure and short pains".

(→) wanting = desiring = preferring

(ii) "We cannot fully trust our preferences$\lfloor_{rev}\rfloor$ to reflect our interests", because due to the peak-end rule and duration neglect we usually choose otherwise.

(→) preferences$_{rev}$ = revealed preferences ≠ 'preference for long pleasure and short pains'

[190] Cf. Morewedge (2015, p. 302) for a survey result that participants (in disregard of duration!) assume that 'experience' rather than 'anticipation' or 'memory' makes up most of total utility. Cf. Morewedge (2015, p. 301 f.) also for several points of criticism regarding the concept of total utility.

[191] Addiction is listed as a separate point, but it really is a subset of 'immediate benefit and long-term costs'.

(→) interest = 'preference for long pleasure and short pains'
(→) interest = best interest/informed desire

In fact, Kahneman (2011) in the same paragraph claims that according to the evidence it is not the case that "humans have consistent preferences and know how to maximize them" (p. 385). That is, for him the 'preference for long pleasure and short pains' is just an inconsistent preference to the (revealed) preference as indicated by choices based on the peak-end rule and duration neglect. This could be a distinction between something like "professed preferences" and revealed preferences/choices. But let's get rid of revealed preferences/choices and let's just have preferences as mental states: desires or maybe beliefs.

What then is the difference between the 'preference for long pleasure and short pains' and the preference for options that adhere to the peak-end rule and duration neglect? Well, the latter is clearly a preference people act upon, because this is what the empirical evidence suggests and this is how the reported experiments are set up. The former, if it is empirically underrepresented in terms of choices, it is apparently rather something people would profess when prompted, or simply an intuition about human nature.[192] So let's say we have two kinds of preferences, "theoretical" ones (what people say when they are asked) and "practical" ones (what people tend to do) – and the idea is that they should be consistent (but they are not).

For present purposes, the empirical inconsistency is not troubling at all, because this is not the question at hand.[193] The question is: What is the normative claim behind total utility?

Kahneman (2011); Kahneman et al. (1997) clearly think something along these lines: 'preference for long pleasure and short pains' is in our best (rational) (self-)interest, is an informed desire, is of prudential value. Whereas the evolutionarily evolved decision-making based on the peak-end rule and duration neglect is contrarily *none* of the above, but a defective mechanism that results in us choosing memories over experiences and longer pains over shorter ones if only the end is uplifting.

Accordingly, a major normative claim is that 'long pleasure and short pains' is what is best for us in terms of prudence and well-being and what we should strive for, *and* that our tendency to choose otherwise (based on duration neglect and peak-end rule) is irrational and should be overcome.

That duration is a determining factor to the estimation of pleasure and pain, is not new: it is after 'intensity' the second of six so-called circumstances according to which "the value of a pleasure or pain [...] will be greater or less" in Bentham's (1907 [1789]) view (Chap. IV, § II-III; cf. also section B on page 79). What is new, is the empirical evidence Kahneman and colleagues (e.g. Kahneman, 2011; Kahneman et al., 1997) provide that duration, strangely, seems not to matter to the degree 'rationally' expected

[192] Funny enough, if Kahneman really though that preferences *are* choices – as he makes very clear in Kahneman et al. (1997) that he does – he could not conceive of something like "professed preferences" that people don't act upon.
[193] And why shouldn't I practically prefer something else than theoretically?

(duration neglect), that intensity only matters in its peak, and that a wholly new factor, the end of a sequence, has a say in the matter (peak-end rule). Accordingly, what *is* new is the second part of the normative claim, namely that how we actually tend to remember, learn, and decide in these cases, is irrational and not in our best interest.

In sum, regarding these 'normative issues', what is Kahneman's theoretical affiliation in terms of a theory of well-being? His position seems to be a mixture of desire/preference satisfactionism and hedonism. In what he writes it does not seem like 'pleasantness' is the good-maker, rather, the *preference* for pleasantness is the good-maker on his account. Accordingly, as a formal theory of well-being he holds desire/preference satisfactionism. As a substantive theory of well-being then he is a hedonist with pleasure being the prudential good.

C Discussion Once evolutionary psychology/biology is on board, it comes with strong ammunition: everything shaped by evolution was to our benefit in terms of survival and procreation – at least within an ancient environment.

Accordingly, it seems to me to be premature to dismiss this setup of our minds as irrational straightaway. Surely, (i) one should beware of the so-called *naturalistic fallacy* (i.e.: concluding from what naturally *is* the case that this also prudentially/morally *should be* the case) and (ii) behavior that was adaptive in an ancient environment may well be maladaptive in the world we live in now.

Nevertheless, *first* it should be interesting to at least consider what originally was adaptive about duration neglect and the peak-end rule forming our 'remembering self' and making it base subsequent decisions on such biased memories. Unfortunately, I cannot follow up on this question here.

Second, it should be interesting to at least consider whether it really is in out best interest to (try to) straighten out these biases – or whether it might rather (or additionally) be in our best interest to use the knowledge of these mechanisms to our advantage. That is, once you know that the peak and the end of an episode is what shapes the memory of it, next time you vacate with a pugnacious friend or family member you could try to create at least one moment of high pleasure, and you could attempt to not quarrel at the time of departure. The same holds for any other activity or even time frame like a single day.

Third, I want to briefly discuss whether there is a mistake in reference when Kahneman speaks of 'our interests'. Consider the following quote: "I am my remembering self, and the experiencing self, who does my living, is like a stranger to me" (Kahneman, 2011, p. 390).

This is the conclusion from the following passage which I will quote in its entirety:

> For another thought experiment, imagine you face a painful operation during which you will remain conscious. You are told you will scream in pain and beg the surgeon to stop. However, you are promised an amnesia-inducing drug that will completely wipe out any memory of the episode. How do you feel about such a prospect? Here again, my informal observation is that most people are remarkably indifferent to the pains of their experiencing self. Some say they don't care at all.

> Others share my feeling, which is that I feel pity for my suffering self but not more than I would feel for a stranger in pain. Odd as it may seem, *I am my remembering self, and the experiencing self, who does my living, is like a stranger to me.* (Kahneman, 2011, p. 390, my italics)

The argument is simple: If I am my remembering self (and my experiencing self is a stranger to me), then my remembering self is the 'me' whose interests I should care about. If 'I' as my remembering self tend to care about the peak and the end, but do not care much about duration and not at all about stuff I cannot and will not remember – then it is not in *my* best interest to strive for time-neutrality and duration-weighing. If pleasure is the one intrinsic good, and my mind's setup as it is, it is in my interest to strive for pleasant peaks and pleasant ends, and to forget all about past pains.

3.3.2.4 Summary

This section showed two things: (1) Benthamite utility is more complex than one might have thought, and its non-simple reading has several consequences, among others that utility $\neq$ well-being, and (2) it has been shown that when going 'back to Bentham' (on the simple reading), the evaluation of one's pleasure at any present moment versus retrospectively (or anticipatory) is a tricky thing and rarely corresponds as expected, which again gives rise to normative claims which I critically discussed.

3.3.3 The Capabilities Approach: The 3rd Option

The so-called capabilities (or: capability) approach[194] is most associated with the economist Amartya Sen and the philosopher Martha Nussbaum.[195] However, according to Robeyns and Byskov (2023), it spans a wide variety of accounts and it is "generally conceived as a flexible and multi-purpose framework, rather than a precise theory of well-being" (§1.2), which is why there is disagreement what the 'approach' essentially consists of. Thus, the capabilities approach – due to its broadness and variety, as well as its practical focus – is not officially one of the philosophical theories of well-being.

Robeyns and Byskov (2023) defines it as follows:

> At the core of the capability approach is a normative commitment to conceptualize well-being in terms of capabilities and functionings. Functionings are 'doings and beings', that is, various states of human beings and activities that a person has achieved, such as being well-nourished, getting married, being educated, and travelling, while capabilities are the real, or substantive, opportunity that they have to achieve these doings and beings. (Robeyns & Byskov, 2023, §2.1)

[194] The terms 'capability approach' (singular) and 'capabilities approach' (plural) can be used interchangeably.

[195] Cf. e.g. Robeyns and Byskov (2023): "Confusingly, within the literature the term 'the capability approach' has also often been used to refer not to this overall framework, but rather to a more specific capability theory, namely Nussbaum's [...] partial capability theory of justice, Sen's [...] theory of transitional justice, or Sen's [...] theory of development as freedom. [...] However, it is possible to develop capability theories that differ significantly from Nussbaum's and Sen's capability theories" (§1.2).

This quote indicates that this is a quite complex framework (which will not be fully explicated here). It is generally agreed that it originated in Sen's writings in the 1980s who developed and refined it over the following decades (cf. e.g. Clark, 2005; Qizilbash, 2013). In spite of the variety, the capabilities approach is usually rather understood to be an objective list theory. However, Sen himself abstains from providing a list of capabilities beyond a few very basic items such as "the ability to avoid starvation, be minimally adequately nourished, sheltered, healthy, and so on" (Qizilbash, 2013, p. 37), whereas Nussbaum (cf. e.g. Nussbaum, 2000, 2008) does provide such a list. It includes: life, bodily health, bodily integrity, senses, imagination, and thought, emotions, practical reason, affiliation, other species, play, control over one's environment (cf. Appendix B, p. 110, in Nussbaum, 2008, with explications).

In his criticism of desire/preference satisfactionism as well as hedonism Sen brings a very powerful argument into play: so-called adaptive preferences. The point here is that (i) people get used to dire living conditions, they adapt, and they also adapt in their preferences and desires – such that as a consequence they might derive a lot of pleasure/happiness from very small changes and betterments, but (ii) from a social and political perspective understanding welfare as a hedonism or desire fulfillment, it would not be fair to capitalize on that effect and privilege further those who based on their good circumstances are more demanding in their desires and preferences and pleasures.

> Desires reflect compromises with reality, and reality is harsher to some than to others. The hopeless destitute desiring merely to survive, the landless laborer concentrating his efforts on securing the next meal, the round-the-clock domestic servant seeking a few hours of respite, the subjugated housewife struggling for a little individuality, may all have learned to keep 14 their desires in line with their respective predicaments. Their deprivations are gagged and muffled in the interpersonal metric of desire fulfillment. In some lives small mercies have to count big. (Sen, 1985, p. 191)

Sen's account specifically is not a 'pure' list theory, but might qualify as a hybrid theory. According to Qizilbash (2013), Sen's point is that "welfare is not the exclusive object of value in moral evaluation and that freedom has a value independent of welfare. The freedom to live a life we value and have reason to value – or the opportunity we have to lead a valuable or good life – is, very roughly, our capability" (p. 35). Accordingly, as opposed to *objective* list theories, Sen adds a *subjective* element, where the "personal valuation" (cf. e.g. L. W. Sumner, 1996, p. 63 f.) of the subject in question plays a crucial role:

> If this is the correct interpretation of the 'valuational exercise' then its introduction forces us to rethink the location of Sen's theory on a subjective-objective continuum. Initially it seemed as though welfare was constituted, at bottom, by some specified set of functionings, all of which are objective features of an individual's life. However, it now seems to consist in doing or being whatever it is that one values. On this construal, Sen's account closely resembles one of his rejected options, namely the view which equates welfare with the satisfaction of desire or

> preference. If Sen is correct in thinking that desiring is not an inherently evaluative attitude then his account will not actually collapse into the desire-fulfilment theory. (L. Sumner, 2006, p. 7-8)

L. Sumner (2006) goes on to say:

> Sen has been urged by Martha Nussbaum to move his account away from its apparently subjective orientation by specifying 'an objective valuational procedure that will have the power to criticize the evaluations of functionings that are actually made by people whose upbringing has been hedged round with discrimination and inequity'. (L. Sumner, 2006, p. 11, citing Nussbaum, 1987, p. 39)

In sum, the capabilities approach is a diverse framework that has been developed over several decades and by many people as an alternative to hedonism and desire/preference satisfactionism. The major players still are Amartya Sen and Martha Nussbaum, whose respective accounts, however, do substantially differ. The capabilities account is mostly an objective list theory, yet in some versions it entails a rather strong tendency towards desire/preference satisfactionism (cf. e.g. Qizilbash, 2013). It was Martha Nussbaum who drew the connection to Aristotelian eudaimonism and elaborated her approach accordingly.[196] The capabilities approach is meant to guide social and political action and in that it has a decisively practical intention. Bentham's intention at the time was political and practical, too, but due to the objective element within the capabilities approach its applicability might be more straightforward.

The capabilities approach is not quite a theory of utility, because it does not explicate utility: it is rather meant to offer an alternative to utility. Yet, while the approach aims at well-being/welfare and could be added to the category of objective list theories, it is not considered a full theory of well-being (cf. the quote from Robeyns & Byskov, 2023, §1.2, given in the first paragraph of section 3.3.3 on page 88). However, since its origin is in economics as well as it decidedly is meant to serve a practical purpose, I believe the capabilities approach fits rightly within the present chapter on utility.

3.4 Summary: Good Decisions

In chapter *Decision Quality* (chap. 2 on page 31) I established that a good decision is either one that leads to true belief or one that correctly applies utility theory to the effect that the option with the highest utility is known. Conceptually it follows that this is also the option preferred (the most).

In the present chapter *Well-Being and Utility* (chap. 3 on page 55) I surveyed theories of well-being and theories of utility. Theories of well-being and theories of utility

[196] Cf. Clark (2005): "Later Sen (1993, p.46) recognised that 'the most powerful conceptual connections' (which he initially failed to appreciate) relate to Aristotle's theory of 'political distribution' and his analysis of *eudaimonia* – 'human flourishing' (see Nussbaum, 1988; 1990)" (p. 2).

parallel each other, both entail three accounts: there is prudential hedonism or Benthamite utility, desire/preference satisfactionism as utility maximization, and objective list theories with perfectionism/eudaimonism and the capabilities framework.

Yet, their perspective is different: theories of well-being ask *what is the (prudential) good* and *what is the good-maker*. Theories of utility seek to understand what is utility. Of course, this may simply be the same once one claims that utility = well-being. On several occasions I argued against this identification.

Theories of utility come with a predicament: there already is a *technical* notion of utility, namely utility = (representation of) preference. If this technical notion is supposed to be consistent with a substantive understanding of utility, this poses substantial limitations to what utility may be identified with.

Specifically, this technical notion makes it impossible for utility to be identified with desire/preference satisfaction. Desire/preference satisfaction = utility *maximization*. Utility as a representation of preference and calculated by the utility formula also cannot be identified with pleasure, as pleasure is not the property of an option, but the sensation of a person. Indeed, Bentham did not suppose such a simple identification. The last option, the capabilities framework, is rather a theory of well-being/welfare than a theory of utility, since it explicitly tries to offer an alternative to pleasure or desire fulfillment. In fact, objective list theories as a whole do not naturally relate well to utility, although such a relationship could probably be constructed.

In sum, the two classic theories of utility failed as theories of well-being. At the very least, they are much more complex than conventionally treated: Desire/preference satisfactionism is a theory of utility maximization (not of utility), and Benthamite utility is the tendency in an object to produce pleasure (not pleasure itself). In both cases utility $\neq$ well-being.

Accordingly, it is the theories of well-being where to look to when wondering what we prudentially should strive for. The three answers they give is: we should strive for (i) pleasure, (ii) getting what we want, or (iii) the realization of a finite list of goods deemed conducive to human flourishing in general.

My favorite is the Aristotelian account, *eudaimonia* is the sense of happiness I find most convincing. Accordingly, a good decision is one that is conducive to eudaimonia. No maximization required. However, eudaimonia is a complex concept: how can it be measured? – This is an empirical question and it will be treated in section 4.4 on page 134.

In conclusion, *whatever* your take on well-being, the answer to the question what is a good decision (once it is *not* about inference) is: A good decision leads to well-being (whether it is pleasure, preference satisfaction, or eudaimonia).

Interestingly, *maximization* really only is included in one of these specifications of well-being, the economic one, preference satisfaction/utility maximization. The other two conceptions fare well without maximization: Bentham was not a maximizer (cf. section 3.3.2.2 on page 80) and Aristotle certainly wasn't.[197] Surely, maximization could be added, but it is not already included – it would need an independent principle and an independent justification.

I cannot dive deeper here for reasons of time and space. However, here is a longish quote from Griffin (1986) which explicates how maximization is tempting, but in some cases entirely misplaced:

> In the domain of prudence, maximizing is irresistible. Although we should reject a policy of maximizing one particular value (say, pleasure) at the expense of others, it is hard to resist a policy simply of making one's life as good as one can. [...] I have argued the point earlier: desires form a hierarchy, and the whole idea of a hierarchy of desires brings the prudential policy of maximization along with it. This justification of maximization in the case of prudence really comes down to the observation that maximization is already built into a person's hierarchy of values. [...] It is true that some prudential values, just as the values they are, ought to be maximized. They are such that, in general, the more the better. Pleasure ought, other things being equal, to be maximized; pain ought to be minimized. And this maximizing/minimizing policy would seem to have to do with the nature of the particular value at stake in this case [...]. But other values seem different in this respect. Having deep, loving attachments is, for many persons, one of the most valuable things in their lives. But do we think the more the better? Well, we do not seem always to aim at still deeper and more loving attachments. The words 'deep' and 'loving' describe a kind of relationship, and not values of which more is better. Nor do we want as many deep, loving attachments as possible. It is very implausible that this is the kind of value where nine or ten such relations are, if they were possible, better than three or four. (Griffin, 1986, p. 144-146)

There are, of course, further questions related to what I have said so far in this chapter. I cannot give them an extended treatment, but here is a mention:

Whose well-being? Kahneman's distinction between the experiencing and the remembering self leads to the question *whose* well-being should (prudentially) be taken into account. Should we try to counteract hard-wired biases in favor of our future experiencing self? I discussed this supposition skeptically in section 3.3.2.3 on page 83.

[197] This is quite an interesting topic and there would be much to read and say about it. Very roughly, it seems that the way Aristotle thought about 'the good life' does not capitalize on maximization. As a more specific point, cf. the 'doctrine of the intermediate' where virtue aims at the middle ground between two extreme behaviors (NE, 1106a29-b7, and for a very short explication cf. e.g. Broadie, 2002, p. 20): for example, the virtue of *courage* is in between *fear* and *overconfidence* (NE, 1104a20 and 1115a6).

Prudence versus Morality. Each of the three theories of well-being has an analogue within normative ethics which I showed in Table 3.1 on page 65 within 3.2.4.1. That which the theories of well-being explicate as the *prudential* good is deemed the *moral* good in the normative ethical theories.

However, I could not further elucidate the difference between the moral and the non-moral in general, the extent of the domain of the moral, specific differences of each of the three theories when seen as a theory of well-being versus a normative ethical theory, nor the huge topic of potential conflict between morality and prudence as seen from the first person perspective in decision making situations.[198]

Guidance. A need for guidance is a good reason for consulting theories of prudence or morality. The question in both cases is: what should I do, how should I decide?[199] Hedonism tells you to compare the consequences of options according to the sum of pleasure they produce and decide accordingly. Satisfactionism tells you to be clear about what you want (your desires/preferences), to rank order your options such, and maximize. Aristotelian eudaimonism tells you two things: (i) eudaimonia (flourishing as based on virtuous activity) is everyone's highest goal and you should deliberate backwards from there to determine the first step to take towards that goal (i.e.: eudaimonism includes a theory of deliberation, cf. section A on page 62 within 3.2.3.1), (ii) in order to flourish, human nature requires certain things (i.e.: eudaimonism includes a list, giving the name to objective list accounts), e.g. friendship, and you should strive to realize and nurture these aspects in your life.

Eudaimonism/objective list theories in providing a list have been deemed paternalistic (cf. e.g. Crisp, 2021, §4.3), yet on the other hand their potential for practical guidance seems both greater for the individual as well as easier to apply in the social and political realm. Fittingly, the capabilities approach (cf. section 3.3.3 on page 88) has gained quite some attention from sociology, political science, and economics.

[198] Aristotle's account of eudaimonia assumes a harmonious relationship between morality and prudence. Being moral (i.e. virtuous) is also prudent (i.e. good for the person/in their self-interest). Cf. e.g. Kraut (2022) regarding *friendship*: "Aristotle does not raise questions about what it is to desire good for the sake of another person. He treats this as an easily understood phenomenon, and has no doubts about its existence. But it is also clear that he takes this motive to be compatible with a love of one's own good and a desire for one's own happiness. Someone who has practical wisdom will recognize that he needs friends and other resources in order to exercise his virtues over a long period of time. When he makes friends, and benefits friends he has made, he will be aware of the fact that such a relationship is good for him. And yet to have a friend is to want to benefit someone for that other person's sake; it is not a merely self-interested strategy. Aristotle sees no difficulty here, and rightly so. For there is no reason why acts of friendship should not be undertaken partly for the good of one's friend and partly for one's own good. Acting for the sake of another does not in itself demand self-sacrifice. It requires caring about someone other than oneself, but does not demand some loss of care for oneself. For when we know how to benefit a friend for his sake, we exercise the ethical virtues, and this is precisely what our happiness consists in." (§9).

[199] The "should" then is either a prudential or a moral should. For now, it is okay to leave the prudence/morality distinction aside.

4 Decision Strategy and Happiness

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4.1 Introduction

4.1.1 Previously on... Decision Strategy

In chapter *Conceptual Clarifications* (chap. 1, section 1.2.5.2 on page 27) I pointed out that 'decision strategy' is not a philosophical term. Instead the more broad term 'decision procedure' is in use. For example, in the case of utilitarianism (as a normative ethical theory) it is important to note that the utilitarian calculus is *not* to be understood as a(n action guiding) decision *procedure*, but rather as the decision *criterion* that makes an action right (cf. section 1.2.5.2 on page 27). The calculus is deemed much too complicated and time-consuming for practical purposes. Bentham already thought of it that way: as a normative ideal (cf. section B on page 79 within 3.3.2.1).

In chapter *Decision Quality* (chap. 2, section 2.4.1.1 on page 39) the utility calculus of MAUT (multi-attribute utility theory) and SEUT (subjective expected utility theory) was introduced. MAU and SEU are officially 'decision strategies' and they are deemed the normative ideal of rational choice. In order to be descriptively useful, a few adjustments had to be made which resulted in Prospect Theory (a descendant of SEUT, cf. footnote 102 on page 39).

The three theories of well-being/utility discussed in chapter *Well-Being and Utility* (chap. 3 on page 55) can clearly be understood as decision strategies. Here, the first two, hedonism and satisfactionism can use the utility calculus of SEUT. While hedonism gives a substantive meaning to utility as concerned with *pleasure and pain* (sections 3.2.1 and 3.3.2), satisfactionism goes one step further and advocates right away *choosing* the option desired the most (sections 3.2.2 and 3.3.1; esp. Table 3.3 on page 77). Aristotelian eudaimonism/the capabilities approach does not offer a calculus, but a list. Both in your own self-interest (i.e. prudentially) as well as in order to be and act virtuously (i.e. morally) you should strive for the realization of this list's items (sections 3.2.3 and 3.3.3).

Accordingly, as a decision strategy eudaimonism is both more 'loose' in that there is no calculus giving overall numbers to options such that their (comparative) desirability is crystal clear, as well as it is more 'strict' in that it provides a one-size-fits-all list of desirable ingredients of life to be pursued as opposed to leaving the to-be-pursued up to an individual's desire structure or pleasure forecast.

4.1.2 Next on... Decision Strategy

The aim of the present chapter is to develop both the independent variable (decision strategy, section 4.3) as well as the dependent variable (wellbeing/happiness, section 4.4) theoretically. To do that, a preliminary step is necessary: Since the two decision strategies I am interested in, *deciding by reasons* and *deciding by principle*, are adopted from moral philosophy, the first section is concerned with the domain of the moral (section 4.2).

The Domain of the Moral Since my conceptualization of 'deciding by reasons' and 'deciding by principle' as domain-general decision strategies is based on the distinction between particularism and generalism in *moral* philosophy, one might wonder whether this makes sense. Say, moral particularism and moral generalism (among other things) are two ways of *moral* decision making: can I just generalize from the moral to the non-moral? Accordingly, I will have a look at the delimitation of the domain of the moral in the upcoming section 4.2 on the following page.

Particularism versus Generalism In section 4.3 on page 112, I will introduce my two decision strategies, namely *deciding by reasons* versus *deciding by principle*. This distinction is inspired by the debate between particularism and generalism in moral philosophy. It is also inspired by my desire to counteract the primacy of the distinction

between deontology and consequentialism that dominates the research in experimental moral philosophy/moral psychology as conducted by psychologists since the 2000s.

Deontology versus Consequentialism I said 'counteract its primacy', because it seems to me both a simplification and a constraint to look at moral decision making only through these lens. Why it is a simplification is spelled out in section A.1.1 on page 576 within the Appendix. Why it is a constraint is, because *both*, consequentialism/utilitarianism *and* deontology/Kantianism have one very pervasive similarity: *they are both principled ethical theories*. That is, they are both generalist theories – which is why the contrast to a non-generalist theory (most prominently: particularism) should be investigated. How both consequentialism as well as deontology are generalist theories will be spelled out further in section 4.3.6 on page 124.

Deciding by Reasons versus Deciding by Principle In section 4.3.7 on page 129 I will start the transition to the empirical research within this project and describe how I conceptualize 'deciding by reasons' and 'deciding by principle' to be used in a prudential and everyday context – *including* moral decision situations. That is, deciding by reasons versus deciding by principle will be conceptualized as two decision strategies that are not confined to the moral nor the prudential nor any other realm, but as domain-general.

From Well-Being to Happiness to Satisfaction In section 4.4 on page 134 I will develop my main dependent variable. Since my interest is in well-being, I will review how it has been conceptualized and how it is measured in psychological research – which terms itself 'happiness research'. Happiness research is partially, but not entirely analogous to the theories of well-being and utility laid out in the previous chapter. After shortly depicting the research traditions of eudaimonism and hedonism, the most common conception of happiness, 'subjective well-being', turns out to be the most fitting to the present research: Decision strategy as the object of happiness research can be best understood as a domain satisfaction.

The subsequent chapter *Consolidation: The Argument* recounts the 'argument' that was established hitherto. Thereafter, I will shortly review *Previous Research* and outline *This Research*.

4.2 The Domain of the Moral

The contrast to moral decision-making I am interested in here, is *non-moral* decision making (non 'immoral', not 'amoral', not morally right or wrong, good or bad). What is 'the moral' to be distinguished from?

4.2.1 Three Common Distinctions

4.2.1.1 Domains of Value

In footnote 136 on page 56 within section 3.1 I distinguished four domains of value: moral, prudential, aesthetic, and epistemic. The same categories can be used here regarding domains of decision making: there are moral, prudential, aesthetic, and epistemic decision situations.

Epistemic decision situations should be identified with probabilistic inference/inferential judgment (cf. e.g. section 2.2 on page 33).

Aesthetic decision situations (e.g. what painting to install above the sofa) intuitively do indeed deserve to be distinguished from the (purely) prudential and moral, although overlap is always possible: maybe the Caspar David Friedrich I chose, each time we look at it, elevates me (prudentially good consequence), but depresses you (morally bad consequence).

4.2.1.2 Prudential vs. Moral

Prudential versus moral decision situations are certainly the most important categories to be distinguished when wondering about the domain of the moral from the perspective of decision making. According to S. M. Campbell (2013), "it is commonly remarked that benefactive deliberation, which aims at securing what is good for another, is rooted in 'other-concern', whereas prudential deliberation is rooted in 'self-concern' " (p. 336-337). As to Crisp (2021), "my giving money to a development charity may have moral value, that is, be morally good. And the effects of my donation may be good for others. But it remains an open question whether my being morally good is good for me; and, if it is, its being good for me is still conceptually distinct from its being morally good" (§1).[200]

Using the distinction between self-concern and other-concern is probably the most intuitive way to think of a distinction between the prudential and the moral. This is

[200] This point hints at how intuitively it seems likely that doing 'the morally good action' may fall square with one's self-interest (the prudential good). Cf. also footnote 198 on page 93 on Aristotle's stand on the matter.

how I treated the Caspar David Friedrich example above: if it only affects me, it is a matter of prudence, as soon as it affects you, too, it is a matter of morality.[201] [202]

4.2.1.3 Conventional vs. Moral

So there is moral normativity and prudential normativity[203], as well as aesthetic and epistemic normativity. While from the perspective of value theory in terms of the most often cited categories this list is complete, there are further sources of normativity:

Another infamous distinction is the moral-conventional distinction: there is morality and there is social convention, e.g. etiquette.[204] Both are normative and generate a "should" (as does prudence), but social norms are not automatically moral norms. There is a huge empirical literature on and ongoing interest in this topic[205] building on the cognitive-developmental research by Piaget (Piaget, 1932) and Kohlberg (e.g. Kohlberg,

[201] But shouldn't we reserve the predicate 'moral' for graver matters than depressing paintings above sofas affecting others? I don't think so. Let's think of the three methods of ethics (cf. section 3.2.4.1 on page 64), Kantian ethics, consequentialism/utilitarianism, and virtue ethics – is there a quantitative threshold condition determining when a potentially moral matter is not grave enough to really count as a moral matter?

In utilitarianism small pains will end up being neglected due to the calculus, but they are not excluded beforehand on charge of being irrelevant. On the contrary: small pains may add up and tip the scale in the end (cf. e.g. section B on page 79 within 3.3.2.1). In Aristotelian virtue ethics the moral and the prudential coincide (cf. footnote 198 on page 93 within 3.4), such that there is no separate domain of the moral, neither by quality nor by quantity. Even in Kantian ethics based on the so-called 'universal law formulation' of the categorical imperative (*act only in accordance with that maxim through which you can at the same time will that it become a universal law*, cf. e.g. Johnson & Cureton, 2022, §5), it seems reasonable that you could not will a universal law stating that people should hang up paintings that make their flat mates suffer.

Cf. also Sinnott-Armstrong and Wheatley (2012, p. 358-359) who claims that a celebratory gift to a colleague is a case of 'moral niceness'. Accordingly, here, too, morality is not reserved to grave matters.

[202] Yet, this distinction is not sufficient to delineate the domain of the moral, because it seems that not all (decision) situations that concern me as well as you are automatically moral situations. For example, we might have planned to order in, I agreed to make the order, and now I have to choose between Asian versus Italian cuisine. This could not be a moral decision, or could it? While intuitively choosing between Italian versus Asian food seems far from a moral matter, I believe an according context can easily be constructed: Assume you hate Italian food, and I hate Italian food haters – and thus I am keen on ordering Italian to punish you for your bad taste. (In fact, I believe a context such that a random situation becomes a moral situation can always be constructed. We'll get to that when introducing the holism of reasons.) At any rate, it seems that a *content criterion* is needed to delineate the domain of the moral. This will be discussed in section 4.2.2 on the following page.

[203] Cf. e.g. Crisp (2021): "A great deal of attention has been paid in philosophy to the issue of moral 'normativity', less so to that of prudential normativity (recent exceptions are Dorsey 2021; Fletcher 2021)" (§1).

[204] B. Gert and Gert (2020) name etiquette, law, and religion (§0) as distinct sources of normativity in the social realm.

[205] Cf. e.g. Aharoni, Sinnott-Armstrong, and Kiehl (2012); Brennan, Eriksson, Goodin, and Southwood (2013); Kelly, Stich, Haley, Eng, and Fessler (2007); Royzman, Leeman, and Baron (2009); Turiel and Dahl (2019).

1969, 1981), and zooming in on said distinction in the work of Nucci (e.g. Nucci, 1977) and Turiel (e.g. Turiel, 1983).

In very short, overall there is reliable evidence in the empirical literature that "by a young age children think in different ways about each of these domains and that each represents a different developmental pathway" (Turiel & Dahl, 2019, p. 195; cf. also Turiel, 2018). For an up to date and thorough critical review of the empirical findings as well as their potential philosophical implications cf. Machery and Stich (2022).[206]

The moral-conventional distinction (under this name) is rooted in psychology, but the idea behind it is not entirely new, which I will take a short look at in the upcoming section.

A The Force of Morality From a philosophical perspective, in her seminal paper Foot (1972) based on Kant's distinction between a categorical and a hypothetical imperative argues that: first, whereas on the received view the 'should' derived from wants/desires and self-interest (i.e. the prudential 'should') is a hypothetical imperative (p. 306), contrary to common understanding a 'should' derived from etiquette (or social convention in general) is not hypothetical, but categorical (p. 309); second, this steals morality's claim to uniqueness regarding being categorical (p. 312); but third, neither morality provides categorical imperatives, since it is *not* nonsensical to ask for (additional) reasons on why to follow moral rules: "It is obvious that the normative character of moral judgment does not guarantee its reason-giving force. Moral judgments are normative, but so are judgments of manners, statements of club rules, and many others. Why should the first provide reasons for acting as the others do not?" (p. 310).

Accordingly, from her philosophical point of view looking at the structure of morality versus convention regarding their 'reason-giving force', the distinction is all but self-evident.

4.2.2 The Content of Morality

4.2.2.1 Psychological Theorizing

A *Justice, Rights, and Welfare* Within the psychological moral psychology research[207] a widely cited definition of the domain of morality is due to Turiel (1983)

[206] Machery and Stich (2022, §11) in fact draw the following conclusion: "The take-home message of this section is that authors who invoke studies using the moral/conventional task in arguing for philosophical conclusions should be very cautious. There are many different versions of the task, and it is far from clear that any of them give us reliable information about the nature of moral cognition or about the moral cognition of children, psychopaths or other groups of philosophical interest."

[207] Empirical investigations into originally philosophical subject matters (such as morality) may be best subsumed under the heading of *moral psychology* which is a hugely interdisciplinary discipline by now (cf. e.g. Doris, Stich, Phillips, & Walmsley, 2020, for an overview; Tiberius, 2014, for an introduction from a philosopher; Gray & Graham, 2018, for a collection of empirical approaches). The even more recent experimental philosophy movement (cf. e.g. Knobe & Nichols, 2017), although having tried to make its own name, mostly overlaps in terms of content.

and a result of his philosophically informed research on the moral-conventional distinction, cf. section 4.2.1.3 on page 99. Turiel (1983) understands the moral domain to essentially involve matters of "justice, rights, and welfare" (p. 3, p. 4; cf. also Nucci, 2001, p. 7).[208]

The definition has recently been refined by Dahl (2023): "I propose to define morality as obligatory concerns with how to treat other sentient beings (i.e., with others' welfare, rights, fairness, and justice), as well as the reasoning, judgments, emotions, and actions that spring from these concerns" (p. 63). However, this latter definition is substantially flawed, for example (but not limited to) by being circular – as spelled out by Sinnott-Armstrong (2023b) in the same volume.[209]

The original suggestion by Turiel (1983), however, remains an important point of reference, as well as it is backed by philosophical theorizing (cf. Stich, 2019, p. 10 ff.).

B Moral Foundations Theory Another well-known approach to state the content of morality is *Moral Foundations Theory* (e.g. Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011, cf. also section G on page 260 within 9.3.1.2 for an introduction), which is based on an evolutionary and intercultural perspective.[210] Moral Foundations Theory provides six bipolar content domains within morality: care/harm, fairness/cheating, loyalty/betrayal, authority/subversion, sanctity/degradation, liberty/oppression. Importantly, however, these dimensions are understood to be "the psychological 'foundations' upon which cultures construct their moralities" (Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011, p. 368), that is: these content domains are supposed to be *descriptive* of 'moralities' (= codes of conduct) actually put forward around the world. Accordingly, this approach is not about the concept of morality, but about the practice of *moralities*.

4.2.2.2 Philosophical Theorizing

A *The Definition of Morality* In their encyclopedia article *The Definition of Morality* B. Gert and Gert (2020, §4) say the following about approaches to state the content of morality:[211]

[208] There are, of course, details and developments. For a thorough overview and discussion cf. Stich (2019).

[209] While I welcome attempts to define the domain of the moral, I was shocked as to the low quality of Dahl's (2023) enterprise. Not only is the resulting definition hardly worth the term – as quite graciously explained by the philosopher Sinnott-Armstrong (2023b) on barely four pages. But also does the 27-page-long target article crawl with big and small mistakes and unnecessarily long elaborations. I have several examples ready, but for the sake of space I will forego them here.

[210] One of its main authors characterizes it such: "MFT is a nativist, cultural-developmentalist, intuitionist, and pluralist approach to the study of morality" (Graham et al., 2013, p. 71).

[211] A content-based definition of morality could be called a *substantive* definition (cf. B. Gert & Gert, 2020, §4, §5.1). However, B. Gert and Gert (2020) think that "the substantive definition still has the drawback that it does not, somehow, seem to get at the essence of morality" (§4), but do not elaborate on this point.

> Indeed, [...] moral rules do seem to limit their content to behavior that directly or indirectly causes or risks harm to others [as opposed to harm affecting the agent himself]. [...]
>
> It is possible to hold that having a certain sort of social goal is definitional of morality (Frankena, 1963). Stephen Toulmin (1950) took it to be the harmony of society. Baier (1958) took it to be 'the good of everyone alike'. Utilitarians sometimes claim it is the production of the greatest good. B. Gert (2005) took it to be the lessening of evil or harm.[212]
>
> [...] Among the views of moral realists, differences in content are less significant than similarities. For all such philosophers, morality prohibits actions such as killing, causing pain, deceiving, and breaking promises. (B. Gert & Gert, 2020, §4)[213]

Accordingly, there are several suggestions out there: 'harmony of society', 'the good of everyone alike', 'the production of the greatest good', 'the lessening of evil or harm', *and* there is substantial agreement regarding certain actions, which is an agreement regarding content (just not of the definitional/substantive kind).

Sinnott-Armstrong and Wheatley (2014) highlight that a "plausible proposal about content claims that all and only moral judgments are about harm to others (B. Gert, 2005; Gray, Young, & Waytz, 2012; Mill, 2003 [1859])" (p. 457).[214]

Indeed, 'harm to others' (broadly construed) seems to be an intuitive as well as a common suggestion (cf. Hooker, 2017, p. 101-102, who provides a whole list of proponents), but it is also contested, both on empirical grounds (cf. e.g. Stich, 2019) as well as on theoretical grounds (cf. e.g. Hooker, 2017; Sinnott-Armstrong & Wheatley, 2012, 2014, but cf. also section 4.2.4 on page 108 for my disagreement).

I am not aware that there is a once and for all defeating argument against 'harm to others' as a major content of morality. Sinnott-Armstrong and Wheatley (2012, 2014) argue against it by counterexample (which I argue to be quite unconvincing in section A.1.3 on page 580 within the Appendix). I am not sure a definitive argument for *or* against 'harm to others' as a major content of morality could even be given. However,

[212] The quote goes on to specify: "This latter goal may seem to be a significant narrowing of the utilitarian claim, but utilitarians always include the lessening of harm as essential to producing the greatest good and almost all of their examples involve the avoiding or preventing of harm. It is notable that the paradigm cases of moral rules are those that prohibit causing harm directly or indirectly, such as rules prohibiting killing, causing pain, deceiving, and breaking promises. Even those precepts that require or encourage positive action, such as helping the needy, are almost always related to preventing or relieving harms, rather than promoting goods such as pleasure" (B. Gert & Gert, 2020, §4).

[213] The citations in this passage were made clickable and added to the bibliography. The identical editions and publication years were used, with the exception of Mill (2003 [1861]). The citation style was adapted to the style used in this work. For the original bibliography see B. Gert and Gert (2020).

[214] Cf. footnote 213 for my policy on quoted citations.

the possibility of (more or less) definitively making such a substantive claim or deny it, is a technical point I cannot follow up on here.[215] [216]

For now, whether 'harm to others' can define morality in terms of content remains an open question. It is easier to argue against it than to argue for it (cf. my remark on that in section 4.2.4 on page 108), which is why, contrarily, I venture to stress that 'harm to others' really is a strong candidate.

Furthermore, 'harm to others' as a content denominator relates well to Turiel's (1983) 'justice, rights, and welfare': all three of these, if lacking, may be argued to be closely related to harm.[217]

4.2.3 The Ambiguity of the Term 'Morality'

A large part of B. Gert and Gert's (2020) article is consumed by the distinction between a descriptive and a normative definition of morality.[218]

A descriptive definition of morality is meant to refer to "the moralities" that people and societies actually hold and practice, whereas a normative definition of morality, according to the authors, hinges on the concept of rationality/a rational agent:

> [T]he term 'morality' can be used either
>
> 1. descriptively to refer to certain codes of conduct put forward by a society or a group (such as a religion), or accepted by an individual for her own behavior, or
>
> 2. normatively to refer to a code of conduct that, given specified conditions, would be put forward by all rational people. (B. Gert & Gert, 2020, §0)[219]

[215] Why is it technically difficult? For example, to definitively conclude that 'harm to others' is not the unifying content of morality, one would need a very strong counterexample of a moral judgment that is not about harm to others. However, opponents could deny either that it is a moral judgment or that it is not about harm. And even if most professional philosophers agreed such that one could call it a mainstream opinion: does mainstream suffice for a definite conclusion? This would be an empirical criterion for an analytical matter. Accordingly: it is technically difficult.

[216] Cf. also Dorsey (2016) for the claim that "any account of the distinctiveness of morality cannot be prior to substantive inquiry into the content of moral reasons, requirements, and concerns. The genuine distinctiveness of morality will become clear only after we have determined what those very reasons, requirements, and concerns really are" (p. 747).

[217] However, cf. Stich (2019) for a very thorough review of the empirical literature and the resulting conclusion that 'justice, rights, and welfare' is not a nomological cluster.

[218] The concept of a substantive definition is explicated more thoroughly in section 4.2.3.2 on page 106.

[219] Note this important explication: "In the normative sense, 'morality' refers to a code of conduct that would be accepted by anyone who meets certain intellectual and volitional conditions, almost always including the condition of being rational. That a person meets these conditions is typically expressed by saying that the person counts as a *moral agent*. However, merely showing that a certain code would be accepted by any moral agent is not enough to show that the code is the moral code. It might well be that all moral agents would also accept a code of prudence or rationality, but this would not by itself show that prudence was part of morality. So something else must be added; for example, that the code can be understood to involve a certain kind of impartiality, or that it can be understood as having the function of making it possible for people to live together in groups" (B. Gert & Gert, 2020, §0).

Yet, we already saw in section A on page 100 that morality's claim to rationality may well be denied. Furthermore, coming from a decision-theoretic view as depicted in section 2.4 on page 37, it seems that it is rather self-interest than morality which is tied to rationality. Accordingly, the above definition of morality (in a normative sense) is in need of explanation, which will be provided in the upcoming section 4.2.3.1. Afterwards we will look at the differences between a descriptive, normative, substantial, and conceptual 'definition' of morality in section 4.2.3.2 on page 106.

4.2.3.1 Morality and Rationality

Foot (1972) made the point that not being moral does not imply being irrational by claiming that morality does *not* come with a unique 'reason-giving force' that other normative systems (such as etiquette) lack. She is not the only one ready to (somewhat) untie morality from rationality, cf. footnote 220.[220]

B. Gert and Gert (2020) claim that normative ethical theories (e.g. the 'three methods of ethics', cf. section 3.2.4.1 on page 64: Kantian ethics/deontology, consequentialism/utilitarianism, virtue ethics) tend to come with the (implicit) claim that rational agents would endorse them: "many moral theorists implicitly hold that the codes they offer would be endorsed by all rational people, at least under certain conditions. Unless one holds this, one will have to admit that, having been shown that a certain behavior is morally required, a rational person might simply shrug and ask 'So what? What is that to me?' " (§4). But the account of rationality may differ between normative ethical theories.[221]

[220] "Among those who use 'morality' normatively, virtually all hold that 'morality' refers to a code of conduct that *applies to* all who can understand it and can govern their behavior by it, though many hold that it *protects* a larger group. Among such theorists it is also common to hold that morality should never be overridden. That is, it is common to hold that no one should ever violate a moral prohibition or requirement for non-moral reasons. This claim is trivial if 'should' is taken to mean 'morally should'. So the claim about moral overridingness is typically understood with 'should' meaning 'rationally should', with the result that moral requirements are asserted to be rational requirements. Though common, this view is by no means always taken as definitional. Sidgwick (1981 [1874]) despaired of showing that rationality *required* us to choose morality over egoism, though he certainly did not think rationality required egoism either. More explicitly, B. Gert (2005) held that though moral behavior is always rationally *permissible*, it is not always rationally *required*. Foot (1972) seems to have held that any reason – and therefore any rational requirement – to act morally would have to stem from a contingent commitment or an objective interest. And she also seems to have held that sometimes neither of these sorts of reasons might be available, so that moral behavior might not be rationally required for some agents. Finally, moral realists who hold desire-based theories of reasons and formal, means/end theories of rationality sometimes explicitly deny that moral behavior is always even rationally *permissible* (Goldman, 2009), and in fact this seems to be a consequence of Foot's view as well, though she does not emphasize it" (B. Gert & Gert, 2020, §4, original italics, cf. footnote 213 on page 102 regarding my policy on citations).

[221] "Definitions of morality in the normative sense – and, consequently, moral theories – differ in their accounts of rationality, and in their specifications of the conditions under which all rational persons would necessarily endorse the code of conduct that therefore would count as morality" (B. Gert & Gert, 2020, §4).

Let's take a step back and look at the notion of rationality and its relation to morality in general. If, as Foot (1972) claims, morality may not be equipped with a special 'reason-giving force', it is possible to ask more generally: 'why be moral?'. Sinnott-Armstrong (2019) spells out what this may mean:

> This interrogative [i.e.: 'why'] asks for a reason, but reasons are understood in different ways. Some philosophers suggest that all reasons are self-interested. Then the question 'Why be moral?' asks 'Why is it in my interest to be moral?' Others, in contrast, argue that some reasons concern effects on others (rather than oneself) or do not concern any effects on anyone. Then the question 'Why be moral?' is not just asking why it is in my interest to be moral. Instead, it asks what, if anything, makes it irrational to be immoral or at least keeps it from being irrational to be moral. (Sinnott-Armstrong, 2019, §1, supp.)

In other words:

> [M]any philosophers deny various universal claims, including the claims that there is *always* some reason to be moral, that there is always a distinctively *moral* (as opposed to self-interested) reason to be moral, and/or that there is always *enough* reason to make it irrational not to be moral or at least not irrational to be moral. (Sinnott-Armstrong, 2019, §1, original italics)

That is, the verdict that it is irrational to not follow a certain moral code of conduct simply rests on the claim that there in fact is *sufficient reason* to indeed follow this code of conduct (of whatever kind this reason may be). Being irrational or acting irrationally here means to not be adequately responsive to the reason(s) I have to adhere to said code of conduct.

In fact, it is rather straightforward to argue that – whether these reasons are self-interested or other-regarding – that there are reasons to not be an 'immoral person' on the whole. Sinnott-Armstrong (2019) makes this point by first splitting the question 'why be moral' into 'why should I be a moral person?' versus 'Why should I do moral acts' (§1, supp.):

> [T]here can be isolated cases where I have no reason not to do a particular immoral act (such as hurting this friend or cheating on this exam) while I still have reason not to want a wider tendency to do immoral acts (such as hurting and cheating regularly). Only such wider tendencies or character traits make someone immoral as a person, but it seems harder to imagine how there could be no reason to avoid such widespread tendencies. If immoral tendencies always directly or indirectly hurt other people, and if some reasons are facts about interests of other people, then there will always be reason not to be an immoral person. Even if reasons are restricted to self-interest, widespread tendencies to immorality might always be dangerous to the agent's self-interest, and then, again, there will always be reason not to be an immoral person.

In sum, even if reasons were singularly about self-interest, it is fairly easy to argue that there is sufficient reason to not be an immoral person overall (and that thus being

an immoral person would be irrational), whereas it is much more difficult to claim that committing a singular immoral act is always irrational (i.e.: not supported by any/ sufficient reason).[222] [223]

4.2.3.2 Descriptive, Normative, Substantive, Conceptual

Four terms, distinguishing ways in which the term "morality" can be used *or* specified, are in need of explication: descriptive, normative, substantive, conceptual.

Descriptive Using the term 'morality' descriptively seems relatively straightforward: as defined by B. Gert and Gert (2020), what is meant are "codes of conduct put forward by a society or a group (such as a religion), or accepted by an individual for her own behavior" (§0). Yet, even within this usage the researcher would have to spell out what makes said – empirically witnessed and descriptively referenced – code of conduct a *moral* one as opposed to one of etiquette or social convention. Sinnott-Armstrong and Wheatley (2012, 2014) let the *intention* to make a moral judgment be the judge of whether it is one (and not another kind of judgment, cf. section 4.2.4 on page 108). Moral Foundations Theory (e.g. Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011) explicitly is about capturing dimensions of 'moralities' actually put forward around the world (cf. section B on page 101).

Normative First, there is the quote from B. Gert and Gert (2020) above where the code of conduct referred to as 'morality' "would be put forward by all rational people" (§0). This point may be understood as a point about morality's (supposed) special normative force – a conception that was criticized e.g. by Foot (1972) (cf. section A on page 100).

Second, one may simply claim that 'morality' is a normative concept in that its meaning comes with the addition that whatever is 'moral' is good or right – maybe even in a special sense (cf. the quote in the footnote).[224] Or, 'moral' is understood to simply be short for 'morally good/right'.[225]

[222] A missing link here is a definition of reasons (plural) as well as reason (singular). Reasons will be treated in section 4.3.2 on page 113.

[223] Surely, this is an all to brief treatment. For a start on a further dive into the topic I recommend Nielsen (1999) who treats the question 'why be moral' (p. 111 ff.) within a discussion of *moral point of view* theories. Debating 'the moral point of view' has generated quite a large literature which also offers a very interesting perspective on defining morality. Sadly, I cannot follow up on it here at all.

[224] "When we attempt to formulate a definition of the terms 'moral' and 'morality' we are likely to run into the problem that our definition is itself a normative one; not just in the general sense in which any definition is normative in that it says how a term is to be used, but in the specific sense that it seems to build certain moral standards into the use of the term 'moral' itself. That is, when you say that something belongs to somebody's morality, then on this kind of definition, you are saying something good about the set of standards so characterized" (Comment by Narveson in "Discussion: The shape of the moral domain", 1971).

[225] The first and the second sense are similar and may even be translated into each other (but remember Foot, 1972). In the first case, the opposite to 'moral' is 'immoral' and 'irrational'; in the second case the opposite is 'morally bad' and 'morally wrong'.

And third, there is the distinction between doing conceptual analysis in a descriptive versus a normative way (e.g. Stich, 2019, p. 5 ff.) – which will be spelled out in the according section below.

Substantive In section A on page 101 based on B. Gert and Gert (2020, §4, §5.1) I claimed that a content-based definition of morality could be termed a 'substantive' definition. "Substantive" is usually contrasted with "formal" (e.g. Crisp, 2021, §4.1, §4.2). A substantive definition or theory states constituents or what something consists in, whereas a formal definition/theory is rather about the inner workings and/or the structure of a thing. One might say 'substantive' answers the question "what thing(s) is that thing", whereas 'formal' answers the question "what makes that thing that thing". (Consider also Kovesi (2004) on form and matter.)

Conceptual One of the main methodological tools of analytic philosophy is so-called conceptual analysis. Anything which has a word for it is a concept: "table", "knowledge", "green" – and analyzing them may mean scrutinizing what we really talk about when we use these words (but also see below for a second type of analysis). As a competent user of some concept you should be able to pick out all instances of said concept, that is: for example, you should be able to distinguish tables from non-tables. Analyzing a concept (i.e. here: saying what it is) comes close to a conventional sense of 'definition'.

However, the analysis of the concept "concept" makes you realize quickly that concepts have metaphysical problems and, what might be worse, concepts might not be analyzable in the way we commonly think definitions work, namely by specifying necessary and jointly sufficient conditions for a concept to apply.[226]

Stich (2019, p. 5 ff.) reminds of a distinction made by Frankena (1970), namely between 'descriptive-elucidatory' versus normative conceptual analysis. The goal of the first is, as the term says, the coherent description of the actual concepts used in a language community. The goal of the latter, however, is "conceptual revision" (Stich, 2019, p. 6); in the case of morality it is about: "whether something should be built into our concept of morality, even if it is not" (Frankena, 1970, p. 150).

Whether descriptive or normative, a conceptual analysis of 'morality' or 'moral judgment' will distinguish the moral from the non-moral, or, in other words, delineate the domain of the moral.

4.2.3.3 Summary and Discussion

Not all of these four terms – descriptive, normative, substantive, conceptual – relate to the term/concept 'morality' in the same way.

A proper 'definition' (suspending definitional skepticism for a moment) of morality can only be conceptual. A substantive definition may be part of the concept, but is not sufficient: a formal element will be needed, too. The so-called normative reference, being elliptical for 'morally right/good', I will admit, seems to me both nonsensical and confusing: what is morally right/good is the subject of normative ethical theories and

[226] Please cf. Margolis and Laurence (2023) for an overview.

some meta-ethical concerns. But it is altogether a completely different question from the question what is 'moral' at all, that is: what is within the moral domain. Yet, when talking of a 'normative definition', what might be alternatively meant is the normative kind of conceptual analysis – but I assume this kind is rather rare (although engaging in it would solve a number of problems). The descriptive sense is somewhat the easiest to grasp as well as important with the surge in empirical research into moral judgment. Yet, of course, empirical research is never only empirical: definitions, concepts, constructs, operationalizations are needed. Psychologists are in the comfortable position that they can just invent what they want to research – *intelligence* is the most famous example of a psychological construct. This habit of just operationalizing a construct might be part of the reason why psychologists/neuroscientists seem to be less shy to come up with definitions of morality/moral judgment than philosophers. But then: regarding its freedom from actual usage, a psychological construct is no different to a product from normative conceptual analysis.

In conclusion: When I wonder 'what is the domain of the moral' I am singularly interested in a conceptual distinction of 'the moral' from 'the non-moral'. Furthermore, while it seems right to say that one can distinguish a descriptive from a normative *use* of the terms 'morality' and 'moral', I find the proper opposite to a descriptive *analysis* of 'morality' (or rather: 'moralities') is a conceptual analysis of 'morality' (or even: 'moralities').

4.2.4 The Disunity of Morality

In their article *The Disunity of Morality and Why it Matters to Philosophy* Sinnott-Armstrong and Wheatley (2012) make the claim that morality/moral judgment[227] is not unified in that "all judgments that are intended to be about morality as opposed to law, economics, aesthetics, and so on are unified by any common and peculiar feature that enables important universal generalizations about their distinctive properties" (p. 357). In order to be able to tackle the question whether 'moral judgments are unified', Sinnott-Armstrong and Wheatley (2012) need a preliminary understanding of 'moral judgment'. Accordingly, they define by stipulation moral judgment "to include all judgments that are intended to resemble paradigm moral judgments. The judger's intention is what makes the judgment moral" (p. 356).[228] [229]

[227] They seem to use the two terms synonymously. I will stick with 'moral judgment'.

[228] Prima facie this seems like an odd move. But in order to scrutinize common features of 'moral judgment' the authors need a defined pool of moral judgments to check the potential features against. Usually, this pool of 'certified moral judgments' is the philosophical author's intuition (plus common examples from the literature). Since the authors do not revert to that, it seems they wish to accommodate the skepticism regarding philosophical intuition. Cf. e.g. Pust (2019) for a discussion of the latter.

[229] Since we just clarified differing uses and/or types of analysis and investigation into morality, the question is wide open: what are Sinnott-Armstrong and Wheatley (2012) trying to do? – I elaborate on that in section A on page 584 from A.1.3.2 within the Appendix. My conclusion there is that while it might seem that the authors are only interested in morality in a descriptive sense, they in fact are interested in morality in a conceptual sense.

Sinnott-Armstrong and Wheatley (2012) proceed to consider "content, phenomenology, force, form, function, and brain mechanism" (p. 358) as overarching categories where unity might be found.

For each category the authors propose likely theses and/or candidates for potentially unifying features – and go on to provide counterexamples to each. The argumentative structure is: (1) reference: moral judgments are all those judgments that are intended to be moral, (2) proposal: feature β could be a feature that is to be found in all moral judgments, (3) counterexample: there is at least one moral judgment as defined by [1] that does not share feature β from [2], (4) conclusion: feature β is not a feature pertaining to all moral judgments, (5) general conclusion: there is no unifying feature to all moral judgments (as defined by [1]).[230]

The analysis the authors offer in Sinnott-Armstrong and Wheatley (2012, 2014)[231] is interesting to discuss regarding both content and argumentative strategy. I have done both in the Appendix (cf. section A.1.3 on page 580) with a focus on the category 'content' to complement section 4.2.2 on page 100.

Here is a super-short overview of the authors' claims regarding each category they discuss (the quotes are from Sinnott-Armstrong & Wheatley, 2012):[232]

Content: "[M]oral judgments are not unified by being about harm to others" (p. 360).

Phenomenology: There is no common *feel* to all moral judgments.

Force: Not all moral judgments are *authority-independent*.

Form: Contrary to Hare (1981): Not all moral judgments are *prescriptive* and *overriding*.

Function: Contrary to G. J. Warnock (1971): It is not the case that "the goal of moral judgments is to reduce liability to harm that arises from limited sympathy: We care about ourselves and our friends and family much more than we care about other people. This limited sympathy leads us to choose acts that harm others, so we are all in danger when lots of other people have such limited sympathy" (p. 365).

Brain mechanism: "[D]ifferent moral judgments rely on different neural systems" (p. 366).

In sum, Sinnott-Armstrong and Wheatley (2012, 2014) nicely structure their analysis into theoretically sensible categories, namely 'content, phenomenology, force, form,

[230] Of course, [6] does not strictly follow, and the authors are aware of that.

[231] Note that these two articles are almost identical, having the same structure, strategy, and most of the counterexamples. Still, Sinnott-Armstrong and Wheatley (2014) is an amended version of Sinnott-Armstrong and Wheatley (2012) and e.g. includes a more pronounced constructive proposal in the end. Cf. also footnote 585 on page 587 on the similarity of the two publications.

[232] Note that this overview only lists the main points and/or those candidates that I believe have some chance to be a unifying feature of morality/moral judgment. Accordingly, I left out all those candidates discussed by Sinnott-Armstrong and Wheatley (2012, 2014) that I believe are not worth mentioning. For example, within the category 'content', Sinnott-Armstrong and Wheatley (2014) as the first possibly unifying feature name (and rightly dismiss) "that they are all about morality" (p. 457) – which I find does not need mentioning.

function, and brain mechanism', and present about three candidate features per category. However, as compared to others' treatment of the topic (e.g. Kovesi, 2004; Machery & Stich, 2022; Stich, 2019), their choice of candidate features seems a bit eclectic. On the other hand, they dedicate more attention to the category 'brain mechanism' than most authors do.

In my longer discussion of Sinnott-Armstrong and Wheatley (2012, 2014) – which I moved to the Appendix, cf. section A.1.3 on page 580 – I pointed out that their argumentative strategy based on (i) their wide definition of moral judgment and (ii) the use of counterexamples regarding possible candidate features is basically immune to contrary claims: even if I argued successfully that some counterexample does not work, they could always and easily come up with another one. Since due to their stipulation that anything intended to be a moral judgment *is* a moral judgment the authors may have an infinite pool at their disposal.

In conclusion, Sinnott-Armstrong and Wheatley (2012, 2014) foster the point that it is difficult to come up with a 'definition' of morality or moral judgment since even one unifying feature is hard to come by – while at the same time showing that it is relatively easy to argue against such unity.

Surely, I am not in a position to claim conclusively that there is such a unifying feature. Yet – as spelled out in section A.1.3 on page 580 within the Appendix – I am rather unconvinced by quite a few of the authors' counterexamples (which, as pointed out above, cannot hurt them, though). – Be that as it may: the status quo is that there is no widely accepted 'definition' or unifying feature out there. Yet, one might wonder: is that even a problem? I will turn to this question within the upcoming section 4.2.5.

4.2.5 Summary and Conclusion

The aim of the present section *The Domain of the Moral* – though necessarily cursory as compared to the exuberant amount of literature in both philosophy and psychology – was to gain at least some understanding of proposals to distinguish the moral from the non-moral, their critical discussion, and the interaction of philosophical analysis and empirical inquiry.[233]

[233] Since this section was indeed all to short to give justice to the topic, here are my eclectic reading recommendations: *The Stanford Encyclopedia of Philosophy*, is, of course, an excellent resource. Yet, *The Definition of Morality* (B. Gert & Gert, 2020) is, for some reason, difficult to read. A much easier to read and thorough overview, also distinguishing clearly between conceptual and empirical contributions, is Stich (2019). Machery and Stich (2022), although concerned with a sub-topic, shows the same clarity (and a few identical passages as Stich (2019)) and is an exemplary instance of a vigorous philosophical examination of empirical results. To the same point, Kauppinen (2014) elaborately and critically scrutinizes the idea that empirical psychology is informative to ethics. Some classics to read with a constructive outlook on the 'definition' of morality are e.g. Frankena (1966, 1970); Hare (1981); Kovesi (2004). A more recent positive outlook is provided by Narveson (2009), also including a very legible overview within the introductory chapter. For a look at the wider context the following provide a start: R. Campbell (2019); Mason (2023); Ridge (2019); Sayre-McCord (2023); Sinnott-Armstrong (2019); Wallace (2020).

In this concluding section I will have a look at whether the lack of an agreed-upon unity to morality/moral judgment really is such a dire prospect.

4.2.5.1 Is it a problem if morality is not unified?

The claim that among philosophers over several decades no consensus has been achieved as regards formal and/or substantive requirements of a definition of morality/moral judgment seems to be made quite unanimously (e.g. Dahl, 2023, p. 55; Machery & Stich, 2022, §2; Stich, 2019, p. 7-8; Sinnott-Armstrong & Wheatley, 2012, 2014):

> After decades of effort by dozens of authors, including some of the most eminent philosophers writing in the second half of the twentieth century, the project failed to reach anything close to consensus. Disagreements persisted on just about every issue of methodology and substance. (Machery & Stich, 2022, §2)

Yet, it is a classic joke, even made by philosophers themselves, that there simply is no philosophical thesis, position, claim, or theory that is not debated and denied by some professional philosopher. Accordingly, what is supposedly meant is that in the case of the definition of morality/moral judgment there is no *mainstream* position among philosophers (which indeed exists on other matters).

However, this diagnosis itself could be denied. For example, Kauppinen (2014) lists a few formal criteria and claims them to be 'relatively uncontroversial marks of moral judgment':[234]

> Similarly, even if Twin Earthers have a very different kind of brain and mind from ours, as long as they make judgments that are categorical (apply to agents regardless of their desires or interests), presumptively universalizable (apply to all non-morally similar cases), have felt intersubjective authority, and are somehow linked to non-self-interested sanctioning behavior, to take a few relatively uncontroversial marks of moral judgment, they do make moral judgments. (Kauppinen, 2014, p. 286)

In sum, it seems that within the very productive philosophical and psychological literature on the matter indeed quite a few promising candidates – both formal and substantive – have emerged, cf. e.g. the quote above and the super-short overview in Stich (2019, p. 7-8).[235] But there is ongoing debate, there are authors outright claiming that a unified theory is impossible (e.g. Sinnott-Armstrong & Wheatley, 2012, 2014; Stich, 2019), and there is the additional difficulty of determining the status of empirical results to philosophical analysis (cf. e.g. Kauppinen, 2014). Accordingly, there is no

[234] The quote is within the context of arguing that (the concept of) moral judgment is not a natural kind. The idea of 'natural kinds' is taken to be supported by the so-called 'Twin Earth thought experiment' which is due to Putnam, 1973, 1975. This thought experiment is supposed to show that meanings are not psychological only. Kauppinen (2014), too, in the quoted quote uses the point of 'Twin Earth' to argue that the essence/concept of 'moral judgment' is not tied to psychological or neurological correlates. – The point here, however, is that he claims that there are 'uncontroversial' formal criteria of moral judgments.

[235] Not to mention the occasional novel idea, as e.g. in Hindriks and Sauer (2020).

mainstream position – or, in other words, there are good arguments for and against each proposal.

But then again: this is just normal for many philosophical questions, even if looking at only one school of philosophy, the analytical tradition. And this characteristic plurality of positions in itself has not been a problem to philosophy. Accordingly, the 'definition' of morality still due is not a problem to philosophy either. It may be, however, a problem to empirical research, as some seem to think (cf. e.g. Dahl, 2023, whereas others deem it satisfactory if researchers just spelled out the conception they are using, e.g. Sinnott-Armstrong & Wheatley, 2012, 2014).[236]

In conclusion, it is not a problem for philosophy if there is not (yet) a mainstream account of the unity of morality/moral judgment. But it might be a problem for empirical research dealing with 'moral judgment'.[237]

4.2.5.2 The Advantage of a Lack of a Delimitation for the Present Research

For the present research, the lack of a clear demarcation of the domain of the moral is an advantage. The first reason is that it allows me a more 'organic' view of both reasons and situations – compatible with Dancy's (2004) particularism and his related views, most importantly the so-called holism of reasons. The second and more important reason is that I want to use the distinction between principled and particularistic reasoning and decision making for the whole of decision making, that is: as two general decision strategies whose distinguishing characteristics are domain unspecific and not at all tied to morality. The lack of a clear delimitation of the moral versus the non-moral makes this generalization unconditional.

4.3 Moral Particularism and Moral Generalism

4.3.1 Definition

> Moral Particularism, at its most trenchant, is the claim that there are no defensible moral principles, that moral thought does not consist in the application of moral principles to cases, and that the morally perfect person should not be conceived as the person of principle. (Dancy, 2017, §0)

[236] Moreover, analyzing the philosophical consequences of psychological research can be quite daunting, not only because of the sheer mass of published studies, but also because each research program is somewhat its own universe, and because many psychologists (sorry to say that) are not good philosophers as regards concepts, precision, argument, and knowledge of relevant literature, history and adjacent concerns. Stich (2019) and Machery and Stich (2022) are valuable examples, I think, on how the philosophical scrutiny of empirical results may proceed, as well as they demonstrate the laboriousness of looking at the details of the studies discussed and the difficulty of putting together results over differing research programs and methodologies.

[237] As regards a 'definition' of moral judgment for psychology, cf. also the *Annual Review of Psychology* article by Malle (2021) where he seems to simply categorize moral judgments by the response scales used to measure it. (I am very not convinced.)

The particularism introduced here will be based on Jonathan Dancy (e.g. Dancy, 2004, 2017) who is a prominent proponent of particularism and according to Ridge and McKeever (2023): "has done more than anyone to articulate and defend an especially radical form of particularism" (§1).

In his central book on particularism Dancy (2004) defines particularism as the claim that "the possibility of moral thought and judgment does *not* depend on the provision of a suitable supply of moral principles" (p. 7, p. 74, my italics), whereas generalism, according to him, claims exactly that (i.e., the non-negated version of that same sentence).

Accordingly, a particularist of the above provenance can well allow that there are a few moral principles – as long as they are not central or necessary to 'moral thought and judgment' (cf. e.g. Dancy, 2004. p. 77 f., p. 82 ff.).

Holism Dancy's particularism is based on an elaborate theory of reasons which includes the doctrine of holism as well as specific "forms of relevance" (p. 42) that help to clarify how reasons work.

Holism about reasons means this: "a feature that is a reason in one case may be no reason at all, or an opposite reason, in another" (Dancy, 2004, p. 7). Holism about reasons – a metaphysical claim – is understood to be "the most prominent argument for particularism", although there are several ways proponents of generalism can react (Ridge & McKeever, 2023, §3).

To better understand holism as well as the above mention of 'forms of relevance', we first need to understand both reasons and principles – which will be done in the upcoming two sections 4.3.2 and 4.3.3 on page 118.

4.3.2 Reasons

4.3.2.1 Domains of Normative Reasons

Normative reasons are distinguished into basically the same categories as introduced in section 4.2.1.1 on page 98 distinguishing domains of value: moral, prudential, aesthetic, and epistemic/theoretical. Väyrynen (2006, p. 713) terms epistemic reasons 'theoretical' and adds a fifth category: instrumental reasons. Dancy (2004, p. 74) explicitly distinguishes theoretical and practical reasons, where theoretical reasons are reasons for belief and practical reasons are reasons for action. Furthermore he considers aesthetic reasons, which he judges to be "difficult to categorize" (i.e.: into the two categories theoretical/practical, p. 75). Furthermore Dancy (2004) uses the term "ordinary practical reasons" (p. 74) which seem to be coextensive with prudential reasons.[238]

In sum, notwithstanding Väyrynen's 'instrumental reasons' (which, I believe, play on another level), the distinction into three or four categories – namely: epistemic/theoret-

[238] Maybe Dancy (2004) also reserves all of 'practical reasons' for prudential reasons as some formulations would suggest that contrast practical reasons with moral reasons (e.g. p. 43, p. 44).

ical (belief), practical: moral and prudential (action), aesthetic – seems to be standard.

In philosophical jargon 'normative reasons' are also termed 'good reasons' (e.g. Dancy, 2004, p. 44, p. 74). Furthermore, it is common usage to say that normative reasons 'count in favor of an action' (cf. e.g. Alvarez, 2017). Last, "[t]here is consensus that normative reasons are facts" (Alvarez, 2017, §2).

Normative reasons are also called 'justifying reasons' – cf. the upcoming section 4.3.2.2.

4.3.2.2 Justifying versus Motivating

What is there besides normative reasons? A further important distinction is between justifying (= normative) and motivating (= explaining) reasons. Normative reasons justify an action and motivating reasons explain an action from the perspective of the agent.[239]

In his *Practical Reality* Dancy (2000) famously claims that justifying and motivating reasons are one and the same, that they are *not* distinct kinds of reasons:

> If we do speak in this way, of motivating and normative reasons, this should not be taken to suggest that there are two sorts of reason, the sort that motivate and the sort that are good. There are not. There are just two questions that we use the single notion of a reason to answer. When I call a reason 'motivating', all that I am doing is issuing a reminder that the focus of our attention is on matters of motivation, for the moment. When I call it 'normative', again all that I am doing is stressing that we are currently thinking about whether it is a good reason, one that favours acting in the way proposed (Dancy, 2000, p. 2-3).

This is a smart move, because it gets rid of the otherwise differing metaphysics of justifying versus motivating reasons:

> Until relatively recently, the distinction between different kinds of reasons was assumed, whether explicitly or not, to imply that these reasons were things of different kinds. Normative reasons were conceived of as facts, and so were regarded as mind-independent: the facts are what they are independently of whether anyone knows them or thinks about them. By contrast, motivating and explanatory reasons were conceived of as mental states of agents and, as such, as entities which depend on someone's thinking or believing certain things [...]. (Alvarez, 2017, §1))

4.3.2.3 Contributory Reasons[240]

Dancy (2004) explicitly understands all reasons to be *contributory* and:

> When I talk in this book about reasons for action, I mean to be talking of what I call contributory reasons. (Dancy, 2004, p. 15)

[239] There might yet be a third kind, which I will leave out, cf. Alvarez (2017, §1) for an overview.

[240] This and the next section on *Invariant Reasons* will be singularly based on Dancy (2004), which is why for short quotes I will only provide page references.

and defines them such:

> A contributory reason for action is a feature whose presence makes something of a case for acting, but in such a way that the overall case for doing that action can be improved or strengthened by the addition of a second feature playing a similar role. Also, a contributory reason on one side is not necessarily destroyed by the presence of a reason on the other side. (Dancy, 2004, p. 15)

A What Reasons There Are Not In making contributory reasons (for action) the standard, Dancy (2004) excludes non-contributory roles that reasons potentially could have:

A.a Overall Reasons First, there are no *overall reasons* "in addition to the contributory ones" (p. 16):

> To talk of what there is overall reason to do (and note that 'reason' in this phrase is not a count noun) is to talk about where the contributory reasons come down – on this side or on that. We can say we have more reason to do this than to do that, but most reason to do some third thing. These verdicts[fn.2] do not themselves specify further reasons (of an overall sort), on pain of changing the very situation on which they pass verdict.
>
> [...] [T]he point that verdictive judgments do not contribute to the situations on which they pass judgment is only one application of the more general truth that thin concepts cannot be used to add to the store of reasons. That an action is good, or right, is no reason to do it. It is the features that make the action good or right that are the reasons for doing it, and to say that it is good or right is merely to express a judgment about the way in which other considerations go to determine how we should act. At least, this is true if we identify these thin judgments with judgments about overall reason. (Dancy, 2004, p. 16)

The latter is a very important point: Reasons are features of a situation or an action, they are facts that speak in favor or disfavor of doing something. There are no extra-reasons that sum up a balance of reasons into a judgment.

A.b Decisive Reasons Second, there are no *decisive reasons*. A decisive reason, in Dancy's conception, would be one that does not pass verdict (as an overall reason above), but one that is so strong that it decides the matter. Unless, there is another and opposing decisive reason present, which, according to Dancy, would lead to both decisive reasons to "be destroyed (as decisive, at least)" (p. 16).

The only interesting conception of a decisive reason would be one where it is "in its own nature decisive" (p. 43):

> The obvious example is a moral reason. Many people suppose that in a battle between reasons, where there are moral reasons on one side and none on the other, the moral reasons will be decisive. Morality always wins. Of course if we have moral reasons on both sides, as sadly we often do, those reasons cannot now be all treated as of their nature decisive. But still, moral reasons are of their nature decisive vis-à-vis reasons of other sorts.

> My own view about this is that the matter is exaggerated. First, it seems to me that weak moral reasons are on occasion defeated by strong practical reasons. [...] Second, the supposed intrinsic decisiveness of moral reasons may be a product rather of an independent commitment to the paramount nature of the moral. Many people are committed to morality in this sense, and treat moral reasons as decisive. But one could be committed to doing the right thing case by case without supposing that moral reasons have an intrinsic decisiveness. (Dancy, 2004, p. 43)

Again, the latter point is important: With this statement Dancy once more positions himself as not treating morality other than e.g. prudence – in not granting a special force to morality (on that matter, cf. also section A on page 100 within 4.2.1.3 as well as section 4.2.3.1 on page 104).

4.3.2.4 Invariant Reasons

An invariant (or: general, p. 76) reason is one "whose practical relevance is invariant" (P. 77). For example, one might claim that "mendacity [i.e.: lying] is always a wrong-making feature wherever it occurs (that is, it always makes the same negative contribution, though it often does not succeed in making the action wrong overall)" (p. 76).

Dancy argues (p. 76-78) that both particularism and holism can allow for invariant reasons, as long as it is agreed that these reasons are invariant due to their specific content as opposed to constituting a new category of reasons. Thus holism is not hurt by their existence. The main claim of particularism is not hurt either, because the main claim was that *it is not the case that* all moral thought and judgment depends crucially on there being suitable moral principles (or for that matter: invariant reasons): "admitting the possibility of some invariant reasons is a far cry from admitting that the very possibility of moral thought and judgment is dependent on our being able to find some such reasons" (p. 77). Accordingly, Dancy concludes:

> [W]e should accept the possibility of invariant reasons, as long as the invariance is not a matter of the logic of such reasons, but more the rather peculiar fact that some reasons happen to contribute in ways that are not affected by other features. We can admit this without adopting a hybrid theory of rationality, so long as we treat the invariance of any invariant reason as an epistemic matter rather than as a constitutive one. (Dancy, 2004, p. 78)

This latter point is important once more: it shows that both holism and particularism as conceptualized by Dancy (2004) is rather accommodating: the possibility of (some) invariant reasons (or in other words: principles, cf. section 4.3.4.2 on page 120) does not have to be denied, since the main claim of particularism is just about the non-centrality and the non-necessity of moral principles to moral thought and action.

4.3.2.5 Internalism vs. Externalism

This distinction concerns normative reasons for action (that is: *not* motivating reasons for action, cf. section 4.3.2.2 on page 114, and *not* normative reasons for belief, cf. section 4.3.2.1 on page 113):

> According to some philosophers, reasons for action always bear some relation [...] to motivation. This idea is [...] known as 'reasons internalism' [...]. According to other philosophers, not all reasons are related to motivation in any of the ways internalists say. This idea is known as 'reasons externalism' [...]. (Finlay & Schroeder, 2017, §0)

The most well-known internalist theory is the counterpart to the *Humean Theory of Motivation*, which I already came across twice (cf. section 1.2.1.2 on page 9 and section A on page 49 within 2.4.2.2): motivation necessitates a combination of belief and desire.

Finlay and Schroeder (2017) term this counterpart the *Humean Theory of Reasons* and define it such:

> If there is a reason for someone to do something, then she must have some desire that would be served by her doing it. (Finlay & Schroeder, 2017, §1.2.1)[241]

Accordingly, the question is: how do reasons move us to act (what is their relation to motivation) and is desire a necessary part of the formula?

A Dancy on Desire Dancy (2004) is not a fan of the Humean theory of motivation because he finds that "Humeans can offer no satisfactory conception of the contributory" (p. 68), the primacy of which is an essential part of his theorizing. Dancy chooses to not elaborate on that point, but he does comment on *desire*:

> Indeed, many find it hard to conceive of our having any practical reasons at all if we had no desires. My own view on this matter, however, is that even if a desireless creature could not have any reasons at all, it is not our desires that give us or ground our reasons. *Reasons stem from the prospect of some good.* If we have no other reason to do a certain action, wanting to do it will give us no reason at all [...]. (Dancy, 2004, p. 75, my italics)

Later, Dancy states more clearly his intention to give an account of "three apparently distinct things [...]: desire, motivation, and the recognition of a reason" (p. 144). His constructive proposal is that "*to desire is to be motivated*" (p. 144, my italics), and that "the recognition of reasons is itself an intrinsically motivating state" (p. 145).[242]

In sum, it is just important to note that there are ways around attaching desire to reasons in order to achieve motivation.

4.3.2.6 Summary

This section distinguished several potential kinds and/or roles of reasons with a special emphasis on Dancy's (2004) views. The next paragraph will be about moral principles. Thereafter we are equipped to look at the doctrine of holism, the main argument for particularism.

[241] This conception runs into problems pretty quickly, cf. Finlay and Schroeder (2017, §1.2.1 ff.).

[242] Dancy (2004) does not elaborate much more on that, but he does in Dancy (2000); cf. also the quote in section 4.3.2.2 on page 114.

4.3.3 Moral Principles

4.3.3.1 Absolute vs. Contributory

Dancy (2017) distinguishes two conceptions of moral principles:

First, there is 'the absolute conception' which "takes a moral principle to be a universal claim to the effect that all actions of a certain type are overall wrong (or right)", and second, there is 'the contributory conception' where all actions having a certain feature are always better or worse for having that feature. Dancy (2017) uses the example of promise-breaking:

> The principle 'don't break your promises' can be expressed in various ways: 'it is wrong to break one's promises'; 'all actions that involve breaking a promise are wrong' – and so on. On the absolute conception, these all mean that each and every action of breaking a promise is a wrong action, whatever else there may be to be said for it. Each such action is wrong overall, despite any redeeming features it may have. [...]
>
> Understood in [the contributory] way, our principle maintains that if an action involves breaking a promise, that counts against it. The action is the worse for being a promise-breaking. Of course it may be the worse for being a promise-breaking but the better for some other feature that it has – that of being kindly meant, say. (Dancy, 2017, §1)

Note that with 'absolute principles' a respective action, due to one of these, is understood to be overall morally wrong or right. With contributory principles however, where in the presence of several features (as in the example above) some may make the action worse and some better, there is no overall verdict to be had.

4.3.3.2 Function, Scope, Hedgedness

Ridge and McKeever (2023) distinguish kinds of moral principles differently.

First, they distinguish them in terms of *function* into standards, guides, and action-guiding standards (a mixture of the former two, cf. §2). Standards say e.g. why an action is right or wrong, whereas guides are for use in real life. I will come back to this distinction and according examples in section 4.3.6 on page 124.

Second, they distinguish them in terms of *scope*, where some have no moral concepts within their antecedent (e.g.: 'if an action produces the best overall results, then it is morally right'),[243] and others do (e.g. "if an action is just then it is morally permissible",

[243] This conditional is based on the formulation of the principle of utility by Nathanson (2023, §2): "do whatever will produce the best overall results". Of course there has been and still is debate on different possible formulations (and their consequences) of this famous principle (cf. e.g. Nielsen, 1979). Yet, whatever formulation, the 'principle of utility' is known to entail a *descriptive* antecedent, cf. e.g.

Ridge & McKeever, 2023, §2).

Third, "principles can be distinguished in terms of whether they are in some sense 'hedged', including a *ceteris paribus* clause of some kind (e.g., 'other things equal, lying is wrong'), or unhedged" (Ridge & McKeever, 2023, §2, original italics).

Furthermore, Ridge and McKeever (2023) *do not* distinguish contributory versus absolute principles. They only mention Dancy's use of the term 'contributory' and note its more common synonym '*pro tanto*' (§1). The context of their usage suggests that they conceive contributory principles to be rather marginal to the concept of 'principle'. Accordingly, it seems that Ridge and McKeever's (2023) three distinctions are *within* what Dancy termed 'absolute principles'.

4.3.3.3 Form

Principles can take several formulations, as was already seen in the quote from Dancy (2004) in section 4.3.3.1 on the preceding page. His examples were these:

> The principle 'don't break your promises' can be expressed in various ways: 'it is wrong to break one's promises'; 'all actions that involve breaking a promise are wrong' – *and so on*. (Dancy, 2004, §1, my italics)

However, their logical form is a universally quantified conditional, $\forall x\,(F(x) \rightarrow G(x))$, where the consequent will involve a normative/moral concept (e.g.: good/bad, right/wrong, obligatory/permissible/prohibited, reason, ought, etc.).

The most 'classic' form of a principle involves a "purely descriptive antecedent [and] a purely normative all things considered consequent, as with (e.g.) the principle of utility" (Ridge & McKeever, 2023, §5). Yet, a principle might also use a thick concept in the antecedent and a thin concept in the consequent.[244] This difference was named 'scope' by Ridge and McKeever (2023) and spelled out in section 4.3.3.2 on the previous page; another term for the latter kind (from thick to thin) is 'intra-moral principles'.

Even what Dancy calls 'contributory principles' will share the general form of a universally quantified conditional, but the consequent will be formulated differently. Compare:

(P_{abs}) If an action involves breaking a promise, then the action is (overall) morally wrong.

Ridge and McKeever (2023). Another formulation might be 'if an action maximizes happiness, then it is morally right'. In both cases, accordingly, 'happiness' and 'best overall results' are meant to be descriptive, or at least non-moral concepts.

[244] "Such [i.e.: thick] words/concepts in some sense have both specific descriptive and normative contents. Concepts associated with virtues and vices are classic examples of thick evaluative concepts – concepts like courage, justice, fairness and generosity are all paradigm cases" (Ridge & McKeever, 2023, §5). Thin concepts classically are e.g. those cited above: good/bad, right/wrong, obligatory/permissible/prohibited, reason, ought. 'Just' is a problem case where it is unclear whether it is thick or thin.

(P_{con}) If an action involves breaking a promise, then the action is morally worse for it.

At any rate, the universality remains, because a (moral) principle is meant to specify a regularity – no matter whether the consequence from the regularity is absolute or contributory.

A remark on the relation of reasons and principles is in order, which will happen in the next section.

4.3.4 The Translation of Principles Into Reasons

Both Dancy (2004, 2017) as well as Ridge and McKeever (2023) do not explicitly convert principles into reasons (or vice versa), but comment on their relation several times in passing. First a comparison in form.

4.3.4.1 A Comparison by Form

It is commonly agreed that (normative) reasons are facts (cf. section 4.3.2.1 on page 113). Here are two examples of moral reasons:

(R_1) I promised to do it. (Dancy, 2004, p. 38)

(R_2) She is in trouble and needs help. (Dancy, 2004, p. 41)

Principles are universally quantified conditionals with a normative consequent (cf. section 4.3.3.3 on the previous page). This is what the above reasons would look like as moral principles:

(P_1) If I promised to do *something*, I (morally) ought to do it.

(P_2) If *someone* is in trouble and needs help, I (morally) ought to help them.

The words italicized are meant to stress how principles must be more general than reasons, because that is what they are for: to make a rule for all relevantly similar situations.

4.3.4.2 Principles and Invariant Reasons

According to Dancy (2017) "[p]rinciples of both sorts aim to specify invariant reasons" (§3).[245] Ridge and McKeever (2023) in passing refer to the relation as "principles specifying which considerations are reasons" (§1) or principles "specify a feature which grounds reasons" (§4).

[245] There are several further remarks in Dancy (2004). Please note that the following quotes are not to be understood as Dancy's claims, but rather are only meant to speak to the potential relationship between principles and reasons; many of these quote snippets are from within considerations that Dancy ultimately denies: "suppose that there are the sorts of general truths about how reasons behave that might be expressed by moral principles" (p. 7-8); "[i]f each principle, when properly understood, specifies a 'decisive' or a 'conclusive' reason [...]" (p. 26); "[i]f moral reasons are given in principles" (p. 28); "why the behavior of moral reasons might *need* to be capturable in some principled way" (p. 83).

So principles definitely 'specify' something involving reasons.

Proceeding with Dancy's claim about invariant reasons (cf. also section 4.3.2.4 on page 116), it seems that the specifying that principles do is (i) pick out a consideration that potentially qualifies as an invariant reason, e.g. 'having made a promise', (ii) link it to a thin moral concept, e.g. 'right', 'ought', and (iii) include an explicit or implicit claim about what to do, e.g. 'you ought to keep it', 'it is morally right to keep it'.

In sum, moral principles are – apart from their main character of universality – more informative than reasons, because, in some sense, they provide a conclusion.[246] Furthermore, principles are made of (invariant) reasons. At any rate, a reason can be extracted from a principle, and you can construct a principle from a reason.

4.3.5 Holism

Based on the distinctions and clarifications from sections 4.3.2 on page 113 and 4.3.3 on page 118 we will now return to the point of holism about reasons – of which Dancy (2004) says that: "it seems to me that particularism does follow from holism" (p. 82). Here is a reminder how Dancy characterizes it:

> *Holism* in the theory of reasons: a feature that is a reason in one case may be no reason at all, or an opposite reason, in another. (Dancy, 2004, p. 7, p. 73, original italics)

Another interesting formulation is this:

> Holism maintains that anything whatever might make a practical difference, or provide a reason, if the circumstances were suitable. (Dancy, 2004, p. 111)

Holism about reasons is about all normative reasons (e.g. Väyrynen, 2006, p. 710). In fact, Dancy's argument for the holism of *moral* reasons relies partially on the undisputed holism of reasons within other domains (cf. e.g. Väyrynen, 2006, p. 713), e.g. the epistemic/theoretical domain (cf. Dancy, 2004, p. 74 ff.), and the point that moral reasons are not special:

> I want to say that straight off it just seems incredible that the very logic of moral reasons should be so different from that of others in this sort of way. Consider here the sad fact that nobody knows how to distinguish moral from other reasons; every attempt has failed. (Dancy, 2004, p. 76)

The doctrine of holism about (normative) reasons can be best shown by example. Furthermore, the 'forms of relevance' mentioned in the beginning (cf. section 4.3.1 on page 112) that characterize the context of a reason and play a major part in how reasons, according to Dancy's conception, work within a holistic theory – can *only* be understood by example. Accordingly, the upcoming section 4.3.5.1 on the following page will demonstrate holism, introduce the 'forms of relevance', and do so by providing examples.

[246] Dancy (2004) generally argues against the idea that "practical reasoning is a form of inference" (p. 101 ff.).

4.3.5.1 Forms of Relevance

The 'forms of relevance' are about "three sorts of role that a relevant consideration can play: a relevant consideration can be a favourer/disfavourer, it can be an enabler/disabler for another favourer/disfavourer, and it can intensify/attenuate the favouring/disfavouring done by something else" (Dancy, 2004, p. 42). According to Ridge and McKeever (2023), these 'forms of relevance' are immensely important: "Holism depends crucially on the sustainability of the distinction between the particular considerations that count as reasons and the contextual factors (defeaters, enablers, etc.) that impact whether a consideration counts as a reason. Context-sensitivity without such a distinction would be unable to explain why a feature which is a reason in one context can fail to be a reason in another" (§3).

A Favorers and Enablers[247] [248] Here is an example of the relations of favoring and enabling (p. 38):

1. I promised to do it.
2. My promise was not given under duress.
3. I am able to do it.
4. There is no greater reason not to do it.
5. So: I do it.

First, note that, in the context of practical deliberation, Dancy terms contributory reasons *favorers*, since reasons commonly are said to 'favor an action' or 'count in favor of an action'.[249]

> Premise (1) presents a clear favourer. That I promised to do it is (in this context at least) a reason in favour of doing it. (p. 39)

So (1) is the reason/the favorer. Furthermore, according to Dancy, (2) through (4) are enablers, but of different kinds, and (5) is the 'conclusion of the reasoning' and represents an action.[250]

A.a Enablers This is what each of the three enablers is doing:

- Premise (2) enables the reason/favorer (1) to favor the action/conclusion (5) (p. 39).
- Similarly, premise (3) enables the reason/favorer (1) to favor the action/conclusion (5), but "[i]t is another enabler, perhaps not quite of the same type as (2)" (p. 40).
- Premise (4) enables "the move from (1) to (5)" and "[t]his is a different sort of enabling from what is done by either (2) or (3)" (p. 40).

[247] I'll continue to use US English ('favor'), but cite Dancy's British English ('favour') in quotations. That is, I'll not make "Favourer" a proper name.

[248] I will use the examples provided in *Ethics Without Principles*; unless otherwise noted, page references will accordingly refer to Dancy (2004).

[249] Cf. Ridge and McKeever (2023): "Particularists typically gloss being a reason as 'counting in favour' of that for which the consideration is a reason' (§3).

[250] Dancy uses the terms 'premises' and 'conclusion', but cautions that he does it only "for ease of reference" (p. 38). I will do the same.

Dancy presents specific arguments for why each of the three enablers is not itself a favorer/reason (cf. p. 39-41). But there is an easy general argument at hand (that Dancy himself uses elsewhere, cf. p. 40-41): namely that in absence of (1) the other three premises (2) to (4) are somewhat left hanging. Without (1), which they refer to, they cannot themselves be independent reasons.

It is not necessary to get into more detail here. The important point is that the example affords to see how easily and in ever so many different ways context may change and accordingly the balance of reasons or the strength or even status of any one reason:

> There are favourers and there are disfavourers, and if there are enablers, there must be such things as disablers; trivially, the absence of an enabler will disable what would otherwise be a reason. So favouring comes along with disfavouring, and enabling comes along with disabling. (p. 41)

B Intensifiers Here is an example of the intensifying relation (p. 41):

1. She is in trouble and needs help.
2. I am the only other person around.
3. So: I help her.

Again, (1) is the reason/favorer, and the last sentence (3) is the action/conclusion. Premise (2), again, is not itself a reason, because in absence (or negation) of (1) it is not effective. Rather, (2) intensifies the reason present.

Dancy (p. 42) goes on to argue (i) that if there are intensifiers, there are attenuators, too, and gives an example. Furthermore, (ii) he claims that the idea of an intensifier/ attenuator is rather easy to grasp: it intensifies or reduces a reason by degrees. And if it is agreed that reasons can be intensified/attenuated gradually, "why should we not suppose that the reduction can be achieved all at once [...]? – which is after all exactly what a disabler does. And if we allow the idea of a disabler, we will have to allow that of an enabler as well".

Accordingly, the idea that reasons can be made stronger or weaker by degree due to certain further considerations present in a specific situation, which seems intuitively plausible, provides a further argument for the conceptualization of enablers and disablers – which may switch reasons on or off all at once.

4.3.5.2 Summary

Holism about reasons in some sense is a reminder that situations are complex – or at least can be, dependent on the detail of description. A feature of a situation – or in other words: a fact – can be a practical reason (moral, prudential) for or against an action, as well as it can become relevant in one of the other two ways discussed (enabling, intensifying).

That it is snowing can be a good reason to go for a walk (add as enablers: I am in good health and possess warm winter clothes) as it can be a good reason to stay at home (add: I am freezing already and as a spectacle wearer I get turned around in snow storms). That it is snowing can be the enabler to the moral reason I have to go out in the snowy weather, which is that I promised my grandmother to visit her grave at first snow.

Holism about reasons has quite a few good arguments going for it, most of all the point that it is agreed that other normative reasons indeed are holistic. At any rate, it is important to keep in mind that holism does not entail particularism: there are viable possibilities for a principled, but holistic ethic (cf. e.g. Dancy, 2004, p. 81) and there are several well worked-out proposals that are somewhat compromising between generalism and particularism (cf. e.g. Ridge & McKeever, 2023, esp. §5).

For present purposes it was most important to see how principles and reasons work differently, but are translatable into each other, that there are arguments for an unprincipled ethics made by particularism, and that two of the big players in normative ethical theory, consequentialism/utilitarianism and deontology/Kantian ethics are indeed principled theories – which we will look at a little bit more closely in the upcoming section 4.3.6.[251]

4.3.6 The Generalism of Consequentialism and Deontology

The first distinction Ridge and McKeever (2023) make regarding differing types of moral principles is in terms of function: there are standards, guides, and action-guiding standards (§2, cf. section 4.3.3.2 on page 118):

> First, there are principles *qua standards*. Standards purport to offer *explanations* of why given actions are right or wrong, why a given consideration is a reason with a certain valence and weight, why a given character trait is a virtue, and the like. [...] Second, there are principles *qua guides*. These purport to be well suited to guiding action. Third, there are principles purporting to play both of these roles simultaneously – *action-guiding standards*. (Ridge & McKeever, 2023, §2)

We already came across the point that the utilitarian calculus is deemed to complicated for use in real life (cf. section B on page 79 within 3.3.2.1) and the distinction between 'decision criterion' and 'decision procedure' in moral theory (cf. section 1.2.5.2 on page 27). This latter distinction is approximately the same as the distinction between 'standards' and 'guides'. Utilitarianism's principle of utility is the paradigm example of a(n ultimate) moral principle that is understood to be a standard (it says which actions are right, namely those that produce the best overall balance of pleasure over pain),

[251] Of course I left out important chunks of Dancy's theory. Important to the discussion of the above practical examples is what he says about the "two normative relations, favouring and right-making" (p. 23), the notion of an 'overall ought' (p. 30) versus 'contributory oughts' (p. 35), and the relation of both to the peremptory (p. 37). However, for present purposes a defense or even just a complete account of Dancy's particularism is not needed.

but not a guide (because it is too complicated to apply).

According to Ridge and McKeever (2023) Kant meant his categorical imperative to be an action-guiding standard in the terminology used here. That is, it is supposed to play both roles: the categorical imperative says why actions are right or wrong (standard) as well as it tells the agent how to determine the rightness or wrongness (guide).[252]

In fact, both consequentialism/utilitarianism and deontology/Kantian ethics are paradigm cases of a principled normative ethical theories:

> To many moral theorists, the central task of moral theory has been to articulate and defend moral principles, or, perhaps, a single ultimate moral principle (maximize impersonal happiness; act only on maxims that can be willed as universal law). (Ridge & McKeever, 2023, §0)

Accordingly, consequentialism and deontology, which are ever so often distinguished from and contrasted with each other (cf. e.g. section 4.1.2 on page 96) are the same in this respect: they are both based on 'a single ultimate moral principle'. This is a reason why it should be interesting to explore this dimension and put together a different contrast: that between principled and particularistic (moral) decision making.

4.3.6.1 Is particularism even a normative ethical theory?

Dancy (2004) points out that "[p]articularism is officially a doctrine in meta-ethical theory" (p. 190). Yet, his examples of practical/moral reasoning based on his conception of favorers, enablers, and intensifiers (cf. section 4.3.5.1 on page 122) seem quite applicable. Indeed, particularism is deemed difficult to categorize: "Though distinct in their primary questions and concerns, metaethics and normative ethics are not fully independent. Indeed, it follows from what I have argued that they are deeply intertwined enterprises, to such an extent that it is not surprising that it is sometimes hard to say of some philosophical issue, such as particularism, whether it belongs to normative ethics or to metaethics" (M. Schroeder, 2019, p. 685, cf. also Gåvertsson, 2013, fn. 28).

In fact, Dancy (2004) himself gives a couple of characterizations of particularism that can *also* be understood in a quite practical sense (rather than exclusively in a meta-theoretical one):

> Particularism is supposed to be a doctrine about how moral reasons work, and what is required or not required for them to operate as they do. (p. 15)

> Particularism is a view about how actions get to be right and wrong. (p. 141)

The first quote sounds quite similar to what Ridge and McKeever (2023, §2) say about principles qua guides, and the second to what they say about principles qua standards (cf. section 4.3.6 on the preceding page). Functioning as standards, guides, or both are the roles principles play in major normative ethical theories (consequentialism and

[252] Cf. also footnote 570 on page 579 within the Appendix.

deontology). If the theorizing that particularism provides can partially fill the same explanatory space, I see no reason why it could not be *also* seen as a normative ethical theory.

For present purposes, therefore, I will treat particularism as a normative ethical theory.

4.3.6.2 Excursus: How is particularism different from utilitarian/hedonic calculus or decision theory?

A Utilitarian and Hedonic Calculus What I mean by 'hedonic calculus' is prudential hedonism as depicted in sections 3.2.1 on page 58 and 3.3.2 on page 77. The 'utilitarian calculus' is different in two ways: (i) is it not about prudence, but about morality, and (ii) it is a different calculation in that it factors in all persons affected, cf. footnote 182 on page 80 within 3.3.2.1.

As spelled out above, both calculi are based on the ultimate principle of utility maximization (cf. section 4.3.6 on page 124) – which is clearly a paradigmatic difference to particularism. But let's leave that aside for a moment: would it not be fair to say that apart from the standardized aggregation, these calculi operate on reasons – which simply are matched onto one currency, namely utility?

Let's try it on Dancy's example: "she needs help" (= moral reason to help her/favorer); and let's add another reason: "I don't feel like helping her" (= prudential reason to not help her/disfavorer).

The particularist would have to intuitively weigh these reasons against each other and make a decision.

How could this same situation be translated into the utilitarian calculus? Well, it couldn't, because that calculus only looks at consequences, accordingly we would have to look at the situation quite differently. Let's do it: The first step is to translate the situation into two options: 'help her' versus 'not help her'. Thereafter the utilitarian would look at the consequences of each option and, to keep it simple, let's say we have there: 'she has been helped' and 'I helped her' on the one side and 'she has not been helped' and 'I didn't help her' on the other side. Next, there are partial utilities to be – intuitively – attributed to each consequence for her and me. On a scale from -10 to +10, let's say:

Option 1:	$u_{\text{'she has been helped'}} = +8$ (for her) and $u_{\text{'I helped her'}} = -6$ (for me).
Option 2:	$u_{\text{'she has not been helped'}} = -8$ (for her) and $u_{\text{'I didn't help her'}} = +2$ (for me).
Sum:	$\Sigma\, u_{\text{Option 1}} = +2$ and $\Sigma\, u_{\text{Option 2}} = -6$. $MAX\,(U) = \text{Option 1}$.
Conclusion:	I ought to help her.

I think, there are several things to see here:

(i) The instruction of the utilitarian calculus is much more detailed, and (therefore) also much longer and more complicated, but provides more guidance (but we saw again in section 4.3.6 on page 124 that the calculus is not usually understood as a 'guide').

(ii) Yet, there is an 'intuitive' element in both cases: while the whole process of weighing is to be done intuitively in the particularist case (but cf. Dancy, 2004, p. 190 ff. on *Competence with a Practical Concept*), the attribution of partial utilities in utilitarianism/decision theory is just as intuitive/subjective/unregulated.

(iii) Consequences are not the only kinds of reasons. They (probably) can be reasons (e.g. 'it would make her happy'), but there are other considerations or facts that plausibly have reason-status, e.g. Dancy's 'she needs help'. Accordingly, while particularism can look at the situation at hand (but is not confined to that), the calculus looks at possible future situations to be (and *is* confined to that).

Corollary: if reasons are facts, uncertain consequences are not that, but rather something like potential future facts and thus 'potential reasons'?

(iv) Whereas the particularist look at things leaves it open how to weigh moral and prudential reasons against each other (cf. e.g. Dancy, 2004, p. 43), the utilitarian calculus just makes no difference between 'she needs help' and 'I'm not in the mood' as long as it can be matched on her and my utility (e.g. happiness/pleasure).

(v) Last, what about Dancy's intensifier: 'I am the only one around'? It naturally would factor in the particularist's reasoning – but there would be no place for it in the utilitarian calculus, because this consideration cannot be translated into any consequence of the two options 'help her' and 'not help her'.

The most important test, of course, would be to see whether the utilitarian calculus can cohere with the holism of reasons. It cannot, if it is based on the axioms of utility theory, as will be seen in the upcoming section B.

Dancy (2004) takes up F. Jackson, Pettit, and Smith (2000) who, according to Dancy, "are [...] suggesting that the particularist doctrine of the holism of reasons can be captured even within the terms of expected-value utilitarianism" (p. 66). Dancy argues (I think successfully) against this claim, but does so in a rather technical manner, so I will skip the details. Dancy's attitude towards the proposal is clear when he calls the suggested kind of utilitarianism "as un-particularist a context as one might hope to find" (p. 66).

B Decision Theory Dancy (2004) dedicates a whole chapter (ch. 12) to the question whether his holism *in the theory of value* (which he had his holism of reasons seamlessly extended to) is compatible with the axioms of (subjective) expected utility theory. I will only provide a very short summary of his results, since his discussion is long and intricate.

Dancy scrutinizes four 'axioms' (which are not identical to the classic four axioms as spelled out in section 2.4.1.2 on page 41). From the four classic axioms (completeness, transitivity, independence, and continuity) he essentially considers the *independence axiom* and the *transitivity axiom*. Furthermore, he considers the so-called *sure-thing principle* and the *principle of the indifference of independent alternatives*. Last, he also mentions what he calls 'the Great Ordering' (which seems to be related to the *completeness axiom*).

Apart from a revised version of the independence axiom all other scrutinized 'axioms' turn out to be incompatible with Dancy's value holism.

The following are his constructive results:

Contra 'indifference of independent alternatives': "[T]he general holistic claim that context can make a difference to value seems like to take us to the view that the value of an action or choice can be affected by the alternatives that are available at the time" (p. 203).

Contra the 'sure thing principle': "I conclude [...] that just as alternatives may vary in their value, according to what other alternatives are available, so may states of nature" (p. 211).

The 'Great Ordering' and the transitivity axiom: Dancy does not specifically argue to disprove either the 'Great Ordering' or the axiom of transitivity, but only concludes: "My conclusions are not very hospitable either to transitivity or to the possibility of a Great Ordering" (p. 215).[253] However, it seems that the failure of both follows needlessly from the above two claims.

Revision of the independence axiom: According to Dancy, a revised version of what he had termed the 'Atomic Principle' is compatible with holism in the theory of value:

> [I]f we value A + B more highly than we value A + C (in this context), and value A equally both times, we necessarily value B more highly than we value C (in this context).
>
> [...] Note the revision we had to make to the principle. As I originally expressed it, it assumed that the value of A in the context 'A + B' must be identical with its value in the context 'A + C'. This assumption is incompatible with holism, and must be [...] turned into an explicit condition, as above. But once that is done, the Atomic Principle can remain as a constraint on rational preferences. (Dancy, 2004, p. 202)

In sum, the compatibility of holism with the axioms of utility theory is very limited. Accordingly, particularism functions nothing like theories of rational choice (MAUT, SEUT).

[253] This is also, strangely, the last sentence of the whole book.

4.3.7 The Conceptualization of Deciding by Reasons and Deciding by Principle

For my purposes in this research it is not necessary to establish the argumentative boundaries of moral particularism versus moral generalism in great detail – which is why I really have not provided much on the topic (cf. Ridge & McKeever, 2023, who do provide a valuable overview of the debate).

What was important to see was:

First, until relatively recently moral theory was rather cast in generalist terms.[254] Second, the famous 'poles' of moral theory, consequentialism and deontology, are both paradigm cases of principled normative ethical theories. Third, particularism does have a few arguments going for itself, most importantly the doctrine of the holism of reasons. Forth, particularism can be cast as a normative ethical theory as well (maybe one that still needs a bit of refining). Fifth, within moral theory, both generalist ethics (e.g. consequentialism and deontology) as well as particularism can be understood as *decision strategies*.[255] Sixth, attempts to distinguish the moral from the non-moral have not succeeded in gaining mainstream acceptance, and according to Dancy it cannot be said what distinguishes a moral from a non-moral reason. Seventh, accordingly, generalist as well as particularist decision strategies are not restricted to a(n undefined) moral domain: *deciding by reasons* versus *deciding by principle* can be cast as general decision strategies.

Surely, one step of emancipation is still missing: In order to be a domain-general decision strategy (i.e.: not restricted to the moral domain), *deciding by reasons* and *deciding by principle* cannot be attached to any normative ethical theory by content. That is, they cannot be restricted to the principle of utility maximization or the categorical imperative – or any other specific principle. Just as well, if we cast particularism (including Dancy's elaborated views on favorers, enablers, and intensifiers) as a normative ethical theory, *deciding by reasons* cannot be tied to any specifics of that theory.

The question is thus: what is the general form of *deciding by reasons* and *deciding by principle*? Plus, since the distinction will be used in empirical research, it must be less 'super-philosophical' and rather 'digestible' and understandable from the perspective of ordinary people (serving as participants).

[254] Cf. e.g. M. Schroeder (2009): "In the last few decades, moral philosophy in the tradition of Kant and Mill – ambitious moral theorizing – has been challenged by *moral particularism*" (p. 568, original italics). However, some think that Aristotle was the first particularist around, cf. e.g. Ridge and McKeever (2023, §0).

[255] Cf. section 4.3.6 on page 124 on the distinction between standards and guides and section 4.3.6.1 on page 125 on how particularism comes close to these functions. It is not necessary for a decision strategy to be actually fit for usage in real life: just as the utilitarian calculus is too complicated, MAUT and SEUT – *the* most classic decision strategies – are, too.

Since in this research participants are supposed to *generate* principles as well as reasons, they must be provided with an intelligible and generally usable, as well as everyday-life compatible 'definition'. The upcoming two sections will summarize what we already said about the characteristics of moral principles and (moral) reasons as well as add to that and generalize such that the result is a theoretically justified instruction to participants used in this research.

4.3.7.1 General Characteristics of Principles

I already established that the true form of a principle is a universal conditional: If the situation is x, then y is the thing to do.[256] The potential action-guidance is to be found in this combination: situation → action.[257]

In case of a *moral* principle, the consequent would include the moral conclusion ('is right', 'ought to do it'). In the case of a *prudential* principle (e.g. 'if you start to have trouble walking, take a break from alcoholic beverages'), the consequent would be about a prudential conclusion. So in both cases, the conclusion is normative and practical: it is about what best to do (or not do).

Are there applications of principles that do not have to do with either moral or prudential concerns? Surely, there are the other two domains of the normative, epistemic and aesthetic, but I will not be concerned with these, since they are not about *practical* reasoning and decision making. Are there principles outside the normative, that is: descriptive principles (e.g. in the realm of motivation)? There is, of course, an abundance of 'descriptive principles' in the natural sciences and in real life: 'if you touch the hot oven, it will burn your finger and hurt'.[258] I don't see a reason why expectable empirical regularities like that should not be called 'principles', but it really seems that paradigm/prototypical principles are normative.

In sum, the general features of principles are: First, they are universally quantified conditionals, that is: they require the consequent every time the antecedent is true (i.e.: every time, a situation is just like specified in the antecedent). Second, principles are (usually) normative: the consequent is a normative conclusion (e.g. about what to do in practical cases). Third, principles do in principle offer some guidance, although this guidance might not practically be applicable such that in this case they do not function as actual 'guides'. Forth, in spite of their true form being a universal conditional, many

[256] In fact, a more correct formulation would be: '*always*, if the situation is x, then y is the thing to do'. However, principles are rarely specified like that, and I haven't either. The 'always' is meant to be implicit as well as it is an essential part of the concept of a principle.

[257] We said that the utilitarian principle is *not* a guide, but a standard (or, in other words a criterion, not a procedure). Still, the conditional 'if an action maximizes happiness, then it is right' (cf. e.g. Ridge & McKeever, 2023, §3, §5, for the formulation) already provides guidance – just to determine whether an action maximizes happiness might be too complicated for actual application. I thus venture to say that any principle includes some guidance, but to be a 'guide' in philosophical usage seems to presuppose that it is actually usable.

[258] Cf. also Dancy's (2004) discussion of a few conditionals about lighting a match on p. 8 f. and p. 106. f.

formulations of principles are out there and understood as such (cf. e.g. Dancy, 2017, §1, and section 4.3.3.3 on page 119).

A A Definition of Principles for Participants Accordingly, a 'definition' of a practical principle usable in everyday life by ordinary people is this:

> **What are principles/rules of life?** Principles are general, action-guiding statements that we believe provide the right or best instructions for action in almost all cases across all situations. Examples of principles are the Ten Commandments from the Bible, the Golden Rule ("do unto others as you would have them do unto you") – or personal rules of life such as "my family/career always comes first" or "it is always better not to drink another beer when faced with this choice". With some principles we think that these prescribe the right actions for all people in all situations; with personal rules of life we believe that these only point out the best action for ourselves, but nevertheless in every situation.

4.3.7.2 General Characteristics of Reasons

The main point that makes reasons intelligible as an entity is that they are facts,[259] even if they are normative (i.e.: moral, prudential, epistemic, aesthetic).

Being facts gives reasons *some* form, as being universal conditionals gives form to principles. But it is easy to see that – by form alone – principles are more informative than reasons. Principles tell you what is the case or what to do once some condition holds. Reasons don't do that: they leave it up to you what to do with them (especially under the doctrine of holism). For example, let 'that it snows' be a reason. You are free to think what this fact may be a reason for. A principle on the other hand would say something like this: 'if it snows, it is about 0 degrees centigrade outside' (descriptive):[260] or, 'if it snows, you must not go outside' (normative).

So the first characteristic is: reasons are facts – and it is up to you what to do with them.

> **A Excursus: How to identify principles and reasons?** Is it easier to identify a principle than a reason? Well, it would seem so, but I don't think so. If just any universal conditional can be a principle, so just any fact can be a reason. In the case of a reason, of course, you immediately ask 'a reason for what', while in the case of a principle this question is unnecessary: the principle states what it is about. For example,

[259] I have not commented on the supposedly realist position in metaphysics underlying this point. Neither does Dancy (2004) see the need to comment on it at length, cf. his remarks on p. 140 ff. Also cf. Alvarez (2017, §2) for the point that while there is agreement on reasons being facts, the disagreement just shifted to the question what *facts* are. For present purposes I am confident to assume that ordinary people are rather fine with the idea of there being 'facts'.

[260] In fact, one might wonder (i) whether this example is rather a case of a *normative* reason for belief (epistemic reason) that there is a certain temperature outside, *or* (ii) the other way around whether the temperature outside is cited as a *cause* for the snowing. On reasons versus causes cf. e.g. Alvarez (2017).

'if it snows, you must not go outside' is a principle about what to do when it snows *or* a principle about when (not) to go outside. Of course, there are plenty of other things to do or not to do when it snows, and there are plenty of other conditions that may determine whether to go outside or not. But a principle – in this case: of all the possible things to say about snow on the one hand or going outside on the other – picks out just one combination. Contrarily, a reason does not pick out a combination, it just picks out a fact: 'it snows'. Yet, picking out a fact of all the possible things to say – in this case: about some outside condition – also might mean something, at least according to ordinary rules of conversation. If I said 'it snows', you might say 'how pretty', 'should we go for a walk' or 'you better put your winter socks on'. In all of these cases you made the fact 'that it snows' a reason for something.

In sum, it seems both reasons and principles are rather easy to identify by form: facts or conditionals. Yet, even if granted that any fact *can* be a reason, it is still an open question whether a certain fact really *is* a reason (and for what). The burden of proof comes up somewhat later for principles: they immediately state what they are about, but it is still for you to decide whether they make sense. What if I said: 'if it snows, you must jump out of the window'? This is a principle by form, but does it make sense?[261] So there is something like an asymmetry to the identification of reasons versus principles: confronted with a fact, you may ask: 'is it a reason and what for?', confronted with a universally quantified conditional, it already is a principle (as defined here) and it already states what it is about, but still you must ask: 'does it make sense?'. In fact, this question 'does it make sense' could be interpreted as asking whether the principle does even provide *a good reason* for doing the action it commands to undertake (cf. also section 4.3.4 on page 120 on the translation from principles to reasons). In that case, (i) we are back to square one, asking whether some fact is a good reason for an action, and (ii) the notion of a reason is primary (what is exactly what Dancy believes, cf. Dancy, 2004, p. 31). In this case of a 'bogus principle' there even is no informational advantage – on the contrary, the irritation it causes rather amounts to a waste of cognitive resources.

Accordingly, as a consequence of the excursus above, the second characteristic of a reason is that it provides less guidance than a principle. Or, to state it differently, reasons are 'open', whereas principles are 'closed'.[262] In saying this, I already subscribed to Dancy's holism of reasons. Because, if reasons were mostly invariant, they indeed would provide almost as much guidance as principles do. If e.g. 'she needs help' is always a reason to help her (even if she is trying to kill her husband) then reasons like that were just an elliptical version of an according principle 'if she needs help, you ought to help her'.

So the second characteristic is: holism and accordingly less guidance. A fact can be a reason for or against (e.g.) an action, or no relevant consideration at all.

The third main feature of reasons comes up when there are several reasons and at least two options (or parties): there can be (and usually are) reasons for and against an

[261] I'm trying to avoid here to ask something like 'is it true'.

[262] The focus and authority a principle comes with might induce a quite different – and constricted – way of reasoning as compared to the rather divergent search the thinking about reasons comes with. But this is a hypothesis that should best be looked at empirically.

action (or a belief).[263] In fact, this is exactly what we tend to use reasons (or the talk of reasons) for: a look at both sides (cf. also footnote 262 on the preceding page).

Accordingly, these reasons must be *weighed* against each other – which also presupposes that they have a weight. This weight could be set to be always the same, say 1, and if you made a pros and cons list for 'go to the party/not go to the party' you would just have to count the number of reasons on each side. But it seems like (and this is certainly the case in Dancy's account) that the weight between reasons could differ. This makes the whole process of weighing reasons rather complex – and potentially mathematical. The idea of weighing reasons also presupposes that they are 'contributory' (not 'decisive'). Furthermore, I agree with Dancy (cf. Dancy, 2004, p. 43) that reasons can be weighed across different domains of the normative (e.g. prudential and moral).[264]

So the third characteristic is: reasons are contributory, they can differ in 'weight', they give us the perspective to weigh options against each other, and a case of practical reasoning on the basis of reasons is not confined to just one domain of the normative.

B A Definition of Reasons for Participants Accordingly, a 'definition' of a practical reason usable in everyday life by ordinary people is this:

> **What are reasons?** All facts can be reasons. For example, "the sun is shining" could be a reason to go for a walk, and "my family is important to me" could be a reason to spend a lot of time with them. Reasons are situational, however, and so a fact that is a reason for something in one situation may be a reason against it in another, or it may not be a reason at all. Also, for different people, the same facts do not have to be the same reasons. For example, in a different situation or for a different person, "the sun is shining" might be a reason to stay indoors (because they might already have a bad sunburn), and "my family is important to me" might be a reason to want to earn a lot of money for them (instead of spending time).

[263] Actually, there are already two sides to any potential action, namely action or omission, do or don't.

[264] A comparative look at principles: Since weighing does not play a role when dealing with principles (although 'contributory principles' would indeed have to be weighed, cf. Dancy, 2004, e.g. p. 25 f.), the question whether the moral can be weighed against e.g. the prudential (or the aesthetic, cf. my example from section 4.2.1.1 on page 98) does not come up as forcefully.

4.3.8 Summary: A Tabular Comparison of Reasons and Principles

Table 4.1 Characteristics of Reasons vs. Principles

	Reasons	Principles
Form	facts (but dispute what are facts)	universally quantified conditionals (but many formulations)
Normativity	normative and motivating	normative and descriptive
Guidance	normally NO, only if there were 'invariant' / 'default' reasons	normally YES, but not full guidance with 'contributory principles'
Holism	yes	compatible, but not the main view
Contributory	yes	only in the case of 'contributory principles'
Weighting	yes, necessary	not usually associated with, with 'contributory principles' necessary, but unclear how
Domain Confinement	no	does not usually come up, with 'contributory principles' to be considered

4.4 The Measurement of Happiness as Well-Being

I already pointed out that there are two distinct uses of 'happiness' that should not be confused (cf. section C on page 80 within 3.3.2.1): (i) 'happiness' as an alternative to 'pleasure' referencing Benthamite utility and prudential hedonism and (ii) 'happiness' as a translation of 'eudaimonia' referencing Aristotle's account of human flourishing.

Haybron (2020) emphasizes that there are two *literatures* on happiness that must be distinguished: on the one hand there is 'happiness' as well-being and on the other hand there is 'happiness' "as a purely descriptive psychological term" (§0). Happiness as well-being is coextensive with the three theories of well-being outlined in section 3.2 on page 57. These theories of well-being are value theories and thus they are *evaluative*: they aim at specifying what is the prudential good. Contrarily, as a psychological term, happiness (a) refers to a mental state, and (b) is meant to be merely *descriptive*.

The most researched approaches to happiness as a psychological construct are these:

(1) Hedonism: Happiness is experiencing more pleasure than pain.
(2) Life satisfaction: Happiness is being overall satisfied with one's life as a whole.
(3) Emotional state/'emotional well-being': Happiness is "the opposite of depression or anxiety" (Haybron, 2020, §2.1), i.e. feeling and being well in terms of emotions and moods more broadly construed than mere pleasantness.

(4) Hybrid theories, e.g. 'subjective well-being': Happiness is comprised of "life satisfaction, domain satisfactions, and positive and negative affect" (Haybron, 2020, §2.1).

In their introduction to the *Oxford Handbook of Happiness*, S. A. David, Boniwell, and Conley Ayers (2013) point out that "happiness in its broadest sense [...] [is] an umbrella concept for notions such as well-being, subjective well-being, psychological well-being, hedonism, eudaimonia, health, flourishing, and so on" (p. 3).[265] They go on to offer two basic distinctions:

First, psychological research on happiness can be seen as belonging to one of two major research traditions, the 'hedonic approach' and the 'eudaimonic approach' (S. A. David et al., 2013, p. 4):[266]

> Roughly speaking, eudaimonia includes states and/or pursuits associated with using and developing the best in oneself, in accordance with one's true self and one's deeper principles. Hedonia includes states and/or pursuits associated with pleasure and enjoyment, and the absence of pain and discomfort. (Huta, 2013, p. 201)

Huta (2013) stresses that eudaimonia as a 'multifaceted concept' (p. 201) is more difficult to grasp than 'hedonia' and accordingly more difficult to define and research (p. 208). She distinguishes two general ways in which eudaimonia was understood and researched, namely either as a "way of acting/thinking" or as a "form of well-being" (p. 201), and names five major eudaimonic research programs that she sees concerned with (aspects of) eudaimonia: self-determination theory which focuses on *autonomy* (cf. e.g. Ryan & Deci, 2000), Csikszentmihalyi's (1990) concept of *flow*, *psychological well-being* as operationalized by Ryff (1989), *personal expressiveness* by Waterman et al. (2003), and Seligman's (2002) discussion of a *life of meaning*. According to S. A. David et al. (2013, p. 4), Ryff's (Ryff, 1989; Ryff & Keyes, 1995) 'psychological well-being' is the most well-known full psychological model of eudaimonia, which includes six subscales: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth.

[265] 'Well-being' seems to be the most often used equivalent to 'happiness'; S. A. David et al. (2013) employ both terms separated with a slash: 'happiness/well-being'. This makes also sense insofar 'well-being' best connects to other disciplines. For now let's note that (i) philosophical theories of the prudential good are theories of well-being in a relatively narrow sense, of which hedonism and eudaimonism are two specific theories that both use the term 'happiness' and spell it out as 'pleasure' or 'flourishing' respectively, (ii) in economics, the preferred term is 'welfare', which again is so closely related to well-being that both terms are often used together and/or separated with a slash, and (iii) the theories of happiness as considered here are psychological theories of well-being, but the preferred term within this literature remains 'happiness'. Henceforth this literature will be occasionally referred to as 'happiness literature'. In sum, I believe 'well-being' is the overall term all disciplines can go with, but more specifically we have 'well-being' (philosophy) versus 'welfare' (economics) versus 'happiness' (psychology).

[266] Within the happiness literature it seems common to use the terms 'hedonic' and 'hedonia' instead of 'hedonistic' and 'hedonism'. Huta (2013, p. 201, fn.1) comments on this tradition: according to her the terms 'hedonistic' and 'hedonism' "have accumulated too many negative connotations".

Furthermore, Huta (2013, p. 207) provides a list of common themes within empirical research tracing eudaimonia (or aspects thereof): excellence, authenticity/autonomy, development, full functioning, broad scope of concern, engagement, autotelism, contemplation, acceptance (eudaimonia as a way of behaving) and meaning, elevation, awe, connection, aliveness, fulfillment, competence (eudaimonia as a form of well-being).

The second distinction is within the "dominant conception of well-being in psychological literature" (S. A. David et al., 2013, p. 3) namely *subjective well-being* (SWB): there is an *affective* and a *cognitive* constituent to this conception. SWB is currently understood to entail four specific components: negative affect and positive affect (= the affective constituent), and life satisfaction and domain satisfactions (= the cognitive constituent), cf. e.g. Diener, Scollon, and Lucas (2003); Miao, Koo, and Oishi (2013); Pavot and Diener (2013).[267] A detailed and historically informed overview can be found in Diener et al. (2003). Interestingly, while the four components are agreed upon, there seems to be no fixed way of assessing them – neither on the theoretical level (i.e.: which are the constructs to form the subscales of each component) nor on the empirical level (i.e.: which instruments are used to measure the subscales). In sum, there is not *the one* established SWB questionnaire; suggestions for subscales and measurement can be found e.g. in Diener et al. (2003).

Furthermore, there is some disagreement as to how to classify SWB and its components in terms of the above mentioned distinction between a hedonic and eudaimonic approach. For example, Huta (2013, p. 209) criticizes "the a priori assumption that certain forms of well-being, such as vitality and feelings of meaning, should be labeled as 'eudaimonic well-being', while other forms of well-being including life satisfaction, positive affect, and negative affect should be called 'hedonic well-being', before much empirical support is accumulated for these two groupings". Diener et al. (2003) specifically point out that "the evolving conception of SWB suggests that ideal SWB is not to be equated with uninterrupted euphoria. Such a view would place too great an emphasis on hedonism when there are clearly non-hedonistic aspects of SWB as well (e.g. global judgments such as life satisfaction, meaning, and fulfillment)" (p. 214).

4.4.1 From Happiness to Satisfaction

4.4.1.1 Eudaimonia as the Dependent Measure

Eudaimonia by its origin in ancient Greek philosophy comes with the broadest of applications: flourishing in the way human nature is meant, the highest goal to all men, the good life. Eudaimonia as an understanding of well-being is broad, deep, intertwined, and includes several non-reducible qualitative aspects. This is, as already noted, why it is difficult to grasp, conceptualize for empirical use, and measure. This general character of eudaimonia is mirrored in the research programs and research themes as recounted above: even if broken up into certain aspects of eudaimonia they still rather refer to a life as a whole. Furthermore, eudaimonia is personal, that is: if aspects of eudaimonia

[267] These two constituents are the reason that 'subjective well-being' was termed a 'hybrid theory' by Haybron above.

are supposed to be empirically evaluated (from a first or third person perspective) this can only be done with regards to a person's real life including their personal history, circumstances, and decisions. Eudaimonia cannot be rated as the result of a fictional and single decision. Eudaimonia references a real personal and a whole life.

This results in the conclusion that measures of eudaimonia as well as the concept of eudaimonia itself are not suitable for an evaluation of decision strategies. First, it does not makes sense to ask which decision strategy led to more eudaimonia on a one-trial run, because eudaimonia does not refer to one action, but to a whole life. Second, it does not make sense to ask which decision strategy led to more eudaimonia when these decision strategies were not chosen, but imposed as the conditions of an independent variable; eudaimonia can only be achieved in a real personal life.

Accordingly, eudaimonia and whatever construct based on it cannot be used as the dependent measure of this research.

4.4.1.2 Subjective Well-Being as the Dependent Measure

Subjective well-being (SWB) in spite of its four components (negative affect, positive affect, life satisfaction, domain satisfactions) is a simpler conception of well-being than eudaimonia. Negative and positive affect, constituting the affective aspect, are conceptualized as transient states, whereas life satisfaction and domain satisfactions, constituting the cognitive aspect, are overall evaluations of larger (e.g. life) or smaller (e.g. marriage) scope.

How is SWB measured? As has already been noted, the four components are and may be measured by differing instruments (cf. e.g. Pavot & Diener, 2013, p. 139).

Non-omnibus measures include PANAS (the Positive and Negative Affect Schedule, Watson, Clark, & Tellegen, 1988) and SPANE (the Scale of Positive and Negative Experience, Diener et al., 2010) for the affective constituents.

Regarding the cognitive constituents, the most well-known measure for life satisfaction is the SWLS (the Satisfaction With Life Scale, Diener, Emmons, Larsen, & Griffin, 1985; Pavot & Diener, 2008), which includes five items. However, life satisfaction has a history of having been measured with a single item (cf. e.g. Pavot & Diener, 2013), as it also was the case within the German Socio-Economic Panel (SOEP) until recently (cf. e.g. Headey, 2013, p. 892).[268] In spite of the disadvantages of a single-item scale (cf. e.g. Tov & Au, 2013, p. 460; Cummins, 2013, p. 195), results often enough have been satisfactory enough to keep it that way, especially in large surveys: " Life satisfaction is measured by a single item on a 0 ('totally dissatisfied') to 10 ('totally satisfied') scale. Although single-item measures do not optimally assess SWB, this question has reasonably adequate reliability and validity (Diener, Suh, Lucas, & Smith, 1999)" (Headey, 2013, p. 892). In fact, in Cummins's (2013) recommendations on which scales to use

[268] "As for life satisfaction, it is surveyed in the SOEP every year using the question 'How satisfied are you with your life, all things considered?'. Individuals rate their life satisfaction on an 11-point scale ranging from 0 'completely dissatisfied' to 10 'completely dissatisfied' [sic!]. All in all this scale is considered to be [a] reliable and valid measurement instrument of life satisfaction (e.g. Schimmack, 2009)" (Pirralha, 2018, p. 799).

to measure SWB, out of five recommendations two are single-item scales, e.g. "How satisfied are you with your life as a whole?" (Andrews & Withey, 1976).

Even more than life satisfaction, domain satisfaction has mostly been assessed with just one item per domain. Here, a typical formulation is: "how satisfied are you with each of the following domains 'in general"' (Oishi & Diener, 2001, p. 652). Oishi and Diener (2001) assessed 30 domains on a more general level (e.g. 'social relationships') as well as on a more specific level (e.g. 'family', 'friends'). The formulation including the specification 'in general' shows that even though the scope of domain satisfactions, of course, is smaller than life satisfaction, it is still a global assessment (of that domain) that is asked for.

A Suitability of the Components of SWB First, among the constituents of SWB, affective and cognitive, the cognitive aspect seems to be the more appropriate one for the present research. Since what is being evaluated are two deliberational[269] decision strategies, a cognitive evaluation suits them better than recording their affective effects. Furthermore, the manipulation of having participants use a certain decision strategy (deciding by reasons versus deciding by principle) on a fictitious decision situation would likely not be strong enough to illicit an affective response. Furthermore, affective responses are easily swayed by context factors which are not of interest. Thus, cognitive it is.

The cognitive constituent in SWB is measured in terms of satisfaction (life satisfaction and domain satisfactions). The satisfaction with the use of a decision strategy can hence be understood as a specific domain satisfaction: the domain being decision making (strategy).

A natural ways to ask for a satisfaction-based evaluation of the decision process is thus to ask: 'How satisfied are you with the decision as a whole/the strategy used/the option chosen/the outcome?' – depending on what part or aspect of the decision making is of interest.

4.4.1.3 Summary

The empirical (descriptive) counterpart to the theoretical (evaluative) analysis of well-being is happiness research. Whereas (value) theories of well-being come in three forms – hedonism, satisfactionism, and eudaimonism – there are only two traditions to happiness research: hedonism and eudaimonism.

Eudaimonism turned out to be unsuitable for present purposes, since it is about a whole life and a personal real life.

As regards subjective well-being (SWB), its cognitive constituent is of primary interest to this research. Specifically, satisfaction with decision making (strategy) may well be understood as a domain satisfaction. According possible items were suggested.

[269] I use the words 'deliberate', 'deliberative', and 'deliberational'. The latter is a term of art. The first two are not synonyms, I believe, but over the breadth of the decision making literature they are treated as such. The same holds for this manuscript.

4.5 Summary

This chapter entailed three main parts:

The first part *The Domain of the Moral* (section 4.2 on page 97) scrutinized the feasibility of distinguishing a moral domain from a non-moral domain. It was important to look at this distinction, because the two deliberational decision strategies I will adopt are from moral philosophy – and thus the question arises whether they can just as well be used for prudential decision making. The result of this section was that while there are several good proposals out there about what may be the unique characteristics of morality, none of them has gained mainstream acceptance. The conclusion was that there is no straightforward, widely accepted or uncritical way to distinguish the 'domain of the moral' from other domains. However, this is a good result for my purposes, because if there are no domain barriers, there is no reason to think that 'deciding by reasons' and 'deciding by principle' could not be domain-general decision strategies – just as well applicable in everyday (non-moral) decision making.

The second part of the chapter *Moral Particularism and Moral Generalism* (section 4.3 on page 112) provided the theoretical background of the two decision strategies I am interested in. Moral particularism's most prominent defendant is Jonathan Dancy, whose conceptions – as spelled out in Dancy (2004) – this part is based on. The introduction of the two decision strategies 'deciding by reasons' and 'deciding by principle' most importantly required a thorough characterization of both reasons (section 4.3.2 on page 113) and (moral) principles (section 4.3.3 on page 118). Furthermore, I spelled out how reasons and principles could be translated into each other (section 4.3.4 on page 120), how Dancy gets his holism of reasons to work (section 4.3.5 on page 121), and how both consequentialism and deontology are generalist theories involving principles (section 4.3.6 on page 124). The last section (section 4.3.7 on page 129) then translated what had been established so far into a definition of both principles and reasons that could be used in everyday reasoning and decision making (sections A on page 131 and B on page 133). These were also the definitions displayed to participants within the experiments.

The last part *The Measurement of Happiness as Well-Being* (section 4.4 on page 134) introduced theory and research on happiness. Happiness research parallels theories of well-being – but only partially. There are three theories of well-being (hedonism, satisfactionism, and eudaimonism/objective list theories), but only two traditions to understand and measure happiness: hedonism and eudaimonism. In some sense, this is not surprising, because desire/preference satisfactionism – even without the principle of revealed preferences equating preference with choice – leaves no questions open. You could ask 'to which degree were you able to satisfy your desire/preferences', but that's it – satisfying them is all there is to well-being. Satisfactionism does not in itself come with a phenomenology: there is no theory about some specific feeling tied to it (as e.g. pleasure). But happiness research – and this justifies the distinction from well-being –

is based on the understanding that happiness comes with some psychological phenomena beyond having gotten what you wanted. Therefore: no satisfactionism in happiness research. The remaining two traditions, hedonism and eudaimonism, were shortly characterized as well as how either conception is measured in current research. It turned out that the cognitive component of subjective well-being is the most suitable measure for my purposes: satisfaction as domain satisfaction (the domain being decision making in a wide sense).

The upcoming chapter *Consolidation: The Argument* will tie together all that has been argued so far.

Consolidation: The Argument

This part, *Theoretical* (Part I), started out with *Conceptual Clarifications* (chap. 1) containing a thorough analysis of the basic concepts, namely *decision making*, *decision situation*, *judgment*, *choice*, and *decision strategy* – looked at and discussed from both a philosophical and psychological perspective. During the remaining part of Part I, I was hence able to refer back to these clarified terms.

The 'argument' necessary for the present research project then was developed over the remaining three chapters, *Decision Quality* (chap. 2), *Well-Being and Utility* (chap. 3), and *Decision Strategy and Happiness* (chap. 4). This is the 'argument':

The research question driving this research is the question whether deciding by reasons versus deciding by principle, conceptualized as two different deliberational decision strategies, makes for a better decision.

Accordingly, *Decision Quality* (chap. 2) was concerned with what makes a decision a good decision. The answer was that in the realm of action (not belief) a good decision is understood to be one that falls in line with the axioms of expected utility theory. The MAUT or SEUT formula then can identify the option with the highest overall utility.

Yet, why care for utility, even the highest one? Chapter *Well-Being and Utility* (chap. 3) thus looked at theories to justify the importance of (the highest) utility. Within the first part of the chapter on well-being, well-being was identified as the prudential good, or: the good for a person. Three theories of well-being were distinguished: (1) hedonism, making the substantive claim that well-being is pleasure/happiness, (2) satisfactionism construing well-being as desire/preference satisfaction, and (3) objective-list-theories, most importantly Aristotelian virtue ethics, where well-being is held to be eudaimonia/happiness. Consequently, there are two theories where well-being is understood to be happiness – yet conceptualized quite differently. The remaining theory, most common in economics, understands well-being as getting what one wants.

Within the second part of the chapter on utility, the mirror image to the theories of well-being was found. There is (1) hedonism, where utility is pleasure/happiness, (2) satisfactionism, where desire/preference satisfaction itself is equivalent to utility maximization, and (3) the capabilities approach which basically is an objective-list-theory, but in spite of stemming from economics it does not hold a simple equivalence relation to utility. I used the second part of the chapter on utility to more thoroughly scrutinize the equivalence claims put forward by hedonism and satisfactionism with the two interesting results that (i) Bentham did not maintain a simple identity relation, and

(ii) desire/preference satisfaction cannot be identified with utility, but only with utility maximization.

In sum, these are the relations:

$$\text{well-being} = \begin{cases} \text{pleasure/happiness} & = \text{utility} \\ \text{desire/preference satisfaction} & = \text{utility maximization} \\ \text{eudaimonia/happiness} & = \text{[does not apply]} \end{cases}$$

Now, the results from *Decision Quality* and *Well-Being and Utility* shall be brought together: We said that a good decision is one in accordance with the utility axioms, but after application of the utility formula we are only left with overall utility ratings for each option. We are not told what to do with this information. Maximization is the principle that says what to do with the knowledge of the overall utilities per option: it says to choose the option with the highest utility. This principle belongs with theories of utility. Thus, the definition of a 'good decision' remains incomplete unless a theory of utility is added.

Among the theories of well-being/utility discussed, there are two things to note: (i) eudaimonism/the capabilities approach is not a theory of utility, rather an alternative to it, and (ii) the *location* where maximization comes into play differs between hedonism and satisfactionism: In the case of hedonism, maximization is part of the theory, but in the case of satisfactionism, maximization is part of the definition. Hedonism *claims* that utility/pleasure is to be maximized, whereas desire/preference satisfaction just *is* utility maximization. That is:

$$\text{a good decision} = \begin{cases} \text{maximizes pleasure} & = \text{hedonism (by theory)} \\ \text{satisfies desire/preference} & = \text{satisfactionism (by definition)} \\ \text{[does not apply]} & = \text{eudaimonism/capabilities approach} \end{cases}$$

In sum, put together, a good decision (based on the utility theory axioms and formula) is one that – adding one of two theories of well-being/utility – either maximizes pleasure (hedonism) or satisfies desire/preference (satisfactionism).

One might alternatively say that well-being/welfare is on the left hand side of an equation where on the right hand side maximum overall utility is identified and chosen. The ideal way to identify maximum overall utility is using MAUT or SEUT. MAUT and SEUT are decision strategies.

$$\text{well-being/welfare} = \left\{ \text{MAUT/SEUT} \quad + \text{utility maximization} \right.$$

Accordingly, well-being/welfare is the consequence of using a decision strategy. And this exactly is the interest of this work: the connection between decision strategy and well-being/happiness.

In the above formula, the connection is necessary. Even without claiming that utility maximization *just is* 'well-being maximization' (although the idea is certainly implied,

but well-being is not countable as is utility and there is no exact equivalence relation), by definition (satisfactionism) or by theory (hedonism): maximum utility is the kind or amount of well-being that is right or best (prudentially speaking).

I, however, am interested in the potential *empirical* connection between decision strategy and well-being. Therefore well-being needs to be measured and decision strategy needs to be manipulated. Well-being is the dependent variable and decision strategy the independent variable.

In other words: In the conventional framework you can ask: Did a person correctly apply a decision strategy (e.g. axioms + MAUT/SEUT) and then maximize their utility by choosing the option with the highest overall utility? If they did, it is assumed they did the best they could for their well-being. The highest overall utility comes with the promise of optimality in terms of well-being. I however wish to ask: Does a person's reported well-being/happiness vary based on one of two deliberational, but non-technical decision strategies used?

Hence, in chapter *Decision Strategy and Happiness* (chap. 4) I introduced the decision strategies I wish to investigate: deciding by reasons versus deciding by principle. The distinction is based on the distinction between moral particularism and moral generalism in moral philosophy – which is why, as the first part of the chapter, I spend some time on the question whether there is a distinct realm of the moral. Maybe there is, and intuitively it would certainly seem so, but there is no proposal that gained mainstream support, and according to Dancy furthermore no one yet succeeded to distinguish moral from non-moral reasons. Consequently, there is nothing in the way of adopting deciding by reasons and deciding by principle as two deliberative domain-general decision strategies. Their defining characteristics were spelled out in the middle part of the chapter, as well as a practical 'definition' for everyday use was provided. This is the right hand side of the equation.

The left hand side of the equation, well-being, is usually termed 'happiness' in the psychological literature dealing with it empirically. In the last part of the chapter I therefore reviewed theories of happiness and their measurement. As it turns out, there are two major conceptions of happiness here: happiness as pleasure (hedonism/'hedonia') and happiness as eudaimonia (eudaimonism). Desire/preference satisfaction is not a candidate here (which may partially be due to the fact that 'preference satisfaction' is already strictly defined and has no phenomenology). Having gotten what you wanted, while being the definition of well-being/welfare in economics, is not understood to be or to represent 'happiness' in psychology. So here is the picture:

$$\text{happiness} = \begin{cases} \text{pleasure} & = \text{hedonism} \\ \text{[does not apply]} & = \text{satisfactionism} \\ \text{eudaimonia/flourishing} & = \text{eudaimonism} \end{cases}$$

Among the two options, it became obvious that eudaimonic measures were too broad and 'qualitative' for present purposes such that a simple measure measuring the cog-

nitive aspect of happiness was chosen: domain satisfaction. As opposed to affective measures, a cognitive measure is an overall and more long-term evaluation that fits better with the deliberative decision strategies chosen.

In conclusion, these three – (i) the question what makes for a good decision, (ii) well-being as the aspired consequence, and (iii) decision strategy as the warrantor for both a good decision and well-being – are at the heart of decision theory. I just shook it up a little.

5 Previous Research

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5.1 Introduction

In this – rather short – chapter I will review empirical psychological literature relevant to the basic themes of this research. Most important are the independent and dependent variables of the experimental part. The basic research question of the experimental part is: Which decision strategy, *deciding by reasons* or *deciding by principle*, leads to more happiness/satisfaction? Accordingly, happiness/satisfaction is the main dependent variable, whereas *deciding by reasons* and *deciding by principle* are the two main conditions of the independent variable 'decision strategy'. Thus, this chapter will focus on decision making and happiness/satisfaction, decision making *strategy* and happiness/satisfaction, and reasons and principles as strategy and happiness/satisfaction.[270]

Note that the research that will be presented in part *Empirical* (Part II) was conducted between 2015 and 2017 and accordingly it is based on literature searches that took place in 2014/15. Therefore, I will present the 'old' literature the empirical research was informed by in this chapter and newer publications from the past few years up to 2023 will be discussed in part *Concluding* (III).

In fact, there was no surge in research on deliberate decision strategies and happiness/satisfaction within the past decade such that the concentration on 'old' literature in this chapter will not even make a big difference, if any, to a review up to 2023.

[270] Why use the term 'happiness/satisfaction' when it has already been established in the previous chapter that the dependent variable will be measured as a domain satisfaction? The reason is that the literature uses both terms in theory and practice. In fact, for present purposes, 'well-being', 'happiness', and 'satisfaction' may be understood as referring to the same thing.

Which is even more important is that the present research is rather grounded in the theoretical considerations exposed in chapters 2, 3, and 4 and consolidated in the summary chapter *Consolidation: The Argument* on page 141. That is, the independent variable 'decision strategy' with its conditions *deciding by reasons* and *deciding by principle* was developed based on moral particularism and moral generalism in moral philosophy, and the dependent variable 'happiness'/'satisfaction' needlessly follows from happiness research.

Together with the diagnosis to be expounded in the present chapter that there is some psychological literature that is concerned with (i) decision making and happiness/satisfaction, but almost no literature on (ii) decision making strategy and happiness/satisfaction, and just a few and divers studies relating to (iii) reasons and principles as decision strategy and happiness/satisfaction – it follows that while the research done in this work is well founded theoretically, it is also necessarily to some degree exploratory, since the regarding empirical research existing so far is so thin.

5.2 Decision Making and Happiness/Satisfaction

5.2.1 General Overview

Most research on decision making and happiness is concerned with an evaluation of the choice made or, in other words, an evaluation of the decision outcome by the chooser, answering the question 'am I satisfied/happy with what I chose?'.[271] Many of these studies focus on post-choice dissonance (reduction) and feelings of conflict or regret.

Two very extensive strands of research deal with consumer satisfaction and medical decision making.[272]

Within the former domain, consumer satisfaction, there are a few studies that also take the decision making process into account (not only the result). Within the latter domain, medical decision making, several studies are concerned with shared decision making and group decision processes (not only individual decision making).

Furthermore, there are some scattered and more recent studies examining the antecedents of post-decision/post-choice satisfaction, focusing on such diverse matters such as choice-goal compatibility (e.g. Shao & Shao, 2011), maximizing versus satisficing and commitment (e.g. Sparks, Ehrlinger, & Eibach, 2012), or reversibility of decisions (e.g. Bullens, Van Harreveld, Förster, & Van Der Pligt, 2013). Best known in this category are probably the studies on the satisfaction-decreasing effect of too many or additional options (cf. e.g. LeBoeuf & Shafir, 2005, p. 250 f., for some examples)

[271] The 'decision outcome' here is co-extensional to the immediate result of the choice, it does not extend to further or long-term consequences.

[272] I will treat the variable 'satisfaction' simply as exemplifying a question such as "How satisfied are you with...?" However, cf. e.g. Aigbavboa and Thwala (2013); Parker and Mathews (2001) for further conceptual and methodological clarifications. (Also note that Aigbavboa and Thwala (2013) is widely cited, but oftentimes wrongly as "Clinton & Wellington (2013)", confusing first and last names.)

and effects of option characteristics more generally. Some of these latter studies are also concerned with what might be called peri-choice or peri-decision making satisfaction.

Lastly, quite a few studies are concerned with interindividual *decision making styles*, and according instruments have been developed (cf. e.g. Leykin & DeRubeis, 2010; Scott & Bruce, 1995). 'Decision style' refers to habitual ways in one's personal decision making, e.g. going about decisions 'rationally' or 'intuitively' or even avoiding or procrastinating decisions.

In sum, the vast majority of research regarding happiness/satisfaction and decision making is about choice or outcome satisfaction. The domains most researched are consumer satisfaction and medical decision making. Outside these two domains, studies investigating causes of post-decision (dis)satisfaction are concerned with diverse topics, one of which is the quantity and quality of options. Last, there is some research on decision making style and happiness/satisfaction. In conclusion, none of these research strands is specifically relevant to the present research, because the present research is concerned with happiness/satisfaction as due to decision strategy, not choice or outcome satisfaction.

5.2.2 Specific Overview: *Hedonomics*

Hsee, Hastie, and Chen's (2008) review article covers research within the behavioral decision making literature that speaks to the inquiry into decision making and happiness. In this ambitious article entitled *Hedonomics – Bridging Decision Research With Happiness Research* the authors propose a new term, 'hedonomics', as an alternative to economics: "Hedonomics does not replace economics – rather, the two approaches complement one another. Whereas economics studies how to maximize wealth with limited resources, hedonomics studies how to maximize happiness with limited wealth" (p. 225).

Hsee et al.'s (2008) review is specifically informative for present purposes not only because it puts together relevant findings, but also because it depicts how within behavioral decision research effects on happiness are thought of and within which frameworks they are investigated. This is also helpful as a contrast to the present research project. Accordingly, this review article will be portrayed and discussed in some detail.

The conception of happiness the authors are interested in is that of hedonism: pleasure, or pleasurable experiences: "In this article, we treat the concept of happiness as a psychological term that describes the positive or negative aspects of hedonic experience. We will use the words *happiness* and *experience* interchangeably because we mean to refer to the positive or negative quality of experiences in the present context" (Hsee et al., 2008, p. 225, original italics). The authors contrast this conception to both satisfactionism, especially the 'principle of revealed preferences', as well as to eudaimonism (although not under that name).

Further, in spite of their commitment to happiness as pleasure, the authors do occasionally use the term 'satisfaction' synonymously. Also (which is, of course, common) for the research they review, they do not report the wording of the response scales measuring 'happiness'. It stands thus to reason that the response scales vary between common terms such as happiness, pleasure, and satisfaction. Moreover, since the happiness-related research in the behavioral economics tradition was not much informed by the psychological happiness research at the time, validated and common instruments measuring the components of subjective well-being (as reported in section 4.4.1.2 on page 137) were likely not used.

Hsee et al. (2008) gather findings as to "the relationship between presentation (how outcomes are arranged among themselves or relative to other outcomes) and happiness, and the relationship between choices and happiness" (p. 225). Accordingly, their article is structured into two main parts: (i) 'presentation and experience' ("We use the term presentation broadly to refer to how outcomes are described, framed, arranged, evaluated, and so on", p. 225), and (ii) 'decision and experience', which is about "the ability of people to make experience-optimizing choices" (p. 231).

5.2.2.1 Presentation of Decision Problems

Under this title the authors gather studies where the *presentation* of the decision problem makes a difference to happiness. They discuss four categories all of which in some way or another are concerned with *reference*.

First, the authors reference Prospect Theory (Kahneman, 1979; Tversky & Kahneman, 1992) and framing effects due to gain/loss frame (e.g. Tversky & Kahneman, 1981, 1986). Here, 'happiness' is simply understood as 'utility' within the adjusted utility function. Happiness as utility is is influenced by framing.

Second, the authors distinguish between joint versus single evaluation as two differing evaluation modes. In joint evaluation (e.g. comparing two apartments) 'evaluability' is always given, since two (or more) things get compared. In single evaluation however (e.g. having moved into one of the apartments), evaluability might be high or low. If evaluability is low, this has an effect on the utility function and accordingly on 'happiness'.

Third, there are effects due to time. On the one hand, there is adaptation: you might initially be happy with your new apartment, but then you get used to it. Underlying mechanisms for adaptation are: physiological adaptation, attention dilution, and rationalization. On the other hand, there is change, where e.g. a quick positive change is preferred to a slow one and a slow negative change to a quick one.

Last, the distribution of outcomes (e.g. irregular payments) make a difference to happiness/satisfaction depending on whether there are positive or negative peaks and on what is perceived to be the default/the norm.

In sum, all of these findings are part of classic research programs within behavioral economics, but are quite different to the present research. The present research is not concerned with framing, evaluation mode, effects of time, or distribution. As the title

says, all of this research is concerned with the effects of *presentation*. In the present research, however, participants are told to either decide by reasons or by principle, and they are given instructions on how to do that as well as a form to fill out to make sure they use the given strategy as instructed. Accordingly, since the two decision strategies differ, there is also a difference in presentation. Yet, the difference in presentation is intrinsic to the difference in strategy – it is not something that is supposed to have an effect independent of strategy. Of course, the difference in presentation could be the underlying reason of a difference between strategy. Yet, the difference in presentation between the two decision strategies used in the present research has nothing to do with the four categories – framing, evaluation mode, time, distribution – referenced above.

5.2.2.2 Decision 'Biases'

The research the authors review within the second part falls in with the heuristics and biases approach, which is stated by the authors such: "We will report on a series of systematic biases that prevent individuals from making experientially optimal choices" (p. 231).

'Experientially optimal choices' refers to choices that maximize hedonic experiences, i.e., happiness in the pleasure sense. The concept is based on Kahneman's *experienced utility* (e.g. Kahneman et al., 1997), cf. section 3.3.2.3 on page 83. The authors stress that they use the term 'happiness' exclusively in the hedonic/hedonistic sense.[273]

In this part, the authors order their presentation along what they identify as "the strategies decision makers use" (p. 231), grouping these into *impulses*, *predictions* of future experiences with prospective outcomes, *memory*-based evaluations, and decision *rules and heuristics* (cf. p. 231 ff., my italics).

First, there are impulsive decisions/choices. The authors define an impulsive decision as one that seeks immediate gratification. Quasi by definition, in this case long-term costs are ignored in favor of short-term benefits. If a decision problem is structured such that there are short-term benefits, but long-term cost (e.g. indulging in unhealthy but fun behaviors such as eating chips and watching TV instead of going for a run), an overall cost-benefit analysis will be unfavorable. Yet, if there are no long-term costs, immediate gratification leads to extra pleasure.

Second, many decisions rely on predictions of future happiness (= affective forecasting). These predictions of future states are often biased by an unduly reliance on the current or near-current state. The authors distinguish three cases: There is (i) impact bias, where you mistake the predicted excitement from acquisition (e.g. having newly acquired a bigger flat) for consumption (e.g. living long-term in that bigger flat); (ii) projection bias, where when currently in a 'cold' state (e.g. being full from a meal) you

[273] Cf. footnote 266 on page 135 for the use of the terms 'hedonic' versus 'hedonistic'. I will understand the terms as synonyms without any value judgment attached.

have a hard time imagining you will ever be 'hot' (e.g. hungry) again; (iii) distinction bias, where in joint evaluation a characteristic seems decisive (e.g. the size when comparing two flats), but in single evaluation that characteristic is not that important any more. Making such mistakes in predicting your future happiness, of course, is a problem to maximization.

Third, many decisions are based on memories of relevant previous experiences. Here, one problem is duration neglect and the peak-end rule – as already discussed in section 3.3.2.3 on page 83. Another one is that the evaluation of memories is influenced by expectations and norms more than is the evaluation of the concurrent living. The resulting discrepancy may lead to suboptimal decisions.

Last, the authors review findings on decisions based on rules, "including heuristics and personal policies" (p. 235). Overall, decision rules are often applied in a rigid way even against one's better judgment. Among these rules, the authors consider findings regarding (i) 'variety seeking' where, even though you may be well aware of your preference, the rule to seek variety makes you e.g. not take your favorite ice cream, but try a new one; (ii) 'waste-not' where you would avoid 'sunk costs' in disregard of other options being more enjoyable, and (iii) 'more options are better' where you would opt to have additional options, yet it has been consistently shows that more options make people unhappier.[274]

In sum, while the first category, impulsive decisions that fail to factor in long-term costs, represents a classic case of wrongful calculation in terms of the ideals of 'rational choice', the second category is about the difficulty of imagining one's future state of mind as fundamentally different to the present. The third category, memory, relies heavily on Kahneman's (e.g. Kahneman, 2011; Kahneman et al., 1997) distinction between differing utilities at different points in time (cf. section 3.3.2.3 on page 83). The most important of these is 'experienced utility' which is the amount of concurrent pleasure that – according to Kahneman's very normative claim – should not get disadvantaged as much as it does due to our mental setup (duration neglect and peak-end rule). The last category, decision rules that are applied against better judgment, will be taken up again in section 5.4 on page 153.

Overall, all of these categories are presented within a normative framework, as the term 'biases' already suggests: In the first category 'impulsive' decisions are measured against the normative ideal of rational choice: identifying relevant consequences, weighing them appropriately, and calculating overall utility accurately. In the second category, predictions are measured against a criterion of 'correctness' regarding the anticipated future states of mind. In the third category, memories are measured against a criterion of duration-weightedness such that 'experienced utility' is given more importance. In the forth category, rules are evaluated regarding whether they promote or inhibit (predicted) pleasure/experienced utility.

[274] Rule-based decision making will be more thoroughly discussed in section 5.4 on page 153.

The present research, however, is not primarily concerned with a normative ideal. Yes, I believe that Aristotelian eudaimonia is the highest end by nature and thus that well-being, even if measured in terms of satisfaction, is a good worthy to promote. I abstain from judgment regarding maximization. Furthermore, deciding by reasons versus deciding by principle will be compared against each other, not compared against a norm. Accordingly, the research reviewed by Hsee et al. (2008) is not of primary interest to the present research.

5.3 Decision Making Strategy and Happiness/Satisfaction

While there is ample literature on decision strategies (as portrayed in section 1.2.5.1 on page 23 and 2.4.1.1 on page 39), "[t]he question of *how* people arrive at satisfying decisions has not been given much attention in psychology or economics" (Crossley & Highhouse, 2005, p. 256, my italics) and

> [P]revious research examining satisfaction with choice has largely been focused on satisfaction with outcomes [...]. In reality, however, one could report being satisfied with an entire decision making process and yet be disappointed by an outcome. In such a case, one may evaluate decision quality as low, not because the decision was bad, but rather because of chance or bad luck affecting the outcome (Crossley & Highhouse, 2005, p. 258).

Zhang and Fitzsimons (1999) make a similar observation:

> The issue of decision satisfaction is an important topic that has received scant attention in psychology and decision research. [...] Satisfaction [...] is associated only with the decision about the outcome choice. (Zhang & Fitzsimons, 1999, p. 193)

Not counting in studies concerned with decision making *style*, there was almost no research on strategy and satisfaction as of 2014, when this research project was conceived.[275] At the time, I was able to find exactly three studies investigating satisfaction with decision strategy:

First: Domain of Consumer Satisfaction In their experimental study in the domain of consumer satisfaction Zhang and Fitzsimons (1999) had participants fill out a questionnaire after they made their choice. The questionnaire was specifically designed to measure participants' satisfaction with the decision process. The questionnaire entailed six items that were rated on a 10-point scale with endpoints labeled, ranging from 'strongly agree' (1) to 'strongly disagree' (10). These are the items (quoted from Zhang & Fitzsimons, 1999, p. 199):

[275] Note that research concerned with principled/rule-based and reason-based decision strategy will be referenced in the next section.

(1) I found the process of deciding which product to buy frustrating.
(2) Several good options were available for me to choose between.
(3) How satisfied or dissatisfied are you with your experience of deciding which product option to choose? (endpoints: 1 = extremely satisfied, 10 = extremely dissatisfied)
(4) I thought the choice selection was good.
(5) I would be happy to choose from the same set of product options on my next purchase occasion.
(6) I found the process of deciding which product to buy interesting.

Second: Domain of Job Search In the domain of job search, Crossley and Highhouse (2005), too, asked their participants to evaluate their satisfaction with the decision making process. Their questionnaire entailed the following four items on a scale from 1 to 5 (endpoint labels were not reported; the items are quoted from Crossley & Highhouse, 2005, p. 263):

(1) I am happy with the way I went about finding this job.
(2) I would look for another job using the same techniques that I used to find this one.
(3) I am satisfied with the process I used to find jobs to apply for.
(4) I am satisfied with how I decided upon which job to take.

Third: Domain of Personal Decisions Last, being interested in the importance of 'true self-knowledge' in a preliminary survey study Schlegel, Hicks, Davis, Hirsch, and Smith (2013) asked participants to rate 36 potential decision making strategies regarding "how important they thought each was for making satisfying decisions" (p. 545). The authors used a questionnaire made of six items with a 11-point response scale ranging from 'completely disagree' (1) to 'completely agree' (11). They reported four example items:

(1) I am completely confident I made the right decision.
(2) I am completely satisfied with the decision (I made).
(3) This decision is consistent with my core values and beliefs.
(4) I am confident I will not regret this decision in the future.

Summary All three studies thus used short and simple questionnaires to investigate participants' satisfaction.[276] In all three studies, effects of decision making process/ strategy on satisfaction were found.[277] In terms of content, the items were specifically

[276] Cf. also section 9.1.1.2 on page 220 within the empirical part for more information.
[277] Two of the studies use the term 'process' and one uses the term 'strategy'. A decision strategy, of course, is also a decision process. For present purposes, the difference is not important.

tailored to each study's research domain. Within each of the short questionnaires, the items seem rather diverse, but acceptable reliabilities are reported (cf. section 9.1.1.2 on page 220). The construction of the questionnaires seems to have been uninformed by happiness research and research on subjective well-being.

In sum, on the one hand studying happiness/satisfaction as an effect of decision process/strategy clearly is a research desideratum, and on the other hand there indeed are effects of decision process/strategy on satisfaction.

5.4 Reasons & Principles as Decision Strategy and Happiness/Satisfaction

Assimilating Reasons and Principles to Previous Research The conceptualization of 'deciding by reason' and 'deciding by principle' as philosophically informed yet fit for everyday use was depicted in section 4.3.7 on page 129.

Deciding by principle for present purposes essentially means to decide based on an action-guiding general maxim or rule such as 'no drinks before 4pm'. Accordingly, as a first step, principled decision-making can be assimilated to what in decision research is termed 'rule-based decision making'. Deciding by reasons, on the other hand, is largely defined by what reasons are: all facts can be reasons. Accordingly, facts about my feelings and intuitions like 'I get the feeling that there is something off' can absolutely be reasons – which might seem at odds with the layman rational-emotional distinction. Furthermore, it is unclear whether uncertain consequences are fact enough to count as reasons. But if they are, as a first step, we can assimilate deciding by reasons with much of the rest of decision making not involving consciously applied rules.[278]

It is also important to keep in mind that both strategies, 'deciding by reason' and 'deciding by principle', are conceptualized to be *conscious and deliberational* – you cannot use them accidentally.

Assimilating principled decision making to rule-based decision making, and reason-based decision making to much of the rest of decision making research affords a more yielding outlook on previous findings.

[278] Glöckner and Betsch (2008b) seem to call 'cues' within an inference task (e.g. the 'city size task', cf. footnote 17 on page 14 within 1.2.3) 'reasons': "If, for instance, the person presumes that the state capital cue is the most valid one, he or she could consider only this information, ignore the other cues, and decide that city A is larger. Such a strategy relies on one reason only" (p. 3). Since attribute=cue, even the title *Multiple-Reason Decision Making Based on Automatic Processing* speaks in favor of the identification, since the more common denomination for this research paradigm is 'multi-attribute decision making' (MADM). However, it would make much more sense to understand the cue *value*/outcome/consequence as the reason. This is so, because 'airport' is not the reason, but 'that city A has an airport' (or commonly symbolized by a '+' in the matrix). Similarly, 'color' is not the reason, but 'that car B is green' is the reason.

Rules It has been shown that there are some practical rules people tend to adhere to, e.g. 'seek variety', 'waste not', 'don't pay for delays', and 'more options are better' (cf. Hsee et al., 2008, p. 236).

Especially the first rule has been studied regarding its effect on satisfaction. It was found quite consistently that in simultaneous choice situations "individuals choose [...] less-preferred options even though they enjoy those items less than they would have enjoyed repeating a more-preferred option" (Ratner, Kahn, & Kahneman, 1999, p. 1).

This again reminds of Kahneman's (2011) distinction between the experiencing and the remembering self. It stands to reason that just as in the forecast, in the retrospect, too, variety is judged to be a good thing – and which self is supposed to be the criterion? Indeed, this is exactly what was shown in the same study: antecedent and retrospect judgments were consistently in favor of variety (cf. Ratner et al., 1999).

The further above mentioned rules – in appropriate decision tasks – seem to operate much to the same effect: the rule can be more important than actual, concurrent enjoyment or anticipated satisfaction (cf. e.g. Arkes & Blumer, 1985, for the latter point, and Hsee et al., 2008, for a short review on rule-based decisions and happiness).

Kahneman's distinctions between different utilities at different points in a timeline and between 'two selves' (Kahneman, 2011; Kahneman et al., 1997) seem to be quite useful here. What these studies might indicate is that (some of) the above rules do not work in favor of the experiencing self, just as memory does not, due to duration neglect and the peak-end rule. Yet, as I argued in section 3.3.2.3 on page 83, I do not think that the proposition to compensatorily advantage the experiencing self has been satisfactorily pleaded.

In sum, none of these studies examined satisfaction with the decision making *strategy* (the 'following the rule'). And what is even less in line with my research project, it did not matter in these studies whether participants were aware at all of their adherence to these rules; I however want to be concerned with the conscious use of rules and (personal) maxims or principles.

Reasons Research on reason-based, deliberative decision making and satisfaction has produced discordant results.

For example, in Wilson et al.'s (1993) famous 'poster study' one of two groups of participants had to give reasons why they liked or disliked several posters belonging to two categories (art vs. humor). Later, all participants were asked to indicate how much they liked each poster and choose one of the posters. At the end of the semester, all participants were asked about their satisfaction with their poster choice. Interestingly, participants in the reasons condition on average liked more and chose posters from the category 'humorous' while control participants rather liked and chose the art posters. Furthermore, in the follow-up interview, control participants were more satisfied with

their choice of posters than were participants from the reasons condition.

The authors interpreted the results such that (i) the choice of given reasons was partly determined by their ease of verbalization, (ii) that which was important for long-term satisfaction was the initial affective attitude towards the posters, and (iii) the reasons participants gave led to a short-term change in attitude in line with the given reasons. Dijksterhuis and van Olden (2006) basically replicated these results and interpretations. Giblin, Morewedge, and Norton (2013) compared a deliberate and an intuitive decision strategy in a poster study and found no difference regarding *immediate* post-choice satisfaction (which is compatible with Dijksterhuis & van Olden, 2006; Wilson et al., 1993).

In broad brushstrokes, this research shows that deliberation can counteract initial/intuitive evaluations in a behaviorally relevant way, but that *long-term* satisfaction may be more in line with an initial affective response – at least in this domain, which is the domain of personal taste.

On the other hand, some studies have shown that deliberative, careful analysis as part of the decision process leads to greater satisfaction and less regret. In direct response to the research program by Wilson an colleagues, Kmett, Arkes, and Jones (1999) had high school students use a 'decision aid' (a computer program or a pros and cons list) to make their actual college choice and assessed satisfaction after one college term. In this study, participants having used either of the two decision aids reported higher satisfaction with their choice than controls. A similar study was conducted by Mann (1972).

Crossley and Highhouse (2005, p. 256) mention in total five studies speaking in favor of 'careful analysis' for subsequent satisfaction. These studies were published between 1972 and 1994, which shows that this is not a widely researched topic. Furthermore, these studies are divers in their setup, satisfaction is often not the main interest, and they can only be said to investigate reasons under a very wide sense and often not under that name. For example, two of those studies (Aldag & Power, 1986; Timmermans & Vlek, 1994) use a computerized 'decision aid' that guides people through the application of MAUT. Both studies do not even refer to reasons. Accordingly, the commonality is rather the deliberate and thorough analysis which was tested for its effects on satisfaction – as compared to non-analytical/intuitive control conditions.

A rare overview on reason-based decision making in general can be found in Shafir, Simonson, and Tversky (1993), however satisfaction does not play a role here.

Overall, the empirical basis is rather limited, and a final verdict on whether the use of reasons specifically rather satisfies or dissatisfies the decision maker cannot be given. Further, 'reasons' – or rather analytical reasoning – was conceptualized in quite differing ways, the domains the reasoning was about were divers, and the focus was mostly on satisfaction with the choice, not the process/strategy.

Of course, there is an abundance of literature on the two 'systems', System 1 and System 2 (cf. section 1.2.5 on page 23), where 'careful analysis' is contrasted with fast

and intuitive decision making (which is also what the above studies do). But this is not the contrast I am interested in.

Summary In sum, this section showed two things: first, the idea of principled versus particularistic decision making can be translated into psychological thinking and connected to previous research, and second, as of 2014, there is virtually no research considering satisfaction as due to the strategy used as opposed to satisfaction with the choice made.

5.5 Summary

In this chapter, previous research was looked at from three perspectives:[279]

Within the first perspective *Decision Making and Happiness/Satisfaction* (section 5.2 on page 146), I first gave a short general overview of common research strands and domains, yet all unfitting to the present research. Furthermore, based on a review article of Hsee et al. (2008), more fitting findings were presented. However, these, too, are rather dissimilar to my research endeavor, since they are firmly located within a normative approach.

The second perspective *Decision Making Strategy and Happiness/Satisfaction* (5.3 on page 151) more specifically looked at strategy and happiness/satisfaction. Only three articles from three different domains dealt with strategy satisfaction. The actual findings from within these domains are not relevant to the present research, but their operationalization of strategy satisfaction is, which this section thus focused on.

The third perspective is the most specific one, considering specifically *Reasons & Principles as Decision Strategy and Happiness/Satisfaction* (5.4 on page 153). Research on rule-based decision making and satisfaction as well as on reasons and satisfaction was reported. Differences between these research strands and mine were: participants are not always aware of the strategy they used, 'reasons' was understood in a very wide sense, and satisfaction is mostly about the choice, not the strategy.

Overall, there really was very little research similar to mine. Most importantly, the setup of my research endeavor has no predecessors: I will be concerned with decision strategy as the independent variable, reasons and principles will be contrasted, and the dependent measure is satisfaction.

There is literature on decision making and satisfaction (the most general perspective), but mostly within medical decision making. There is research on decision strategy and satisfaction, but strategy is not manipulated. There is research on rules and reasons as decision strategy and satisfaction, but they are not contrasted with each other.

[279] Note once again that the research reported here is the research that was available at the time this project was conceived (2014/2015). Newer research findings will be discussed in the discussion.

Accordingly, there are several new aspects I put together. This will be spelled out in the upcoming section *This Research*.

6 This Research

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6.1 Purpose, Aim and Scope of the Present Research

6.1.1 Exploration

This research is largely exploratory. It is one sense of 'exploratory' to refer to an empirical project that cannot be closely based on previous research. This is the case here. There are several aspects that are novel about the present research:

(i) **Definition:** Based on the philosophical literature, 'deciding by reasons' and 'deciding by principle' is clearly and strictly defined:
   - Reasons are facts and principles are universal conditionals.
   - 'Deciding by reasons' and 'deciding by principle' are deliberative strategies.
   - Both decision strategies are applied consciously.

(ii) **Distinction:** The distinction is between 'deciding by reasons' and 'deciding by principle', and
   - NOT between rule-based/reason-based versus intuitive (broadly construed),
   - NOT between consequentialism versus deontology.

(iii) **Manipulation:** Decision strategy ('deciding by reasons' versus 'deciding by principle') is the *independent variable*.

(iv) **Output:** Well-being/satisfaction as due to decision strategy is the *dependent variable*.

There is some research interested in (iv) the satisfaction as due to decision strategy (cf. section 5.3 on page 151), and some research where (iii) decision strategy is induced (cf. e.g. Söllner, Bröder, Glöckner, & Betsch, 2014, p. 88) – yet both strands of research are located in completely different contexts than the present research. Furthermore, there is some research on rule-based and reason-based decision making, but (ii) the two strategies are not contrasted with each other and (i) differently defined than suggested above (cf. section 5.4 on page 153).

Moreover, putting all of the above together – defining the two strategies as explicated, contrasting the two strategies with each other, manipulating them as the independent variable, and measuring the difference on the dependent variable 'satisfaction' – the present research really explores a completely novel area.

The purpose of the present research was (1) to make use of philosophical theorizing and its unique competence in precision and analysis to flash out an important distinction between the use of reasons versus principles in decision making, (2) to find ways to manipulate 'deciding by reasons' versus 'deciding by principle' as distinct, yet both conscious and deliberate decision strategies true to their definition as such, and (3) to investigate the effects of these decision strategies on well-being/satisfaction as an important goal and quality criterion of decision making.

The high-reaching ultimate aim of this research was to be able to advice in favor or disfavor of the use of either reasons or principles within deliberational decision making if their well-being/satisfaction were the decision maker's goal.

6.1.2 Overall Procedure

The overall procedure of the present research project was adapted to its exploratory nature in that the first step was the conception and conduction of a pilot study. This pilot study is reported within a separate chapter (*Pilot Study* chap. 8 on page 168) and aimed at scrutinizing several aspects at once (cf. section 8.1 on page 170).

The pilot study includes an experimental and a questionnaire part. The questionnaires are reported in a separate chapter (*Questionnaires*, cf. sections 9.1 on page 220 and 9.2 on page 231). Furthermore, it was one of the consequences of the pilot study to understand that *content* was a major determinant (cf. section 8.5.2 on page 208) to be calculated with. The reason for this is that having participants make a decision (based on a decision strategy) requires content – which is usually provided by means of a scenario/vignette describing a decision situation. The understanding of the importance of content triggered further spin-of studies trying to characterize *decision situations*, such that content could be taxonomized. One of these attempts is a questionnaire study that is reported in section 9.3 on page 250.

That is, while the original research interest was with 'deciding by reasons' and 'deciding by principle' as distinct decision strategies, during the early stages of this project it seemed wise to get a grip on content, which motivated the above questionnaire study.

Having understood the immense importance of content, all experimental studies investigating the effect of 'deciding by reasons' versus 'deciding by principle' were based on a specific already existing research paradigm such as the Trolley paradigm. Three of these studies are reported in the according chapter (*Reasons vs. Principles*, 10 on page 363). Several further studies were conducted, but could not be included due to time, space, or the lack of results. There is a list of all studies conducted to be found in the Appendix (cf. Appendix I.2.2 on page 768).

The yield of the research reported here is thus two-fold: On the one hand there are the results from the effects of 'deciding by reasons' and 'deciding by principle' on satisfaction (as based on three experimental studies), and on the other hand there are the results from questionnaire construction (based on three correlational and factor analytic) studies.

In sum, the viability of studying the two decision strategies 'deciding by reasons' and 'deciding by principle' using a scenario/vignette-based methodology has been thoroughly (but not yet sufficiently) explored. The results and limitations are discussed in the last part of this work, *Concluding* (Part III).

The scope of the present research interest is thus much wider than was or could be reported or even researched within this project: The scope was to delimit content (of decision situations) and maybe personality such that within a very specific context the potentially differing effects of the two deliberational decision strategies on satisfaction could be determined. The aim was to be able to say that – within a context X – if well-being/satisfaction is your goal, it is better to decide using either one or the other of the two decision strategies. This aim was not reached. In fact, the main result was something else altogether. But see for yourself in the upcoming part *Empirical* (Part II).

II Empirical

Overview

This part, *Empirical* (Part II), includes four chapters: *General Method* (chap. 7) will depict the methodological elements that remained constant over all studies. The *Pilot Study* (chap. 8) will explore the empirical feasibility of the present research project and set the stage. The chapter *Questionnaires* (chap. 9) presents three questionnaire projects, the Strategy Satisfaction Questionnaire (SSQ), the Decision Style Questionnaire (DSQ), and the Decision Categorization Scales (DCSs). The chapter *Reasons vs. Principles* (chap. 10) will be concerned with the main question *Does one or the other deliberational decision strategy lead to greater satisfaction*?

While the part *Theoretical* (Part I) provided a general scope of relevant theorizing and previous research, the specific theoretical background and literature important to each questionnaire and experiment will be reported within the introduction to the respective study.

General Method: 7 on the next page

Pilot Study: 8 on page 168

Questionnaires: 9 on page 216

Reasons vs. Principles: 10 on page 363

7 General Method

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All studies to be reported in the following were conducted online. They were programmed using the same software, and their general structure and some standard variables always remained the same. These constant elements will be outlined in the present chapter *General Method* (chap. 7).

7.1 General Procedure

All studies (experimental as well as correlational) were implemented as online questionnaires on the platform *SoSci Survey* (www.soscisurvey.de/). The first page included a short welcome and introduction to the study, as well as information regarding expected duration and compensation (course credit or participation in a lottery). The second page asked for demographics, and from the third page onward participants were presented with the respective study's contents. The last one or two pages each contained filter questions (e.g. self-rated diligence) and the option to enter contact details (to be separately saved) for course credit or lottery participation. It will be noted where the specific procedure of a study deviated from this general outline. Screenshots of all studies are to be found in the *Original Materials* Appendix (F.2.3 on page 661).

7.2 General Materials

This section will introduce *General Dependent Variables* and *General Response Formats* that will be employed throughout this manuscript.

7.2.1 General Dependent Variables

Since all studies were implemented using the same online questionnaire tool, there are several variables that were identical over most or even all studies. These variables make up three categories:

1. system-generated variables (cf. Table 7.1),
2. "closing questions" probing data quality, gathering additional (occasionally qualitative) information, or managing personal data for compensation (cf. Table 7.2), and
3. demographic variables (cf. Table 7.3).

These three categories of recurring variables are depicted in detail in the following three tables. In the depiction of each individual study they will hence be referred to only by *Name* without the details already given here.

Table 7.1 List of system variables.

System Variable Name	Explanation of Variable	Interpretation of Variable
DEGRADE [legacy variable]	Sum of negative points for missing answers and negative points for extremely fast completion.	This variable is normed such that values of more than 100 points indicate low-quality data.
DEG_TIME	Negative points for extremely fast completion.	This variable is normed such that values of more than 100 points indicate low-quality data.
TIME_RSI	Index that indicates how much faster or slower a participant comlpleted the questionnaire as compared to the typical respondent (*Mdn*).	Values >1 identify faster completion, values <1 identify slower completion.
FINISHED	Participant reached the farewell page.	1=finished, 0=unfinished
LASTPAGE	Last page the participant completed.	
TIME_SUM	Sum of completion times per questionnaire page minus identifyable intermissions.	Measuring unit: seconds.
STARTED	Date and time when the praticipant started the questionnaire.	

Table 7.2 List of "closing question" variables.

Dependent Variable Name	Wording in German + English translation	Type of Scale and Anchorage in German + [English]
Diligence	Ich habe alle Fragen konzentriert und gewissenhaft beantwortet. I answered all questions in a focused and diligent manner .	6-point Likert scale, end points labeled *trifft gar nicht zu* [not at all] (1) and *trifft absolut zu* [absolutely] (6). No values displayed to participants.
Comments	Haben Sie noch Anmerkungen zu dieser Befragung? Do you want to leave a comment regarding this study?	Open field answer; optional entry.
Course Credit	Erhalt von Versuchspersonenstunden [Name, Matrikelnummer] Course Credit [Name, Student Number] *NB: A detailed description on how to gain course credit was included, as well as a confirmation that contact details would be saved separately from each individual's study data.*	Open field answer; optional entry.
Lottery	Wenn Sie am Gewinnspiel teilnehmen möchten, tragen Sie bitte hier Ihre E-Mail-Adresse ein. If you want to participate in the lottery, please enter your e-mail address below. *NB: A confirmation that contact details would be saved separately from each individual's study data was included.*	Open field answer; optional entry.
Device	Auf welchem Gerät beantworten Sie gerade diesen Fragebogen? Which device are you currently using to answer this questionnaire?	5-point nominal scale: - Own computer/laptop - Public computer - Tablet - Smartphone - Other device, namely: [open field].
Code	Bitte bilden Sie einen 4-stelligen Code aus den folgenden Elementen. Please generate a 4 digit code from the following elements.	1. First letter of your place of birth. 2. First letter of your mother's given name. 3. First letter of your father's given name. 4. Day of your birth (01-31).

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Table 7.3 List of demographic variables.

DV#	Dependent Variable Name	Wording in German + English translation	Type of Scale and Anchorage in English + [German]
DV1	Age	Wie alt sind Sie? How old are you?	Open field ratio scale: [open field] years.
DV2	Gender	Was ist Ihr Geschlecht? What is your gender?	3-point nominal scale: - female - male - other.
DV3	Education	Welchen Bildungsabschluss haben Sie? Bitte wählen Sie den höchsten Bildungsabschluss, den Sie bisher erreicht haben. What is your educational background? Please choose the highest formal qualification you attained so far.	10-point ordinal scale: - Dropped out of school [Schule beendet ohne Abschluss] - Still in school [Noch Schüler] - Graduation after school year 9 [Hauptschulabschluss] - Graduation after school year 10 [Mittlere Reife] - Completed apprenticeship [Abgeschlossene Lehre] - Vocational diploma [Fachabitur] - University-entrance diploma [Abitur] - University degree [Hochschulabschluss] - Other degree, namely: [open field].
DV4	Occupation	Was machen Sie beruflich? What is your occupation?	7-point nominal scale: - Pupil at school [Schüler/in] - Apprentice [In Ausbildung] - Student of: [open field] [Student/in in Studienfach:] - Employee or civil servant [Angestellte/r oder Beamtin/er] - Self-employed [Selbstständig] - Unemployed [Arbeitslos / Arbeit suchend] - Other: [open field].
DV5	Field of study	Falls Sie studieren oder studiert haben: was ist oder war Ihr Studienfach? If you study or studied at university: what is or was your field of study?	Open field answer.
DV6	University	Falls Sie studieren oder studiert haben: an welcher Hochschule? If you study or studied at university: at which university do/did you study?	Open field answer.

Note. DV2 *Gender* did not include the third category "other" in all studies.

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7.2.2 General Response Formats

Likewise, there are some response formats that were used in several studies. A relatively unconventional response format is the prompting of reasons and principles during the manipulation of decision strategies. This response format will be introduced in detail within the following chapter *Pilot Study* (chap. 8, section A.b on page 178 from 8.3.1.3).

Another still relatively uncommon response format is the use of so-called *visual analogue scales* (VAS). These truly represent an interval level of measurement in that they offer a sliding scale with numerous values. The VASs used throughout this manuscript have a grading of 100 values; i.e. they range from 1 to 101. Participants can position a slider anywhere on a bar without noticing switching between values. Figure 7.1 displays a sample bi-polar VAS. For an overview regarding the properties of visual analogue scales as compared to conventional categorical scales cf. e.g. Funke (2004).

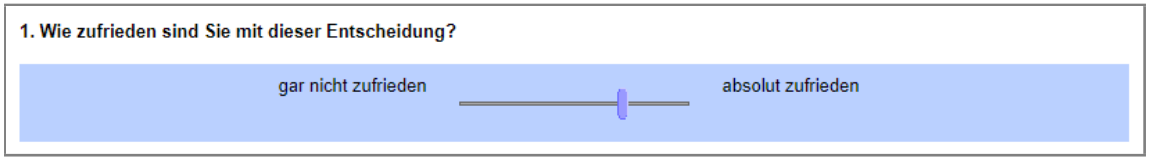


Figure 7.1 A typical visual analogue scale (VAS) with slider.

7.3 Statistical Computing

All data was analyzed using R and RStudio. Where appropriate, footnotes will indicate which packages and functions were chosen to produce a given result.

The Upcoming Chapter In the following chapter *Pilot Study* (chap. 8) the Pilot Study will be presented. This study – part experiment, part questionnaire study – aimed at piloting the general direction this research project was to take: Does the philosophical distinction between a principled and a particularistic decision strategy hold up psychologically? Does decision strategy affect satisfaction? Can we construct questionnaires on strategy satisfaction and decision style that satisfy criteria of good quality as well as that they help illuminate the effects of decision strategy on satisfaction? Do we need a taxonomy of decision situations? – Partial answers will be found in the following.

8 Pilot Study

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The Pilot Study is a multiple-study study since it includes three (partially) distinct parts, namely:

Part A: Decision Strategy and Satisfaction (experiment)

Part B: Strategy Satisfaction Questionnaire (questionnaire)

Part C: Decision Style Questionnaire (questionnaire)

The three parts were presented to participants in the above order, but they were not specifically declared to be distinct parts or distinct studies. The listed *General Dependent Variables* (cf. section 7.2.1) are part of all three studies.[280]

[280] A note on typographic decisions: independent as well as dependent variables are italicized. When used as a proper noun, the first word of independent as well as dependent variables is capitalized. However, in case of multi-word *independent* variables all words are capitalized according to so-called *start case* (cf. *Letter case*, 2021), whereas in case of multi-word *dependent* variables only the first word is capitalized. Thus, multi-word independent vs. dependent variables are easy to distinguish by capitalization, whereas one-word variables are not. Names of questionnaires will be throughout capitalized (according to start case as above), but not italicized. Experimental conditions / levels of independent variables will appear in quotation marks.
Please also note that without capitalization and italicization the reference is general. That is, when

However, only Part A, the experiment, will be reported in this chapter *Pilot Study* (chap. 8). The main reason is that reporting both questionnaires (Part B and Part C) in chapter *Questionnaires* (chap. 9) is more reader-friendly in that it purports a clear structure by dividing experimental and correlational work. A downside to this decision is that all analyses combining the experiment and the questionnaires will lack an in-detail introduction to the questionnaires. Cross-references will mitigate this aspect.

The following sections 8.1 and 8.2 will reference those aspects of the Pilot Study that are relevant to all three parts of the study.

8.1 General Theory and Purpose

This chapter *Pilot Study* (chap. 8) entails exactly what it says it does: a pilot. That is, the study reported here is largely exploratory in that I used it to test ways of manipulation and measurement as well as the general idea of distinguishing the two decision strategies taken from philosophy (particularistic vs. principled decision making) and their effect on satisfaction (as a proxy for happiness). There is no specific theory or previous research to reference.[281]

I use the term >decision strategy< I simply use this term as anyone would, and I do *not* specifically refer to *Decision Strategy* as the independent variable. Similarly, when I write >strategy satisfaction<, this term is meant in a general way and I do *not* refer to the dependent variable *Strategy satisfaction*.
Furthermore, I use italicization for emphasis (like in the previous sentence). You may thus read *strategy* satisfaction (or *Strategy* Satisfaction in title case), stressing "strategy" within the general term >strategy satisfaction<. Sometimes italicization is used instead of quotation marks when speaking *about* a certain word (like in the previous sentence >"strategy"<) or term (like >the decision strategy *deciding by reasons*<). The latter example (>the decision strategy *deciding by reasons*<) allows to distinguish *deciding by reasons* as a decision strategy from "deciding by reasons" as the condition/ level of an independent variable. – Last, italicization is used when referring to chapter or section headings. | The French-like quotation marks "><" are only used within this paragraph substituting the regular quotation marks to avoid confusion!

[281] However, the non-specific theoretical underpinnings of the present study are, of course, to be found in the part *Theoretical* (Part I).

Aspects Piloted Within the Experimental Part

First: The Independent Measure. At the time this research project was conceptualized, the distinction between *deciding by reasons* and *deciding by principle* had no counterpart in psychological research or empirical Moral Psychology. Accordingly, never before had participants been manipulated to use one of these two strategies – such that *Decision Strategy* could function as an independent variable. Thus, purpose #1 was to test the decision strategy manipulation – both as a manipulation in a technical sense and as a factor affecting the dependent measure.

Second: The Dependent Measure. The interest of this research enterprise is the effect of decision strategy on satisfaction. There were not many studies concerned with strategy satisfaction, as outlined in depth in the introduction to the Strategy Satisfaction Questionnaire (SSQ, cf. section 9.1 on page 220 from chap. 9). Furthermore, the so-called *Outcome Bias* is a well-known and pervasive effect to be taken into account when evaluating post-outcome satisfaction. Therefore, purpose #2 was to test various satisfaction measures.

Third: The Effect of Decision Strategy. Purpose #3 and the main research interest was to test whether the two decision strategies, *deciding by reasons* and *deciding by principle*, would show an effect on strategy satisfaction (pre and post outcome).

Forth, The Effect of Content. The experiment in this study (as all of the following experiments reported in chapter *Reasons vs. Principles*, chap. 10) is scenario/vignette-based. That is, participants are asked to make a decision based on a fictional situation described as a little scenario, called a "vignette". These scenarios/vignettes, of course, come with contents, they are not neutral (whatever that would mean). Thus, purpose #4 was to test whether these scenario contents have an effect on the dependent measure of interest. Furthermore, the two scenarios used in this study were rated by the only situational taxonomy available at the time in order to fathom whether a taxonomical approach is indicated.

Goals Within the Correlational Part

First: Strategy Satisfaction. The Strategy Satisfaction Questionnaire (SSQ) was developed for and validated within this study. Purpose and goal: create a questionnaire specifically measuring strategy satisfaction (not option satisfaction, not outcome satisfaction, not general satisfaction) that satisfies criteria of good quality.

Second: Decision Style. Three previous questionnaires on decision style were combined and reduced to a new Decision Style Questionnaire (DSQ) validated within this study. Purpose and goal: reduce overlap within the existing literature and create a decision style questionnaire of feasible length and good quality for a German-speaking population.

Third: Effect on Satisfaction. Does decision style, conceptualized as a habit, make a difference to strategy satisfaction? Purpose and goal: scrutinize whether the Decision Style Questionnaire (DSQ) can help explain satisfaction with the decision strategy used in that maybe certain styles more or less harmonize with the two decision strategies.

Summary

This Pilot Study is exploratory in nature. However, the downsides of not being able to build on previous research are mitigated by the richness of conclusions to be drawn.

8.2 General Method

8.2.1 Procedure and General Materials

The study was conducted online; the link was circulated via newsletter. After the welcome page, participants were confronted with a vignette describing a decision situation and were instructed to decide among two options either by use of a principle or by the weighing of reasons (factor 1). After they had chosen an option, they were asked to indicate their satisfaction both with the freely chosen option and the predetermined decision strategy respectively. Thereafter they were informed about the outcome that was either all negative or all positive in terms of consequences (factor 2). After the outcome information, participants had to indicate their mood on a Self-Assessment Manikin (SAM) semantic differential scale (3 items, based on Bradley & Lang, 1994), complete the Strategy Satisfaction Questionnaire with respect to the decision strategy they had had to employ (12 items, adapted from Crossley & Highhouse, 2005; Schlegel et al., 2013; Zhang & Fitzsimons, 1999), and classify the decision situation (8 items, Situational Eight DIAMONDS Scale S8-II, Rauthmann & Sherman, 2015). The Decision Style Questionnaire (60 items, based on Leykin & DeRubeis, 2010; Mann et al., 1998; Scott & Bruce, 1995) concluded the study. On the last page of the questionnaire, participants were asked to answer the items *Diligence*, *Comments*, *Course credit*, *Lottery*, and *Code* (cf. Table 7.2), as well as four demographic questions (*Age*, *Gender*, *University*, *Field of study*, cf. Table 7.3), rate the extent to which they had been able to put themselves in the position of having to make the required decision, and elect whether to get an individual feedback regarding their decision style. Cf. Table 8.1 for an ordered list of presented variables and questionnaires as well as their affiliation to the respective three parts/studies A-C.

Table 8.1 Order and affiliation of variables and questionnaires.

Page #	Dependent Variable Name	Wording in English	Variable Affiliation (Part A-C)
Page 4			
DV1	Option satisfaction	How satisfied are you with the option you chose?	A
DV2	Strategy satisfaction	How satisfied are you with the decision strategy [weigh reasons / act according to a principle/rule] that you were told to use?	A
DV3	Comment	Do you have a comment regarding the topic of satisfaction?	A
Page 7	Mood (3 items)		
DV4	Mood valence		
DV5	Mood activity	Put yourself into this situation – how would you feel? Mood:	A
DV6	Mood potency		
Page 8	Strategy Satisfaction Questionnaire (12 items)		B
Page 9	Situational Eight DIAMONDS Scale S8-II (8 items)		A
Pages 11-16	Decision Style Questionnaire (60 items)		C
Page 17			
DV7	Extent of immersion	To what extent were you able to immerse yourself in the depicted situation and the decision to make?	A-C
DV8	*Diligence*	Cf. Table 1.2.	A-C
DV9	*Comment*	Cf. Table 1.2.	A-C
DVs 10-13	Demography (*Age*, *Gender*, *University*, *Field of study*), cf. Table 1.3.		A-C
DV14	*Lottery*	Cf. Table 1.2.	A-C
DV15	*Code*	Cf. Table 1.2.	A-C
DV16	*Course Credit*	Cf. Table 1.2.	A-C
DV17	Feedback	I would like to receive a short feedback regarding my decision style on the next page.	C

Note. The response scales are described in Table 8.5.

8.2.2 Participants

Participants were recruited via mailing list from Leuphana University Lüneburg, as well as from several universities of North Rhine-Westphalia via the mailing lists of their respective student representative bodies. Recruitment took place in June and Juli 2015 (first data entry 10/06/15, last data entry 22/07/15).

After filtering for self-rated diligence,[282] N=145 of originally N=148 participants remained for analysis. Of these, n=81 participants (56%) studied or worked at Lüneburg University and n=64 participants (44%) were affiliated with various other universities.[283] The majority of n=125 participants (86%) studied a diverse variety of subjects, a minority of n=21 participants (14%) majored in Industrial Psychology at Lüneburg University.[284]
On average, participants took M=16 min to complete the questionnaire (SD=3.64 min). Age ranged from 18-51 years, with a mean of M_{age}=24 years (Mdn_{age}=24 years, too, SD_{age}=4.5 years). 81% (n=117) of participants were female and 19% (n=28) were male.

[282] Based on the 6-point scale of the variable *Diligence*, where 6 denoted the highest value of diligence, participants reporting a value <4 were excluded from further analysis. For further information on the variable *Diligence*, cf. Table 7.2 from section 7.2.1.
This cut-off was cross-validated with the system variable *DEGRADE*, where a value of $DEG_{\text{i}} \geq 100$ points would indicate insufficient data quality. For further information on this variable, cf. Table 7.1 from section 7.2.1. With a mean of M_{DEG}=14 and a median of Mdn_{DEG}=9 it can be assumed that the data quality of this study was good. Furthermore, the three maximum values were $max_{1\ \text{DEG}}$=101, $max_{2\ \text{DEG}}$=77, and $max_{3\ \text{DEG}}$=57, establishing once more that the vast majority of participants provided good data quality on the measure *DEGRADE*.

[283] I failed to ask whether participants were still students or otherwise members of university or else. Two participants noted that they did not study any more and two others noted that they were enrolled in graduate school. However, these answers had not been prompted and thus there might be more of such cases in this sample. Nevertheless we can assume that the vast majority of participants were indeed students at the time, since (a) recruitment mails were sent through official to semi-official university mailing lists, and (b) the age distribution speaks to that assumption, too: only n=8 participants (6%) were older than 30 years of age, only n=3 (2%) of which were older than 35 years.

[284] Industrial Psychology was the one academic major at Lüneburg University where students could earn course credit from participating in this study.

8.3 The Experiment (Part A)

8.3.1 Method

8.3.1.1 Design and Hypotheses

The design was a 2 (*Decision Strategy*: "decide by reasons" vs. "decide by principle") * 2 (*Outcome*: "positive" vs. "negative") between-subjects design. After being presented with a decision situation vignette, participants were led to make a decision either by reasons or by principle (factor 1) among two options. Each option could result in either a good or a bad outcome (factor 2), which was (unknown to participants) randomly drawn.[285] Participants were asked to indicate their satisfaction[286] before and after they received the outcome information.

This experimental part of the Pilot Study was tackled with an exploratory approach[287] which is appropriate to a pilot study. Therefore, the results section will be structured according to exploratory questions rather than hypotheses. The below hypotheses will be referred to where fitting within the exploratory framework, but are not in the focus of this pilot.

Planned analyses relied on the following non-directional hypotheses:

(H1.1) There is a difference in *Strategy satisfaction* between "deciding by reasons" vs. "deciding by principle" before knowing the outcome.

(H1.2) There is an interaction of *Decision Strategy* * *Outcome* on the post-outcome measures of satisfaction.

8.3.1.2 Procedure

Cf. section 8.2.1.

[285] The mechanism behind the random allocation of outcome was an *urn drawing* so that participants would be equally distributed over outcomes. In the description of the vignette it was made clear that due to uncertainty either outcome might come about.

[286] Note that satisfaction was operationalized in four different ways in order to examine specific constructs as well as pilot various measurement options. Before outcome information satisfaction was measured by *Option satisfaction* and *Strategy satisfaction*, after outcome information it was measured by *Mood* (3 items) and the Strategy Satisfaction Questionnaire (12 items). Cf. Table 8.5 for details.

[287] The term "exploratory" is used in two different ways: (a) data is analyzed without prior hypothesizing, and (b) there are hypotheses before data analysis, but these hypotheses are not (sufficiently) backed by appropriate literature and previous empirical work.
In this case, on the one hand all analyses were conducted without *directional* hypotheses, yet hypothesizing (unspecified) differences, and on the other hand there was no specifically fitting empirical literature at the time that could be drawn on.

8.3.1.3 Materials

A Independent Variables

A.a Decision Situation Vignettes The decision situation content described in the vignette was modeled after a typical situation a student might encounter: the next weekend they could either meet old friends from oversees who were staying in a major European city that weekend or else work on an important application due soon. Cf. Table 8.2 for the complete content of the vignette and Tables 8.3 on the next page and 8.4 on page 178 for the four possible outcome information text modules, namely a negative vs. a positive outcome for each of the two options. For screenshots of the original materials within the online questionnaire as viewed by participants cf. the Appendix.

Table 8.2 Decision situation vignette in German and English translation.

Type of text module	
Vignette (German)	Zwei Ihrer Freunde aus den USA sind in Europa unterwegs und möchten Sie gerne nach langer Zeit einmal wiedersehen. Dazu schlagen diese vor, sich kurzfristig am nächsten Wochenende in Paris zu treffen. Sie sind allerdings gerade sehr beschäftigt, denn Sie müssen eine wichtige Bewerbung fertigstellen, deren Abgabefrist kurz nach dem vorgeschlagenen Wochenende liegt. Sie haben diese Freunde zuletzt vor drei Jahren gesehen, und es würde sich sicher nicht so bald wieder eine Gelegenheit ergeben. Vielleicht wären diese sehr enttäuscht, wenn Sie nicht kommen würden. Auf der anderen Seite wäre die Gefahr gegeben, dass Sie die Bewerbung nicht rechtzeitig fertigstellen können oder nur mit geringerer Qualität. Das wäre sehr ärgerlich für Sie. Sie müssen sich also entscheiden zwischen den Optionen nach Paris zu fahren, um die Freunde zu treffen – oder aber zuhause zu bleiben, um die Bewerbung zu schreiben.
Vignette (English translation)	Two of your friends from the USA are traveling in Europe and would like to see you again after a long time. They suggest meeting up in Paris next weekend at short notice. However, you are very busy at the moment as you have an important application to complete and the deadline is shortly after the proposed weekend. The last time you saw these friends was three years ago, and you're sure there won't be another opportunity so soon. Perhaps they would be very disappointed if you didn't show up. On the other hand, there is the risk that you might not be able to complete the application in time or only with lower quality. That would be very upsetting for you. So you have to decide between the options of going to Paris to meet your friends – or staying at home to write the application.

Table 8.3 Negative outcome information in German and English translation.

Type of text module	Option 1: meet friends	Option 2: work on application
Outcome information "negative" (German)	Sie haben sich entschieden Ihre Freunde zu treffen. Stellen Sie sich nun vor, dass das Szenario wie folgt weiter verläuft: Der Treffen mit den Freunden wird ein absoluter Reinfall; Sie können sich nicht auf gemeinsame Unternehmungen einigen und es kommt sehr schlechte Stimmung auf. Für das Schreiben der Bewerbung finden Sie vor und nach dem Treffen nicht genügend Zeit, können die Frist zwar einhalten, aber sind sehr unzufrieden mit der Qualität. Zwei Wochen später erhalten Sie eine Absage, sowie eine Postkarte von Ihren Freunden, die einen blöden Witz über das unschöne Treffen enthält.	Sie haben sich entschieden in Ruhe Ihre Bewerbung zu schreiben. Stellen Sie sich nun vor, dass das Szenario wie folgt weiter verläuft: Das Schreiben der Bewerbung wird ein absoluter Reinfall; es macht Ihnen keinen Spaß und Sie schaffen es nicht, sich zu einer ordentlichen Einarbeitung zu motivieren, so dass die Qualität der Bewerbung gering bleibt. Für Ihre Freunde finden Sie noch nicht mal ein wenig Zeit, und lehnen selbst ein Skype-Gespräch ab, das diese vorgeschlagen hatten. Zwei Wochen später erhalten Sie eine enttäuschte Postkarte von Ihren Freunden, sowie eine Absage auf Ihre Bewerbung.
Outcome information "negative" (English translation)	You have decided to meet your friends. Now imagine that the scenario continues as follows: The meeting with your friends turns out to be an absolute flop; you can't agree on things to do together and a very bad mood arises. You don't find enough time to write the application before and after the meeting, you are able to meet the deadline but are very dissatisfied with the quality. Two weeks later, you receive a rejection and a postcard from your friends containing a stupid joke about the unpleasant meeting.	You have decided to write your application in peace. Now imagine that the scenario continues as follows: Writing the application turns out to be an absolute failure; you don't enjoy it and you don't manage to motivate yourself to do a proper research, so that the quality of the application remains low. You can't even find a little time for your friends, and even turn down a Skype call that they had suggested. Two weeks later, you receive a disappointed postcard from your friends and a rejection of your application.

Table 8.4 Positive outcome information in German and English translation.

Type of text module	Option 1: meet friends	Option 2: work on application
Outcome information "positive" (German)	Sie haben sich entschieden Ihre Freunde zu treffen. Stellen Sie sich nun vor, dass das Szenario wie folgt weiter verläuft: Der Treffen mit den Freunden wird ein voller Erfolg; Sie alle haben sehr viel Spaß und endlich wieder einmal die Gelegenheit, sich in Ruhe auszutauschen. Für das Schreiben der Bewerbung finden Sie vor und nach dem Treffen genügend Zeit, können die Frist einhalten und sind auch zufrieden mit der Qualität. Zwei Wochen später erhalten Sie eine Einladung zum Vorstellungsgespräch, sowie eine Postkarte von Ihren Freunden, die sich noch einmal für das schöne Treffen bedanken.	Sie haben sich entschieden in Ruhe Ihre Bewerbung zu schreiben. Stellen Sie sich nun vor, dass das Szenario wie folgt weiter verläuft: Das Schreiben der Bewerbung wird ein voller Erfolg; es macht Ihnen Spaß und Sie haben die Gelegenheit sich ordentlich einzuarbeiten. Für Ihre Freunde finden Sie auch ein wenig Zeit und vereinbaren ein längeres Skype-Gespräch, was diese freut. Zwei Wochen später erhalten Sie eine Postkarte von Ihren Freunden, die sich für das nette Skype-Gespräch bedanken, sowie eine Einladung zum Vorstellungsgespräch und einen sehr interessierten Anruf des dortigen Ansprechpartners.
Outcome information "positive" (English translation)	You have decided to meet your friends. Now imagine that the scenario continues as follows: The meeting with your friends is a complete success; you all have a lot of fun and finally the opportunity to talk to each other again in quiet. You find enough time to write the application before and after the meeting, meet the deadline and are satisfied with the quality. Two weeks later, you receive an invitation to the interview and a postcard from your friends thanking you once again for the lovely meeting.	You have decided to write your application in peace. Now imagine that the scenario continues as follows: Writing the application is a complete success; you enjoy it and you have the opportunity to research properly. You also find a little time for your friends and arrange a longer Skype conversation, which pleases them. Two weeks later, you receive a postcard from your friends thanking you for the nice Skype conversation, as well as an invitation to an interview and a very interested call from the contact person there.

A.b Decision Strategy Manipulation The two decision strategies were introduced in detail (see blockquote below), as well as participants were instructed to not only adhere to the strategy manipulation mentally, but to spell it out in writing in two distinct formats respectively. In the condition "principle" participants had to write out an appropriate principle (cf. Figure 8.1 on the next page), while in the condition "reasons" they had to fill in a four-field matrix detailing reasons for and against each of the two options (cf. Figure 8.2 on page 180). Afterwards and on the same page of the online questionnaire they were then guided to choose an option, that is: either to meet their friends or to work on their application.

The wording of the descriptions of the two decision strategies was as follows:

> **What are reasons?** All facts can be reasons. For example, "the sun is shining" could be a reason to go for a walk, and "my family is important to me" could be a reason to spend a lot of time with them. Reasons are situational, however, and so a fact that is a reason for something in one situation may be a reason against it in another, or it may not be a reason at all. Also, for different people, the same facts do not have to be the same reasons. For example, in a different situation or for a different person, "the sun is shining" might be a reason to stay indoors

(because they might already have a bad sunburn), and "my family is important to me" might be a reason to want to earn a lot of money for them (instead of spending time).

What are principles/rules of life? Principles are general, action-guiding statements that we believe provide the right or best instructions for action in almost all cases across all situations. Examples of principles are the Ten Commandments from the Bible, the Golden Rule ("do unto others as you would have them do unto you") – or personal rules of life such as "my family/career always comes first" or "it is always better not to drink another beer when faced with this choice". With some principles we think that these prescribe the right actions for all people in all situations; with personal rules of life we believe that these only point out the best action for ourselves, but nevertheless in every situation.

This theoretical explanation of what are principles and reasons respectively is based on the meta-ethical approach of Jonathan Dancy (e.g. Dancy, 2004).

Figures 8.1 and 8.2 display the original instructions as shown to participants in the online questionnaire.[288]

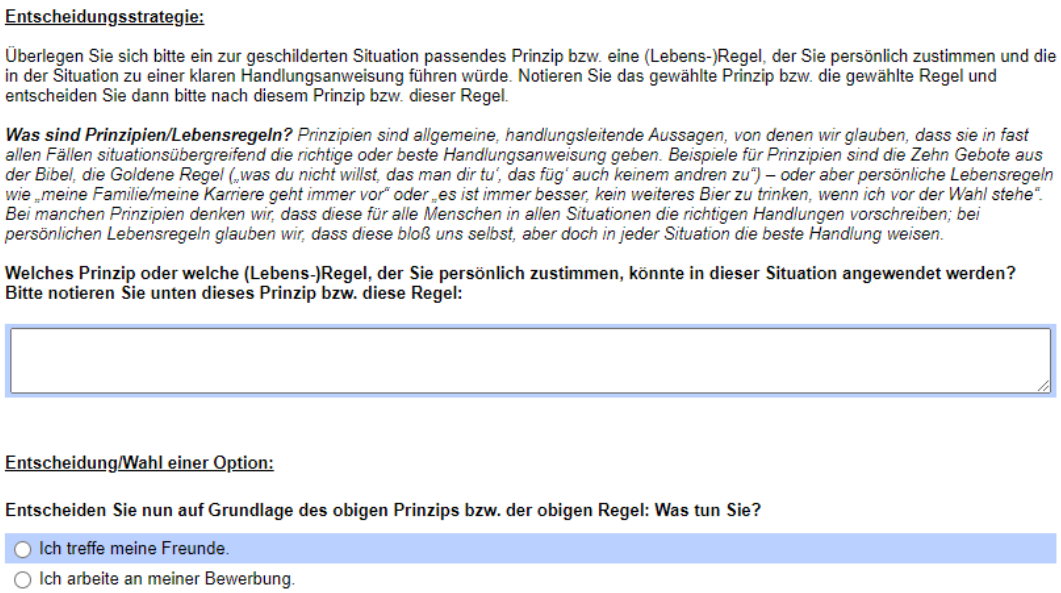
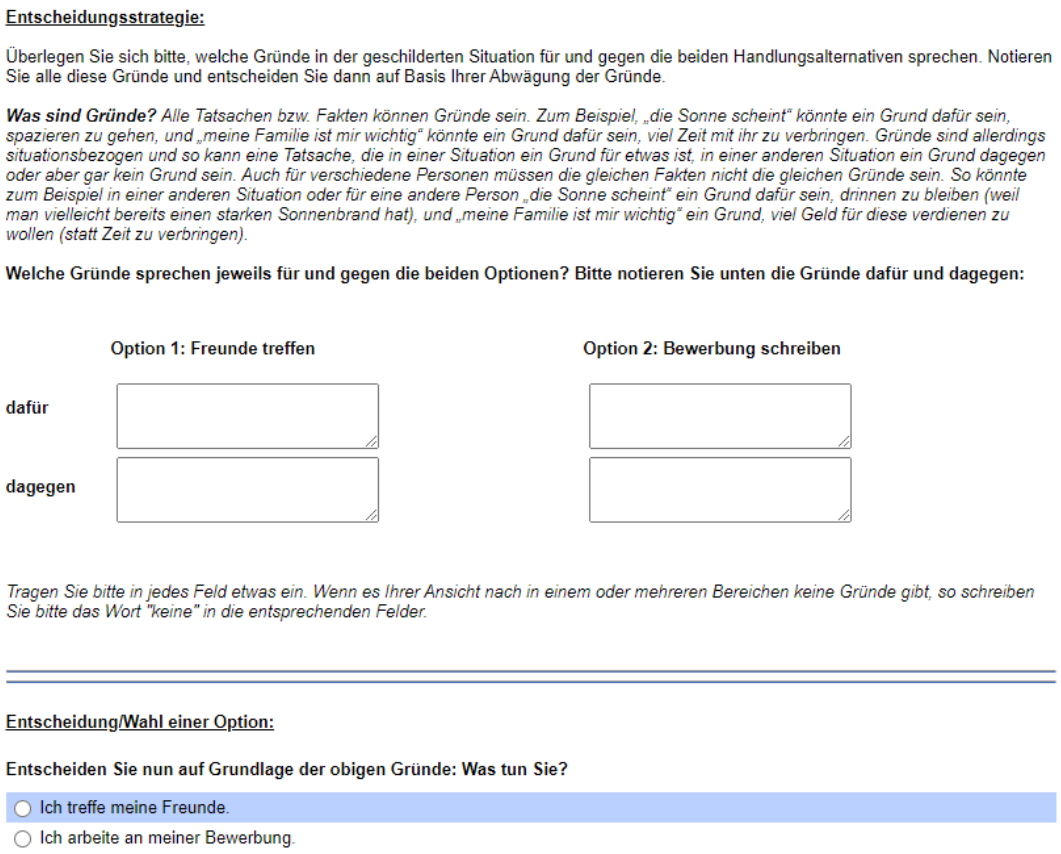


Figure 8.1 Instructions to the decision strategy "decide by principle".
Note. English translation: Decision strategy: Please think of a principle or a (life) rule that fits the situation described, which you personally agree with and which would lead to a clear instruction for action in the situation. Write down the chosen principle or rule and then decide according to this principle or rule. [theoretical explanation] What principle or (life) rule that you personally agree with could be applied in this situation? Please write down this principle or rule below: [open text field] Decision/choice of an option: Now decide based on the above principle/rule: What do you do?

[288] Note that all following experiments manipulating the use of these two decision strategies did use this same (or a very similar) format.



Entscheidungsstrategie:

Überlegen Sie sich bitte, welche Gründe in der geschilderten Situation für und gegen die beiden Handlungsalternativen sprechen. Notieren Sie alle diese Gründe und entscheiden Sie dann auf Basis Ihrer Abwägung der Gründe.

Was sind Gründe? *Alle Tatsachen bzw. Fakten können Gründe sein. Zum Beispiel, „die Sonne scheint" könnte ein Grund dafür sein, spazieren zu gehen, und „meine Familie ist mir wichtig" könnte ein Grund dafür sein, viel Zeit mit ihr zu verbringen. Gründe sind allerdings situationsbezogen und so kann eine Tatsache, die in einer Situation ein Grund für etwas ist, in einer anderen Situation ein Grund dagegen oder aber gar kein Grund sein. Auch für verschiedene Personen müssen die gleichen Fakten nicht die gleichen Gründe sein. So könnte zum Beispiel in einer anderen Situation oder für eine andere Person „die Sonne scheint" ein Grund dafür sein, drinnen zu bleiben (weil man vielleicht bereits einen starken Sonnenbrand hat), und „meine Familie ist mir wichtig" ein Grund, viel Geld für diese verdienen zu wollen (statt Zeit zu verbringen).*

Welche Gründe sprechen jeweils für und gegen die beiden Optionen? Bitte notieren Sie unten die Gründe dafür und dagegen:

	Option 1: Freunde treffen	**Option 2: Bewerbung schreiben**
dafür		
dagegen		

Tragen Sie bitte in jedes Feld etwas ein. Wenn es Ihrer Ansicht nach in einem oder mehreren Bereichen keine Gründe gibt, so schreiben Sie bitte das Wort "keine" in die entsprechenden Felder.

Entscheidung/Wahl einer Option:

Entscheiden Sie nun auf Grundlage der obigen Gründe: Was tun Sie?

- ○ Ich treffe meine Freunde.
- ○ Ich arbeite an meiner Bewerbung.

Figure 8.2 Instructions to the decision strategy "decide by reasons".

Note. English translation: Decision strategy: Please consider which reasons speak for and against the two alternative courses of action in the situation described. Write down all these reasons and then decide on the basis of your consideration of the reasons. [theoretical explanation] What are the reasons for and against each of the two options? Please write down the reasons for and against below: [four-field matrix] Please enter something in each field. If you think there are no reasons in one or more areas, please write the word "none" in the corresponding fields. Decision/choice of an option: Now decide based on the reasons above: What do you do?

B Dependent Measures Cf. Table 8.5 for the dependent variables.

Table 8.5 List of dependent variables, wording in German and English, and scale information.

Page #	Dependent Variable Name	Wording in German + English translation	Type of Scale and Anchorage in German + [English]
Page 4			
DV1	Option satisfaction	Wie zufrieden sind Sie mit der von Ihnen gewählten Option? How satisfied are you with the option you chose?	Visual Analogue Scale (VAS), end points labeled *gar nicht zufrieden* [not at all satisfied] (1) and *absolut zufrieden* [absolutely satisfied] (101). No values displayed to participants. Introductory sentence: *Zufriedenheit mit der gewählten Option* [satisfaction with the chosen option]
DV2	Strategy satisfaction	Wie zufrieden sind Sie mit der Entscheidungsstrategie [(= Gründe abwägen) / (= nach einem Prinzip/einer Regel handeln)], die Sie verwenden sollten? How satisfied are you with the decision strategy [weigh reasons / act according to a principle/rule] that you were told to use?	VAS as above. Introductory sentence: *Zufriedenheit mit der Entscheidungsstrategie* [satisfaction with the decision strategy]
DV3	Comment	Haben Sie noch eine Anmerkung zum Thema Zufriedenheit? Do you have a comment regarding the topic of satisfaction?	Open field answer; optional entry.
Page 7	Mood (3 items)		
DV4 DV5 DV6	Mood valence Mood activity Mood potency	Blicken Sie noch einmal zurück: Sie befanden sich in einer Entscheidungssituation, die zwei Optionen hatte. Sie haben eine Entscheidungsstrategie angewandt und sich für eine der beiden Optionen entschieden. Zuletzt wurde Ihnen ein mögliches Ergebnis Ihrer Entscheidung präsentiert. Look back: you were in a decision situation which had two options. You employed a decision strategy and chose one of the two options. Last, you were presented with a possible outcome of your decision.	5-point Self-Assessment Manikin (SAM) scale, 3 items, end points labeled: - *sehr negativ* [very negative] (1) and *sehr positiv* [very positive] (5); - *völlig ruhig* [completely calm] (1) and *sehr erregt* [very agitated] (5); - *sehr stark/ überlegen* [very strong/ superior] (1) and *sehr schwach/ unterlegen* [very weak/ inferior] (5). No values displayed to participants. Introductory sentence: Versetzen Sie sich in diese Situation – wie würden Sie sich fühlen? Stimmung: Put yourself into this situation – how would you feel? Mood:

(Continued on next page.)

Table 8.5 (Continued.)

Page 8	Strategy Satisfaction Questionnaire (12 items)		
Page 9	Situational Eight DIAMONDS Scale S8-II (8 items)		
S8-1	Duty	Die Situation enthält... - Arbeit, Aufgaben, Pflichten - Intellektuelles, Schöngeistiges, Tiefgründiges - Bedrohung, Kritik, Beschuldigung - Romantik, Sexualität, Liebe - Positives, Erfreuliches, Schönes - Negatives, Unerfreuliches, schlechte Gefühle - Täuschung, Lüge, Unehrlichkeit - Kommunikation, Interaktion, soziale Beziehungen The situation contains... - Work, tasks, duties - Intellectual, aesthetic, profound things - Threat, criticism, accusation - Romance, sexuality, love - Positive, pleasant, nice things - Negative things, unpleasant things, bad feelings - Deceit, lie, dishonesty - Communication, interaction, social relationships	7-point Likert scale, end points labeled *überhaupt nicht* [not at all] (1) and *absolut* [absolutely] (7). No values displayed to participants. Introductory sentence: Einordnung der Situation: Wie sehr treffen die folgenden Eigenschaften auf das geschilderte Szenario zu? Classification of the situation: To what extent do the following properties apply to the depicted scenario?
S8-2	Intellect		
S8-3	Adversity		
S8-4	Mating		
S8-5	pOsitivity		
S8-6	Negativity		
S8-7	Deception		
S8-8	Sociality		
Pages 11-16	Decision Style Questionnaire (60 items)		
Page 17			
DV7	Extent of immersion	Wie gut konnten Sie sich in die geschilderte Situation und die zu treffende Entscheidung hineinversetzen? To what extent were you able to immerse yourself in the depicted situation and the decision to make?	6-point Likert scale, end points labeled *konnte mich überhaupt nicht hineinversetzen* [I was not able to immerse myself at all] (1) and *konnte mich sehr gut hineinversetzen* [I was very well able to immerse myself] (6). No values displayed to participants.
DVs 8-9	*Diligence*, *Comment*		Cf. Table 1.2.
DVs 10-13	Demography (*Age*, *Gender*, *University*, *Field of study*)		Cf. Table 1.3.
DVs 14-16	*Lottery*, *Code*, *Course Credit*		Cf. Table 1.2.
DV17	Feedback	Ich möchte auf der nächsten Seite gerne eine kurze Rückmeldung zu meinem Entscheidungsstil erhalten. I would like to receive a short feedback regarding my decision style on the next page.	Binary nominal scale: - *ja* [yes] - *nein* [no]. Introductory sentence: *Rückmeldung* [Feedback]:

8.3.1.4 Participants

Cf. section 8.2.2.

8.3.2 Results

8.3.2.1 Overview

The experiment conceptually may be thought of as entailing two parts. The first part includes all dependent variables *before* outcome information, namely *Choice*, *Option satisfaction* and *Strategy satisfaction*. The second part includes all dependent measures *after* outcome information, namely *Mood* (3 items) and the Strategy Satisfaction Questionnaire (12 items), both proxies for post-outcome satisfaction. Furthermore there is the Situational Eight DIAMONDS Scale S8-II (8 items) to classify the situation, and last *Extent of immersion* as a manipulation check.

The Strategy Satisfaction Questionnaire will be treated as a separate study and presented in chapter *Questionnaires* (chap. 9). Analyses of the present experiment involving the Strategy Satisfaction Questionnaire will be presented in section 8.4.

Cf. section 8.3.1.1 regarding the structuring of this section along exploratory aspects.

8.3.2.2 Before Outcome Information

A *Choice* by *Decision Strategy*

A.a Did participants rather choose to meet their friends or to work on their application? Table 8.6 displays the number of participants choosing either to meet their friends or to work on their application respectively. Overall, almost two thirds of participants (64%) chose to meet their friends rather than working.

A.b Was there an association between *Choice* and *Decision Strategy*? There was no significant association between *Decision Strategy* and *Choice*, $\chi^2(1) = 0.23$, $p = 0.630$.

Table 8.6 Number of participants choosing to meet their friends or to work on their application by *Decision Strategy*.

	Choice		Total
Decision Strategy	1 friends	2 application	
1 by reasons	43 (30%)	27 (19%)	70 (48%)
2 by principle	50 (34%)	25 (17%)	75 (52%)
Total	93 (64%)	52 (36%)	145 (100%)

B *Option satisfaction* and *Strategy satisfaction* by *Decision Strategy*

B.a Does *Decision Strategy* make a significant difference to *Option satisfaction* and *Strategy satisfaction* (includes H1.1)? Table 8.7 displays means and standard deviations of *Option satisfaction* and *Strategy satisfaction* by *Decision Strategy*, as well as according t-tests. The t-tests revealed no significant effect of *Decision Strategy* on either satisfaction measure: there is no significant difference between groups, cf. Figure 8.3 for a visualization by boxplots. Thus, hypothesis H1.1 could not be confirmed.

Table 8.7 Means, standard deviations, medians, and t-test results for *Option satisfaction* or *Strategy satisfaction* by *Decision Strategy*.

DVs	Decision Strategy (IV)						*t* (df)	*p*	Cohen's *d*
	1 by reasons			2 by principle					
	M	*SD*	*Mdn*	*M*	*SD*	*Mdn*			
Option satisfaction	68.06	22.87	71	67.23	26.90	74	0.20 (142)	0.841	0.03
Strategy satisfaction	63.66	25.04	65	67.40	28.59	71	-0.84 (142)	0.402	-0.14

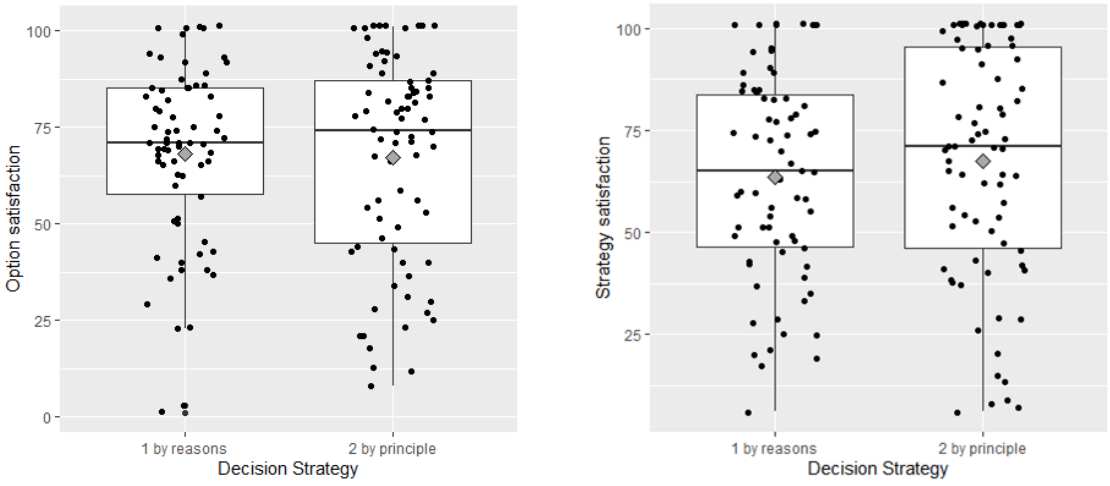


Figure 8.3 Boxplots of *Option satisfaction* and *Strategy satisfaction* by *Decision Strategy*.
Note. Means per condition are symbolized by the grey diamond shape.

C Correlation of *Option satisfaction* and *Strategy satisfaction*

C.a What is the correlation of *Option satisfaction* and *Strategy satisfaction* given *Decision Strategy*? The correlation between the two satisfaction measures was significant with $r = 0.40$, $p < 0.001$. In Figure 8.4 the correlation between the two satisfaction measures is displayed ungrouped (left) and grouped by *Decision Strategy* (right).

The correlations by condition differ in magnitude, with $r_{\text{reas}} = 0.16$, $p_{\text{reas}} = 0.191$ and $r_{\text{prin}} = 0.58$, $p_{\text{prin}} < 0.001$.[289] Thus, only in the condition "deciding by principle" there is a significant correlation between the two satisfaction measures *Option satisfaction* and *Strategy satisfaction*. The difference in magnitude between the correlations grouped by *Decision Strategy* is significant, $z_{\text{Dec.Strategy}} = -2.93$, $p_{\text{Dec.Strategy}} = 0.002$.

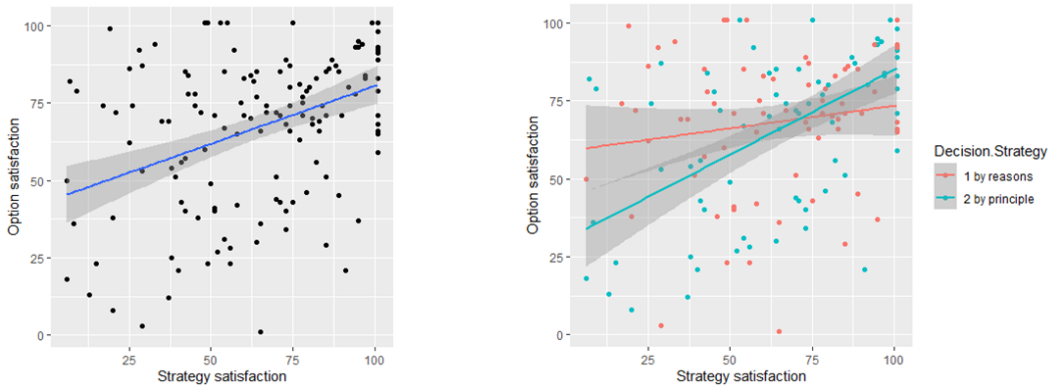


Figure 8.4 Correlation of *Option satisfaction* with *Strategy satisfaction* ungrouped and grouped by *Decision Strategy*.

C.b What is the correlation of *Option satisfaction* and *Strategy satisfaction* given *Choice*? Another difference between correlation magnitude can be found when looking at the correlations between the two satisfaction measures grouped by *Choice*, with $r_{\text{frien}} = 0.25$, $p_{\text{frien}} = 0.017$ and $r_{\text{appl}} = 0.58$, $p_{\text{appl}} < 0.001$.[290] Both correlations are significant, and so is their difference, $z_{\text{Choice}} = -2.31$, $p_{\text{Choice}} < 0.010$. Figure 8.5 displays the correlation between *Option satisfaction* and *Strategy satisfaction* grouped by *Choice* (left), as well as additionally grouped by *Decision Strategy* (right).

[289] Note: The index "$_{\text{reas}}$" signifies "deciding by reasons" and the index "$_{\text{prin}}$" signifies "deciding by principle".

[290] Note: The index "$_{\text{frien}}$" signifies the choice to meet one's friends and the index "$_{\text{appl}}$" signifies the choice to write on one's application. Since participants could freely choose between the two options, the frequencies differ notably: $n_{\text{frien}} = 93$, $n_{\text{appl}} = 52$, cf. Table 8.6.



Figure 8.5 Correlation of *Option satisfaction* with *Strategy satisfaction* grouped by *Choice* as well as grouped by both *Choice* and *Decision Strategy*.

D *Option satisfaction* by *Choice*

D.a Is there a difference in *Option satisfaction* given *Choice*? Visual inspection of the latter graphs suggests that participants were much happier when they chose to meet their friends over working on their application. This is confirmed by numbers: on average, participants reported a higher *Option satisfaction* having chosen to meet their friends ($M_{\text{frien}} = 78.00$, $SD_{\text{frien}} = 17.30$), than to work on their application ($M_{\text{appl}} = 49.10$, $SD_{\text{appl}} = 26.00$). This difference was significant, $t(77) = 7.17$, $p < 0.001$, $d = 1.31$.

E Interim Summary and Interpretation

On *Choice*, 64% of participants chose to meet their friends, and only 36% chose to work on their application (cf. section A.a). The IV *Decision Strategy* had nothing to do with it (cf. section A.b). Thus, independent of decision strategy, participants tended to choose to meet their friends – which is probably what one would expect from a sample of young students: a tendency towards sociality. But the second aspect is the more important one: decision strategy did not determine choice. That is, both decision strategies allowed for either choice – and the relative numbers split by choice and decision strategy do not even differ much (cf. Table 8.6). [Section A on page 183.]

Decision Strategy hat no significant effect on either satisfaction measure (cf. Table 8.7). H1.1 could not be confirmed. That is, the two decision strategies "decide by reasons" and "decide by principle" produced no difference in *Strategy satisfaction* – participants rated their satisfaction with the strategy they had to use to be equally satisfactory. [Section B on page 184.]

The two satisfaction measures were significantly correlated overall. When grouped by *Decision Strategy* the correlation magnitude differed significantly between conditions (cf. Figure 8.4). Split by conditions, the correlation between the two satisfaction

measures was significant only in the condition "decide by principle". That is, participants in the condition "decide by principle" saw less of a difference between the two aspects of *Option satisfaction* versus *Strategy satisfaction*. On the other hand, the low and non-significant correlation in the condition "decide by reasons" speaks to the fact that these participants did much more differentiate whether they were satisfied with the chosen option or the employed strategy.[291] – What can explain the stronger link between *Option satisfaction* and *Strategy satisfaction* in the condition "decide by principle"? Did participants maybe feel that their choice of an option was more determined by the strategy when they used a principle rather than reasons, that is: did the use of a principle tie in closer with the resulting choice than did the use of reasons? (Remember that the instructions read "decide according to the principle" and "decide according to the weighing of the reasons" respectively.) [Section C.a on page 184.]

The correlation magnitude of the two satisfaction measures also differed significantly by *Choice* (cf. Figure 8.5). Although here both correlations were significant in themselves, their difference is remarkable with the correlation in the condition "friends" being much lower than the correlation in the condition "application". In this case, applying the same logic as above, participants who chose to work on their application did see much less of a difference between the two aspects of satisfaction, *Option satisfaction* versus *Strategy satisfaction*. Those participants who then chose to work on their application: had they thus felt a stronger determination by decision strategy – in both conditions? [Section C.b on page 185.]

There is a significant difference between "friends" and "application" on *Option satisfaction* with participants being much more satisfied having chosen to meet their friends. The difference in satisfaction with the option between the two options is huge: in fact, participants who chose to work on their application fell rather into the lower half of the scale, thus indicating more dissatisfaction than satisfaction. Why would they choose an option that a minute later and before even knowing the outcome they would indicate to be rather dissatisfied with? [Section D on the previous page.]

The above two paragraphs make wonder whether participants who had had to decide by principle did choose to work on their application more often than did participants who had had to decide by reasons. But again: they did not. Decision strategy and choice were independent.

F Interaction of *Decision Strategy* and *Choice* on *Strategy satisfaction* Analyses and visualizations so far strongly suggest that the decision content as recorded by

[291] This difference between strategies is also well visible in the means displayed in Table 8.7, where the difference in means between *Option satisfaction* and *Strategy satisfaction* is much greater in the condition "decide by reasons" than in the condition "decide by principle", where there is descriptively almost no difference at all. A repeated measures ANOVA and dependent t-tests split by group could test this difference. For reasons of brevity these tests will not be performed.

Choice is a variable to be counted with. Therefore, the following analyses will look at the effect of *Decision Strategy* when accounting for *Choice*.

A two-way ANOVA for unbalanced designs[292] yielded no significant main effects neither of *Decision Strategy* nor *Choice*, cf. Table 8.8 for full ANOVA statistics.[293] However, there was a significant interaction, $F(1, 141) = 9.57$, $p = 0.002$, cf. Figure 8.6 for a visual display.

Table 8.8 *Decision Strategy* * *Choice* ANOVA for *Strategy satisfaction*.

Source	*df*	*F*	η^2	*p*
Decision Strategy	1	0.01	<0.001	0.905
Choice	1	2.26	0.02	0.135
Interaction	1	9.57	0.06	0.002
Error	141			

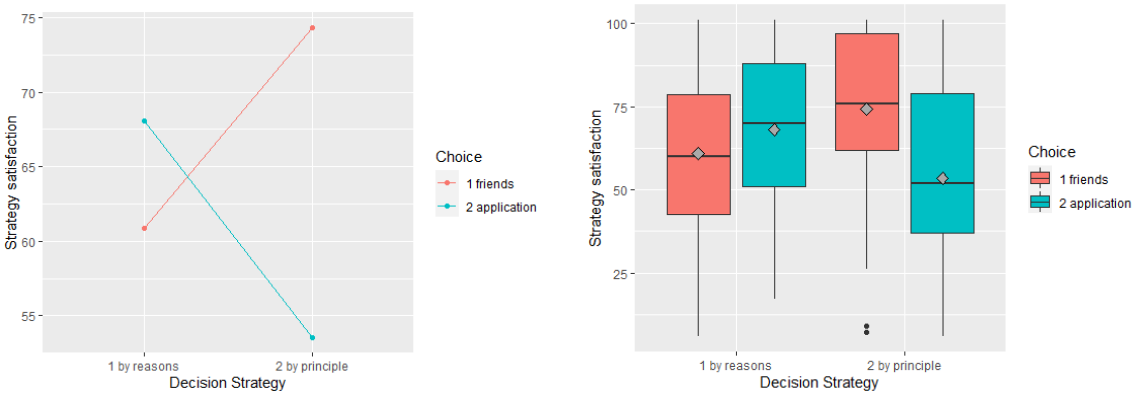


Figure 8.6 Interaction of *Decision Strategy* and *Choice* on *Strategy satisfaction*.

Table 8.9 displays descriptive statistics and simple effects for *Strategy satisfaction* by *Decision Strategy* * *Choice*.[294] Simple effects analyses revealed that if participants had had to decide by principle they were significantly more satisfied with the strategy

[292] It is a common recommendation to use Type III ANOVA especially when working with an unbalanced design. The present design is quite unbalanced regarding *Choice* with $n_{\text{frien}} = 93$ and $n_{\text{appl}} = 52$, cf. Table 8.6. Note: Type-III SSq are the default in SAS and SPSS, whereas aov{stats} in R calculates Type-I SSq by default.

[293] The ANOVA was carried out using the function lm{stats} with Anova{car} to call Type-III results. Effect sizes were taken from aov_car{afex}, where the default is Type-III SSq. Both ANOVA functions return identical results.

[294] Simple effects were calculated as pairwise comparisons using lsmeans{emmeans}. Any methods of p-value adjustment were switched off. I explain my attitude regarding this matter in footnote 534 on page 421 from section 10.2.2 and footnote 500 on page 391 from section 10.1.2, both within chap. 10. In case the kind reader is thoroughly disturbed by the non-adjustment, here is what to do with a conjunctive alternative hypothesis containing four comparisons: multiply each given p-value by 4, and the result will be a Bonferroni adjustment.

used when they chose to meet their friends rather than to work on their application $t(141) = 3.25$, $p = 0.001$. There was no significant difference in *Strategy satisfaction* between friends/application when they had had to decide by the weighing of reasons $t(141) = -1.12$, $p = 0.263$, yet descriptively their *Strategy satisfaction* was higher when they had decided to work on their application rather than to meet their friends. Furthermore, if participants had decided to meet their friends, they were significantly more satisfied with the strategy used if they had had to base their decision on a principle rather than the weighing of reasons $t(141) = -2.48$, $p = 0.014$, while in case they had chosen to work on their application their *Strategy satisfaction* was significantly higher when they had had to decide by reasons rather than by principle $t(141) = 2.01$, $p = 0.047$. All effect sizes (Cohen's d) of significant differences were of medium size.

Table 8.9 Simple effects statistics for *Strategy satisfaction* by *Decision Strategy* * *Choice*.

	Decision Strategy (IV)		*t* (141)	*p*	Cohen's *d*
Choice	1 by reasons	2 by principle			
1 friends	60.88 (24.10) *n*=43	74.32 (25.62) *n*=50	-2.48	0.014*	-0.52
2 application	68.07 (26.32) *n*=27	53.56 (29.67) *n*=25	2.01	0.047*	0.56
***t* (141)**	-1.12	3.25			
p	0.263	0.001***			
Cohen's *d*	-0.28	0.80			

Note. * = $p \leq 0.05$, *** = $p \leq 0.001$. Standard deviations appear in parentheses below means.

F.a Summary and Interpretation

[Section F on page 187.]

It seems that in terms of *Strategy satisfaction* the decision strategy "deciding by principle" is rather sensitive to decision content (as registered by *Choice*), while the decision strategy "deciding by reasons" is rather robust to decision content: When having had to decide by principle, the choice taken made a difference to *Strategy satisfaction*, but having had to decide by the weighing of reasons, choice content did not significantly matter.

That is: in the case of reasons the chosen option did not influence participants' satisfaction with the strategy, namely the weighing of reasons. But in the case of principles the chosen option did influence participants' satisfaction with the strategy, namely applying their principle. In other words: *Strategy satisfaction* was rather dependent on the chosen option for those who had had to decide by principle, and rather immune to the chosen option for those who decided by reasons.

We know that (a) participants were in general more satisfied with the option to meet their friends and that (b) the two measures of satisfaction correlated (more) highly and significantly in case participants had had to decide by principle. Thus, it might be that the greater difference in *Strategy satisfaction* between options in the principle case is

driven by the different evaluation of those options as asserted by *Option satisfaction*. Of course, there are appropriate statistical procedures to scrutinize this thesis (MANOVA, ANCOVA). Yet, this point in itself is not important, the question is: Why is *Strategy satisfaction* affected by the chosen options in the principle case but not in the reasons case?

Does using a principle more strongly determine the choice of an option than using reasons (cf. also section E)? After all, a principle is absolute and direct: once established it leaves no room for interpretation. On the other hand, using reasons does leave a lot of room: namely during the necessary (and necessarily subjective) weighing of these reasons.

Just imagine, it is your principle that "family and friends always come first"– then the option to choose is clear. But if you weigh reasons such as "I haven't seen my friends in a long time" versus "I need the money from this potential new job" plus a bunch of further reasons on each side – you may choose an option in the end, but there is always still the weight of the reasons on the other side. That is: there simply *are* reasons for the alternative option and noted down, too, – you have considered them, you have them in mind. And this will necessarily lead to cognitive dissonance (Festinger, 1957), since with this decision strategy, weighing the reasons for and against both options, you make it clear to yourself that there are some reasons speaking in favor of the alternative option that you will not be able to realize once you choose the other option. In weighing reasons for and against both options you make your mind aware of the fact that in choosing one option you will always also lose something, namely the benefits of the alternative option (this is called "opportunity cost", cf. Wieser, 1914).[295] Through the process of considering the benefits (and disbenefits) of both sides, you make yourself aware not only of what you can positively realize with the chosen option, but also of what you *cannot* realize with the non-chosen option. – And this is a very different mental state to the mental state you are in when deciding upon a principle: when deciding upon a principle, you look in only one direction, you look at only one side, your mind is not bothered with what you cannot realize. Instead once you commit to a principle, once you make a general and action-guiding commitment to something that is really important to you independent of specific situation characteristics, but *always*, – then your mind is set, your choice is determined, you do not sway, there is no cognitive dissonance to deal with.

From these considerations I conclude: Using a principle theoretically *and* indeed empirically determines a specific choice more strongly than using reasons. In the case that the derived choice option is undesirable in itself (i.e. the satisfaction with that option is low) this reflects badly on the decision strategy that made this undesirable option come about *and* vice versa (cf. Figure 8.6 on page 188 and Table 8.9 on the preceding page) – in the case that the link between strategy and choice is tight (as it is the case when deciding by principle). This does explain the interaction effect: it comes about through the extremeness of ratings in the principle case (versus the indifference in the reasons case) plus the difference in option desirability.

[295] Wieser (1914) first introduced the term, but the idea already came up with Bastiat (1859).

8.3.2.3 Summary – Before Outcome Information

A higher number of participants chose to meet their friends than to work on their application – and who chose their friends was on average happier with that option than who chose to work. For participants who had had to decide by principle their satisfaction with the option and their satisfaction with the decision strategy was intertwined; their strategy satisfaction differed by choice. The main hypothesis, H1.1, stating that satisfaction with the decision strategy would differ between decision strategies could not be confirmed. However, accounting for choice, decision strategy did have an effect on strategy satisfaction.

8.3.2.4 After Outcome Information

A Mood – A Proxy for General Satisfaction The post-outcome scale *Mood* consisted of three items measuring *Mood valence*, *Mood activity*, and *Mood potency* according to the semantic differential technique (cf. Osgood, Suci, & Tannenbaum, 1957) using the Self-Assessment Manikin (SAM) (cf. e.g. Bradley & Lang, 1994; Hodes, Cook, & Lang, 1985; Lang, 1980). A picture of the scale is depicted below, cf. Figure 8.7.[296] For scale information refer to Table 8.5 on page 181.

[296] The depiction is taken from Bradley and Lang (1994). In their study, they used several words to identify the anchors, e.g. "happy, pleased, satisfied, contented, hopeful, relaxed" (cf. Bradley & Lang, 1994, p. 53) where I only used *"sehr positiv"* [very positive]. Cf. Table 8.5 on page 181 for translations and further information on the scale. Bradley and Lang (1994) named the three dimensions *pleasure*, *arousal*, and *dominance*.

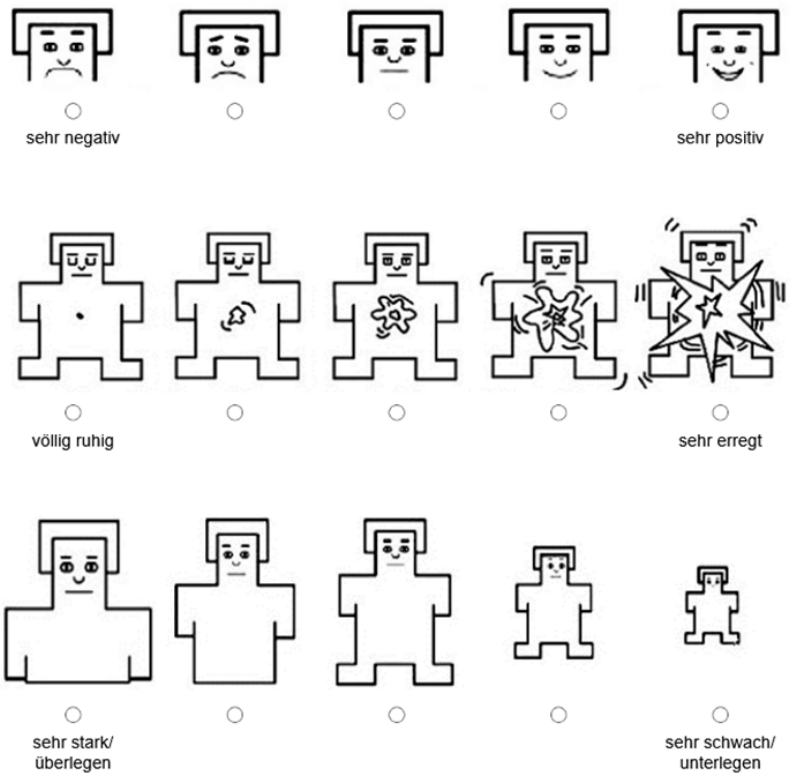


Figure 8.7 *Mood* scale as shown in the online questionnaire using the Self-Assessment Manikin (SAM). **Note.** From top to bottom: *Mood valence* ('very negative', 'very positive'), *Mood activity* ('completely calm', 'very agitated'), and *Mood potency* ('very strong/superior', 'very weak/inferior'). Further scale information is given in Table 8.5 on page 181.

Means and standard deviations of the three *Mood* items per condition are shown in Table 8.10. Over all conditions *Mood valence* shows a much larger standard deviation than the other two items with $SD_{\text{M-v}} = 1.56$ as compared to $SD_{\text{M-a}} = 0.97$ and $SD_{\text{M-p}} = 0.98$.[297] This difference in variance is also quite visible in the means per condition, showing descriptively that *Mood valence* reacted more sensitively to the experimental manipulation than the other two items.

[297] The indices "$_{\text{M-v}}$", "$_{\text{M-a}}$" and "$_{\text{M-p}}$" signify "*Mood valence*", "*Mood activity*", and "*Mood potency*" respectively.

Table 8.10 Means and standard deviations of *Mood valence*, *Mood activity*, and *Mood potency* by *Decision Strategy*, *Choice*, and *Outcome*.

Decision Strategy (Factor 1)	Choice	Outcome (Factor 2)	n	Mood valence		Mood activity		Mood potency	
				M	SD	M	SD	M	SD
1 by reasons	1 friends	1 negative	19	1.89	0.81	3.32	0.82	3.21	1.03
1 by reasons	1 friends	2 positive	24	4.92	0.28	3.25	1.11	2.25	0.74
1 by reasons	2 application	1 negative	12	2.08	0.67	3.50	0.67	3.58	1.16
1 by reasons	2 application	2 positive	15	4.53	0.64	3.53	1.13	2.53	0.64
2 by principle	1 friends	1 negative	25	1.92	0.76	3.32	0.95	3.36	0.57
2 by principle	1 friends	2 positive	25	4.88	0.33	2.96	1.02	2.12	0.60
2 by principle	2 application	1 negative	11	1.55	0.69	3.73	0.79	3.82	0.75
2 by principle	2 application	2 positive	14	4.43	0.65	3.21	1.05	2.14	0.77
			145	3.42	1.56	3.30	0.97	2.79	0.98

Note. The last row shows overall means and standard deviations as well as *N*. Mind the direction of the scales!

A.a Do *Decision Strategy* and *Outcome* interact on the *Mood* items (H1.2)?

A MANOVA[298] was conducted including *Choice*. There was a significant main effect of *Choice*, $F(3, 135) = 3.15$, $p = 0.027$, $\eta_p^2 = 0.07$, as well as a significant main effect of *Outcome*, $F(3, 135) = 233.21$, $p \leq 0.001$, $\eta_p^2 = 0.84$. There were no other significant main effects or interactions.

Thus, H1.2 could not be confirmed regarding *Mood* as one of the post-outcome measures of satisfaction.[299]

The following list shows the results of the follow-up separate ANOVAs:

Mood valence The three-way ANOVA[300] yielded a significant main effect both of *Choice*, $F(1, 137) = 5.76$, $p = 0.018$, $\eta_p^2 = 0.04$, and of *Outcome*, $F(1, 137) = 708.01$, $p \leq 0.001$, $\eta_p^2 = 0.84$. There were no other significant main effects or interactions.

Mood activity There were no significant main effects or interactions besides a marginally significant main effect of *Choice*, $F(1, 137) = 2.75$, $p = 0.099$, $\eta_p^2 = 0.02$.

[298] The MANOVA was calculated using Manova{car} with Type III SSq, and effect sizes using etasq{heplots}. Manova{car} is able to calculate Type III SSq as opposed to manova{stats}. The univariate test statistics of the follow-up analysis to the MANOVA, using summary{base} on Anova{car}, are identical to the univariate tests using aov_car{afex}, where {afex}, too, employs Type III sums of squares.

[299] Remember that the second post-outcome measure that H1.2 refers to is the Strategy Satisfaction Questionnaire, cf. section 8.3.2.1 on page 183.

[300] ANOVAs and effect sizes were calculated using aov_car{afex}.

Mood potency Analogously to *Mood valence* there were two significant main effects, one of *Choice*, $F(1, 137) = 4.44$, $p = 0.037$, $\eta_p^2 = 0.03$, and one of *Outcome*, $F(1, 137) = 83.24$, $p \leq 0.001$, $\eta_p^2 = 0.38$. Furthermore there was a marginally significant two-way interaction of *Decision Strategy* * *Outcome*, $F(1, 137) = 2.81$, $p = 0.096$, $\eta_p^2 = 0.02$.

In sum, the three *Mood* items each reacted differently to the experimental manipulation. While the second item, *Mood activity*, ranging from "completely calm" to "very agitated" did not at all react to either grouping variable, both *Mood valence* and *Mood potency* showed effects of *Choice* as well as *Outcome* with the effect of *Outcome* being much larger in magnitude in both cases. Only *Mood potency*, ranging from "very strong/superior" to "very weak/inferior", showed a marginally significant interaction effect of *Decision Strategy* * *Outcome*, thus including the independent variable of most interest, *Decision Strategy*. The dependent measure most closely related to satisfaction semantically, *Mood valence*, ranging from "very negative" to "very positive", however, did not show any effect of *Decision Strategy*.[301]

Are these items a good proxy for satisfaction? This question, asking for construct validity, requires correlating the *Mood* variables with another satisfaction measure.

While the study included a second satisfaction measure post-outcome, namely the Strategy Satisfaction Questionnaire (SSQ, which will be reported as a separate study as noted in section 8.3.2.1 on page 183), there are unfortunately two problems with the idea of using it to establish construct validity: (1) The Strategy Satisfaction Questionnaire (SSQ) focuses strictly on *strategy* satisfaction whereas the *Mood* items could only be a proxy for general satisfaction. Therefore, the SSQ could not be employed to establish *convergent* construct validity. Using it to look at *discriminant* construct validity instead is not advisable, because without having results for convergent construct validity results for discriminant construct validity alone are difficult to evaluate. (2) Both post-outcome measures of satisfaction were recorded after the experiment – whose conditions were hypothesized to differentially affect satisfaction. Therefore, if one wanted to look at correlations between the two satisfaction measures, this would have to be done for each condition separately. Due to the upstream experiment and the splitting into 2 (*Decision Strategy*) by 2 (*Choice*) by 2 (*Outcome*) conditions, the results would be difficult to interpret.

The question whether the *Mood* items are a good proxy for general satisfaction therefore must remain unanswered.

A.b Summary and Interpretation The semantic differential technique (cf. Osgood et al., 1957) was originally developed to measure the meaning of words and sentences (cf. also section D on page 253 from 9.3.1.2 within *Questionnaires* (chap. 9), for a short introduction and further references). Its three dimensions Evaluation, Activity,

[301] The follow-up analysis of the marginally significant interaction effect of *Decision Strategy* * *Outcome* on *Mood potency* yielded no significant simple effects. There was no significant effect of *Decision Strategy* given a negative *Outcome*, $t(137) = -0.96$, $p = 0.338$, $M_{reas} = 3.35$, $M_{prin} = 3.50$ nor given a positive *Outcome*, $t(137) = 1.44$, $p = 0.154$, $M_{reas} = 2.36$, $M_{prin} = 2.13$.

and Potency are supposed to be exhaustive of the main dimensions of meaning. With the Self-Assessment Manikin (SAM, cf. e.g. Bradley & Lang, 1994; Hodes et al., 1985; Lang, 1980) these dimensions were applied to measure *mood*, an individual mental state variable. In this Pilot Study the *Mood* items served as a proxy for satisfaction.

Overall, the pervasive effects on (two of) the three *Mood* variables are the main effects of *Choice* and *Outcome*, with the effect of *Outcome* being much larger than the effect of *Choice*. *Decision Strategy* did not yield any main effects or interactions. H1.2 could not be confirmed.

The results from the second post-outcome measure of satisfaction, the Strategy Satisfaction Questionnaire, will be reported in section 8.4. Before, I will briefly depict the results of the Situational Eight DIAMONDS Scale S8-II which was employed to characterize the type of situation that was given to participants by the initial vignette as a basis to their fictional decision making.

B The Situational Eight DIAMONDS Scale S8-II The 8 items of the Situational Eight DIAMONDS Scale S8-II (Rauthmann & Sherman, 2015) are described in Table 8.5 on page 181 (cf. also section C on page 252 from 9.3.1.2 within *Questionnaires* (chap. 9), for a short introduction and further references). Since participants were explicitly asked to characterize the initial scenario by content, effects of the experimental manipulation were not expected or intended. However, in the light of the choice they made (meet their friends or work on their application) and the positive or negative outcome, the scenario may well have seemed diverse to participants. To explore this, a MANOVA was conducted. In fact, the experimental manipulation did have an effect on participants' characterization of the scenario: There was a significant main effect of *Choice*, $F(8, 130) = 2.69$, $p = 0.009$, $\eta_p^2 = 0.14$, as well as a significant main effect of *Outcome*, $F(8, 130) = 2.35$, $p = 0.022$, $\eta_p^2 = 0.13$, with the effect of *Choice* being larger in magnitude. There were no other significant main effects or interactions.

Post-MANOVA univariate tests revealed a pattern of significances that is displayed as a Table of p-values in Table 8.11.

Table 8.11 Table of p-values for the Situational Eight DIAMONDS Scale S8-II by *Decision Strategy*, *Choice*, and *Outcome*.

Source	Duty	Intellect	Adversity	Mating	pOsitivity	Negativity	Deception	Sociality
Decision Strategy	0.256	0.777	0.456	0.689	0.341	0.6967	0.221	0.333
Choice	0.172	0.279	0.104	0.737	0.002**	0.036*	0.203	0.260
Outcome	0.223	0.353	0.027*	0.077	0.030*	0.004**	0.844	0.815
Decision Strategy* Choice	0.569	0.183	0.245	0.213	0.637	0.205	0.306	0.725
Decision Strategy* Outcome	0.292	0.177	0.680	0.369	0.662	0.167	0.093	0.286
Choice* Outcome	0.485	0.093	0.333	0.282	0.839	0.903	0.383	0.601
Decision Strategy* Choice* Outcome	0.851	0.391	0.559	0.389	0.938	0.991	0.071	0.894

Note. * $= p \leq 0.05$, ** $= p \leq 0.01$.

Table 8.11 shows that the items "pOsitivity" and "Negativity" reacted to both *Choice* and *Outcome*; the item "Adversity" reacted to *Outcome*. There were no further significant results. Consequently, Table 8.12 shows global means and standard deviations for all items, while M and SD for "pOsitivity", "Negativity", and "Adversity" will additionally be split by *Outcome* and *Choice*.

Table 8.12 Means and standard deviations for the Situational Eight DIAMONDS Scale S8-II.

	M	*SD*
Duty	6.32	0.90
Intellect	3.53	1.79
Adversity	3.23	1.79
Outcome		
1 – negative	3.52	1.85
2 – positive	2.97	1.71
Mating	2.00	1.35
pOsitivity	5.67	1.51
Choice : 1 – friends		
Outcome: 1 – negative	5.64	1.57
Outcome: 2 – positive	6.24	1.16
Choice: 2 – application		
Outcome: 1 – negative	4.87	1.60
Outcome: 2 – positive	5.38	1.57
Negativity	4.49	1.73
Choice : 1 – friends		
Outcome: 1 – negative	4.70	1.73
Outcome: 2 – positive	3.88	1.72
Choice: 2 – application		
Outcome: 1 – negative	5.35	1.50
Outcome: 2 – positive	4.52	1.62
Deception	1.68	1.16
Sociality	6.34	1.02

Note. *M* and *SD* are displayed split by *Choice* and *Outcome* where the differences were significant, cf. Table 8.11. The S8-II scale is a 7-point Likert scale ranging from "not at all" [1] to "absolutely" [7], cf. Table 8.5 on page 181.

The differences by *Outcome* and *Choice* shown by "Adversity", "pOsitivity", and "Negativity" are intuitive: "Adversity" is rated higher given a negative *Outcome*, as is "Negativity" and reversely "pOsitivity"; "pOsitivity" is rated higher when participants chose to meet their friends as opposed to working on their application, and reversely so "Negativity". Figure 8.8 is a visualization of participants' characterization of the decision situation by means of the S8-II scale.

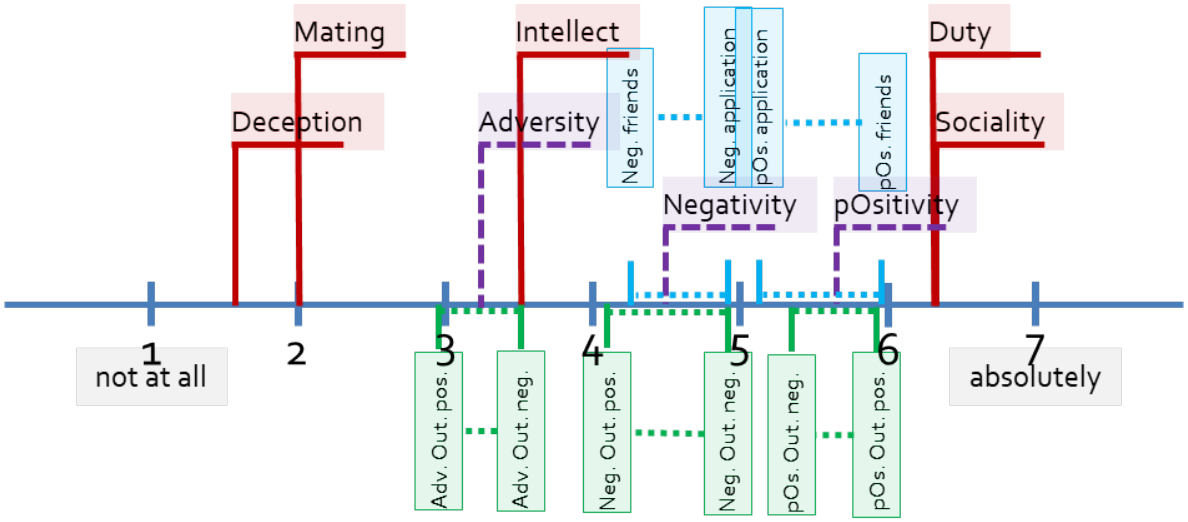


Figure 8.8 Visualization of the character of the decision situation by the S8-II Scale.

Note. The y-axis has no meaning, the x-axis displays the response scale. The position on the x-axis indicates mean values per item. Red items showed no differences by condition, purple items did. Green boxes (vertical, below x-axis) display means of "Adversity", "Negativity", and "pOsitivity" split by *Outcome* (only), light blue boxes (vertical, above x-axis) display means of "Negativity" and "pOsitivity" split by *Choice* (only).

B.a Summary and Interpretation On average, the highest rating – and independent of condition – was given to both "Duty" and "Sociality". Furthermore, the means of these two items are almost identical (with $M_D = 6.32$ and $M_S = 6.34$). Intuitively, this is exactly what the two options were about: either meet your friends (sociality) or work on your application due (duty). This almost identical average value given to the two main aspects of the decision situation vignette – sociality and duty – as well as its independence of any of the experimental conditions speaks to the point that the decision situation vignette was quite balanced in terms of the respective strengths of the two options.

8.3.2.5 Summary – After Outcome Information

Regarding the *Mood* items – as a post-outcome proxy for satisfaction – H1.2 (an interaction of *Decision Strategy* and *Outcome*) could not be confirmed: there only were two main effects of *Choice* and *Outcome*. The Situational Eight DIAMONDS Scale S8-II with its high and highly similar ratings of "duty" and "sociality" suggests that the vignette options were well-balanced.

8.3.3 Summary and Discussion

The overarching question asked by this experiment was: Does the philosophical distinction between principled and particularistic decision making hold up psychologically? And the answer is: yes! And yes, the manipulation worked. How can I be so sure? Well,

we did find a difference between strategies when accounting for choice, the most interesting aspect of which was participants' reaction in the condition "decide by principle", namely that their strategy satisfaction was so much more affected by choice than was participants' reaction in the condition "decide by reasons". A plausible reason for this finding was discussed (cf. section F.a on page 189): using a principle to arrive at a decision more strictly determines choice than using reasons. Thereby, this finding was only possible, because participants' option satisfaction (in general) differed greatly between the two choice options. Since I had not planned for this difference to be the case, this was a lucky finding. At any rate: using a principle to decide did something else to participants than using reasons. And this was to be shown.

Strong effects had to be reported regarding *Outcome* and *Choice*. The occurrence of an Outcome Effect was expected, but not of interest: of course a negative or positive outcome affects people's satisfaction with their decision – in spite of the alleged irrationality of using *a posteriori* information to evaluate an *a priori* action (= the decision). This is called "Outcome Bias".

The variable *Choice* on the other hand was expected to be a mere control variable. Rationalistically one might think that people usually choose the option they expect the greatest benefit or happiness from – unless, of course, they adhere to a deontological idea of duty.[302] In that case, happiness is really rather off-topic. – Indeed, with respect to their mean value on *Option satisfaction* ("How satisfied are you with the option you chose?") before outcome information(!), participants who chose to work, who chose the dutiful action, on average were really rather unhappy. Why did they choose this option then?

Based on the current data, this question cannot be answered. It shows, however, that there are further aspects that determine choice besides the (immediate) satisfaction with the option. Which are they? It is not a short-sighted hedonism or utilitarianism aiming at the most positive result, because participants were not happy with the choice immediately after making it, before even knowing the outcome. But neither can we conclude that participants just were *not* utilitarians, as they might have planned to harvest the "utility" later on – which is exactly what working on an application suggests: to be a warrant on the future. But many other causes might have come into play, e.g. personality and character traits including neurotic habits and unconscious conflicts or inconsistent desires. – We will save these thoughts for later.

An important lesson to be drawn from this Pilot Study is that choice content is immensely important. Since the only way I can think of to test decision strategies involves fictional scenarios as a basis for both the decision as well as the application of the strategies there will always be choice content. One might thus (a) somewhat control for it by using many content-wise differing but structurally (intended to be) equivalent scenarios and average over them (the quick and dirty approach), (b) find or devise appropriate taxonomies or dimensions that exactly latch onto those aspects that make scenarios

[302] With a stress on "deontological": It does not matter whether you feel bad about it! In fact, you should not feel good about it either!

different to participants, construct scenarios along these dimensions and pretest them (the unfeasible approach), or (c) use already existing and well-known paradigms (the 'build on the shoulders of giants' approach). More on this in chapter *Reasons vs. Principles* (chap. 10).

The following section 8.4.1 reports the repeated measures analyses (pre and post outcome) that are possible based on the 1-item variable *Strategy satisfaction* (pre-outcome) and the Strategy Satisfaction Questionnaire (post-outcome). The Strategy Satisfaction Questionnaire itself is outlined as a separate study in chapter *Questionnaires* (chap. 9).

8.4 General Results Including SSQ (Part B) and DSQ (Part C)

8.4.1 Repeated Measures Analysis of Satisfaction Pre and Post Outcome Information Using the SSQ

Satisfaction with the decision strategy was measured by the variable *Strategy satisfaction* pre-outcome and by the Strategy Satisfaction Questionnaire (SSQ) post-outcome. Thereby, all analyses were conducted using (the mean value of) the SSQ's Factor 1, labeled "Decision Strategy Satisfaction". The Strategy Satisfaction Questionnaire (SSQ) is described in detail in chapter *Questionnaires* (chap. 9), section 9.1.

The repeated-measures analyses required a reduction of the data set from $N = 145$ to $N = 118$ participants due to the missing values in the Strategy Satisfaction Questionnaire (SSQ), cf. section 9.1.1.3. Furthermore, the pre-outcome measure *Strategy satisfaction*, scaled 1-101 (cf. Table 8.5), was rescaled to a scale of 1-5 according to the 1-5 scale of the SSQ.

NB: All detailed analyses were transferred to the Appendix (cf. section B.1.1) due to a lack of hypothesized results. The following section 8.4.1.1 will provide the summary.[303]

8.4.1.1 Summary

There was a significant two-way interaction of *Decision Strategy* and *Choice*, $F(1, 110) = 6.12, p = 0.015$; a significant three-way interaction of *Decision Strategy*, *Outcome* and *Time*, $F(1, 110) = 4.79, p = 0.031$; and a marginally significant main effect of *Time*, $F(1, 110) = 3.88, p = 0.051$. There were no further main effects or interactions.[304]

However, follow-up analyses undermined the relevance of most of these results. For details and a deeper understanding please refer to the section *Which effects are important and interpretable?* (section B on page 601 from B.1.1.6 within the Appendix).

The one persistent result is the interaction of *Decision Strategy* and *Choice* at the first measurement point – just as already found in section F on page 187 from 8.3.2.2.

Interestingly, *Outcome* – that is: outcome information – did not produce any systematic effect on satisfaction with the decision strategy. On the one hand, this is a very encouraging result, because it might mean that participants were able to distinguish their satisfaction with the outcome – which should reasonably vary with outcome

[303] Since this manuscript serves as a so-called scientific qualification work ("Qualifikationsarbeit"), with this decision I intend to prove (a) that I am able to conduct the required and planned analyses, and (b) that I am, too, able to distinguish prolific from futile results. The results reported in the Appendix are extensive and detailed, but in the end they yield little.

[304] A Type III ANOVA was calculated using the R function anova_test{rstatix}. Identical results were obtained using lmer{lme4}, specifying *lmer (Satisfaction_5 ~ Decision.Strategy * Choice * Outcome * Time_f + (1|CASE))*, as well as using ezANOVA{ez} (which again uses Anova{car}), and aov_car{afex} or aov_ez{afex}. The function aov{stats} returns Type I sums of squares without further specification.

valence – from their satisfaction with the strategy – which, from a rational point of view – should not be that dependent on bad or good outcomes. On the other hand, non-significant results are risky to interpret, since simply my manipulation might have failed. That is, participants might not have been too disturbed by the negative or positive outcome information they received. It should be possible, though, to find an answer to this question (were participants moved by the negative or positive outcome information) with a look at the *Mood* variables (cf. section A on page 191 from 8.3.2.4). And yes, there was a significant and strong main effect of *Outcome* on both *Mood valence* and *Mood potency*, cf. section A.a on page 193. Thus, it seems that indeed participants' strategy satisfaction was largely independent of outcome.

There was no main effect of the variable of interest, *Decision Strategy*, nor a persistent interaction of *Decision Strategy* and *Outcome* as hypothesized with H1.2 (cf. section 8.3.1.1). Thus, H1.2 could not be confirmed regarding the Strategy Satisfaction Questionnaire (SSQ) as one of the post-outcome measures of satisfaction. Since the hypothesized interaction was not found on the *Mood* items either, it is final that H1.2 could not be confirmed regarding either post-outcome satisfaction measure.[305]

Given the fact that there were no further simple main effects of *Outcome* or *Time* respectively, it seems safe to conclude that there are no systematic effects of *Outcome* or outcome information nor such effects interacting with *Decision Strategy* on strategy satisfaction at the second measurement point.

8.4.2 Satisfaction Pre and Post Outcome Given Decision Style

Decision style is what comes closest to a measure of personality traits in this study. Decision style is supposed to depict individual differences in the way people usually make their decisions: Do they gather lots of information? Do they deliberate much? Do they ask others' advice? Do they decide from intuition? Do they try to postpone decisions...? The questionnaire used here, the Decision Style Questionnaire (DSQ), is described in detail in chapter *Questionnaires* (chap. 9), section 9.2. It entails six factors named "anxious/confident" (Factor 1), "avoidant/procrastinating" (Factor 2), "intuitive/spontaneous" (Factor 3), "rational/vigilant" (Factor 4), "dependent" (Factor 5), and "buck-passing" (Factor 6).

8.4.2.1 Decision Style Pre Outcome

The six factors of the Decision Style Questionnaire (DSQ) were treated as covariates to examine whether the previous results would change when controlling for decision style. The dataset at the first measurement point (pre-outcome) etailed $N = 145$ participants (cf. section 8.2.2 for further participant characteristics).[306]

[305] Remember that there were two post-outcome measures of satisfaction, namely the *Mood* variables and the Strategy Satisfaction Questionnaire (SSQ) that H1.2 referred to.

[306] The sequence and code of this analysis was taken from Kassambara (n.d.-a).

A Test of Assumptions for ANCOVA

Linearity There was a mostly linear relationship between the covariate (DSQ, Faktor 1)[307] and the outcome variable (*Strategy satisfaction*) for each group, as assessed by visual inspection of the scatter plot.

Homogeneity of Regression Slopes There was homogeneity of regression slopes as the interaction terms (between the covariate (DSQ, Faktor 1) and the grouping variables (*Decision Strategy* and *Choice*)) were not statistically significant, $p > 0.05$.

Normality of Residuals The Shapiro Wilk test was significant ($W = 0.97, p = 0.001$), so we cannot assume normality of residuals.

Homogeneity of Variances The Levene's test was not significant ($p > 0.05$), so we can assume homogeneity of the residual variances for all groups.

Outliers There were no outliers in the data, since there were no cases with standardized residuals greater than 3 in absolute value.

B Inferential Statistics As a reminder, the ANOVA of *Decision Strategy* and *Choice* on *Strategy satisfaction* had yielded a significant interaction of *Decision Strategy* * *Choice*, $F(1, 141) = 9.57, p = 0.002$, cf. section F on page 187 from 8.3.2.2.

Adding either of the six factors of the DSQ did not change anything in this result. For example, adding Factor 1 ("anxious/confident") produced the same interaction of *Decision Strategy* * *Choice* as the only significant effect with almost identical values: $F(1, 140) = 9.53, p = 0.002$. The same was the case for the remaining five factors of the DSQ, which is why these results will not be reported here in detail.

C Summary and Conclusion There is no need to adjust for decision style. Decision style has no effect on *Strategy satisfaction* at the first measurement point before outcome information.

8.4.2.2 Decision Style Post Outcome

The Decision Style Questionnaire (DSQ) was also added to the repeated-measures analysis of satisfaction from section 8.4.1 and section B.1.1 in the Appendix. As explained in section 8.4.1, for this analysis the data set had to be reduced to $N = 118$ participants to account for the missing values in the Strategy Satisfaction Questionnaire (SSQ).

A Inferential Statistics As a reminder, the repeated-measures analysis for strategy satisfaction pre and post outcome information from section B.1.1.3 in the Appendix had yielded a significant two-way interaction of *Decision Strategy* and *Choice* ($F(1, 110) = 6.12$, $p = 0.015$), a significant three-way interaction of *Decision Strategy* and *Outcome*

[307] Note that for reasons of time and space, assumptions were only checked exemplarily for Factor 1.

and *Time* ($F(1, 110) = 4.79, p = 0.031$), and a marginally significant main effect of *Time* ($F(1, 110) = 3.88, p = 0.051$).[308]

A repeated-measures analysis was calculated adding all six factors of the DSQ at once. The above described effects remained, but the two-way interaction of *Decision Strategy* and *Choice* dropped to marginal significance. Of the six scales of the DSQ only one scale showed an effect: there was a main effect of Factor 4 ("rational/vigilant"), $F(1, 104) = 5.20, p = 0.025$.

The analysis was then repeated, adding only Factor 4 of the DSQ. The effect of Factor 4 of the DSQ was significant with $F(1, 109) = 5.24, p = 0.024$. Again, the original effects without the covariate from section B.1.1.3 in the Appendix remained relatively unchanged with the two-way interaction of *Decision Strategy* and *Choice* with similar values ($F(1, 109) = 4.75, p = 0.032$), the three-way interaction of *Decision Strategy* and *Outcome* and *Time* with identical values ($F(1, 110) = 4.79, p = 0.031$), and the main effect of *Time* again with identical values ($F(1, 110) = 3.88, p = 0.051$).

To be thorough, I tested for interactions of Factor 4 of the DSQ and all other experimental factors. Interestingly, this analysis yielded no significant main effects or interactions at all – but the known main effect of Factor 4 of the DSQ, $F(1, 102) = 5.27, p = 0.024$. This would indicate that satisfaction with the decision strategy (at least when adding these many effects to be tested) is singularly dependent on an individual's value on the scale "rational/vigilant decision style".

B Follow-up Analyses From section 8.4.2.1 on page 202 above we know that there were no effects of any of the DSQ factors/scales before outcome information at the first measurement point. Thus, the effect of Factor 4 of the DSQ from section A on the previous page above must be driven by the second measurement point. To confirm this suspicion, two regression models were calculated with the data set split by *Time*. The first model before outcome information (entering *Decision Strategy*, *Choice*, and DSQ's Factor 4 without interactions) rather confirmed the results from section 8.4.2.1: there was the known significant interaction of *Decision Strategy* and *Choice* ($F(1, 113) = 6.78, p = 0.010$) and a (new) marginally significant main effect of *Decision Strategy*, $F(1, 113) = 3.44, p = 0.066$.[309] The second model after outcome information (entering *Decision Strategy*, *Choice*, DSQ's Factor 4 without interactions, as well as *Outcome*) confirmed the suspicion: there were no main effects or interactions but the main effect of DSQ's Factor 4, $F(1, 109) = 10.83, p = 0.001$.

Looking at correlations, the overall correlation of satisfaction and Factor 4 before outcome information was not significant, $r = 0.10, t(116) = 1.10, p = 0.274$, but it was significant after outcome information, $r = 0.34, t(116) = 3.96, p < 0.001$. At both time points the correlation was descriptively positive, meaning that the higher participants' score on the scale "rational/vigilant" of the DSQ, the higher their strategy satisfaction – independent of any of the experimental manipulations.

[308] This analysis was calculated using lmer{lme4}.

[309] Remember that it was necessary to use a slightly different sample for this analysis with $N = 118$ which might well explain the slightly differing result to section 8.4.2.1 with $N = 145$.

Looking at the correlation of satisfaction with the decision strategy and rational/ vigilant decision style by experimental group as split by all factors, we see that descriptively of the 16 cells all but three of the correlations are positive. Furthermore, only two of the correlations are significant. These two significant correlations both occur when participants had to decide by reasons, when they chose to meet their friends, and after outcome information, yet at both negative and positive outcomes. In these cases, the more participants assumed a rational/vigilant decision style, the more they were satisfied with the decision strategy used.

C Summary and Conclusion After outcome information, there is indeed an effect of decision style: From the six factors of the DSQ, Factor 4, referring to a rational/vigilant decision style, had an effect on satisfaction with the decision strategy. This effect was independent of any of the experimental factors and even the only significant main effect, thus singularly explaining the dependent measure satisfaction.

Overall, at the second measurement point, rational/vigilant decision style and satisfaction with the decision strategy correlate positively and significantly. Split by experimental conditions, the significance remained when participants had had to decide by reasons and when they chose to meet their friends.

8.4.2.3 Summary

At the first measurement point before outcome information none of the six factors of the Decision Style Questionnaire (DSQ) had an effect on *Strategy satisfaction*. Contrarily, at the second measurement point none of the experimental factors had an effect on strategy satisfaction as measured by the Strategy Satisfaction Questionnaire (SSQ), but there was a significant main effect of DSQ's Factor 4 "rational/vigilant".

8.4.3 Summary of General Results

Two questionnaires were constructed for the Pilot Study: the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ). Both were constructed on the basis of previous research: the items of the Strategy Satisfaction Questionnaire (SSQ) drew on previous strategy satisfaction measures and the Decision Style Questionnaire (DSQ) used all items but doubles from the three big previous decision style measures. Both questionnaires and their psychometric validation are presented in detail in chapter *Questionnaires* (chap. 9).

Within the Pilot Study the Strategy Satisfaction Questionnaire (SSQ) served as one of two post-outcome satisfaction measures and was used to test hypothesis H1.2 (cf. section 8.3.1.1 on page 175). The Decision Style Questionnaire (DSQ) was not tied to any hypothesis, but the exploratory research interest was to see whether this measure of decision making habits would refine the results.

Hypothesis H1.2 that assumed that *Outcome* might moderate the effect of *Decision Strategy* on (strategy) satisfaction as measured post outcome both by the Strategy Satisfaction Questionnaire (SSQ) as well as the *Mood* items from the SAM (Self-Assessment

Manikin, cf. section 8.3.2.4 on page 191) could not be confirmed. Regarding the Decision Style Questionnaire (DSQ) its factors/subscales did not make a difference to the variable *Strategy satisfaction* within the first measurement point before outcome information, but within the second measurement point after outcome information the DSQ's Factor 4 "rational/vigilant" was the *only* variable that explained strategy satisfaction (i.e.: while none of the experimental variables had an effect).

8.5 General Discussion

This section will include a *Reminder of all Results* (section 8.5.1), a *Purpose Evaluation* (section 8.5.2 on the next page), an analysis of *Limitations* (section 8.5.3 on page 214), and a *Conclusion* (section 8.5.4 on page 215).

8.5.1 Reminder of all Results – Part A, B, and C

Exp: Before Outcome Information [E on page 186 and F on page 187.]

- *Decision Strategy* did not determine *Choice*.
- Participants from both groups – "deciding by reasons" vs. "deciding by principle" – pre-outcome were equally satisfied both with the option chosen as well as the strategy used. *Decision Strategy* made no difference. (H1.1 was not confirmed.)
- Participants from the condition "decide by principle" saw less of a difference between the two satisfaction measures *Option satisfaction* and *Strategy satisfaction* than participants from the condition "decide by reasons". Similarly, participants who chose to work on their application saw less of this difference than those who chose to meet their friends.
- *Option satisfaction* (pre-outcome) was much greater when participants had chosen to meet their friends instead of working on their application.
- There was an interaction of *Decision Strategy* and *Choice* on *Strategy satisfaction*.
- Using a principle determines a specific choice more strongly than using reasons.

Exp: After Outcome Information [A.b on page 194 and B.a on page 198.]

- *Choice* and *Outcome* determined participants' ratings on two of the three *Mood* items. *Decision Strategy* did not produce any main effects or interactions. (H1.2 was not confirmed on the *Mood* items.)
- The two options in the scenario, depicting a dutiful action (work on an application) and a social action (meet friends) seemed to be well-balanced as to the results from the Situational Eight DIAMONDS Scale S8-II.

Strategy Satisfaction Questionnaire (SSQ) [8.4.1 on page 201.]

- In the repeated measures analysis, there was a persistent interaction of *Decision Strategy* and *Choice* on *Strategy satisfaction* at the first measurement point (pre outcome) as above.
- There were no systematic effects of *Outcome* on satisfaction with the decision strategy.
- There were no main effects or interactions of *Decision Strategy*. (H1.2 could not be confirmed on the Strategy Satisfaction Questionnaire (SSQ).)

Decision Style Questionnaire (DSQ) [8.4.2 on page 202.]

- The six factors of the Decision Style Questionnaire (DSQ) did not make a difference to the results from the first measurement point (pre outcome).

– At the second measurement point (post outcome) Factor 4 "rational/vigilant" of the DSQ was the only significant effect on strategy satisfaction – none of the experimental independent variables turned significant.

8.5.2 Purpose Evaluation

Referring back to section 8.1 on page 170, how did the Pilot Study fare regarding its purposes?

The Independent Measure: the Manipulation of *Decision Strategy* Did the decision strategy manipulation work?[310] Well, if the hypothesized results had come about (which they did not), it would have been justified to conclude that the manipulation worked as expected. According to positivist logic (cf. Fisher, 1935, on null hypothesis testing), though, it is not correct to conclude from a null result that something is *not* the case.

How can the effectiveness of the decision strategy manipulation thus be evaluated otherwise?

It is not the case that there were no effects of *Decision Strategy* whatsoever. The interaction of *Decision Strategy* and *Choice* on *Strategy satisfaction* at the first measurement point (pre outcome) was a persistent result. Furthermore, this interaction (cf. section F on page 187 and Figure 8.6 for the details) was well interpretable and led to conclusion that using a principle more strongly determines the choice of an option than using reasons – which is exactly what it analytically should (cf. section F.a on page 189).

As seen in Figures 8.1 on page 179 and 8.2 on page 180 from section 8.3.1.3, as part of the decision strategy manipulation participants had to enter string variables: namely the principle they wanted to use or the reasons for and against the two options. These string variables could be analyzed according to two questions: (i) Are the principles and reasons provided by participants formally correct, i.e.: are they really principles and reasons as theoretically aimed at? (ii) Did participants really decide (i.e. make their choice) according to the principle or reasons they reported? The first point [i] would answer the question whether the instructions to participants that defined principles and reasons formally were understood and implemented (cf. section A.b on page 178 from 8.3.1.3 for the exact wording). The second point [ii], though, seems the more important one: Did participants really apply the principle or reasons and choose accordingly?

This second point, however, poses a problem to analysis: in the reasons case participants were not asked to provide weights to each reason reported. That is, the weights are unknown[311], and therefore, from the researcher's outside perspective, the choice

[310] For screenshots of the decision strategy manipulation as seen by participants cf. section A.b on page 178 from section 8.3.1.3.

[311] Of course, this is formal speak. Surely most participants did not formally assign weights to their reasons.

made by a specific participant cannot strictly be inferred from the semantics of the reasons given. In the principles case, too, while likely simpler, there is a potential gap between semantics and choice: Imagine, someone notes the principle "It is important to feel part of society." – Does this speak in favor of meeting your friends or of writing on your application in order to have a good job?

In sum, an analysis of [i] the formal correctness of participants' principles and reasons and [ii] the correctness of their inferences from principles/reasons to choice was not undertaken in this study for the above and pragmatic reasons.[312] For now I will conclude that there is sufficient reason to believe that the decision strategy manipulation worked.

There is one further very important point that needs mention: *Decision Strategy* did not determine *Choice* (cf. section A.b on page 183 from 8.3.2.2). This again is a null result of sorts, but this result, the independence of decision strategy and choice, is really immensely important. *Deciding by reasons* (particularistic decision making) and *deciding by principle* (principled decision making) conceptualized as decision *strategies* (and operationalized as described in section 8.3.1.3 on page 176) must allow for any choice. Otherwise the strategy would be biased (e.g. principled decision making always leading to dutiful action) and in being biased anticipate the choice. Choosing a strategy would already be choosing an option, forcing a strategy would be forcing an option. If this were the case, if strategy determined choice, the present research – asking for satisfaction as due to strategy *and not* choice option or outcome – would not be possible.[313]

The Dependent Measure: Four Ways to Measure Satisfaction

Before Outcome Information Pre outcome the variables *Option satisfaction* and *Strategy satisfaction*, both one-item variables (cf. Table 8.5 on page 181 from 8.3.1.3 for the exact wording and response scale information), were measured. They were related to each other and analyzed in detail in section 8.3.2.2 on page 183. While their overall correlation ($r = 0.40$) was significant, their correlation magnitude significantly differed between decision strategies ($r_{reas} = 0.16$, $r_{prin} = 0.58$) and reached significance only in the "decide by principle" condition.[314] In sum, these two pre-outcome satisfaction variables reacted differently and intelligibly enough to conclude that participants were able to distinguish them.

After Outcome Information Post outcome there were the three *Mood* items and the Strategy Satisfaction Questionnaire (SSQ) in place to measure satisfaction. Two of the three *Mood* items strongly and solely reacted to *Choice* and *Outcome*, whereas strategy satisfaction as based on the SSQ's Factor 1 "Decision Strategy Satisfaction"

[312] However, the formal correctness of participants' principles and reasons as demanded in [i] was scrutinized in the Trolley Study reported in sections F.a on page 386 from 10.1.2.1 and C on page 392 from 10.1.2.2, both within chapter *Reasons vs. Principles* (chap. 10).

[313] Furthermore, if choice and strategy had not turned out to be empirically independent in this study, this would have sounded the death knell for the operationalization of *deciding by reasons* and *deciding by principle* used here.

[314] This result took part in the conclusion that choice is more strictly determined by principles than by reasons (cf. section F.a on page 189).

(cf. section 8.4.1 on page 201) did not systematically react to outcome information. Thus, the *Mood* items did latch onto different aspects than SSQ's Factor 1 – which indeed was very specifically concerned with *strategy* satisfaction.[315] While the psychometric properties of the Strategy Satisfaction Questionnaire (SSQ) as reported in chapter *Questionnaires* (chap. 9, section 9.1) were fine, it is difficult to evaluate whether the *Mood* items are a viable proxy for (general) satisfaction: Due to the fact that the Strategy Satisfaction Questionnaire (SSQ) is so specifically concerned with *strategy*, it is not a good candidate for establishing convergent construct validity of the *Mood* items. Therefore, upon the differing patterns of results, we may conclude that the *Mood* items measured something else than SSQ's Factor 1 "Decision Strategy Satisfaction", which is consistent with the idea that strategy satisfaction is to be distinguished from general satisfaction (or option satisfaction as outlined above). But we cannot establish that the *Mood* items are a good proxy for general satisfaction.

The Effect of *Decision Strategy* on Strategy Satisfaction Post outcome there were no viable effects of *Decision Strategy* on either post outcome measure of satisfaction. Pre outcome, *Decision Strategy* had an effect on *Strategy satisfaction* dependent on *Choice*. Yet, none of the two hypotheses (cf. section 8.3.1.1 on page 175) could be confirmed.

This is not the best result for what I termed my "main research interest" in section 8.1 on page 170, but it is not dire either. In fact, considering the exploratory nature of the whole enterprise I found the results I got rather encouraging at the time: It seems save to conclude that the two decision strategies, *deciding by reasons* and *deciding by principle* as operationalized here, *can have* an effect on satisfaction – but the ancillary conditions necessary to crystallize this effect are not yet well understood.

The Effect of Content[316] Overall, the effect of content turned out to be considerable. About two-thirds of participants chose to meet their friends and only one third chose to work on their application. Furthermore, *Option satisfaction*, measured immediately after having made the choice and before outcome information, on average was higher when participants chose to meet their friends. Most importantly, however, the effect of *Decision Strategy* only became visible when accounting for *Choice*. While *Choice* did not affect strategy satisfaction as measured by Factor 1 of the Strategy Satisfaction Questionnaire (SSQ) post-outcome, it did affect two of the three *Mood* items (as did *Outcome*).

[315] For the items of the final version of the Strategy Satisfaction Questionnaire (SSQ), cf. Table 9.3 on page 227 from section 9.1.2.1 within chapter *Questionnaires* (chap. 9).

[316] A note on what is meant by "content": First and foremost, "content" refers to the scenario/vignette content in this study, namely *meet friends vs. work on application*. However, since the choice to be made was between the two options of meeting your friends or working on your application, *Choice* is tied to scenario content. Or, in other words, the scenario content was about these two choice options. Therefore, when writing about "content", I refer to both the scenario content as well as the choice options.

Evaluating scenario content by means of the Situational Eight DIAMONDS Scale S8-II showed that the two options (meet friends vs. work on application) were understood to be about *Sociality* vs. *Duty*. Interestingly, on the Situational Eight DIAMONDS Scale S8-II, asking how much each aspect was present in the situation, *Sociality* and *Duty* received almost identical ratings (cf. Figure 8.8 on page 198 and section B.a on page 198 from 8.3.2.4). This suggests the conclusion that participants perceived the two options to be of equal strength, such that on average they rated the two content domains (sociality and duty) to be equally present within the depicted scenario.

Still, these two options were not neutral to participants: participants were differentially happy with having chosen one or the other option – and independent of outcome! They were unhappy when having had to decide by principle when they were unhappy with the chosen option (and vice versa). Being free in making their choice, most of them chose the social option over the dutiful one.

That is, while on the one hand there is good reason to believe that the two options (friends vs. application) were perceived to be well-balanced within the scenario, the two options – or rather the content domains they belong to: sociality vs. duty – make a huge difference to participants (in this sample).

And this is the diagnosis: content makes a difference. And I cannot think of a way to get rid of content.[317]

The next best option is to try to *control* content. What would a controlled-for content look like? As described above, the use of the Situational Eight DIAMONDS Scale S8-II on the scenario of this study showed that the content domains of the scenario's two options received equal ratings. This could be made the first criterion: that the options in a decision situation scenario on average must be perceived as equally strong as indicated by a similar rating of the according content domains on the Situational Eight DIAMONDS Scale S8-II. Immediately several questions ensue: (i) Does a similar rating of the according content domains on the Situational Eight DIAMONDS Scale S8-II guarantee "equal strength"? What is really meant by "equal strength"? (ii) What if I wanted to construct several so-called "parallel" scenarios? Which extent of similarity between patterns of ratings on the Situational Eight DIAMONDS Scale S8-II would guarantee parallelism? (iii) Do the Situational Eight DIAMONDS, which are a *general*

[317] Just for the fun of it: What would a content-free scenario look like? It would only have structure, not content. Is that even possible? Refer back to the scenario used in this study as depicted in Table 8.2 on page 176 from 8.3.1.3. Now, a content-rid version might be something like this: "You have an attractive offer to spend your time on the coming weekend, but you have little capacity and other important things to finish. The opportunity will not come about again soon, and declining the offer might disappoint. On the other hand, not getting your things done might lead to annoyance.". There are no details in this version, but it is certainly not content-free. (It also feels less balanced.) Let's try again: "You are in a decision situation and have to decide between two options. There are things that speak in favor as well as in disfavor of each option. Choosing either option will likely realize some desired consequences tied to the chosen option. On the other hand, there are negative consequences that will likely result from either non-chosen option. Now, which option will you choose, *Option A* or *Option B*?" – Quite obviously, it is impossible to do (this) research upon a scenario like that. There is nothing that distinguishes the options, and there is nothing, a principle or reasons could latch onto. Without content, there is nothingness.

situation taxonomy, even cover all dimensions relevant to *decision* situations as a special subgroup of situations simpliciter? – The answers are: no, none, and unlikely.[318]

For now I will conclude: It seems almost impossible to *strictly* control content, because even if the Situational Eight DIAMONDS were a fitting taxonomy for decision situations (point [iii]), and even if a similar rating of their content domains was indicative of the options having a similar "pull" (point [i]), it would be at the very least difficult and require a lot of pretesting to achieve parallel rating patterns for several scenarios (point [ii]).

Therefore, as pointed to in section 8.3.3 on page 198, it is one possibility to use scenarios that have already been used in previous research or stay within well-established paradigms.[319] This does not really solve the "problem of content", because most scenario-based research does not provide much evidence in favor of their scenarios' parallelism besides intuition and word count. But at least the evidence gathered can be related to other evidence.

For now, the main lesson is: do not underestimate content. The conclusions drawn for the present research enterprise are these: First, all subsequent scenario-based experiments will be carried out within established paradigms as well as make use of vignettes already employed in previous research. These experiments are to be found in chapter *Reasons vs. Principles* (chap. 10). Second, in order to approach point [iii] from above ("Which are the dimensions relevant to *decision* situations?"), several taxonomic approaches will be used on a decision situation in a large questionnaire study. This study is to be found in chapter *Questionnaires* (chap. 9), section *Decision Categorization Scales (DCSs)* (section 9.3 on page 250).

The Strategy Satisfaction Questionnaire (SSQ) One goal of the Pilot Study was to build a questionnaire specifically measuring strategy satisfaction that would satisfy criteria of good quality. The construction and validation of said questionnaire, the Strategy Satisfaction Questionnaire (SSQ), is described in detail in section 9.1 on page 220 within chapter *Questionnaires* (chap. 9).

In short, starting out from 12 items, the final Strategy Satisfaction Questionnaire (SSQ) entails 10 items loading onto three factors. Labels, number of items, and Cronbach's alphas of these factors are: Decision Strategy Satisfaction (Factor 1, 5 items, $\alpha = 0.84$), Choice Option Satisfaction (Factor 2, 3 items, $\alpha = 0.76$), Affective Process Satisfaction (Factor 3, 2 items, $\alpha = 0.70$). Furthermore, a short version (the SSQ-S) and a general version (the SSQ-G), not specifically referring to reasons and principles, were proposed.

[318] These points warrant further discussion, but I will save them for later.

[319] Here, "paradigm" is used in the narrow sense of "research that is based on a specific body of theory and methods".

The results of the repeated measures analysis including the SSQ's Factor 1 as one of the post-outcome measures of satisfaction (cf. section 8.4.1 on page 201) were complicated at first sight, but once disentangled there were no viable effects on strategy satisfaction.

The Decision Style Questionnaire (DSQ) The second questionnaire-related goal of the Pilot Study was a reduction of the existing three questionnaires on decision style to one unitary and short enough version for a German speaking population, again satisfying criteria of good quality. The Decision Style Questionnaire (DSQ) is described in detail in section 9.2 on page 231 within chapter *Questionnaires* (chap. 9).

In short, starting out with 60 items, the final Decision Style Questionnaire (DSQ) entails 24 items loading onto six factors. Labels, number of items, and Cronbach's alphas of these factors are: anxious/confident (Factor 1, 5 items, $\alpha = 0.86$), avoidant/procrastinating (Factor 2, 5 items, $\alpha = 0.92$), intuitive/spontaneous (Factor 3, 5 items, $\alpha = 0.86$), rational/vigilant (Factor 4, 5 items, $\alpha = 0.82$), dependent (Factor 5, 2 items, $\alpha = 0.83$), buck-passing (Factor 6, 2 items, $\alpha = 0.87$.

The results of the repeated measures analysis including the six DSQ factors yielded an interesting contrast between the first (before outcome information) and the second (after outcome information) measurement point: At the first measurement point decision style had no effect on strategy satisfaction, at the second measurement point, however, a rational/vigilant decision style (Factor 4) was the only variable that significantly predicted strategy satisfaction.

8.5.2.1 Summary

Regarding the independent measure, the decision strategy manipulation worked, and strategy did not determine choice. Regarding the dependent measures, participants were able to distinguish satisfaction with the option versus satisfaction with the strategy, and the *Mood* items measured something else than the Strategy Satisfaction Questionnaire (SSQ). Regarding the effect of *Decision Strategy* on strategy satisfaction, there was an interaction with *Choice* at the first measurement point (before outcome), but no effect at the second measurement point (after outcome). Regarding the effect of content, the two options within the scenario seemed well-balanced according to the Situational Eight DIAMONDS Scale S8-II, but participants still reacted very differently to them. Conclusions from the realization that content cannot be strictly controlled were drawn. Regarding the two questionnaires from the correlational part of the study, both the Strategy Satisfaction Questionnaire (SSQ) as well as the Decision Style Questionnaire (DSQ) fulfilled criteria of good quality. Decision style as additional explanatory variables had no effect at the first measurement point, but at the second measurement point a rational/vigilant decision style predicted strategy satisfaction.

In sum, all measures – both independent and dependent – seem usable, but the effects of decision strategy were quite limited.

8.5.3 Limitations

Sample Characteristics The sample size after filtering for diligence was still adequate with $N = 145$ participants for the experimental part of the study, whereas for the questionnaire construction within the correlational part a larger sample size would have been desirable. The missing values in the Strategy Satisfaction Questionnaire (SSQ) were furthermore unfortunate and reduced the according analyses to $N = 118$ participants.

As common in convenience samples from student bodies, participants on average were young, female and highly educated. However, their majors at university were diverse and only a minority studied psychology.

Measures None of the measures used – both independent and dependent – was taken one-to-one from previous research. The decision strategies *deciding by reasons* versus *deciding by principle* were carefully operationalized according to theoretical considerations – but there was no previous research to lean on. The decision situation scenario was constructed on the basis of intuition. The dependent measures *Option satisfaction* and *Strategy satisfaction* were one-item variables relying on face validity.

However, in the case of the two questionnaires, it was possible to loosely (in the case of the Strategy Satisfaction Questionnaire (SSQ)) and even tightly (in the case of the Decision Style Questionnaire (DSQ)) base them on previous versions.

Design In this Pilot Study I did too many things at the same time. First, the setup of being part experiment, part questionnaire study was potentially disadvantageous to the questionnaires (the SSQ and the DSQ) that were collected after the experiment. Since due to this setup participants had already been subject to experimental manipulations and – if one trusts the (at least temporary) force of these manipulations – were thus artificially "made divers". For example, as part of the experiment, participants received a positive versus a negative outcome information, which indeed affected their mood as measured by the *Mood* variables. Thus, they started out to answer the forthfollowing questionnaires with an artificially diversified mood. – This likely will not have produced a strong effect, but it is not ideal.

Second, the desire to try out various dependent measures and at the same time use them for measurement and hypothesis testing, moreover within a repeated-measures design was at best...exploratory. Examples: (1) The repeated-measures analysis over strategy satisfaction with the one-item variable *Strategy satisfaction* pre-outcome and Factor 1 of the Strategy Satisfaction Questionnaire (SSQ) post-outcome was less than ideal. It would have been preferable (and standard procedure) to use the same variable at both measurement points. (2) It was not possible to evaluate whether the *Mood* items were a viable proxy for general satisfaction, because I failed to collect an additional item asking for general satisfaction post-outcome. The Strategy Satisfaction Questionnaire (SSQ) with its strong focus on strategy was not a suitable measure for validation, because it clearly could not establish convergent construct validity. (3) Furthermore, even if the Strategy Satisfaction Questionnaire (SSQ) on the other hand were appropriate

to establish *discriminant* construct validity of the *Mood* items, correlations would have had to be calculated separately for each condition due to the upstream experiment (that was expected to differentially affect satisfaction).

Summary As already noted in the very beginning (cf. section 8.1 on page 170), this Pilot Study is simply that: a pilot. Or an appetizer. Much of its setup and its all-over-the-place exploration was not ideal, but it did yield a variety of results – and inspiration.

8.5.4 Conclusion

None of the two hypotheses could be confirmed, that is: the hypothesized effects of decision strategy on the satisfaction measures did not show. Yet, a few questions could be answered: (i) The decision strategy manipulation seems to have worked, but should be further scrutinized (which will happen in section 10.1). Also, decision strategy did not determine choice, as it also conceptually shouldn't, which is good. (ii) Participants were able to distinguish option satisfaction and strategy satisfaction. Accordingly, these single-item measures may be further used. (iii) The effect of content was immense, and is a problem to scenario/vignette studies. Therefore, possible taxonomic differentiations of decision situations will be entertained (section 9.3) and all further studies using the reasons/principle manipulation will be situated within a known paradigm.

The next chapter will introduce three questionnaires, the Strategy Satisfaction Questionnaire (SSQ), the Decision Style Questionnaire (DSQ), and the Decision Categorization Scales (DCSs).

9 Questionnaires

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This chapter, *Questionnaires* (chap. 9) will introduce and report two questionnaires and one questionnaire-based endeavor. The two questionnaires, the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ), were created for and collected within the Pilot Study. Analyses from the Pilot Study that made use of these questionnaires have already been reported in the previous chapter *Pilot Study* (chap. 8) within section 8.4 on page 201. The questionnaires' theoretical base, construction and validation, however, is fully reported in the present chapter *Questionnaires* in section 9.1 on page 220 (the SSQ) and section 9.2 on page 231 (the DSQ).

The third part of this chapter – which I called above the "questionnaire-based endeavor" – is something else, which is why it is named *Decision Categorization Scales (DCSs)* – plural. In the according study (cf. section 9.3 on page 250) I gathered question-

naires/scales that seemed appropriate to characterize situations in general or decision situations specifically – just like the Situational Eight DIAMONDS Scale S8-II, which was already used in the Pilot Study. Not all of these scales – eight in total – even purport to do such a thing: characterize or taxonomize (decision) situations. But based on *The Effect of Content* within 8.5.2 on page 208, discussing lessons learned from the Pilot Study, it seemed quite important to try to get a grip on the content-wise differences between (decision) situations – or at least look at possibilities to do so.

The Strategy Satisfaction Questionnaire (SSQ): 9.1 on the following page

The Decision Style Questionnaire (DSQ): 9.2 on page 231

The Decision Categorization Scales (DCSs): 9.3 on page 250

9.1 Strategy Satisfaction Questionnaire (SSQ)

As noted by Zhang and Fitzsimons (1999), previous research had largely understood post-decision satisfaction as satisfaction with choice or outcomes, while the concept of process satisfaction or strategy satisfaction went rather unnoticed. At the time the present study was devised, there were only three publications (Crossley & Highhouse, 2005; Schlegel et al., 2013; Zhang & Fitzsimons, 1999) that dealt with measuring process satisfaction or at least a satisfaction different to mere outcome satisfaction. The authors each developed their own post-decision process satisfaction items which are briefly reported below. On the basis of these items a new measure of strategy satisfaction was constructed.

9.1.1 Method

9.1.1.1 Procedure

Cf. section 8.2.1 within the Pilot Study.

9.1.1.2 Materials

A Previous Decision Process Satisfaction Scales

Zhang and Fitzsimons (1999) outline the differences between option satisfaction, outcome satisfaction, and choice-process satisfaction, stating that research at the time had payed little to no attention to process satisfaction. Thus, they created a small choice-process satisfaction questionnaire, comprising the below 6 items (cf. Zhang & Fitzsimons, 1999, p. 199) with a response scale from "strongly agree" [1] to "strongly disagree" [10] unless otherwise noted. In their studies, participants had to choose between differently branded products.

Z-1 I found the process of deciding which product to buy frustrating.
Z-2 Several good options were available for me to choose between.
Z-3 How satisfied or dissatisfied are you with your experience of deciding which product option to choose? ("extremely satisfied" [1] to "extremely dissatisfied" [10])
Z-4 I thought the choice selection was good.
Z-5 I would be happy to choose from the same set of product options on my next purchase occasion.
Z-6 I found the process of deciding which product to buy interesting.

The reliability of the scale used in 3 experiments ranged from $\alpha = 0.79$ to $\alpha = 0.82$.

Crossley and Highhouse (2005) examine the relation of job search and choice process with subsequent job satisfaction. In order to assess satisfaction with the decision making process, they devised the below scale with 4 items ranging from [1] to [5], endpoints not reported.

C-1 I am happy with the way I went about finding this job.

C-2 I would look for another job using the same techniques that I used to find this one.
C-3 I am satisfied with the process I used to find jobs to apply for.
C-4 I am satisfied with how I decided upon which job to take.

The reliability of the scale was $\alpha = 0.83$; a previous factor analysis had confirmed that all items loaded on a single factor (cf. Crossley & Highhouse, 2005, p. 263).

Schlegel et al. (2013) use a scale of 6 items ranging from "completely disagree" [1] to "completely agree" [11] to assess participants' decision satisfaction with an individual and recent major life decision; only example items were reported (cf. Schlegel et al., 2013, p. 546, p.550):

S-1 I am completely confident I made the right decision.
S-2 I am completely satisfied with the decision (I made).
S-3 This decision is consistent with my core values and beliefs.
S-4 I am confident I will not regret this decision in the future.

The reliability of the scale in three studies ranged from $\alpha = 0.80$ to $\alpha = 0.88$.

B A New Measure of Decision Strategy Satisfaction

Table 9.1 displays the 12 items of the Strategy Satisfaction Questionnaire (SSQ). For use in the context of this Pilot Study wherein the questionnaire followed the experiment with its two conditions of decision strategy ("decide by reasons" or "decide by principle"), two versions of the questionnaire were created such that some items referred distinctively to the decision strategy participants had had to use in the previous experimental part of the Pilot Study. These three items (#3, #4, #5) have grey background in the table. The last column specifies the origin of the items by referring to their specific enumeration codes used in section A. All items were scored on a 5-point Likert scale from 1 "stimme gar nicht zu" [do not agree at all] to 5 "stimme absolut zu" [do absolutely agree]. For further specifications please refer to the notes underneath Table 9.1.

Table 9.1 The 12 items of the Strategy Satisfaction Questionnaire (SSQ) by *Decision Strategy* in German and English.

#	Deciding by Reasons	Deciding by Principle	Previous Research
1	Ich bin zufrieden mit der Entscheidungsstrategie, die ich anwenden sollte. I am satisfied with the decision strategy I was instructed to use.		(Z-3) C-1 C-3
2	Im Alltag würde ich die gleiche Entscheidungsstrategie anwenden. In everyday life, I would use the same decision strategy.		C-2
3	Ich bin zufrieden damit, dass ich als ersten Schritt mir Gründe für und gegen die Optionen vergegenwärtigt habe. I am satisfied that as a first step I thought about reasons for and against the options.	Ich bin zufrieden damit, dass ich als ersten Schritt mir ein Prinzip bzw. eine (Lebens-) Regel vergegenwärtigt habe. I am satisfied that as a first step I thought about a principle or a (life) maxim.	(Z-3) (C-3)
4	Ich bin zufrieden damit, dass ich die Gründe für und gegen die Optionen als Basis für die Entscheidung genutzt habe. I am satisfied that I used the reasons for and against the options as the basis for the decision.	Ich bin zufrieden damit, dass ich das Prinzip / die (Lebens-) Regel als Basis für die Entscheidung genutzt habe. I am satisfied that I used the principle / the (life) maxim as the basis for the decision.	(Z-3) (C-3)
5	Ich fand den Prozess des Abwägens der Gründe frustrierend. I found the process of weighing the reasons frustrating.	Ich fand den Prozess des Wählens eines Prinzips / einer (Lebens-) Regel frustrierend. I found the process of choosing a principle / a (life) maxim frustrating.	Z-1
6	Die beiden Entscheidungsoptionen in dem Szenario reichten aus, eine gute Entscheidung zu treffen. The two choice options in the scenario were sufficient to make a good decision.		Z-2
7	Ich war zufrieden damit, nach einem vorgegebenen Schema eine Option zu wählen. I was satisfied with choosing an option according to a given procedure.		(Z-3) (C-3)
8	Ich fand die Auswahlmöglichkeiten gut. I liked the options available.		Z-4
9	Ich fand den Entscheidungsprozess interessant. I found the decision-making process interesting.		Z-6
10	Ich bin mir sicher, dass die Entscheidungsstrategie, die ich benutzen sollte, allgemein zu guten Entscheidungen führt. I am confident that the decision strategy I was instructed to use generally leads to good decisions.		(S-1)
11	Die Entscheidungsstrategie, die ich verwenden sollte, passt zu meinen Werten und Meinungen. The decision strategy I was instructed to use fits my values and opinions.		(S-3)
12	Ich bin mir sicher, dass ich diese Entscheidungsstrategie nicht bereuen würde. I am confident that I would not regret this decision strategy.		(S-4)

Note. Items that specifically refer to "deciding by reasons" or "deciding by principle" are displayed on grey background. Item origin is referred to in the last column "Previous Research", where brackets indicate that the original items served as a vague basis, but were quite strongly modified to fit the specific purpose of the new questionnaire.

9.1.1.3 Participants

Cf. section 8.2.2 from the Pilot Study.

The number of complete cases for "deciding by reasons" was $n = 62$, and the number of complete cases for "deciding by principle" was $n = 56$. The number of complete cases without differentiation between reasons vs. principle was $n = 118$. Thus, from the originally $N = 145$ participants $n = 27$ participants (19%) did not respont to all 12 items.

9.1.2 Results

9.1.2.1 Psychometric Validation

Since three items were specific to either "deciding by reasons" vs. "deciding by principle" three separate analyses were initiated.

A Sampling Adequacy To examine the adequacy of the data sets for factor analysis, the *MSA*[320] [321] according to Kaiser and Rice (1974) was calculated.[322]

Reasons version The overall MSA was $MSA_{overall} = 0.81$. The item MSAs lay between $MSA_{item(lowest)} = 0.48$ and $MSA_{item(highest)} = 0.91$, where only one item, namely item #5 ("I found the process of weighing the reasons frustrating"), fell short with its $MSA \leq 0.5$. The second lowest MSA was well above 0.5 with $MSA_{item(2nd-low.)} = 0.61$.

Principle version The overall MSA was $MSA_{overall} = 0.80$. The item MSAs lay between $MSA_{item(lowest)} = 0.56$ and $MSA_{item(highest)} = 0.88$. No item fell short of the $MSA > 0.5$ mark; the second lowest MSA (2 items) was $MSA_{item(2nd-low.)} = 0.72$.

SSQ complete The overall MSA was $MSA_{overall} = 0.85$. The item MSAs lay between $MSA_{item(lowest)} = 0.68$ and $MSA_{item(highest)} = 0.92$ (2 items). No item fell short of the $MSA > 0.5$ mark.

B Parallel Analysis Separate parallel analyses were conducted for each questionnaire version, as well as the combined version with $n = 118$ data points. Parallel analyses[323]

[320] Measure of Sampling Adequacy (MSA) versus Kaiser-Meyer-Olkin (KMO) Index: The abbreviations "MSA" and "KMO" seem to be used interchangeably. SPSS makes one name out of the two using the denomination "Kaiser-Meyer-Olkin Measure of Sampling Adequacy" (cf. IBM Corporation, 2021), maybe based on Dziuban and Shirkey (1974) who use that term. Kaiser (Kaiser, 1970; Kaiser & Rice, 1974) in the original publications calls the index "MSA", which is what I will do in the following.

[321] The MSA was calculated using

[322] According to Kaiser and Rice (1974) an $MSA \leq .5$ is unacceptable, whereas an MSA "in the .80s [is] meritorious" (cf. Kaiser & Rice, 1974, p. 112).

[323] Parallel analysis as introduced by Horn (1965) is a technique to help interpret the scree plot as based on the scree test by Cattell (1966). The parallel analyses were conducted with fa.parallel{psych}. A *common factor analysis* (CFA) model rather than a *principal components analysis* (PCA) model was adopted.

for the two separate data sets suggested 2-3 factors, parallel analysis for the combined data set suggested 3 factors. Therefore a three-factor solution was chosen.

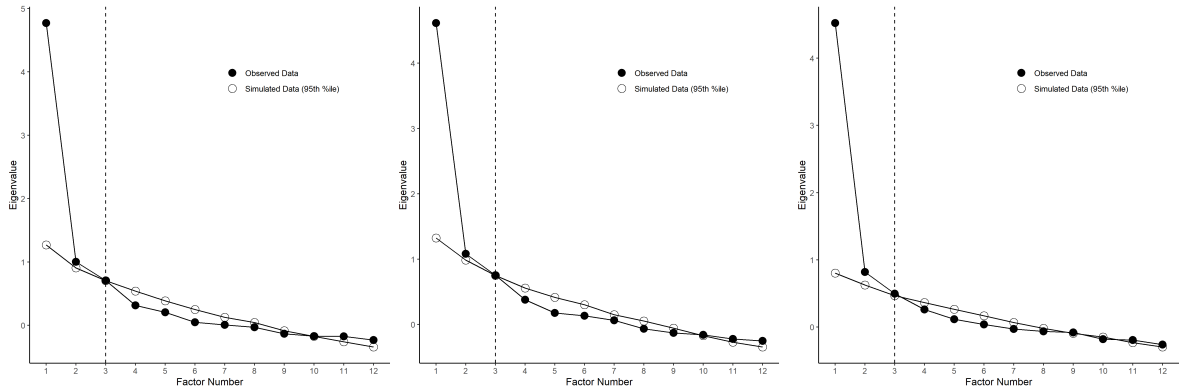


Figure 9.1 Scree plots of the Strategy Satisfaction Questionnaire (SSQ) for "deciding by reasons" (left), "deciding by principle" (middle), and the combined data set (right).

C Factor Structure – Separate Versions Two separate maximum-likelihood factor analyses were performed on the two questionnaire versions. *Promax* was chosen as an oblique rotation method.[324] According to the respective parallel analysis three factors were to be specified in both cases. The *chi-squared test* that three factors are sufficient did not reject the three-factor solution for the *reasons* version ($\chi^2(33) = 36.6, p = 0.305$) nor for the *principle* version ($\chi^2(33) = 36.3, p = 0.317$). Cf. Table 9.2 for the loadings of both questionnaire versions.[325]

[324] Factor analyses were performed first using fa{psych} as well as factanal{stats}, both specified to *promax* rotation. The function fa{psych} was also to be set to maximum-likelihood factor analysis (fm="mle"), whereas the function factanal{stats} does only perform such. Both functions yielded identical results in the first set of analyses, therefore all following analyses were performed using the easier to use function factanal{stats}.

[325] It is my aim, if statistics allow, to combine both questionnaire versions to one data set. Therefore, more detailed statistics regarding the factoring solution and its adequacy will follow once this is decided.

Table 9.2 Factor loadings of the two questionnaire versions of the Strategy Satisfaction Questionnaire (SSQ).

	Loadings "deciding by reasons"			Loadings "deciding by principle"		
Item #	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
1	**0.66**	0.24				**0.94**
2	**0.69**			**0.87**		
3	**0.76**		0.24	**0.76**		
4	**0.59**	0.23		**0.57**		
5	-0.23		**0.61**			**-0.53**
6		**1.08**			**1.01**	
7	**0.44**	0.32	0.21		**0.42**	0.23
8		**0.54**	0.30		**0.70**	
9	0.33		**0.70**			**0.51**
10	**0.68**			**0.86**		
11	**0.84**			**0.54**		
12	**0.63**					**0.72**

Note. The cut-off for the display of loadings was set to 0.2; all loadings were rounded to two digits. Loadings in bold font signify their attribution to the respective factor. Grey background signifies differences in item attribution between the two questionnaire versions. The three items that did semantically differ (items #3, #4, and #5) are printed in bold font in column "Item #".

C.a Comparison It is obvious that in terms of item to factor attribution the two questionnaire versions are more similar than not. Only three items show differing factor affiliations, namely item #1, item #7, and item #12 – yet item #7 has a rather similar loading pattern between the two questionnaire versions. Most importantly, the three items that did semantically differ between the two versions (items #3, #4, and #5) *do not* load onto different factors. Therefore, it seems justified to combine both versions and conduct further analyses with the complete data set in the following. But before turning to the complete data set, I will have a short closer look at the differences between the two questionnaire versions as well as entertain a first attempt at labeling the factors.

C.b Interpretation Please refer back to Table 9.1 for the SSQ items.

Reasons version Factor 1 includes all items that include the word *decision strategy* (items 1, 2, 10, 11, 12) or strongly refer to it semantically (items 3, 4, 7). Factor 2 includes the two items (items 6 and 8) that refer to *choice options*. Factor 3 includes items (items 5 and 9) that refer to the *(decision) process* in an affective way ("frustrating", "interesting").

Principle version Factor 1 includes the same items as above, but items #1 and #12. These items go to Factor 3 with its items #5 and #9 (as above) that stress the affective content of the decision process. Factor 2 keeps items #6 and #8 as above that refer to choice options, and gains item #7 which also includes the term "option".

Interestingly, it seems that participants in the "deciding by principle" experimental group see more of the affective content in items #1 and #12 ("satisfied", "not regret") than participants in the "deciding by reasons" experimental group. These two differing item attributions are the main difference between the two versions, since item #7 showed a tendency towards Factor 2 in both questionnaire versions. Yet, this difference does not debunk the general semantic pattern – a common labeling of the three factors as valid to both questionnaire versions is absolutely possible.

The factors for both questionnaire versions can thus be named:

Factor 1 Decision Strategy Satisfaction (satisfaction with the decision strategy)

Factor 2 Choice Option Satisfaction (satisfaction with the choice options)

Factor 3 Affective Process Satisfaction (affective reaction to the decision process)

C.c Reliability Analysis I will skip a reliability analysis of the respective factors of the two questionnaire versions, since working with the complete data set seems justified in terms of factor structure (cf. section C.a) and advisable in terms of data set size.

The overall reliability of both the reasons and the principle version was $\alpha = 0.86$.

D Factor Structure – Complete Data Set NB: A detailed description of the steps that were taken to arrive at the final factoring solution can be found in the Appendix, cf. section A.

D.a Final Factoring Solution The *chi-squared test* that three factors are sufficient accepted a three-factor solution (cf. section A in the Appendix). Based on section A.f in the Appendix, items #5 and #9 were excluded from the questionnaire and the *chi-squared test* was re-run, again accepting a three-factor solution ($\chi^2(18) = 20.4$, $p = 0.313$). Cumulative variance explained at three factors with the remaining 10 items was 61%.

The allocation of items to factors is displayed in Table 9.3 including the wording of the items. The only non-conservative allocation decision was made for item #7. The three factors were labeled: Decision Strategy Satisfaction (Factor 1), Choice Option Satisfaction (Factor 2) and Affective Process Satisfaction (Factor 3).

This is identical to the labeling that fit the two separate questionnaire versions above (cf. section C.b).

Table 9.3 Final factoring solution for the Strategy Satisfaction Questionnaire (SSQ), 10 items.

Item #	Item Wording	Loadings to Factor Allocation Version 4		
		Factor 1	Factor 2	Factor 3
1	I am satisfied with the decision strategy I was instructed to use.			**1.07**
2	In everyday life, I would use the same decision strategy.	**0.93**		-0.21
3	I am satisfied that as a first step I thought about reasons for and against the options. // I am satisfied that as a first step I thought about a principle or a (life) maxim.	**0.71**		
4	I am satisfied that I used the reasons for and against the options as the basis for the decision. // I am satisfied that I used the principle / the (life) maxim as the basis for the decision.	**0.58**		
5	I found the process of weighing the reasons frustrating. // I found the process of choosing a principle / a (life) maxim frustrating.	--	--	--
6	The two choice options in the scenario were sufficient to make a good decision.		**1.09**	
7	I was satisfied with choosing an option according to a given procedure.	0.41	**0.32**	
8	I liked the options available.		**0.51**	
9	I found the decision-making process interesting.	--	--	--
10	I am confident that the decision strategy I was instructed to use generally leads to good decisions.	**0.81**		
11	The decision strategy I was instructed to use fits my values and opinions.	**0.64**		
12	I am confident that I would not regret this decision strategy.			**0.47**

Note. The cut-off for the display of loadings was set to 0.2; all loadings were rounded to two digits. Loadings in bold font signify their attribution to the respective factor.

D.b Reliability Analysis Analysis of the internal consistency of the final three-factor, 10-item scale showed moderate to high reliability in all three retained factors (cf. Table 9.4 for *Cronbach's alpha* and *Item Total Correlations*).[326]

[326] I am aware that standards for *Cronbach's alpha* are a matter of dispute in spite of the widely believed idea that anything above $\alpha > 0.7$ is fine. However, since this is exploratory work *and* these are very short scales, I do think that an $\alpha > 0.7$ is quite acceptable (cf. e.g. Cortina, 1993).

Table 9.4 Internal consistency coefficients for the final three scales of the Strategy Satisfaction Questionnaire (SSQ).

	Cronbach's alpha	Number of Items	Corrected Item Total Correlations
Strategy Satisfaction Questionnaire	0.87	10	0.47-0.74
Factor 1: Decision Strategy Satisfaction	0.84	5	0.63-0.67
Factor 2: Choice Option Satisfaction	0.76	3	0.54-0.63
Factor 3: Affective Process Satisfaction	0.70	2	0.54

E Best Single Scale – SSQ-S If one wanted to use the SSQ, but only a one-scaled version of it, which items should be chosen? The criterion was to maintain the highest possible Cronbach's α, as well as one-dimensionality. Therefore, in a successive process items were dropped and a subsequent factor analysis was conducted, the details of which can be found in the Appendix (cf. section B on page 610). The result was that the best single scale (SSQ-S) is identical to Factor 1 of the final SSQ. Thus, if one wanted to employ a simple, single-scaled version of the SSQ, named SSQ-S, it would be Factor 1 (5 items, $\alpha = 0.84$). The proportion of variance explained is 52%.

F Best Set of General Items for Future Research – SSQ-G Some of the items of the SSQ are very much tailored to the specifics of this Pilot Study. For them to be used in studies with other decision strategies given to participants would require major adjustments in item wording, which again would make the resulting factor structure rather unpredictable. Therefore, I constructed a scale with more general items to form SSQ-G.

The details of the construction of the SSQ-G can again be found in the Appendix (cf. section C on page 611). The resulting scale contained 5 items on two factors. Cumulative variance explained at the two-factor solution was 61%. Cf. Table 9.5 for items, their loadings, as well as reliability statistics. Reliability (internal consistency) of the total scale was $\alpha = 0.80$. The factors were labeled:

Factor 1 SSQ-G Personal Evaluation of Strategy Satisfaction

Factor 2 SSQ-G Overall Evaluation of Strategy Satisfaction

Table 9.5 Factoring solution and internal consistency coefficients for SSQ-G.

Item #	Item Wording	Loadings to Factor Allocation	
		Factor 1 Personal Evaluation	Factor 2 Overall Evaluation
1	I am satisfied with the decision strategy I was instructed to use.		1.04
2	In everyday life, I would use the same decision strategy.	0.88	
10	I am confident that the decision strategy I was instructed to use generally leads to good decisions.	0.71	
11	The decision strategy I was instructed to use fits my values and opinions.	0.61	
12	I am confident that I would not regret this decision strategy.		0.48
Cronbach's α		0.78	0.70
Item Total Correlations		0.61-0.64	0.54-0.54
Higher α if an item dropped		no	no

9.1.3 Summary

As based on previous research (Crossley & Highhouse, 2005; Schlegel et al., 2013; Zhang & Fitzsimons, 1999) a new measure of strategy satisfaction was constructed. This new measure contained 12 items, three of which referred to the specifics of "deciding by reasons" versus "deciding by principle" as the two decision strategies that participants had been instructed to use in the previous experimental part of the Pilot Study (chap. 8). Two items rather referred to satisfaction with the given choice options (#6 and #8). The remaining seven items referred to satisfaction with the employed decision strategy in a rather non-specific way.

First, the two questionnaire versions ("deciding by reasons" versus "deciding by principle") were analyzed separately. For both versions a three-factor solution was obtained. The loadings to factor allocations were very similar between the two versions, and most importantly the three items that differed between the two versions *did not* load onto different factors. Therefore, (i) it seemed justified to conduct further analyses with the complete data set and (ii) a common labeling of the three factors as valid to both questionnaire versions was possible. The three factors were thus labeled: (1) Decision Strategy Satisfaction, (2) Choice Option Satisfaction, and (3) Affective Process Satisfaction.

For the final factoring solution, two items (#5 and #9) were excluded, and the extraction of three factors was specified (cf. section D.a). These three factors could be

named identically to the three factors that resulted from the analyses of the separate questionnaire versions (see above). The final factoring solution for the Strategy Satisfaction Questionnaire (SSQ) thus included 10 items on 3 scales with quite satisfactory reliability coefficients each (cf. section D.b). Cumulative variance explained was 61%.

In an exploratory manner the best single scale version of the SSQ, thus named the SSQ-S, was determined. The SSQ-S consists of the 5 items of Factor 1 of the final SSQ with good reliability coefficients (cf. section E). The proportion of variance explained was 52%.

Last, a set of items most appropriate for future research on decision strategy satisfaction was gathered upon semantic criteria. These items were supposed to be rather non-specific regarding any strategy or choice option details. This general version of the SSQ, thus named the SSQ-G, consists of 5 items on 2 factors with satisfactory reliability coefficients each (cf. Table 9.5). The two factors were named: (1) Personal Evaluation of Strategy Satisfaction and (2) Overall Evaluation of Strategy Satisfaction. Cumulative variance explained was 61%.

Cf. section 8.4.1 within the Pilot Study where the Strategy Satisfaction Questionnaire (SSQ) is used to refine the results of the pilot experiment. That is, it is used to perform a repeated measures analysis regarding satisfaction (pre and post outcome), where *Strategy satisfaction* from chapter *Pilot Study* (chap. 8) will serve as the pre-outcome satisfaction measure and the first factor of the SSQ will serve as the post-outcome satisfaction measure.

9.2 Decision Style Questionnaire (DSQ)

Despite the frequent use of the term "strategy" in decision research, it is rarely defined. According to Jungermann et al. (2005), decision rules or strategies are "processes of information processing and information evaluation" (p. 119, my transl.), or "the way in which information about options is processed and in which a choice is made between options" (p.279, my transl.). For an early definition, see e.g. Beach and Mitchell (1976). In classical decision research, heuristics (cf. e.g. Gigerenzer & Gaissmaier, 2011) and normative models (such as WADD, TTB, etc.) are usually referred to as "strategies".

But there is another perspective on strategies of decision making – namely from the standpoint of differential or personality psychology. Here, one speaks of "decision styles", defined as a habitual pattern individuals use in decision making (M. J. Driver, 1979).

At the time of the design of this study (2015), three questionnaires for measuring decision making styles could be found in the literature (Leykin & DeRubeis, 2010; Mann et al., 1998; Scott & Bruce, 1995). They overlap widely in content in that many items are even identical in wording, and several factors are identical in naming. However, they do use different quantities of items (and factors), and thus depict differing sets of aspects. See section A for a short overview.

9.2.1 Method

9.2.1.1 Procedure

Cf. section 8.2.1 within the Pilot Study.

9.2.1.2 Materials

A Previous Decision Style Questionnaires Here is a short overview of the amount of items and factors, as well as their naming, that previous decision style questionnaires have used. Cf. Table 9.6 for a tabular version.

(i) Scott and Bruce (1995)
24 items, 5 factors: rational, intuitive, spontaneous, dependent, avoidant

(ii) Mann et al. (1998)
22 items, 4 factors: vigilance, buck-passing, procrastination, hypervigilance

(iii) Leykin and DeRubeis (2010)
43 items, 9 factors: vigilant, intuitive, spontaneous, dependent, avoidant, anxious, confident, respected, brooding

10	anxious	--	--	5
11	confident	--	--	5
12	respected	--	--	2
13	brooding	--	--	5
	Total # of Items	**24**	**22**	**43**

Table 9.6 Scales of previous decision style questionnaires.

		Scott & Bruce, 1995	Mann et al., 1997	Leykin & DeRubeis, 2010
Decision Style Questionnaire Scales			**# of Items**	
1	rational	4	--	--
2	vigilant	--	6	6
3	intuitive	5	--	5
8	spontaneous	5	--	4
4	dependent	5	--	6
5	buck-passing	--	6	--
6	avoidant	5	--	5
7	procrastination	--	5	--
9	hyper-vigilant	--	5	--
10	anxious	--	--	5
11	confident	--	--	5
12	respected	--	--	2
13	brooding	--	--	5
	Total # of Items	**24**	**22**	**43**

B A New Measure of Decision Style The three questionnaires were translated into German. After the exclusion of duplicates, 60 items remained. Cf. Table 9.7 for all included items, their origin and their translation. All items were scored on a 5-point Likert scale from 1 "stimme gar nicht zu" [do not agree at all] to 5 "stimme absolut zu" [do absolutely agree].

Table 9.7 Origin of the 60 items of the Decision Style Questionnaire (DSQ).

	Origin			60 Items	Differences to		
Item #	Scott & Bruce, 1995; 5 factors, 24 items	Mann et al., 1997; 4 factors, 22 Items	Leykin & DeRubeis, 2010; 9 factors, 43 Items	Scott & Bruce, 1995	Mann et al., 1997	Leykin & DeRubeis, 2010	Final Translation
1	rational			I double-check my information sources to be sure I have the right facts before making decisions.	---	---	Bevor ich Entscheidungen treffe, überprüfe ich meine Informationsquellen genau, um sicherzugehen, dass ich die richtigen Fakten habe.
2	rational			I make decisions in a logical and systematic way.	---	---	Ich treffe Entscheidungen auf logische und systematische Weise.
3	rational	vigilance	vigilant	My decision making requires careful thought.	I take a lot of care before choosing.	like Scott & Bruce	Wenn ich Entscheidungen treffe, denke ich gründlich nach.
4	rational		vigilant	When making a decision, I consider various options in terms of a specified goal.	---	like Scott & Bruce	Beim Entscheiden ziehe ich verschiedene Optionen in Betracht mit Hinblick auf ein bestimmtes Ziel.
5		vigilance	vigilant	--- I like to consider all of the alternatives.		like Mann et al.; without 'of'	Ich erwäge gerne alle Alternativen.
6		vigilance		--- I try to find out the disadvantages of all alternatives.		---	Ich versuche die Nachteile aller Alternativen herauszufinden.
7		vigilance		--- I consider how best to carry out a decision.		---	Ich überlege, wie man am besten eine Entscheidung fällt.
8		vigilance	vigilant	--- When making decisions I like to collect a lot of information.		like Mann et al.; 'lots of'	Wenn ich Entscheidungen treffe, sammle ich gerne viele Informationen.
9		vigilance	vigilant	--- I try to be clear about my objectives before choosing.		like Mann et al.	Ich versuche mir über meine Ziele klar zu sein, bevor ich eine Wahl treffe.
10			vigilant	--- I weigh the pros and cons of each option before I make a decision.	---		Ich wäge die Vor- und Nachteile jeder Option ab, bevor ich eine Entscheidung fälle.
11	intuitive		intuitive	When making decisions, I rely upon my instincts.	---	like Scott & Bruce	Wenn ich Entscheidungen treffe, verlasse ich mich auf meinen Instinkt.
12	intuitive		intuitive	When I make decisions, I tend to rely on my intuition.	---	like Scott & Bruce	Beim Entscheiden tendiere ich dazu, mich auf meine Intuition zu stützen.
13	intuitive			I generally make decisions that feel right to me.	---	---	Im Allgemeinen entscheide ich mich so, dass es sich richtig für mich anfühlt.
14	intuitive		intuitive	When I make a decision, it is more important for me to feel the decision is right than to have a rational reason for it.	---	like Scott & Bruce	Wenn ich eine Entscheidung treffe, ist es wichtiger für mich, das Gefühl zu haben, dass die Entscheidung richtig ist, als einen rationalen Grund dafür zu haben.
15	intuitive		intuitive	When making a decision, I trust my inner feelings and reactions.	---	like Scott & Bruce	Beim Entscheidungentreffen vertraue ich auf meine Gefühle und inneren Reaktionen.
16	de-pendent		de-pendent	I often need the assistance of other people when making important decisions.	---	like Scott & Bruce; without 'often'	Ich brauche oft die Hilfe anderer Leute bei wichtigen Entscheidungen.
17	de-pendent		de-pendent	I rarely make important decisions without consulting other people.	---	When I need to make a decision, I consult family or friends.	Wenn ich eine Entscheidung treffen muss, ziehe ich Familie oder Freunde hinzu.
18	de-pendent		de-pendent	If I have the support of others, it is easier for me to make important decisions.	---	like Scott & Bruce	Wenn ich die Unterstützung Anderer habe, ist es einfacher für mich wichtige Entscheidungen zu treffen.
19	de-pendent		de-pendent	I use the advice of other people in making my important decisions.	---	like Scott & Bruce	Ich nutze den Rat anderer Leute beim Fällen wichtiger Entscheidungen.
20	de-pendent		de-pendent	I like to have someone steer me in the right direction when I am faced with important decisions.	---	like Scott & Bruce	Ich habe gerne jemanden, der mir die richtige Richtung weist, wenn ich mit wichtigen Entscheidungen konfrontiert bin.

(Continued on next page.)

Table 9.7 (Continued.)

21		buck-passing		--- I prefer to leave decisions to others.		---	Ich ziehe es vor, Entscheidungen anderen zu überlassen.
22		buck-passing		--- I do not like to take responsibility for making decisions.		---	Ich übernehme nicht gern die Verantwortung für das Treffen von Entscheidungen.
23		buck-passing		--- If a decision can be made by me or another person I let the other person make it.		---	Wenn eine Entscheidung von mir oder von einer anderen Person gefällt werden kann, dann lasse ich die andere Person sie treffen.
24		buck-passing		--- I prefer that people who are better informed decide for me.		---	Ich ziehe es vor, dass Leute, die besser informiert sind, für mich entscheiden.
25			de-pendent	--- I do not seek advice from others when I make decisions. (R)	---		Ich suche keinen Rat von Anderen wenn ich Entscheidungen treffe.
26	avoidant	buck-passing	avoidant	I avoid making important decisions until the pressure is on.	I do not make decisions unless I really have to.	like Mann et al.	Ich fälle keine Entscheidungen, bevor ich es wirklich muss.
27	avoidant	procras-tination	avoidant	I postpone decision making whenever possible.	I put off making decisions.	like Scott & Bruce	Ich verschiebe das Entscheiden wann immer möglich.
28	avoidant		avoidant	I often procrastinate when it comes to making important decisions.	---	like Scott & Bruce; without 'often'	Ich trödele oft, wenn wichtige Entscheidungen anstehen.
29	avoidant			I generally make important decisions at the last minute.	---	---	Zumeist treffe ich wichtige Entscheidungen erst in letzter Minute.
30	avoidant		avoidant	I often put off making many decisions because thinking about them makes me uneasy.	---	like Scott & Bruce; without 'often'	Ich schiebe Entscheidungen oft auf die lange Bank, denn an sie zu denken beunruhigt mich.
31		buck-passing		--- I avoid making decisions.		---	Ich vermeide es, Entscheidungen zu fällen.
32		procras-tination		--- I waste a lot of time on trivial matters before getting to the final decision.		---	Ich verschwende viel Zeit mit trivialen Dingen, bevor ich zu der letztlichen Entscheidung komme.
33		procras-tination		--- Even after I have made a decision I delay acting upon it.		---	Selbst nachdem ich eine Entscheidung getroffen habe, zögere ich es hinaus, danach zu handeln.
34		procras-tination		--- When I have to make a decision I wait a long time before starting to think about it.		---	Wenn ich eine Entscheidung treffen muss, warte ich lange Zeit, bevor ich anfange, darüber nachzudenken.
35		procras-tination		--- I delay making decisions until it is too late.		---	Ich schiebe das Entscheiden auf, bis es zu spät ist.
36			avoidant	--- I worry that making a decision will close out other options, so I postpone the decision.	---		Ich sorge mich, dass das Treffen einer Entscheidung andere Optionen ausschließt, also verschiebe ich die Entscheidung auf später.
37	spon-taeous		spon-taeous	I generally make snap decisions.	---	My decisions are spontaneous.	Meine Entscheidungen sind spontan.
38	spon-taeous		spon-taeous	I often make decisions on the spur of the moment.	---	like Scott & Bruce	Ich treffe Entscheidungen oft der Eingebung des Augenblicks folgend.
39	spon-taeous		spon-taeous	I make quick decisions.	---	I make decisions quickly.	Ich fälle Entscheidungen schnell.
40	spon-taeous		spon-taeous	I often make impulsive decisions.	---	like Scott & Bruce; without 'often'	Ich treffe oft impulsive Entscheidungen.
41	spon-taeous		intuitive	When making decisions I do what feels natural at the moment.	---	like Scott & Bruce; 'seems' instead of 'feels'	Wenn ich Entscheidungen treffe, tue ich das, was mir gerade natürlich erscheint.
42		hyper-vigilance		--- Whenever I face a difficult decision I feel pessimistic about finding a good solution.		---	Immer wenn ich einer schwierigen Entscheidung begegne, bin ich pessimistisch, dass sich eine gute Lösung finden lässt.

(Continued on next page.)

Table 9.7 (Continued.)

43	hyper-vigilance	anxious	--- I feel as if I am under tremendous time pressure when making decisions.		like Mann et al.	Ich fühle mich beim Entscheiden als sei ich unter gewaltigem Zeitdruck.
44	hyper-vigilance	brooding	--- The possibility that some small thing might go wrong causes me to swing abruptly in my preference.		like Mann et al.; 'to change my mind abruptly'	Die Möglichkeit, dass irgend eine Kleinigkeit schief gehen könnte, führt dazu, dass ich mich abrupt anders besinne.
45	hyper-vigilance	anxious	--- I cannot think straight if I have to make a decision in a hurry.		like Mann et al.; 'decisions' (plural)	Ich kann keinen geraden Gedanken fassen, wenn ich eine Entscheidung in Eile treffen muss.
46	hyper-vigilance		--- After a decision is made I spend a lot of time convincing myself it was correct.		---	Nachdem eine Entscheidung getroffen ist, verbringe ich viel Zeit damit, mich selbst zu überzeugen, dass sie korrekt war.
47		anxious	--- I feel very anxious when I need to make a decision.	---		Ich bin nervös, wenn ich eine Entscheidung fällen muss.
48		anxious	--- I panic when I think that my decision might be wrong.	---		Ich kriege Panik, wenn ich daran denke, dass meine Entscheidung falsch sein könnte.
49		anxious	--- When making a decision, I am afraid that I might be wrong.	---		Wenn ich entscheide, habe ich Angst, dass ich falsch liegen könnte.
50		confident	--- I have faith in my decisions.	---		Ich habe Vertrauen in meine Entscheidungen.
51		confident	--- I don't trust my ability to make important decisions. (R)	---		Ich vertraue meiner Fähigkeit wichtige Entscheidungen zu fällen nicht.
52		confident	--- I feel confident about my ability to make decisions.	---		Ich bin überzeugt von meiner Fähigkeit Entscheidungen zu treffen.
53		confident	--- I feel inferior to most people in making decisions. (R)	---		Ich fühle mich den meisten Leuten bzgl. des Entscheidens unterlegen.
54		confident	--- I think I am a good decision maker.	---		Ich glaube, ich bin ein guter Entscheider.
55		respected	--- My friends or family seek my advice when they have to make important decisions.	---		Meine Familie oder Freunde suchen meinen Rat, wenn sie wichtige Entscheidungen treffen müssen.
56		respected	--- Others seek my help in making their decisions.	---		Andere ersuchen meine Hilfe, wenn sie ihre Entscheidungen fällen.
57		brooding	--- I think about all the bad decisions I have made in my life.	---		Ich denke oft an all die schlechten Entscheidungen, die ich in meinem Leben getroffen habe.
58		brooding	--- Whenever I make a choice, I try to get information about how the other alternatives turned out.	---		Immer wenn ich eine Wahl getroffen habe, denke ich darüber nach, wie die anderen Optionen ausgegangen wären.
59		brooding	--- If I make a choice and it turns out well, I still feel like something of a failure if I find out that another choice would have turned out even better.	---		Wenn ich eine Wahl treffe und sie gut ausgeht, fühle ich mich dennoch wie ein Versager, wenn ich herauskriege, dass eine andere Option ein besseres Ergebnis erbracht hätte.
60		brooding	--- When I make decisions, my top priority is to not get "burned."	---		Wenn ich Entscheidungen treffe, ist meine oberste Priorität, mir nicht die Finger zu verbrennen.

Note. The first column numbers the items, no matter their origin. The next three columns "Origin" give the name of the factor the item was allocated to in the three original studies; if blank, the respective item was not included. All items are listed in full wording in the next column entitled "Scott & Bruce". If an item was part of this study, it is printed on grey background; if it was not, it is marked with three dashes "-" on blank background. The same holds for the following two columns, where grey background signifies that the item was part of the respective study and additionally differences in wording are noted. The last column presents the final German translation.

Based on the naming of the factors/scales by the respective authors, *prima facie* 13 factors/scales come into view: rational, vigilant, intuitive, dependent, buck-passing, avoidant, procrastination, spontaneous, hyper-vigilant, anxious, confident, respected, brooding. However, there are several categories whose items have notable semantic similarities, namely (1) "rational" and "vigilant", (2) "buck-passing", "dependent", and "avoidant", and (3) "hyper-vigilant", "anxious", and "brooding". Especially the two subscales mentioned in [1], *rational* and *vigilant*, seem prone to collapse into one scale only. Therefore, from a theoretical point of view, a maximum of 12 factors can be expected.

9.2.1.3 Participants

Cf. section 8.2.2.

The number of complete cases for the Decision Style Questionnaire (DSQ) was $N = 145$ which accords with the total number of participants after filtering for diligence (cf. section 8.2.2).

9.2.2 Results

9.2.2.1 Psychometric Validation

A Data Analytical Procedure The relatively large amount of items of the Decision Style Questionnaire (DSQ) made it necessary to rely more on the results provided by factor analytical practices as well as to stringently adhere to guidelines and quality criteria, since it would have been impossible to simply try out and compare various options (as done in the case of the Strategy Satisfaction Questionnaire (SSQ)).

First, as done with the SSQ and recommended by most sources (cf. e.g. Mueller, 2019), maximum likelihood (ML) was used as optimization method,[327] and *promax* as an oblique rotation.

Second, the following criteria were used:[328]

1. **Factorability.** The factorability of the data set was determined by the *Kaiser-Meyer-Olkin Index* (Kaiser & Rice, 1974) as well as by *Bartlett's Test of Sphericity* (Bartlett, 1950), yet only for the initial and the final set of items.

2. **Factor retention.** To determine the number of factors to retain and evaluate goodness of fit, *Parallel Analysis* (Horn, 1965) as well as the (apparently otherwise unnamed, cf. e.g. Kenny, 2020; Ruscio & Roche, 2012) *Chi-Squared Test* were used.[329] However, similar to their use with the SSQ, they led to very different results: the number of factors required by the *chi-squared test* was usually quite

[327] ML also brings the advantage to be able to provide a large array of goodness of fit measures (cf. e.g. Fabrigar, Wegener, MacCallum, & Strahan, 1999, p. 277).

[328] For a very interesting overview and useful best practice recommendations cf. Worthington and Whittaker (2006, esp. pp. 832-834).

[329] The function fa{psych} calls this test *Likelihood Chi Square*.

high.[330]
Therefore, as usually suggested in the literature (cf. e.g. Cabrera-Nguyen, 2010; Fabrigar et al., 1999), multiple criteria were used. After a review of the literature (e.g. Costello & Osborne, 2005; Courtney & Gordon, 2019; Fabrigar et al., 1999; Finch, 2020; Goretzko, Pham, & Bühner, 2021; Howard, 2016; D. L. Jackson, Gillaspy Jr., & Purc-Stephenson, 2009; Ruscio & Roche, 2012; Watkins, 2018; Worthington & Whittaker, 2006; Yaşlioğlu & Yaşlioğlu, 2020), apart from parallel analysis and *chi-squared test*, the follwing further procedures were chosen: *Root Mean-Square Error of Approximation* (RMSEA, Steiger, 2016; Steiger & Lind, 1980), *Minimum Average Partial* (MAP, Velicer, 1976), *Comparison Data* (CD, Ruscio & Roche, 2012), and *Very Simple Structure* (VSS, Revelle & Rocklin, 1979).[331]
Furthermore, variance accounted for/cumulative variance explained at various factoring solutions will be reported as an intuitive descriptive criterion as well as recommended by e.g. Goretzko et al. (2021, p. 3517).

3. **Item deletion.** Item deletion will be an important part of creating a final version of the DSQ, since 60 items are uncomfortably many to be rated by participants. The following criteria will be used, the EFA will be rerun after each step:
   a) Factors with less than three items will be deleted unless the two items correlate highly with $r > 0.70$ and are relatively uncorrelated with other items.[332]
   b) Items with factor loadings less than 0.32[333] or a communality of less than 0.40[334] will be deleted.
   c) Crossloading items that load at 0.32 or higher on two or more factors will be deleted, as well as crossloading items with less than 0.15 difference to the highest loading. Crossloading items are to be avoided in order to approximate simple structure.[335]

[330] Cf. e.g. Mueller (2019) on this point: "You can also use the goodness-of-fit statistics reported in the model. Many times, the challenge is that in order to get a model whose goodness-of-fit is large enough to satisfy the basic advice, you need to add more factors than are really interpretable." (Mueller, 2019, section "Choosing the right number of factors and evaluating goodness of fit").
[331] CD analysis was conducted by the R function CD{EFAtools}; VSS, MAP, and RMSEA are part of the output of vss{psych}. Furthermore, fa{psych} was used to obtain confidence intervals for the RMSEA index. The function vss{psych} requires entering a maximum number of factors to test for retention. Here, 12 factors were entered, since this was the maximum number of factors that could theoretically be expected, given that 13 scales (with one especially strong overlap) formed the basis of the 60 items of the initial version of the Decision Style Questionnaire (DSQ), cf. section B. The VSS function was thus specified such: *VSS (DecStyleQ, fm = "mle", rotate = "promax", n.obs* $= 145, n = 12$).
[332] Cf. e.g. Worthington and Whittaker (2006, p. 821).
[333] This cut-off value gets oftentimes cited (cf. e.g. Cabrera-Nguyen, 2010; Costello & Osborne, 2005; Worthington & Whittaker, 2006), and it is attributed to Tabachnick and Fidell (2001).
[334] Cf. e.g. Costello and Osborne (2005); Worthington and Whittaker (2006) for this criterion.
[335] Cf. e.g. Cabrera-Nguyen (2010); Costello and Osborne (2005); Worthington and Whittaker (2006) for these cut-off values.

4. **Scale-length optimization.** Based on reliability analyses, further items will be dropped from each factor/scale in order to achieve a good trade-off between (short) scale length and (high) internal consistency. The EFA will be rerun afterwards.[336]

B Factorability The overall MSA was $MSA_{overall} = 0.86$. The item MSAs lay between $MSA_{item(lowest)} = 0.59$ and $MSA_{item(highest)} = 0.94$, thus no item fell short of an $MSA > 0.5$. Considering the large number of items in relation to the low number of participants with a subject-to-item ratio of about 2.5:1, this is a very good result.[337] Bartlett's test of sphericity was significant, $\chi^2(1770) = 5759.9$, $p < 0.001$.

C Factor Retention

a) **Parallel analysis.** Parallel analysis suggested 6 factors.[338] Cf. Figure 9.2 for the according scree plot. Six factors obtained an eigenvalue >1, and twelve components obtained an eigenvalue >1. Cumulative variance explained at 6 factors was 49%.

b) **Chi-squared test.** The *chi-squared test* that six factors are sufficient did reject a six-factor solution, $\chi^2(1425) = 1822.1$, $p < 0.001$. Therefore, the number of factors was increased successively up to the point where the *chi-squared test* was not significant.[339] This was the case, once eleven factors were specified, $\chi^2(1165) = 1233.1$, $p = 0.081$. Cumulative variance explained at 11 factors was 59%.

c) **RMSEA.** The RMSEA achieved a minimum of 0.015 at 12 factors (i.e. at the maximum number of factors entered), 90% CI [0, 0.029].[340] Cumulative variance explained at 12 factors was 61%. However, the RMSEA value only rose to a level of >0.05 at four factors or less.

d) **MAP.** The MAP achieved a minimum of 0.01 with 8 factors.[341] Cumulative variance explained at 8 factors was 52%.

e) **CD.** Comparison Data (CD) analysis suggested 6 factors – as did parallel analysis above.[342] Cumulative variance explained at 6 factors was 49%.

[336] Cf. e.g. Worthington and Whittaker (2006, p. 824).

[337] Cf. footnote 322 on the interpretation of the MSA; cf. e.g. Osborne and Costello (2004) for a discussion of minimum absolute sample size versus subject-to-item ratio as a quality criterion for EFA/PCA; cf. e.g. Budaev (2010) for a (positive) evaluation of the usefulness of the KMO test.

[338] The R function used was fa.parallel{psych}, specifying factor analysis (fa="fa"), and maximum likelihood as factoring method (fm = 'ml').

[339] Cf. e.g. Ruscio and Roche (2012, p. 285) for this procedure.

[340] "Values for the root mean square error of approximation (RMSEA) at or less than .05 indicate close model fit, which is customarily considered acceptable." (Worthington & Whittaker, 2006, p. 828).

[341] MAP is a widely used criterion; cf. e.g. Howard (2016, p. 54) on how it works. The number of factors to retain is determined by the index minimum. On the one hand, MAP is listed as one of the "most accurate empirical estimates of the number of factors to retain" (Watkins, 2018, p. 230), on the other hand it is criticized for having been created for PCA rather than CFA, cf. e.g. Goretzko et al. (2021, p. 3517).

[342] Cf. e.g. Goretzko et al. (2021, p. 3516) for a short explanation of the procedure or Ruscio and Roche (2012) for the original publication.

f) **VSS.** VSS complexity 1 achieved a maximum of 0.75 with 2 factors, and VSS complexity 2 achieved a maximum of 0.85 with 3 factors.[343] Cumulative variance explained at 2 factors was 36%, and 41% at 3 factors.

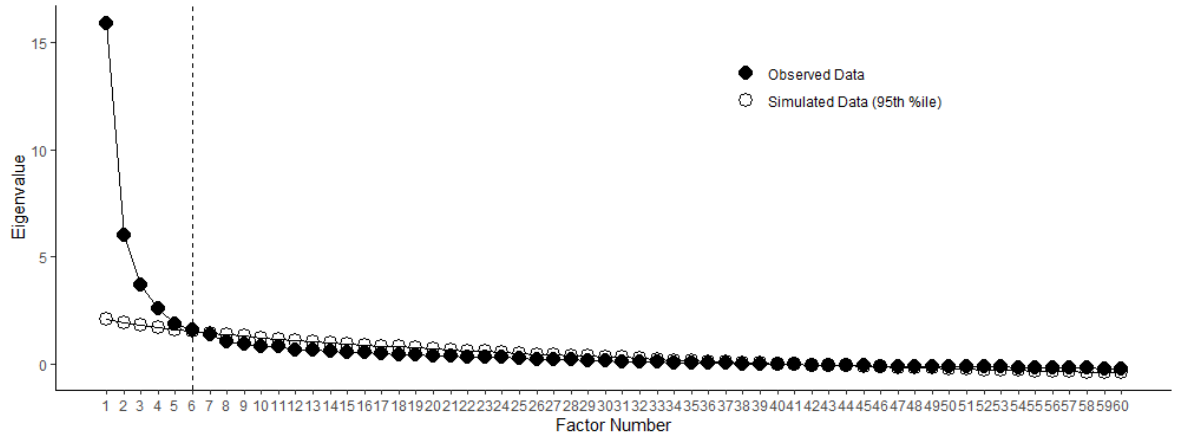


Figure 9.2 Scree plot of the Decision Style Questionnaire (DSQ).

C.a Summary and Factor Retention Decision Among the six reported indices, the *chi-squared test* suggested the highest number of 11 factors. VSS suggested the lowest number of 2 or 3 factors, however it is known to make rigid assumptions that may lead to poor performance (cf. e.g. Golino & Epskamp, 2017, section "Conclusion"). At least from a theoretical standpoint, given that 13 scales were included (cf. footnote 331), three or less factors seem unlikely to be optimal to the data set. Parallel analysis and CD analysis both suggested 6 factors, and MAP suggested 8 factors. The RMSEA only fell below a cut-off of 0.05 at four factors or less. Given this quite mixed picture, still a decision has to be made. Since PA, CD, and MAP seem to usually gain among the highest praise in the literature, I will go for 6 factors – with the declared attempt to reduce items.

D Factor Structure A maximum-likelihood (ML) factor analysis was performed; *promax* was chosen as an oblique rotation method.[344]

D.a Initial Solution One factor included only two items (items #55 and #56). These two items were indeed the only two items that belonged to the scale "respected" (cf. Table 9.7). Their correlation was $r = 0.86$, thus above the cut-off of >0.70. The correlation of that respective factor with the other factors was between $r = -0.17$ and $r = -0.41$.[345] Since the two items did theoretically and semantically belong to

[343] The documentation did not explain the difference between the two complexity levels.

[344] The R package fa{psych} was used with the following specifications: *fa (DecStyleQ, fm = "mle", rotate = "promax", nfactors = 6)*.

[345] Upon the function factanal{stats}, specified as $factanal(DecStyleQ, factors = 6, rotation = "promax")$, the respective factor showed correlations between $r = 0.13$ and $r = -0.74$ with the other factors. This is a substantial difference, which I am unable to solve. Loadings and factor allocations between the two factor analysis functions were very similar.

an independent scale, they were deleted and the factor analysis was repeated including foregoing PA and CD analysis to determine factor retention. The mean of communalities at 6 factors and 60 items was $M_{h^2} = 0.51$.

D.b Second Solution After Factor Deletion PA and CD agreed on the suggestion of again 6 factors. The second solution did not include a factor with less than three items; the factor with the least items had four items. There was one item (item #53) that only showed factor loadings <0.32. Nine further items had communalities <0.40 (items #1, #7, #9, #14, #18, #25, #34, #59, #60). Of these five items had loadings <0.50 and the remaining items did not exceed loadings of 0.70. None of these ten items stuck out semantically, and they belonged to different scales (cf. Table 9.7).[346]

Furthermore, there were nine crossloading items (items #6, #13, #14, #22, #33, #39, #43, #52, #53), of which two items doubled with the previous categories (items #14, #53).[347] Therefore, seventeen items were marked for deletion. The factor analysis was repeated including foregoing PA and CD analysis to determine factor retention. The mean of communalities at 6 factors and 58 items was $M_{h^2} = 0.52$.

D.c Third and Pre-Final Solution After Item Deletion Based on Loadings, Communalities, and Crossloadings PA and CD agreed on the suggestion of 6 factors again. Factor 5 and 6 had few items with four and three items respectively. There were no items with loadings <0.32; the lowest loadings were those of items #20 (with 0.35) and #54 (with -0.34); the next-lowest loading was 0.52 (item #45). There were no crossloadings (with loadings <0.3 not displayed). Three items had communalities <0.40, namely items #4 (0.39), #45 (0.37), and #57 (0.39). I decided to not delete them in order to avoid more factoring solutions. The mean of communalities at 6 factors and 41 items was $M_{h^2} = 0.56$; cumulative variance explained was 56%. Cf. Table 9.8 for factor loadings. Intercorrelations of factors are displayed in Table 9.9.

[346] As described in point [3] on item deletion a new EFA would be required at this point. However, this step will be skipped and the next step – deletion of crossloading items – will be performed on the initial solution as well. The reason is this: I scrutinized the difference between a new EFA after just deleting items with low loadings and communalities (as marked above) and an EFA after deleting these items *and* crossloading items in one go. The result was that exactly the same items did crossload and were marked for deletion even when skipping the additional EFA.

[347] All nine crossloading items crossloaded on only two factors with loadings >0.3 (cut-off for display). Three of these nine items did not crossload with >0.32 on both factors, but the difference between the two loadings (or: the difference from the highest loading) was <.15; cf. point [3] on item deletion.

Table 9.8 Pre-final factoring solution for the Decision Style Questionnaire (DSQ).

			Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
#	Abbreviated Item Label	Previous Factor Label	anxious / confident	avoidant / procrastinating	intuitive / spontaneous	rational / vigilant	dependent	buck-passing
1	double-check information	rational	--	--	--	--	--	--
2	logical and systematic way	rational				0.60		
3	requires careful thought	rational/ vigilant				0.63		
4	various options, specified goal	rational/ vigilant				0.60		
5	consider all alternatives	vigilant				0.61		
6	find out disadvantages	vigilant	--	--	--	--	--	--
7	how to best carry out	vigilant	--	--	--	--	--	--
8	collect a lot of information	vigilant				0.79		
9	clear about objectives	vigilant	--	--	--	--	--	--
10	weigh the pros and cons	vigilant				0.68		
11	rely upon instincts	intuitive			0.80			
12	rely on intuition	intuitive			0.81			
13	decisions that feel right	intuitive	--	--	--	--	--	--
14	feel right more important than rational reason	intuitive	--	--	--	--	--	--
15	trust inner feelings + reactions	intuitive			0.71			
16	need assistance of others	dependent					0.60	
17	not without consulting others	dependent					0.93	
18	easier with support of others	dependent	--	--	--	--	--	--
19	use the advice of others	dependent					0.79	
20	like someone to steer me	dependent					0.36	
21	prefer to leave dec. to others	buck-passing						0.80
22	don't like to take responsibility	buck-passing	--	--	--	--	--	--
23	rather let other person make dec.	buck-passing						0.67
24	better informed others decide	buck-passing						0.62
25	don't seek advice from others	dependent (r)	--	--	--	--	--	--
26	avoid dec. until pressure	avoidant/ buck-passing		0.71				
27	postpone dec. when possible	avoidant/ procrastinating		0.83				
28	often procrastinate	avoidant		0.82				
29	make dec. at the last minute	avoidant		0.89				
30	put off dec. because uneasy	avoidant		0.88				
31	avoid making dec.	buck-passing		0.69				
32	waste a lot of time before	procrastinating		0.74				

(Continued on next page.)

Table 9.8 (Continued.)

33	after dec. delay acting upon	procrastinating	--	--	--	--	--	--
34	wait long before starting to think	procrastinating	--	--	--	--	--	--
35	delay dec. until it is too late	procrastinating		0.54				
36	worry dec. will close out options	avoidant		0.73				
37	generally make snap dec.	spontaneous			0.56			
38	dec. on the spur of the moment	spontaneous			0.70			
39	make quick dec.	spontaneous	--	--	--	--	--	--
40	often impulsive dec.	spontaneous			0.56			
41	do what feels natural at present	intuitive/ spontaneous			0.74			
42	feel pessimistic about solution	hyper-vigilant	0.54					
43	feel under tremendous time pressure	hyper-vigilant/ anxious	--	--	--	--	--	--
44	swing abruptly in my preference	hyper-vigilant/ brooding	0.64					
45	cannot think straight in hurry	hyper-vigilant/ anxious	0.52					
46	after dec. need convincing myself	hyper-vigilant	0.59					
47	feel anxious when need to dec.	anxious	0.56					
48	panic when think dec. wrong	anxious	0.89					
49	afraid that might be wrong	anxious	0.73					
50	have faith in my dec.	confident	-0.69					
51	don't trust my ability	confident (r)	-0.60					
52	feel confident about ability	confident	--	--	--	--	--	--
53	feel inferior to others making dec.	confident (r)	--	--	--	--	--	--
54	am a good dec. maker	confident	-0.34					
55	others seek my advice	respected			deleted			
56	others seek my help	respected			deleted			
57	think of all my bad decisions	brooding	0.69					
58	how the other alternatives turned out	brooding	0.63					
59	feel like failure if another choice better	brooding	--	--	--	--	--	--
60	top priority not to get 'burned'	brooding	--	--	--	--	--	--

Note. All 60 items were included in the table. Items excluded from the pre-final factoring solution beforehand were set on dark grey background. Factor loadings of included items are rounded to two digits; loadings <0.3 are not displayed.

```
2   1.00   0.71 -0.10   0.05   0.23   0.52
1   0.71   1.00 -0.16   0.15   0.42   0.50
3  -0.10  -0.16  1.00  -0.34  -0.18  -0.25
4   0.05   0.15 -0.34   1.00   0.26   0.09
5   0.23   0.42 -0.18   0.26   1.00   0.26
6   0.52   0.50 -0.25   0.09   0.26   1.00
```

Table 9.9 Intercorrelations of factors of the third and pre-final factoring solution for the Decision Style Questionnaire (DSQ).

Factor Label	Intercorrelations				
	1	2	3	4	5
Factor 1: anxious / confident					
Factor 2: avoidant / procrastination	0.71				
Factor 3: intuitive / spontaneous	-0.16	-0.10			
Factor 4: rational / vigilant	0.15	0.05	-0.34		
Factor 5: dependent	0.42	0.23	-0.18	0.26	
Factor 6: buck-passing	0.50	0.52	-0.25	0.09	0.26

Cronbach's alpha | Number of Items | Corrected Item Total Correlations

Decision Style Questionnaire – pre-final	0.93	41	0.12-0.71
Factor 1: anxious / confident	0.91	12	0.56-0.77
Factor 2: avoidant / procrastinating	0.93	9	0.65-0.84
Factor 3: intuitive / spontaneous	0.87	7	0.58-0.73
Factor 4: rational / vigilant	0.83	6	0.51-0.70
Factor 5: dependent	0.81	4	0.52-0.70
Factor 6: buck-passing	0.85	3	0.63-0.81

Note. Intercorrelations of ≥ 0.50 are displayed on grey background.

E Reliability Analysis Analysis of the internal consistency of the above third and pre-final factoring solution revealed high reliabilities for all six scales (cf. Table 9.10).[348]

Table 9.10 Internal consistency coefficients for the pre-final six scales of the Decision Style Questionnaire (DSQ).

	Mean (SD)	Number of Items	Cronbach's alpha	Corrected Item Total Correlations
Decision Style Questionnaire – pre-final		**41**	**0.93**	**0.12-0.71**
Factor 1: anxious / confident	2.72 (0.83)	12	0.91	0.51-0.77
Factor 2: avoidant / procrastinating	2.68 (0.98)	9	0.93	0.65-0.84
Factor 3: intuitive / spontaneous	3.23 (0.76)	7	0.87	0.58-0.73
Factor 4: rational / vigilant	4.03 (0.67)	6	0.83	0.51-0.70
Factor 5: dependent	3.52 (0.83)	4	0.81	0.52-0.70
Factor 6: buck-passing	2.47 (1.00)	3	0.85	0.63-0.81

The above scales contain 12, 9, 7, 6, 4 and 3 items. Especially with longer scales it is oftentimes the case that several items can be dropped without a major – or any – loss in internal consistency (*Cronbach's alpha*). Therefore, the aim of the following procedure is to find a trade-off between high internal consistency and short scales.

E.a Scale-Length Optimization Decisions on dropping items were based on "reliability if an item is dropped", *corrected item total correlations* ("r.drop"), and semantic criteria (in that order).

Factor 5 and Factor 6 increased in internal consistency with dropping items, and therefore went from four and three items to only two items each. Factors 2, 3 and 4 could

[348] Reliability analysis was conducted using the R function alpha{psych}.

	Cronbach's alpha (change)	Number of Items (change)	Corrected Item Total Correlations
Decision Style Questionnaire – final	**0.89 (-4)**	**24 (-17)**	**0.19-0.68**
Factor 1: anxious / confident	0.86 (-5)	5 (-7)	0.63-0.74
Factor 2: avoidant / procrastinating	0.92 (-1)	5 (-4)	0.75-0.84
Factor 3: intuitive / spontaneous	0.86 (-1)	5 (-2)	0.59-0.76
Factor 4: rational / vigilant	0.82 (-1)	5 (-1)	0.57-0.68
Factor 5: dependent	0.83 (+2)	2 (-2)	0.70-0.70
Factor 6: buck-passing	0.87 (+2)	2 (-1)	0.77-0.77

be reduced to five items each with the loss of only 0.01 points in internal consistency. Therefore, I decided to reduce Factor 1 to five items, too, in spite of the fact that Factor 1's internal consistency dropped from $\alpha = 0.91$ to $\alpha = 0.86$ by 0.05 points. In total, the result was a 24-item questionnaire with 6 factors, 4 of which containing five items, and 2 factors containing two items. The internal consistency of every scale was well above $\alpha = .8$, ranging from $\alpha = 0.82$ to $\alpha = 0.92$. Cf. Table 9.11 for full reliability statistics.

Table 9.11 Internal consistency coefficients for the final six scales of the Decision Style Questionnaire (DSQ).

	Mean (SD)	Number of Items (change)	Cronbach's alpha (change)	Corrected Item Total Correlations
Decision Style Questionnaire – final		**24 (-17)**	**0.89 (-4)**	**0.19-0.68**
Factor 1: anxious / confident	2.83 (0.93)	5 (-7)	0.86 (-5)	0.63-0.74
Factor 2: avoidant / procrastinating	2.69 (1.08)	5 (-4)	0.92 (-1)	0.75-0.84
Factor 3: intuitive / spontaneous	3.44 (0.80)	5 (-2)	0.86 (-1)	0.59-0.76
Factor 4: rational / vigilant	4.13 (0.69)	5 (-1)	0.82 (-1)	0.57-0.68
Factor 5: dependent	3.87 (0.89)	2 (-2)	0.83 (+2)	0.70-0.70
Factor 6: buck-passing	2.40 (1.07)	2 (-1)	0.87 (+2)	0.77-0.77

Note. Regarding the number of items and Cronbach's alpha the change as compared to the previous (pre-final) version of the DSQ (cf. Table 9.10) is reported in brackets. The reported change in Cronbach's alpha is multiplied by 100 (e.g. "-4" means "-0.04").

F Factor Structure – Final Solution After scale-length optimization, of course, another factor analysis is due in order to confirm factor structure (cf. e.g. Worthington & Whittaker, 2006). Thus, another EFA (ML, promax) was performed on the final 24 items. This EFA completely confirmed the previous factor structure of the 41-item pre-final factoring solution;[349] furthermore, there were no item loadings <0.32 and no crossloading items. This final factoring solution is displayed in Table 9.12. Cumulative variance explained at 6 factors was 63%. Communalities ranged between $h^2 = 0.44$ and $h^2 = 0.99$. Intercorrelations of factors are displayed in Table 9.13.

[349] PA suggested 4, and CD analysis suggested 6 factors. The final solution was set to 6 factors.

Table 9.12 Final factoring solution for the Decision Style Questionnaire (DSQ).

#	Abbreviated Item Label	Previous Factor Label	Item Origin	Factor # 1 anxious / confident	2 avoidant / procrastinating	3 intuitive / spontaneous	4 rational / vigilant	5 dependent	6 buck-passing
3	My decision making requires careful thought.	rational/ vigilant	S,M,L				0.66		
4	When making a decision, I consider various options in terms of a specified goal.	rational/ vigilant	S,--,L				0.65		
5	I like to consider all of the alternatives.	vigilant	--,M,L				0.66		
8	When making decisions I like to collect a lot of information.	vigilant	--,M,L				0.78		
10	I weigh the pros and cons of each option before I make a decision.	vigilant	--,--,L				0.69		
11	When making decisions, I rely upon my instincts.	intuitive	S,--,L			0.82			
12	When I make decisions, I tend to rely on my intuition.	intuitive	S,--,L			0.85			
15	When making a decision, I trust my inner feelings and reactions.	intuitive	S,--,L			0.73			
17	I rarely make important decisions without consulting other people.	dependent	S,--,L					1.02	
19	I use the advice of other people in making my important decisions.	dependent	S,--,L					0.69	
21	I prefer to leave decisions to others.	buck-passing	--,M,--						0.87
23	If a decision can be made by me or another person I let the other person make it.	buck-passing	--,M,--						0.79
27	I postpone decision making whenever possible.	avoidant/ procrastinating	S,M,L		0.78				
28	I often procrastinate when it comes to making important decisions.	avoidant	S,--,L		0.82				
29	I generally make important decisions at the last minute.	avoidant	S,--,--		0.88				
30	I often put off making many decisions because thinking about them makes me uneasy.	avoidant	S,--,L		0.90				
31	I avoid making decisions.	buck-passing	--,M,--		0.70				
38	I often make decisions on the spur of the moment.	spontaneous	S,--,L			0.64			
41	When making decisions I do what feels natural at the moment.	intuitive/ spontaneous	S,--,L			0.71			
47	I feel very anxious when I need to make a decision.	anxious	--,--,L	0.73					
48	I panic when I think that my decision might be wrong.	anxious	--,--,L	0.83					
49	When making a decision, I am afraid that I might be wrong.	anxious	--,--,L	0.73					
50	I have faith in my decisions.	confident	--,--,L	-0.61					
51	I don't trust my ability to make important decisions. (r)	confident (r)	--,--,L	-0.47					

Note. Item number refers to the numbering of the original full set of 60 items. Reversed items are marked "(r)". Item origin abbreviates "S" for Scott and Bruce (1995), "M" for Mann et al. (1998), and "L" for Leykin and DeRubeis (2010) in that order (by publication date); two dashes ("-") indicate that the respective item was not part of the respective original questionnaire.

Table 9.13 Intercorrelations of factors of the final factoring solution for the Decision Style Questionnaire (DSQ).

Factor Label	Intercorrelations				
	1	2	3	4	5
Factor 1: anxious / confident					
Factor 2: avoidant / procrastination	0.65				
Factor 3: intuitive / spontaneous	-0.25	-0.09			
Factor 4: rational / vigilant	0.23	0.06	-0.28		
Factor 5: dependent	0.27	0.06	-0.07	0.29	
Factor 6: buck-passing	0.55	0.57	-0.35	0.10	0.13

Note. Intercorrelations of ≥ 0.50 are displayed on grey background.

The above final solution includes two factors with only two items – which is commonly a deletion criterion. However, according to Worthington and Whittaker (2006) factors with two items may be retained if their items highly correlate with each other and do not correlate much with other variables.[350] The two factors with two items each in the final solution had four and three items in the third and pre-final solution, which were then deleted in order to maximize Cronbach's alpha (cf. section E.a). Therefore, a justification for their retention is given. Also, the pre-final solution with 41 items explained 56% of variance, whereas the final solution with 24 items explained 63% of variance.

Yet, an inspection of the correlations among these two items each and their respective correlations with other variables is in order. The correlation between item #17 and #19 (Factor "dependent") was $r = 0.70$, and the correlation between items #12 and #23 (Factor "buck-passing") was $r = 0.77$. Correlations with other items were as follows:[351]

Item #17: $r_{min-other} = |0.02|$ with #12, $r_{max-other} = |0.26|$ with #47

Item #19: $r_{min-other} = |0.01|$ with #15, $r_{max-other} = |0.23|$ with #8

Item #21: $r_{min-other} = |0.00|$ with #10, $r_{max-other} = |0.62|$ with #31

Item #23: $r_{min-other} = |0.02|$ with #10, $r_{max-other} = |0.52|$ with #31

[350] "It is possible to retain a factor with only two items if the items are highly correlated (i.e., $r > .70$) and relatively uncorrelated with other variables. Under these conditions, it may be appropriate to consider other criteria (e.g., interpretability) in deciding whether to retain the factor or to discard it. Nevertheless, it may be best to revisit item-generation procedures to produce additional items intended to load on the factor (which would require a new EFA before moving on to the CFA)." (Worthington & Whittaker, 2006, pp. 821-822).

[351] To facilitate a manual search in the output of correlations for e.g. item #17, instead of *cor (DE01_17, DecStyleQ_final)* the following code was used: *sort (abs (cor (DE01_17, DecStyleQ_final)))[1]* (determines the lowest absolute value in the matrix) and *sort(abs (cor (DE01_17, DecStyleQ_final))) [length(abs (cor (DE01_17, DecStyleQ_final))) - 2]* (determines the third highest absolute value in the matrix, since the highest is $r = 1$, the correlation of the item with itself, and the second highest is the above correlation with (in this example) item #19, the other item of the respective factor).

In sum, both 2-item factors showed a sufficiently high correlation of their two items with each other (cf. footnote 350), but items #21 and #23 (Factor 6) also showed relatively high correlations with other variables of the questionnaire. This high correlation of Factor 6 with other factors is also visible in Table 9.13. Thus, for testing purposes, Factor 6 was deleted and the EFA was re-run with 5 factors (which was also suggested by CD analysis). Factor structure did not change at all and loadings were very similar, but cumulative variance explained dropped from 63% to 61%. Therefore, Factor 6 will not be deleted from the final solution.

F.a Further Parameters As described in section A factorability for the final 6-factor solution was determined: The overall MSA was $MSA_{overall} = 0.85$. The item MSAs lay between $MSA_{item(lowest)} = 0.57$ and $MSA_{item(highest)} = 0.93$. This result is very similar to the initial solution (cf. B). Bartlett's test of sphericity was significant, $\chi^2(276) = 1963.1$, $p < 0.001$.

9.2.3 Summary

The final version of the Decision Style Questionnaire with 6 factors and 24 items total provides 4 scales with 5 items each and 2 scales with 2 items each, all of which have high reliability (internal consistency ranging from $\alpha = 0.82$ to $\alpha = 0.92$. These scales measure dimensions of habitual decision making behavior, namely decision making behavior that is (1) anxious/confident, (2) avoidant/procrastinating, (3) intuitive/spontaneous, (4) rational/vigilant, (5) dependent, or (6) buck-passing. From the altogether 13 dimensions reported in the literature (cf. Table 9.6), 10 dimensions are included in the presented final DSQ, since four of the six factors retained items from two previous dimensions each, which is also made visible in the respective factor labels. The final solution is able to explain 63% of variance. Mann et al. (1998) and Leykin and DeRubeis (2010) do not report explained variance; Scott and Bruce (1995) report 63% and 58% (two samples) for their 25-item measure.[352] Thus, in terms of total variance explained, internal consistency of scales, scope regarding covered dimensions, as well as economy regarding number of items, the presented final DSQ can well compete. It cannot well compete in terms of sample size and sample diversity. Cf. Table 9.14 for an overview.

However, the major merit of this new DSQ is that it brought together and combined previous decision style questionnaires, retained most of their content while at the same time being rather economical in terms of item number, as well as achieving respectable coefficients. Furthermore, the English language originals were translated into German and at the time of data collection this was – to my knowledge – the first time that a study on decision style was run with a German speaking sample.

[352] Scott and Bruce (1995) consistently write about a 25-item measure (cf. e.g. p. 824), but only report 24 items at full length.

Table 9.14 Comparison of previous decision style questionnaires and the presented pre-final and final Decision Style Questionnaire (DSQ).

		Scott & Bruce, 1995	Mann et al., 1997	Leykin & DeRubeis, 2010	DSQ pre-final	DSQ final
Decision Style Questionnaire Scales						
1	rational	4	--	--	6	5
2	vigilant	--	6	6		
3	intuitive	5	--	5	7	5
8	spontaneous	5	--	4		
4	dependent	5	--	6	4	2
5	buck-passing	--	6	--	3	2
6	avoidant	5	--	5	9	5
7	procrastination	--	5	--		
9	hyper-vigilant	--	5	--	--	--
10	anxious	--	--	5	12	5
11	confident	--	--	5		
12	respected	--	--	2	deleted: 2	--
13	brooding	--	--	5	--	--
	Total # of Items	**24**	**22**	**43**	**41**	**24**
	Dimensions / Factors	**5**	**4**	**9**	**6**	**6**
	Total Item Variance Explained	**63%, 58%**	**n.a.**	**n.a.**	**56%**	**63%**
	Cronbach's Alpha Range	**unclear**	**0.74 - 0.87**	**0.68 - 0.88**	**0.81 - 0.93**	**0.82 - 0.92**
	Number of Samples	**4**	**1**	**2**	**1**	
	Participant Number Range	**84 - 1.441**	**2051**	**301, 162**	**145**	

Note. Numbers indicate the number of items per subscale. Sample characteristics of the above decision style questionnaire versions are: (i) Scott and Bruce (1995): military officers, MBA students, business undergraduate students, engineers and technicians; (ii) Mann et al. (1997): undergraduate psychology students from six countries (USA, Australia, New Zealand, Japan, Hong Kong, Taiwan); (iii) Leykin and DeRubeis (2010): undergraduate (psychology) students, paid online pool participants with depressive symptomatology; and (iv/v) present study (Decision Style Questionnaire – DSQ): German university students (majoring in various subjects).

9.2.3.1 Future Research

I will suggest that the presented final version of the DSQ may be appropriate for use in German student samples, and a CFA might be successfully conducted with such a sample (at least if most students were female; cf. section 9.2.1.3 for the sample characteristics of this Pilot Study). However, it would be preferable to (a) reconsider all item translations in an intersubjective process, (b) re-sample the full set of 60 items with a larger and more diverse sample, and (c) additionally collect data for related constructs in order to establish convergent and discriminant validity.

Cf. section 8.4.2 within the Pilot Study where the Decision Style Questionnaire (DSQ) is used to refine the results of the pilot experiment. That is, it is used as a covariate to both pre and post outcome satisfaction.

9.3 Eight Decision Categorization Scales (DCSs)

It is one thing to define "decision" in general, but it is something else to differentiate decisions by their varying characteristics. Franz and Kramer (2010) note that "only a small amount of research has focused on delineating a comprehensive typology of decision characteristics that define the dimensions of decisions" (p.517). Therefore, they compiled a list of dimensions from previous literature as well as developed a survey based on these dimensions in order to explore them empirically (cf. p. 527). Similar to the ambition of the foregoing authors I gathered scales from previous literature that might characterize a specific decision situation. The set of these scales will be henceforth termed "Decision Categorization Scales". The scales chosen are depicted in detail in section 9.3.1.2.

Participants were asked to think of a decision of medium importance they had made and all subsequent questionnaire items referred to this decision. The decision situations participants described were later coded according to content. That way the present study served a double purpose: on the one hand scales differentiating different kinds of decisions or decision situations were put to the test, and on the other hand a list of typical collegiate decision situations resulted.[353]

9.3.1 Method

9.3.1.1 Procedure

The study was conducted online and the link was circulated via newsletter. The welcome page informed participants that the interest of the study were "medium sized decisions", that is: decisions of medium importance. Next, participants were asked to recall the last couple of years and think of an according decision situation and shortly describe it in an open text field. Thereafter the questionnaire items of 8 Decision Categorization Scales were presented on 8 online questionnaire pages.[354] The last page included the items *Comment*, *Diligence*, *Lottery*, *Code*, and *Course credit* (cf. Table 7.2 from section 7.2) as well as the four demographic questions *Age*, *Gender*, *University*, and *Field of study* (cf. Table 7.3 from section 7.2).

9.3.1.2 Materials

A Collegiate Decision Situations In the very beginning of the study participants were asked to describe a real decision they had made in the last couple of years. The instructions (cf. Table 9.15 below) vaguely specified a range regarding this decision's importance/significance, which was supposed to be 'medium'. This specification was mainly intended to exclude super-mundane decisions such as what to order in a restaurant.

[353] Almost all participants were university students, therefore "collegiate" decision situations.
[354] Note: The eight Decision Categorization Scales will not be abbreviated to acronyms in order for them to be more easily distinguishable.

The retrieval of an individual, non-fictitious decision situation had a two-fold purpose: (i) it served as the anchor regarding which participants answered all questionnaire items in the following, and (ii) a set of typical collegiate decision situations ensued.

The following Table 9.15 displays the instructions given to participants in German and English. The procedure of and results from coding the provided decision situations will be described in section 9.3.2.1.

Table 9.15 Instructions to participants regarding the decision situation to be provided.

Page	Wording in German	Wording in English
p. 1	[...] In diesem Experiment geht es um Entscheidungen. Wir interessieren uns dafür, welche Entscheidungssituationen – und zwar solche mittlerer Tragweite – Ihnen bisher in Ihrem Leben begegnet sind. Natürlich entscheiden wir uns ständig: viele Entscheidungen haben im Normalfall kaum längerfristige Konsequenzen, wie z.B. die Wahl zwischen zwei Pizzen (= geringe Tragweite); andere Entscheidungen können lebensbestimmend sein, wie z.B. die Frage, ob und wen man heiratet (= große Tragweite). Wir sind hier interessiert an Entscheidungssituationen, die zwischen diesen Extremen liegen. [...]	[...] This experiment is about decisions. We are interested in which decision situations - and those of medium consequence - you have encountered in your life so far. Of course, we decide all the time: many decisions normally have hardly any long-term consequences, such as the choice between two pizzas (= little significance); other decisions can be life-defining, such as the question of whether and whom to marry (= great significance). We are interested here in decision situations that lie between these extremes. [...]
p.2	Bitte denken Sie einmal an die letzten Jahre zurück und daran, mit welchen Entscheidungssituationen mittlerer Tragweite Sie konfrontiert wurden. Beschreiben Sie bitte im Textfeld unten kurz eine Entscheidungssituation aus den letzten Jahren. Auf den nächsten Seiten folgen dann einige Fragen dazu. (Wenn Ihnen weitere Situationen in den Sinn kommen sollten, haben Sie am Ende der Studie noch einmal die Gelegenheit, diese zu notieren.) [open text field]	Please think back over the last few years and think about the decision-making situations of medium significance with which you were confronted. In the text field below, please briefly describe a decision-making situation from recent years. On the next pages you will find some questions about it. (If other situations come to mind, you will have the opportunity to write them down again at the end of the study). [open text field]

Note. Only the parts of the instructions relevant to the task at hand are provided here, omissions are indicated by [...]. Typographical emphases (bold, italic) are not reproduced.

B Introduction to the Eight Decision Categorization Scales Below is a list of the eight Decision Categorization Scales included in the present study – ordered according to their succession in the study – giving their name, their number of items, and their origin.

(i) the Situational Eight DIAMONDS Scale S8-II, 8 items, Rauthmann and Sherman (2015)

(ii) a Semantic Differential Scale, 12 items, cf. Osgood et al. (1957)
(iii) the 14BiPole-Value Questionnaire, 14 items, Strack (2001, 2004); Strack, Gennerich, and Hopf (2008)
(iv) the Evolutionary Domains Mini-Scale, 6 items, cf. Ackerman and Kenrick (2008); Kenrick et al. (2009); Kenrick, Li, and Butner (2003)
(v) the Moral Foundations Mini-Scale, 6 items, cf. e.g. Graham, Nosek, Haidt, Iyer, Koleva, and Ditto (2011); Graham, Nosek, Haidt, Iyer, Spassena, and Ditto (2011); Haidt and Joseph (2004, 2008)
(vi) the Domains of Risk Mini-Scale, 5 items, cf. Weber, Blais, and Betz (2002)
(vii) the Characteristics of Decision Situations Scale, 36 items, cf. Jungermann et al. (2005)
(viii) the Dimensions of Decisions Scale, 84 items, Franz and Kramer (2010)[355]

The three scales (i), (iii), and (viii) are ready-made questionnaires and were adopted as instructed by the authors.[356] In three further cases – (iv), (v), and (vi) – a validated questionnaire exists, but did not fit in terms of content and perspective. In these cases super-short one-item-per-subscale/domain questionnaires were generated to fit the purpose of the present inquiry. Therefore these three scales are labeled "mini-scale".[357] In case of (ii), the employed Semantic Differential Scale, appropriate items always need to be specifically chosen according to context (cf. section D for the details).[358] In case of (vii), the Characteristics of Decision Situations Scale, items were closely based on the textbook by Jungermann et al. (2005), but item formulations and response scales had to be newly created.

In the following, all scales will be described in detail.

C The Situational Eight DIAMONDS Scale S8-II The authors of the Situational Eight DIAMONDS Scale (Rauthmann et al., 2014) had set out to provide a taxonomy of situations based on situation characteristics of psychological importance. The original scale, the RSQ-8 (Rauthmann et al., 2014), was established based on the Riverside Situational Q-Sort (Sherman, Nave, & Funder, 2010, 2012, 2013; Wagerman & Funder, 2009) and comprised 32 items to measure the eight dimensions "*Duty* (Does something need to be done?), *Intellect* (Is deep cognitive processing required?), *Adversity* (Is someone threatened by external forces?), *Mating* (Is there an opportunity to attract potential mates?), *pOsitivity* (Is the situation pleasant?), *Negativity* (Can the situation arouse negative feelings?), *Deception* (Can others be trusted?), and *Sociality* (Is social interaction possible or expected?)" (Rauthmann & Sherman, 2016, p.155). The Situational Eight DIAMONDS Scale S8-II (Rauthmann & Sherman, 2015) includes only 8

[355] Franz and Kramer (2010) did not give a name to their questionnaire.
[356] Note that (viii), the Dimensions of Decisions Scale, was not labeled by the authors, but I labeled it such for ease of reference.
[357] Note that the well-validated Situational Eight DIAMONDS Scale S8-II is a mini-scale, too, where each of its eight domains is rated by one item only.
[358] That is: *the* Semantic Differential Scale does not exist, it is always *a* Semantic Differential Scale.

items and is thus the shortest version of measuring the above eight situation characteristics. Cf. Table 9.16 for all items, their wording in German and English, and their response scale.

Table 9.16 Items of the Situational Eight DIAMONDS Scale S8-II, wording in German and English, and scale information.

Item #	Item Name	Wording in German	Wording in English	Type of Scale and Anchorage in German + [English]
S8-1	Duty	Arbeit, Aufgaben, Pflichten	Work, tasks, duties	7-point Likert scale, end points labeled *überhaupt nicht* [not at all] (1) and *absolut* [absolutely] (7). No values displayed to participants.
S8-2	Intellect	Intellektuelles, Schöngeistiges, Tiefgründiges	Intellectual, aesthetic, profound things	
S8-3	Adversity	Bedrohung, Kritik, Beschuldigung	Threat, criticism, accusation	**Introductory sentences:** Wie sehr treffen die folgenden Eigenschaften auf das geschilderte Szenario zu? Die Situation enthält... To what extent do the following properties apply to the depicted scenario? The situation contains...
S8-4	Mating	Romantik, Sexualität, Liebe	Romance, sexuality, love	
S8-5	pOsitivity	Positives, Erfreuliches, Schönes	Positive, pleasant, nice things	
S8-6	Negativity	Negatives, Unerfreuliches, schlechte Gefühle	Negative things, unpleasant things, bad feelings	
S8-7	Deception	Täuschung, Lüge, Unehrlichkeit	Deceit, lie, dishonesty	
S8-8	Sociality	Kommunikation, Interaktion, soziale Beziehungen	Communication, interaction, social relationships	

D A Semantic Differential Scale The semantic differential technique was famously devised by Osgood and colleagues (Osgood et al., 1957) with the original purpose to measure the meaning of words and phrases. The items of a semantic differential scale are bipolar response scales where the anchors are opposing adjectives, e.g. "warm–cold", "good–bad". A three-factor structure was found by Osgood and colleagues and confirmed in several studies in the 60s and 70s (cf. e.g. Bradley & Lang, 1994; Heise, 1969, for an overview). These three factors are labeled Evaluation, Activity, and Potency.

It is important to note that the semantic differential "is not intended to be a particular test, but rather a general technique of measurement from which tests can be devised for specific purposes. Possible suggested applications include attitudes, assessment of personality, effects of psychotherapy, cultural and language meaning differences, and effects of messages in advertising and other mass communications" (Osgood et al., 1957, Abstract).

Accordingly, a semantic differential scale for the present purpose was newly devised. Adjective pairs were gathered according to the following criterion: the three dimensions Evaluation, Activity, and Potency were supposed to be depicted by conceptually central, abstract, and rather non-specific adjectives – such that these would fit to a wide array of situations. Based on this criterion three items per dimension resulted. Three additional

items were then added that were not meant to fall into any of the three dimensions, although they may (which is an empirical question). Table 9.17 displays all items, their wording in German and English, and their response scale.[359]

Table 9.17 Items of the Semantic Differential Scale employed here, wording in German and English, and scale information.

Item #	Dimension	Wording in German	Wording in English	Type of Scale and Anchorage in German + [English]
SD-1	Evaluation	schlecht – gut	bad – god	Visual Analogue Scale (VAS), end points labeled according to item content, values ranging from 1 ("negative pole") to 101 ("positive pole"), no values displayed to participants, mid-point marked and labeled *neutral* [neutral]. **Introductory sentence:** Wie beurteilen Sie die geschilderte Situation? Bitte positionieren Sie die Schieberegler so, wie es Ihrem spontanen Eindruck entspricht. How do you assess the situation described? Please position the sliders according to your spontaneous impression.
SD-2	Evaluation	hässlich – schön	ugly – beautiful	
SD-3	Evaluation	unangenehm – angenehm	unpleasant – pleasant	
SD-4	Activity	passiv – aktiv	passive – active	
SD-5	Activity	langsam – schnell	slow – fast	
SD-6	Activity	erregt – ruhig	excited – calm	
SD-7	Potency	schwach – stark	weak – strong	
SD-8	Potency	klein – groß	small – large	
SD-9	Potency	ergeben – mächtig	obedient – powerful	
SD-10	--	weiblich – männlich	female – male	
SD-11	--	unvernünftig – vernünftig	unreasonable – reasonable	
SD-12	--	hat nichts mit Moral zu tun – hat mit Moral zu tun	has nothing to do with morality – has to do with morality	

E The 14BiPole-Value Questionnaire The 14BiPole-Value Questionnaire (Strack, 2001, 2004; Strack et al., 2008) is a short form to assess personal values within the framework of the Schwartz Value Circle (Schwartz, 1992; Schwartz & Bilsky, 1987).[360]

E.a Excursus: The Schwartz Value Circle The Schwartz Value Circle was a big step in empirical value research. Its general theory and its first application on two samples from Israel and Germany was published together with Wolfgang Bilsky in 1987 (Schwartz & Bilsky, 1987). They then extended their empirical investigation to five

[359] The items were displayed to participants in random order and the anchors were randomly varied, too. Unfortunately, by mistake "forced response" was disabled for this set of questions such that there are many missing values.

[360] In German one would distinguish "Werthaltung" [personal stance on values] from "Wert" [value] in order to allow the object of the first to be a subjective psychological state and the object of the latter to be an objective state of the world. [The belief in the existence of "objective states of the world" is, of course, dependent on your position in metaphysics (e.g. realist or constructivist), and, in this case, your position in value theory in moral philosophy.] To my knowledge, there is no according terminology in English. In the following when using the term "value" it will always refer (unless otherwise noted) to what people value, that is: their attitudes or beliefs regarding something that could be valued (e.g. "freedom") – or, in other words, their psychological states. Note that "psychological state" or "mental state" is a technical term in philosophy and refers to a mind's specific content corresponding to a feeling, a belief, an attitude, a sensation etc.

further countries (Schwartz & Bilsky, 1990). Finally, in his famous flagship publication (Schwartz, 1992) Shalom Schwartz reported data from 20 countries and established the cross-cultural validity of this content model.[361]

The Schwartz Value Circle is a content model of values. From theorizing and by using the Rokeach Value Survey (Rokeach, 1973) where 36 values are to be rank ordered according to personal importance, finally ten so-called "motivational types" were determined, namely: Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, and Universalism.

Each of these motivational types encompasses several single values (such as *pleasure* or *equality*), and thus they are to be understood as defining a common goal of the subsumed single values. Figure 9.3 displays a picture taken from Schwartz (2012, p.9) showing the ten motivational types in relation to each other, and Figure 9.4 displays a picture taken from Strack and Gennerich (2011, p.421) showing the individual values (from their study) positioned in the value circle.

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Schwartz: An Overview of the Schwartz Theory of Basic Values

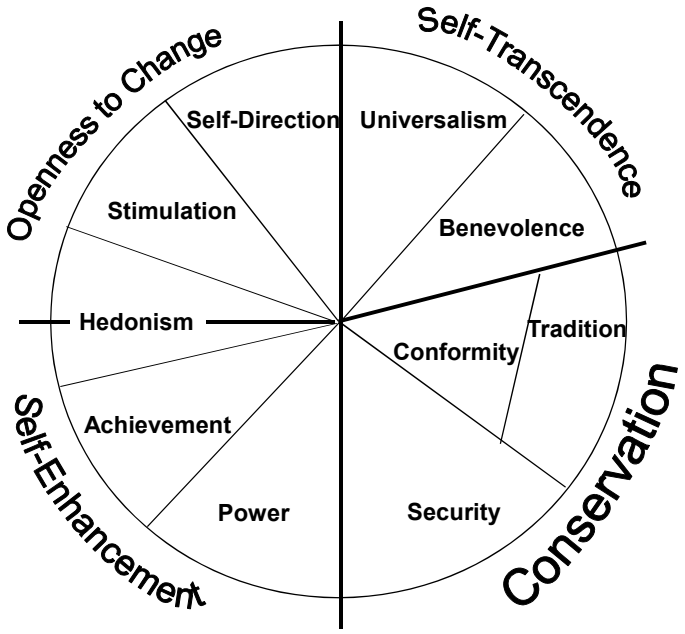


Figure 1. Theoretical model of relations among ten motivational types of value

Figure 9.3 Theoretical model of the ten motivational types of value according to Schwartz (2012).

Note. The thickened lines *are not* the axes of the two dimensions *Universality* (Self-enhancement vs. Self-transcendence) and *Tradition* (Openness to Change vs. Conservation), but rather they demarcate the borders of the quadrants of motivational types that belong to each of the four poles of the two dimensions. This is more clearly displayed in Schwartz (1992, p.45).

Although the theory discriminates ten values, it postulates that, at a more basic level, values form a continuum of related motivations. This continuum gives rise to the circular structure. To clarify the nature of the continuum, I note the shared motivational emphases of adjacent values:

a) power and achievement--social superiority and esteem;
b) achievement and hedonism--self-centered satisfaction;
c) hedonism and stimulation--a desire for affectively pleasant arousal;
d) stimulation and self-direction--intrinsic interest in novelty and mastery;
e) self-direction and universalism--reliance upon one's own judgment and comfort with the diversity of existence;
f) universalism and benevolence--enhancement of others and transcendence of selfish interests;
g) benevolence and tradition--devotion to one's in-group;
h) benevolence and conformity--normative behavior that promotes close relationships;
i) conformity and tradition--subordination of self in favor of socially imposed expectations;

[361] Over publications the proposed model and according theory was changed and sharpened slightly, but for a long time found its final version in Schwartz' 1992 publication (Schwartz, 1992) – until recently: In 2012 Schwartz and colleagues published a revised version (Schwartz et al., 2012). However, most research still relies on the 1992 version, which is why the 2012 revised version – apart from this mention – will not further be considered.

Figure 1: Value circle (14-Bipolar-Short-Form; Strack, 2004) `--> present study`

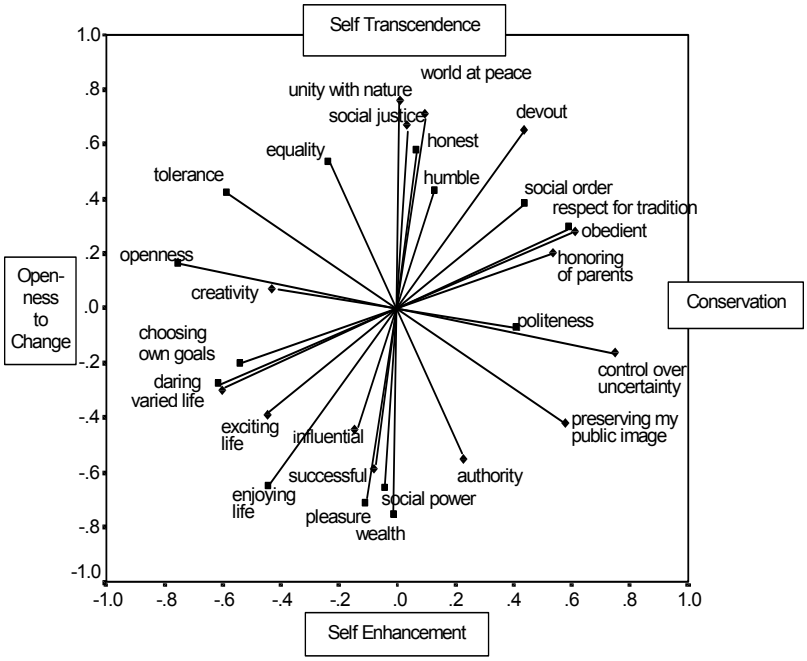


Figure 9.4 Empirical model with individual values within the value circle from Strack and Gennerich (2011).

In both figures it is apparent that the value circle consists of two bipolar dimensions, namely (1) "Openness to Change" versus "Conservation" and (2) "Self-Enhancement" versus "Self-Transcendence". Furthermore, it is important to note that the theory of the value circle includes a theory on the compatibility of and conflict between single values (and motivational types): the further apart single values are located in the value circle, the more they are in conflict – the closer together, the more compatible they are. A value's location closer to the center of the circle means that it could be a central value to anyone person and is not that strongly associated with any of the two dimensions' poles (classic candidates are here: self-respect, health, aptitude, intelligence, wisdom, and friendship, cf. Strack et al., 2008, p.95).

The classic instrument to measure individual value priorities is the Schwartz Value Survey (Schwartz, 1992). The original set of 56 values was gathered from previous research, most prominently from Rokeach's set of 36 values (Rokeach, 1973) of which 21 were adopted. Below is a list of these 56 single values assigned to the 10 motivational types (cf. Schwartz, 2012, p.5 ff.); value items in parentheses belong to more than one motivational type. Cf. the Appendix in Schwartz (1992) for a list of the values included in the Schwartz Value Survey as displayed to participants.

- **Self-direction**: creativity, freedom, choosing own goals, curious, independent (self-respect, intelligent, privacy)
- **Stimulation**: a varied life, an exciting life, daring
- **Hedonism**: pleasure, enjoying life, self-indulgent
- **Achievement**: ambitious, successful, capable, influential (intelligent, self-respect, social recognition)
- **Power**: authority, wealth, social power (preserving my public image, social recognition)

- **Security**: social order, family security, national security, clean, reciprocation of favors (healthy, moderate, sense of belonging)
- **Conformity**: obedient, self-discipline, politeness, honoring parents and elders) (loyal, responsible)
- **Tradition**: respect for tradition, humble, devout, accepting my portion in life (moderate, spiritual life)
- **Benevolence**: helpful, honest, forgiving, responsible, loyal, true friendship, mature love (sense of belonging, meaning in life, a spiritual life)
- **Universalism**: broadminded, social justice, equality, world at peace, world of beauty, unity with nature, wisdom, protecting the environment (inner harmony, a spiritual life)

For a thorough overview on the Schwartz Value Circle including an introduction to the Schwartz Value Survey please refer to Schwartz (2012).

The 14BiPole-Value Questionnaire is made up of 14 bipolar items with a bipolar 5-point scale (numbered 2-1-0-1-2). It includes 26 of the values from the Schwartz Value Survey plus one additional item ("Open to the world (cosmopolitan, enjoying variety) – Control over uncertainty (to retain control)"), cf. Strack and Gennerich (2011). Table 9.18 provides all items, their wording in German and English, and scale information.[362]

The 14BiPole-Value Questionnaire was originally developed to measure individual value priorities, however, in their study Strack and Gennerich (2011) did additionally construct vignettes depicting value-laden situations based on the Schwartz Value Circle (cf. Strack & Gennerich, 2011, p.426). Therefore I deemed it possible to use the 14BiPole-Value Questionnaire to assess situations – and instead of having participants use it to describe their personal values, have them use it to describe value-laden aspects of the decision situation they had provided in the beginning of the study. Even most of the original introduction to the questionnaire could be retained.[363]

[362] Note: Strack and Gennerich (2011) provide an English version of the questionnaire where most item formulations are identical to those from Schwartz (1992) with only minor deviations. Only one item from the German original of the 14BiPole-Value Questionnaire (namely item #VC-6, left pole: "VERGNÜGEN (Erfüllung von Wünschen)") majorly deviates from its equivalent in Schwartz (1992) (namely "PLEASURE (gratification of desires)") in that it was translated to "ENJOYING LIFE (fulfillment of wishes)". The column *Wording in English* of the below table Table 9.18 reports the formulations from Schwartz (1992).

[363] The introduction read: "Which values were present in the situation? In the following, 14 values each are juxtaposed. The pairs often do not really form opposites, sometimes they are rather to be understood in a figurative sense. *Please choose one number per line in the direction of the value that was more present in the situation, or played a greater role.*". German original in this study: "Welche Werte waren in der Situation vorhanden? Im Folgenden sind je 14 Werte einander gegenübergestellt. Die Paare bilden oft nicht wirklich Gegensätze, manchmal sind sie eher im übertragenen Sinne zu verstehen. *Bitte wählen Sie pro Zeile eine Zahl in Richtung des Wertes, der stärker in der Situation vorhanden war, bzw. eine größere Rolle spielte.*". For the German original of the 14BiPole-Value Questionnaire cf. section C.2.1.1 in the Appendix.
Note that the italicized instruction entails a mistake: as opposed to the original 14BiPole-Value Questionnaire where the response scale was numbered "2 1 0 1 2" there were no response scale values displayed to participants in the present online version. This is because for technical reasons only the numbering "-2 -1 0 1 2" could have been implemented, but thereby classifying the values as "negative" or "positive" would have been semantically and theoretically inadequate.

Table 9.18 Items of the 14BiPole-Value Questionnaire, wording in German and English, and scale information.

Item #	Wording in German	Wording in English
VC-1	GLEICHHEIT (gleiche Chancen für alle), AUTORITÄT (das Recht zu führen und zu bestimmen)	EQUALITY (equal opportunity for all), AUTHORITY (the right to lead or command)
VC-2	SOZIALE MACHT (Kontrolle über andere, Dominanz), SOZIALE GERECHTIGKEIT (Ungerechtigkeiten beseitigen, sich um die Schwachen kümmern)	SOCIAL POWER (control over others, dominance), SOCIAL JUSTICE (correcting injustice, care for the weak)
VC-3	SOZIALE ORDNUNG (Stabilität der Gesellschaft), EIN ANREGENDES LEBEN (anregende Erfahrungen)	SOCIAL ORDER (stability of society), AN EXITING LIFE (stimulating experiences)
VC-4	REICHTUM (materieller Besitz, Geld), EINHEIT MIT DER NATUR (Einpassung in die Natur)	WEALTH (material possessions, money), UNITY WITH NATURE (fitting into nature)
VC-5	HÖFLICHKEIT (gute Umgangsformen), KREATIVITÄT (Originalität, Phantasie)	POLITENESS (courtesy, good manners), CREATIVITY (uniqueness, imagination)
VC-6	VERGNÜGEN (Erfüllung von Wünschen), EINE WELT IN FRIEDEN (frei von Krieg und Konflikt)	PLEASURE (gratification of desires)*, A WORLD AT PEACE (free of war and conflict)
VC-7	TOLERANT (gegenüber verschiedenen Ideen und Überzeugungen), IN DER ÖFFENTLICHKEIT ANSEHEN BEWAHREN (das Gesicht wahren)	BROAD-MINDED (tolerant of different ideas and beliefs), PRESERVING MY PUBLIC IMAGE (protecting my "face")
VC-8	DEMÜTIG (bescheiden, selbstlos), EINFLUSSREICH (Einfluss auf Menschen u. Ereignisse ausüben)	HUMBLE (modest, self-effacing), INFLUENCIAL (having an impact on people and events)
VC-9	EHRLICH (echt, aufrichtig), ERFOLGREICH (Ziele erreichen)	HONEST (genuine, sincere), SUCCESSFUL (achieving goals)
VC-10	DAS LEBEN GENIEßEN (Freude an Essen, Erotik, Vergnügungen usw.), FROMM (religiöse Glaubensinhalte annehmen)	ENJOYING LIFE (enjoying food, sex, leisure, etc.), DEVOUT (holding to religious faith and belief)
VC-11	ACHTUNG VOR DER TRADITION (Erhaltung altehrwürdiger Sitten), EIN ABWECHSLUNGSREICHES LEBEN (erfüllt mit Herausforderungen, Neuem u. Veränderungen)	RESPECT FOR TRADITION (preservation of time-honored customs), A VARIED LIFE (filled with challenge, novelty, and change)
VC-12	WAGEMUTIG (Abenteuer und Risiko suchen), GEHORSAM (Pflichten erfüllen)	DARING (seeking adventure, risk), OBEDIENT (dutiful, meeting obligations)
VC-13	EIGENE ZIELE WÄHLEN (eigene Absichten verfolgen), EHRERBIETIG GEGENÜBER ELTERN UND ÄLTEREN MENSCHEN (respektvoll)	CHOOSING OWN GOALS (selecting own purposes), HONORING OF PARENTS AND ELDERS (showing respect)
VC-14	WELTOFFEN (kosmopolitische Orientierung, die Vielfalt lieben), KONTROLLE ÜBER UNSICHERHEITEN (die Dinge in der Hand behalten)	OPENNESS (cosmopolitan orientation, advocate of diversity), CONTROL OVER UNCERTAINTY (control over events and their development)

Note. Type of Scale: bipolar 5-point scale positioned in between each pair of individual values, end points labeled according to item content, item values ranging from 1 (left pole) to 5 (right pole), no numbers/item values displayed to participants. The asterisk (see item VC-6, English version) signifies a major divergence from the English version of the questionnaire in Strack and Gennerich (2011), cf. also footnote 362 to that point.

F The Evolutionary Domains Mini-Scale The interest in so-called "evolutionary domains" is rooted in an evolutionary perspective on judgment and decision making. While in the 1970s Social Psychology was dominated (and fascinated) by the *heuristics and biases* approach that was famously pulled into existence by Amos Tversky, Daniel Kahneman, and colleagues (cf. e.g. Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974, 1983), by the 1990s the evolutionary perspective had conquered quite some explanatory space (e.g. Barkow, Cosmides, & Tooby, 1992; Cosmides & Tooby, 1994; Gigerenzer, 1995).

As opposed to the former research program, where human minds seemed to consistently fail norms of rationality (provided by formal logic, mathematics, and statistics), the latter pointed out that it was mistaken to think of human brains as "one purpose serve all" computers that operate on a small number of general rules. Rather, researchers argued, human brains had evolved over millions of years under adaptive constraints. That is, a long-gone social and physical environment had shaped how to deal with problems of survival and reproduction, and thereby the brain gained *specialized* rules and mechanisms to deal with these recurring problem sets.[364]

Now, which are these recurring problem sets from our hunter-gatherer past? According to Wilke and Todd (2011, p.9), typical candidates are finding food, finding shelter, finding a mate, parenting and kinship, and cooperation. Wilke et al. (2014) specified ten "evolutionary risk domains" (between-groups competition, within-group competition, status/power, environmental exploration, food acquisition, food selection, mate attraction, mate retention, parental investment, kinship) and developed a 30-item questionnaire, the Evolutionary Risk Scale (ERS), where participants are asked to rate their likelihood to engage in risk-taking behavior within those ten domains. Reviewing literature from diverse research fields Kenrick and colleagues in several publications (cf. e.g. Ackerman & Kenrick, 2008; Kenrick et al., 2009, 2003) propose six key domains that they believe "organize[...] a great deal of human social cognition and interpersonal interaction" (Ackerman & Kenrick, 2008, p.122). These six domains are:[365]

- Coalition formation / Affiliation
- Status
- Self-protection
- Mate choice / Mate acquisition / Mate search
- Relationship maintenance / Mate retention
- Parental care / Familial care / Kin care

The short questionnaire used in this study, the Evolutionary Domains Mini-Scale, is based on the above six domains with one item per domain. Cf. Table 9.19 for its items and response scale.

[364] Note that this latter and key assumption, the so-called "modularity of mind", is subject to intense debate, cf. e.g., among many others, Buller (2006).

[365] Note that the labels as well as the descriptions of these six domains slightly differ over publications. The below list entails the labels that were used in the above cited three publications in chronological order.

Table 9.19 Items of the Evolutionary Domains Mini-Scale, wording in German and English, and scale information.

Item #	Wording in German	Wording in English	Type of Scale and Anchorage in German + [English]
ED-1	BINDUNG UND GESELLUNG Kooperative Bündnisse mit Anderen formen und aufrechterhalten	AFFILIATION AND COALITION FORMATION Forming and maintaining cooperative alliances with others	5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5). No values displayed to participants.
ED-2	SOZIALER STATUS Respekt von und/oder Macht über andere Gruppenmitglieder erlangen und aufrechterhalten	SOCIAL STATUS Gaining and maintaining respect from and/or power over group members	**Introductory sentence:** Folgende Bereiche des sozialen Lebens waren in der beschriebenen Situation relevant: The following areas of social life were relevant in the situation described:
ED-3	SELBSTSCHUTZ Sich selbst und bedeutsame Andere vor Gefahren schützen	SELF-PROTECTION Protecting oneself and significant others from threats	
ED-4	PARTNERFINDUNG Einen Beziehungspartner finden	MATE ACQUISITION Finding a mate with whom to establish a romantic relationship	
ED-5	BEZIEHUNGSAUFRECHT-ERHALTUNG Eine Beziehung mit einem Partner aufrechterhalten	RELATIONSHIP MAINTENANCE Maintaining a romantic relationship with a mate	
ED-6	FAMILIENFÜRSORGE Sich um Kinder und Verwandte kümmern	FAMILIAL CARE Taking care of children and relatives	

Note. The back-translation to English was based both on the German wording used in this study as well as on the formulations used in the according literature (cf. Ackerman & Kenrick, 2008; Kenrick et al., 2009, 2003).

G The Moral Foundations Mini-Scale In their retrospect article, Graham, Nosek, Haidt, Iyer, Koleva, and Ditto (2011) describe how in psychology they saw the "need for a systematic theory of morality, explaining its origins, development, and cultural variations" (p.368), which led to the creation of so-called *Moral Foundations Theory*. According to these researchers, previous psychological theories and measures lacked (i) sufficient width in their conceptualization of morality in that they were singularly informed by (Western philosophical traditions of) deontology and consequentialism focusing on problems of harming others and justice while neglecting e.g. a virtue-ethical perspective where the space for moral thought is much broader, and (ii) sufficient (socio-)cultural fairness. For example, it was shown that political liberals systematically score higher than political conservatives (Emler, Renwick, & Malone, 1983) on the so-called Defining Issues Test (DIT, cf. e.g. Rest, Narvaez, Thoma, & Bebeau, 1999) which is based on Kohlberg's famous stages of moral development (cf. e.g. Kohlberg, 1976) –

a result which makes Kohlberg's theory of moral reasoning (and its measurement) lack impartiality.[366]

In order to avoid these pitfalls – narrow conceptualization and partiality – Haidt and colleagues adopted an evolutionary perspective (Haidt & Joseph, 2004), and their "cross-disciplinary review produced five top candidates for being the psychological 'foundations' upon which cultures construct their moralities" (Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011, p.368).

The five 'foundations' were finally labeled according to the poles of their respective dimension (Graham et al., 2013):[367]

- Care/harm
- Fairness/cheating
- Loyalty/betrayal
- Authority/subversion
- Sanctity/degradation
- Liberty/oppression[368]

The according questionnaire, the Moral Foundations Questionnaire (MFQ), is based on the original five foundations. The development and validation of its fourth and presently final version with 30 items tested on a sample of 34,476(!) participants is reported in Graham, Nosek, Haidt, Iyer, Koleva, and Ditto (2011) and can be found in their appendix.[369]

The short questionnaire used in this study, the Moral Foundations Mini-Scale, is based on the above six foundations with one item per foundation. Cf. Table 9.20 for its items and response scale.

[366] Regarding Kohlberg's stages of moral development and their partiality, of course, their critical discussion by Carol Gilligan needs to be mentioned. Gilligan (1982) argues that the ascription of a high stage of moral development is not impartial to gender (either), but favors a 'mode of thought' that is empirically more strongly associated with males than females.

[367] As explicitly stated in Graham et al. (2013, p.60, fn.1), the five foundations were differently named prior to 2012, namely: Harm/care, Fairness/reciprocity, Ingroup/loyalty, Authority/respect, Purity/sanctity (cf. e.g. Haidt & Graham, 2007).

[368] This sixth foundation was proposed by Jonathan Haidt in his 2012 book *The Righteous Mind* (Haidt, 2012) where he writes both about Moral Foundations Theory as well as his other flagship theory in moral psychology, his *Social Intuitionist Model* (Haidt, 2001). I included Liberty/oppression in this list, because its integration into Moral Foundations Theory is already under way (cf.e.g. Iyer, Koleva, Graham, Ditto, & Haidt, 2012). However, the authors are open to and interested in further possible foundations, specifically Efficiency/waste, Ownership/theft, and Honesty/deception (cf. Graham et al., 2013, p.104).

[369] Note that the authors maintain two websites (`https://moralfoundations.org` and `https://www.yourmorals.org`) with extensive material on both Moral Foundations Theory and the Moral Foundations Questionnaire (Dehghani, Atari, Koleva, & Graham, n.d.-a, n.d.-b). On a subsite of the former a self-scorable version of the MFQ30 can be downloaded: `https://moralfoundations.org/questionnaires/`.

Table 9.20 Items of the Moral Foundations Mini-Scale, wording in German and English, and scale information.

Item #	Wording in German	Wording in English	Type of Scale and Anchorage in German + [English]
MF-1	Schädigung/Verletzung – Fürsorge	Harm – Care	5-point bipolar scale, end points labeled according to item content, values ranging from 1 ("negative pole") to 5 ("positive pole"), no values displayed to participants.
MF-2	Betrug/Täuschung – Fairness	Cheating – Fairness	
MF-3	Verrat/Vertrauensbruch – Loyalität	Betrayal – Loyalty	**Introductory sentence:** In der Situation ging es um:
MF-4	Unterwerfung – Autorität	Subversion – Authority	The situation was about:
MF-5	Entehrung – Heiligkeit	Degradation – Sanctity	
MF-6	Unterdrückung – Freiheit	Oppression – Liberty	

H The Domains of Risk Mini-Scale A scale on risk-taking behavior was developed by Weber et al. (2002) to accommodate the need to assess individual differences in risk-taking. Within their questionnaire of 40 items they distinguish (i) between two psychological aspects regarding risk, namely risk perception and attitude towards perceived risk and (ii) between five distinct content domains. The domains "were identified based on a review of the literature on risk-taking behaviors [...] including a review of existing risk-taking measures, in an attempt to cover the full range of risk-taking situations encountered by young adults in Western cultures" (p.268). In 2006 the authors published a revised version of the questionnaire with 30 items that were more adapted to a general population rather than young adults only (Blais & Weber, 2006). The scale was now named the "Domain-Specific Risk-Taking (DOSPERT) Scale". The "five

domains of life" [sic!] remained the same (Blais & Weber, 2006, p.36).[370] These are the five domains:

- financial
- health/safety
- recreational
- ethics
- social

The short questionnaire used in this study, the Domains of Risk Mini-Scale, is based on the above five domains with one item per domain. Cf. Table 9.21 for its items and response scale.

[370] Note that "risk-taking" may well be understood in a common everyday language sense here, and the sample items given conform to that understanding ("'Co-signing a new car loan for a friend' (financial), 'Driving home after you had three drinks in the last two hours' (health/safety), 'Trying bungee jumping' (recreational), 'Cheating on an exam' (ethical), and 'Speaking your mind about an unpopular issue at a social occasion' (social)", Weber et al., 2002, p.268).

However, "risk" is also an important technical term in decision sciences with a tight definition (that does not correspond to the authors' use here – a point that De Groot and Thurik (2018) wrote a whole article on). Decision research traditionally focuses on states of either *risk* or *uncertainty*, two categories that differ in the amount of information given. However, the whole range of categories is this: certainty, risk, uncertainty, ignorance. Their difference in information given concerns the knowledge about (i) the outcomes and (ii) their probabilities. In case of *certainty* all outcomes are known and their probabilities are all $p = 1$, i.e.: they certainly come about. In case of *risk* all outcomes are known as well as their probabilities, which vary between $p = [0, 1]$, i.e.: expected utility can be *calculated*. In case of *uncertainty* all outcomes are known, but not their probabilities, i.e.: expected utility can only be *estimated*. In case of *ignorance* neither the outcomes nor their probabilities are known such that no estimation of expected utility is possible.

The distinction between risk and uncertainty is famously attributed to Knight (1921), yet there is uncertainty about the definition of "uncertainty": does it include only a lack of knowledge regarding probabilities of outcomes as stated above (cf. e.g. Kolmar, 2021, p.2; Oehmen, Locatelli, Wied, and Willumsen, 2020, p.332), or also about the set of possible outcomes itself (cf. e.g. De Groot & Thurik, 2018, p.1), or do authors just not make that distinction (cf. e.g. Payne, Bettman, & Luce, 1998, p.305)? There is all the more confusion regarding "ignorance", where there is not even common agreement about its label (– in German: "Unwissenheit" to be distinguished from "Unsicherheit" [uncertainty]), cf. e.g. this forum discussion to that point: Hardy (2018).

My above definitions – apart from making sense to me – may be based on Hansson (2013, p.12) who cites Luce and Raiffa (1989, p.13); cf. also the entry in the Stanford Encyclopedia of Philosophy by the same author: Hansson (2018).

Table 9.21 Items of the Domains of Risk Mini-Scale, wording in German and English, and scale information.

Item #	Wording in German	Wording in English	Type of Scale and Anchorage in German + [English]
DR-1	Finanzielle Entscheidung	Financial decision	5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5). No values displayed to participants. **Introductory sentence:** Die Entscheidung war folgender inhaltlicher Art: The decision was of the following nature:
DR-2	Gesundheits-/Sicherheitsentscheidung	Health/security decision	
DR-3	Freizeitentscheidung	Recreational decision	
DR-4	Moralische Entscheidung	Moral decision	
DR-5	Soziale Entscheidung	Social decision	
	Sonstiges: [open text field]	Other: [open text field]	

I The Characteristics of Decision Situations Scale In their textbook "Die Psychologie der Entscheidung" [The Psychology of Decision] Jungermann et al. (2005, chap. 2) describe characteristics of decisions and decision situations such that based on these characteristics different decision problems can be distinguished and/or classified.

First, there are *components of decision problems*, namely (i) options (objects, actions, strategies, or rules), (ii) events/states (external/internal, prospective/current), (iii) consequences/outcomes (immediate/delayed, short term/long term) with attributes, (iv) goals (incl. principles, values, wishes, intentions), (v) reasons. Second, there are *characteristics of decision situations*, namely (i) fixed or open set of options, (ii) single-stage or multi-stage decision, (iii) unique or repeated decision. Third, the authors distinguish four *levels of cognitive effort*: (i) routine decisions, (ii) stereotype decisions, (iii) deliberate decisions, (iv) constructive decisions.

The decision characteristics and distinctions portrayed in this textbook were used as a framework to build the questionnaire at hand. Some characteristics/distinctions could quite directly be transformed into questionnaire items (as e.g. the distinction between short term vs. long term consequences is mirrored in the item "The consequences of the decision had a long-term impact."), others had to be more freely operationalized. A relatively large amount of items is not directly or indirectly based on specifications from the Jungermann et al. (2005) textbook, but rather explores the semantic space of a decision characteristic (this is e.g. the case with all items pertaining to the decision component "Goals"). Furthermore, the present questionnaire also includes some items that could not straightforwardly be subsumed under the textbook categories (e.g. the items scrutinizing aspects of uncertainty). Last, some of the theoretical distinctions were deemed non-suitable for self-rating in virtue of their analytical definition (e.g. the four levels of cognitive effort), and were thus not operationalized as such.[371]

[371] For example, the four levels of cognitive effort are analytically defined such that e.g. a trained rater might allocate a specific decision to one of the four categories, but a naive participant might not. Therefore, the respective items regarding cognitive effort instead tackle the dimensions "big/small cognitive effort", "deliberate/automated decision process", and "fast/slow decision process" (cf. Table

The present questionnaire includes 36 items that (at the time) were allocated to four categories: Components (16 items), Uncertainty (8 items), Various (9 items), and Cognitive effort (3 items); items were displayed in random order within each category and categories were randomized, too.[372]

Table 9.22 portrays the connection between items and characteristics from the Jungermann et al. (2005) textbook (English translation only), Table 9.23 lists all items in German and English as allocated to the chunks that were presented to participants.

9.23). In combination with some further items (e.g. asking whether all the options were known from the beginning, or whether similar decisions had been made many times before) the information needed to assign a decision to one of the four levels of cognitive effort should be available and sufficient.

[372] In hindsight I believe the random display of items was a mistake, because it would have been rather helpful to participants to be able to answer the items topic-wise. Furthermore, my present self would likely categorize differently.

Table 9.22 Items of the Characteristics of Decision Situations Scale and their allocation to the characteristics portrayed in Jungermann et al. (2005).

(a) Components of Decision Problems.

Components	Wording	Item # (category)
Options	One of the possible options was clearly better than all the others.	CD-33 (various)
Objects, actions, strategies, rules	*[analytical]*	
Events	The consequences of the decision were strongly influenced by factors over which I had no control.	CD-01 (comp.)
external/internal	The uncertainty was related to internal causes, i.e. uncertainty about my feelings, opinions or reasons, etc.	CD-22 (uncert.)
	The uncertainty referred to external causes, i.e. a lack of information about the world.	CD-23 (uncert.)
prospective/current	--	
Consequences and Attributes	The decision had a variety of consequences.	CD-02 (comp.)
	The decision had (also) unexpected consequences.	CD-04 (comp.)
	It was clear to me which consequences I desired or wanted to avoid.	CD-05 (comp)
	Weighing desired and undesired possible consequences of the decision was difficult.	CD-06 (comp.)
	The consequences of the decision were of high importance. (i)	CD-07 (comp.)
immediate/delayed	--	
short term/long term	The consequences of the decision had a long-term impact.	CD-03 (comp.)
Goals	When making the decision, my goals were clear to me.	CD-08 (comp.)
	My goals were an important basis for my decision.	CD-09 (comp.)
	My goals were concrete (not abstract).	CD-10 (comp.)
	I had multiple goals.	CD-11 (comp.)
	I had to weigh my goals against each other.	CD-12 (comp.)
	None of the given options would have led to the realization of all my goals relevant to the decision.	CD-13 (comp.)
Principles, values, wishes, intentions	*[analytical]*	
Reasons	Reasons for and against the options in the decision situation played an important role.	CD-14 (comp.)
	I relied on my feelings and decided intuitively.	CD-15 (comp.)
	Adherence to certain rules and principles played an important role in the decision.	CD-16 (comp.)

(b) Characteristics of Decision Situations.

Characteristics	Wording	Item # (category)
Set of Options		
fixed/open	It was clear from the beginning what the options were.	CD-17 (uncert.)
	I had to first search for the possible options or design them myself.	CD-18 (uncert.)
Stagedness of Decision		
single-stage/multi-stage	Further decisions depended on the decision.	CD-25 (various)
Uniqueness of Decision		
unique/repeated	The decision was unique, i.e. the decision situation would not be repeated.	CD-26 (various)
	I had made similar decisions many times before.	CD-27 (various)

(c) Levels of Cognitive Effort.

Cognitive Effort	Wording	Item # (category)
	The cognitive or mental effort involved in the decision was high.	CD-35 (cog.ef.)
	The process of deliberation and decision-making was largely deliberate.	CD-35 (cog.ef.)
	The process of deliberation and decision-making was fast. (ii)	CD-36 (cog.ef.)
Routine, stereotype, deliberate, constructive	*[analytical]*	

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(d) Further Aspects.

Further Aspects	Wording	Item # (category)
Uncertainty	The possible consequences of the options were known.	CD-19 (uncert.)
	The probability of the consequences occurring could be estimated.	CD-20 (uncert.)
	I felt that my uncertainty in making the decision was great.	CD-21 (uncert.)
	I felt that I was in control of the decision situation.	CD-24 (uncert.)
Significance	The decision was very important. (i)	CD-29 (various)
	The decision could not be taken back.	CD-30 (various)
Difficulty	The decision was difficult.	CD-31 (various)
	I experienced the decision situation as a conflict.	CD-32 (various)
	The decision-making process took a long time. (ii)	CD-28 (various)

Note. First column: Entries in bold and italic typeset are categories, entries in normal font are their (possible) qualifications. Middle column: Items are allocated to qualifications of categories where possible and otherwise allocated to the category (heading) itself. The entry "*[analytical]*" refers to cases where qualifications are strictly analytically defined (cf. footnote 371). The roman numbers '(i)' and '(ii)" denote two pairs of items that are redundant in content. Third column: Categories in parentheses refer to the categories of the subsequent Table 9.23, namely 'components', 'uncertainty', 'various', and 'cognitive effort'. Subtable (d) entails items that were not based on Jungermann et al. (2005).

Table 9.23 Items of the Characteristics of Decision Situations Scale, wording in German and English, and scale information.

(a) Characteristics of the decision's components.

Item #	Wording in German	Wording in English
Components		
CD-1	Die Konsequenzen der Entscheidung wurden stark von Faktoren mitbestimmt, auf die ich keinen Einfluss hatte.	The consequences of the decision were strongly influenced by factors over which I had no control.
CD-2	Die Entscheidung hatte vielfältige Konsequenzen.	The decision had a variety of consequences.
CD-3	Die Konsequenzen der Entscheidung waren von langfristiger Wirkung.	The consequences of the decision had a long-term impact.
CD-4	Die Entscheidung hatte (auch) unerwartete Konsequenzen.	The decision had (also) unexpected consequences.
CD-5	Welche Konsequenzen ich mir wünschte oder vermeiden wollte, war mir klar.	It was clear to me which consequences I desired or wanted to avoid.
CD-6	Das Abwägen erwünschter und unerwünschter möglicher Konsequenzen der Entscheidung war schwierig.	Weighing desired and undesired possible consequences of the decision was difficult.
CD-7	Die Konsequenzen der Entscheidung waren von hoher Bedeutung.	The consequences of the decision were of high importance.
CD-8	Bei der Entscheidung waren mir meine Ziele klar.	When making the decision, my goals were clear to me.
CD-9	Meine Ziele waren eine wichtige Grundlage für meine Entscheidung.	My goals were an important basis for my decision.
CD-10	Meine Ziele waren konkret (nicht abstrakt).	My goals were concrete (not abstract).
CD-11	Ich hatte mehrere Ziele.	I had multiple goals.
CD-12	Ich musste meine Ziele gegeneinander abwägen.	I had to weigh my goals against each other.
CD-13	Keine der gegebenen Optionen hätte zur Verwirklichung aller meiner entscheidungsrelevanten Ziele geführt.	None of the given options would have led to the realization of all my goals relevant to the decision.
CD-14	Gründe für und gegen die Optionen in der Entscheidungssituation spielten eine wichtige Rolle.	Reasons for and against the options in the decision situation played an important role.
CD-15	Ich habe mich auf mein Gefühl verlassen und intuitiv entschieden.	I relied on my feelings and decided intuitively.
CD-16	Das Einhalten bestimmter Regeln und Prinzipien spielte eine wichtige Rolle bei der Entscheidung.	Adherence to certain rules and principles played an important role in the decision.

(b) Uncertainty involved in the decision.

Item #	Wording in German	Wording in English
Uncertainty		
CD-17	Es war von Anfang an klar, welche Entscheidungsoptionen es gab.	It was clear from the beginning what the options were.
CD-18	Ich musste die möglichen Optionen zuerst suchen bzw. selbst entwerfen.	I had to first search for the possible options or design them myself.
CD-19	Die möglichen Konsequenzen der Optionen waren bekannt.	The possible consequences of the options were known.
CD-20	Die Wahrscheinlichkeit des Eintretens der Konsequenzen konnte abgeschätzt werden.	The probability of the consequences occurring could be estimated.
CD-21	Gefühlt war meine Unsicherheit bei der Entscheidung groß.	I felt that my uncertainty in making the decision was great.
CD-22	Die Unsicherheit bezog sich auf interne Ursachen, also Unsicherheit bzgl. meiner Gefühle, Meinungen oder Gründe etc.	The uncertainty was related to internal causes, i.e. uncertainty about my feelings, opinions or reasons, etc.
CD-23	Die Unsicherheit bezog sich auf externe Ursachen, also einen Mangel an Informationen über die Welt.	The uncertainty referred to external causes, i.e. a lack of information about the world.
CD-24	Ich hatte das Gefühl, die Entscheidungssituation unter Kontrolle zu haben.	I felt that I was in control of the decision situation.

(c) Various further characteristics of the decision.

Item #	Wording in German	Wording in English
Various		
CD-25	Von der Entscheidung hingen weitere Entscheidungen ab.	Further decisions depended on the decision.
CD-26	Die Entscheidung war einmalig, d.h. die Entscheidungssituation würde sich nicht wiederholen.	The decision was unique, i.e. the decision situation would not be repeated.
CD-27	Ähnliche Entscheidungen hatte ich schon oft getroffen.	I had made similar decisions many times before.
CD-28	Die Entscheidungsfindung dauerte lange.	The decision-making process took a long time.
CD-29	Die Entscheidung war sehr wichtig.	The decision was very important.
CD-30	Die Entscheidung konnte nicht zurückgenommen werden.	The decision could not be taken back.
CD-31	Die Entscheidung war schwer.	The decision was difficult.
CD-32	Ich habe die Entscheidungssituation als Konflikt erlebt.	I experienced the decision situation as a conflict.
CD-33	Eine der möglichen Optionen war deutlich besser als alle anderen.	One of the possible options was clearly better than all the others.

(d) Cognitive effort involved in the decision.

Item #	Wording in German	Wording in English
Cognitive effort		
CD-34	Der kognitive, also gedankliche Aufwand bei der Entscheidung war hoch.	The cognitive or mental effort involved in the decision was high.
CD-35	Der Prozess des Überlegens und Entscheidens war weitgehend überlegt.	The process of deliberation and decision-making was largely deliberate.
CD-36	Der Prozess des Überlegens und Entscheidens war schnell.	The process of deliberation and decision-making was fast.

Note. Type of Scale and Anchorage in German + [English]: 5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5), midpoint labeled *teils/teils bzw. weder/noch* [in part or neither/nor]. No values displayed to participants. Introductory sentence: *Wie sehr treffen die folgenden Eigenschaften auf die geschilderte Situation zu?* [How much do the following characteristics apply to the situation described?].

J The Dimensions of Decisions Scale As noted in the introduction, Franz and Kramer (2010) were interested in the exact same undertaking as I am in this study, namely to gather dimensions that distinguish decision situations. From previous literature they first compiled a set of dimensions including five discrete values within each dimension named 'characteristics' which they present in tabular format (p.528). The following Table 9.24 is a replica.

Table 9.24 Dimensions of decision making from Franz and Kramer (2010).

Dimension	Characteristic					
Scope	Personal	Interpersonal	Family	Organizational	Community	Societal
Type	Choice	Evaluation	Construction	Recognition primed	Adoption	Progress
Structure	Structured	Mostly structured	Semi-structured	Mostly unstructured	Unstructured	Amorphous
Span of control	Impulsive	Habitual	Operational	Managerial	Strategic	Momentous
Importance	Negligible	Low	Moderate	High	Very High	Preemptive
Difficulty	Very Little	Little	Moderate	High	Very High	Wicked
Relationship to other decisions	Independent	Similar	Connected	Concurrent	Antecedent to	Related in multiple ways Interdependent
Participation	Individual Low involvement	Individual High involvement	Group advisory Low involvement	Group advisory High involvement	Group directive Low involvement	Group directive High involvement
Outcomes	Abysmal	Unacceptable	Slightly unacceptable	Acceptable	Positive	Outstanding
	Very unsatisfactory	Unsatisfactory	Slightly unsatisfactory	Slightly satisfactory	Satisfactory	Very satisfactory

Based on this compilation the authors identified 21 characteristics (e.g. "satisfaction with decision") and generated 3-8 items for each. After factor analysis and item elimination 84 items were retained which loaded on 21 factors, explaining 71% of variance. The items were constructed as bipolar items ("semantic differential-type items" Franz & Kramer, 2010, p.529), the number of points of the response scale was not reported.

The following list entails the 21 factors as allocated to the previously distinguished dimensions as well as the number of items per factor. Note that the dimensions "Scope" and "Type" were not made part of the questionnaire.

- **Structure**: Limited knowledge based decision (5 items), Slow/delayed decision (4 items), Incomplete information (4 items), Uncertain about results (5 items), Highly uncertain setting (5 items), Inconsistent effort (3 items), Rational decision (2 items)
- **Span of Control**: Short term impact (3 items)
- **Importance**: Unimportant decision (4 items), Low pressure situation (4 items), Unchangeable decision (3 items)
- **Difficulty**: Simple, easy decision (11 items), Easy to implement decision (4 items), Few options considered (4 items)
- **Relationship to other decisions**: Uncommon decision (3 items), Web of decisions (4 items)
- **Participation**: Serve individual interest (3 items), Individual decision (3 items), Self-initiated (3 items), Unpopular decision (3 items)
- **Outcomes**: Satisfaction with decision (4 items)

The 84 items were translated to German[373] and a 5-point bipolar response scale was chosen. Items were displayed in random variation within each subscale, and the order of the subscales was randomly varied, too. All items/subscales were displayed on one long questionnaire webpage with sufficient blank space between them. Cf. Table 9.25 for all items in German and English, and the response scale. Subscales/factors are reported in the order given in Franz and Kramer (2010).

[373] All items were reported in Franz and Kramer (2010, pp.530-32), but (apparently) in an abbreviated format. In my German translation, however, I used full sentences for the present study. This difference is visible in Table 9.25.

Table 9.25 Items of the Dimensions of Decisions Scale according to Franz and Kramer (2010), wording in German and English, and scale information.

Item #	Wording in German	Wording in English
Simple, easy decision		
DD-1	Die Entscheidung war sehr stressig. / Die Entscheidung war gar nicht stressig.	very stressful / not very stressful
DD-2	Die Entscheidung war frustrierend. / Die Entscheidung war gar nicht frustrierend.	frustrating / not frustrating
DD-3	Die Entscheidung kostete viel Anstrengung. / Die Entscheidung kostete wenig Anstrengung.	lots of effort / not much effort
DD-4	Die Entscheidung war schwer. / Die Entscheidung war leicht.	hard / easy
DD-5	Die Entscheidung war rational. / Die Entscheidung war emotional.	rational / emotional
DD-6	Die Entscheidung war komplex. / Die Entscheidung war simpel.	complex / simple
DD-7	Ich war sehr besorgt. / Ich war gar nicht besorgt.	worried a lot / not worried
DD-8	Es gab bei der Entscheidung viel zu analysieren. / Die Entscheidung war eine Leichtigkeit.	lots of analysis / no-brainer
DD-9	Ich war nervös. / Ich war gar nicht nervös.	anxious / not anxious
DD-10	Es gab viel zu bedenken. / Es gab nur eine Sache zu bedenken.	lots to consider / one thing to consider
DD-11	Die Entscheidung erforderte Ausdauer. / Die Entscheidung erforderte keine Ausdauer.	required persistence / no persistence

Item #	Wording in German	Wording in English
Satisfaction with decision		
DD-12	Ich war zufrieden mit der Entscheidung. / Ich war unzufrieden mit der Entscheidung.	satisfied / dissatisfied
DD-13	Ich war glücklich/stolz mit der Entscheidung. / Ich habe die Entscheidung bedauert.	happy or proud / regretful
DD-14	Die Entscheidung war gut. / Die Entscheidung war schlecht.	good / bad
DD-15	Die Entscheidung war angenehm. / Die Entscheidung war unangenehm.	comfortable / uneasy

Item #	Wording in German	Wording in English
Limited knowledge based decision		
DD-16	Die Entscheidung war wissensabhängig. / Die Entscheidung war nicht wissensabhängig.	knowledge / not depend on knowledge
DD-17	Ich habe die Fakten bedacht. / Ich habe die Fakten nicht bedacht.	facts / facts not considered
DD-18	Die Entscheidung war abhängig von Erfahrung. / Die Entscheidung war nicht abhängig von Erfahrung.	experience / not depend on experience
DD-19	Ich hatte viel Input von anderen. / Ich hatte wenig Input von anderen.	input from others / little input from others
DD-20	Bei der Entscheidung war gesunder Menschenverstand hilfreich. / Bei der Entscheidung war gesunder Menschenverstand keine Hilfe.	common sense / common sense no help

Item #	Wording in German	Wording in English
Unimportant decision		
DD-21	Die Entscheidung machte viel aus. / Die Entscheidung machte wenig aus.	mattered a lot / didn't matter much
DD-22	Die Entscheidung war sehr bedeutsam. / Die Entscheidung war nicht sehr bedeutsam.	highly significant / not very significant
DD-23	Ich habe mich bei der Entscheidung stark engagiert. / Ich habe mich bei der Entscheidung kaum engagiert.	highly engaged / not very engaged
DD-24	Die Entscheidung hat Einfluss auf meine Zukunft. / Die Entscheidung wird meine Zukunft nicht beeinflussen.	affects my future / won't affect future

Item #	Wording in German	Wording in English
Slow/delayed decision		
DD-25	Die Entscheidung war rechtzeitig. / Die Entscheidung war zu spät.	timely / late
DD-26	Die Entscheidung war pünktlich/frühzeitig. / Die Entscheidung war in letzter Minute.	on time or early / last minute
DD-27	Ich habe die Entscheidung nicht hinausgezögert. / Ich habe die Entscheidung so lange wie möglich hinausgezögert.	did not delay / delayed as long as possible
DD-28	Die Entscheidung war zügig. / Die Entscheidung war langsam.	speedy / slow

Item #	Wording in German	Wording in English
Easy to implement decision		
DD-29	Die Entscheidung erforderte viel Arbeit/Energie. / Die Entscheidung erforderte wenig Arbeit/Energie.	lots of work or energy / little work or energy
DD-30	Die Entscheidung erforderte viele Ressourcen/Gelder. / Die Entscheidung erforderte wenige Ressourcen.	lots of resources or funds / few resources
DD-31	Die Entscheidung beinhaltete eine große Verpflichtung. / Die Entscheidung beinhaltete wenig oder keine Verpflichtungen.	big commitment / little or no commitment
DD-32	--	long commitment / no commitment

Item #	Wording in German	Wording in English
Few options considered		
DD-33	Ich habe viele Optionen gesichtet. / Ich habe keine Sichtung der Optionen durchgeführt.	screened many options / didn't screen
DD-34	Ich konnte aus guten Alternativen wählen. / Es gab wenige Alternativen zur Auswahl.	choose from good alternatives / few alternatives
DD-35	Ich habe viele Alternativen bewertet. / Ich habe wenige Alternativen bewertet.	evaluated many alternatives / evaluated few
DD-36	Kreativität war erfordert. / Kreativität war nicht beteiligt.	creativity needed / creativity not involved

Item #	Wording in German	Wording in English
Uncommon decision		
DD-37	Ich treffe häufig Entscheidungen wie diese. / Ich treffe nicht häufig Entscheidungen wie diese.	frequently make decision like this / not frequent
DD-38	Die Entscheidung hatte Ähnlichkeit mit einer vorherigen Entscheidung. / Die Entscheidung war nicht wie andere Entscheidungen.	similar to previous decision / not like other
DD-39	Die Entscheidung war Routine. / Es war keine Routine-Entscheidung.	routine / non-routine

Item #	Wording in German	Wording in English
Web of decisions		
DD-40	Die Entscheidung stand nicht in Beziehung zu anderen Entscheidungen. / Es handelte sich um eine Gruppe von Entscheidungen.	unrelated decision / group of decisions
DD-41	Es war eine alleinstehende Entscheidung. / Die Entscheidung war abhängig von anderen Entscheidungen.	stand-alone decision / dependent on other decisions
DD-42	Es gab eine Sache zu bedenken. / Es gab viele Dinge zu bedenken.	one thing to consider / lots of things to consider
DD-43	Es war eine einstufige Entscheidung. / Es war eine mehrstufige Entscheidung.	single stage decision / multiple stage decision

Item #	Wording in German	Wording in English
Incomplete information		
DD-44	Ich hatte vertrauenswürdige Informationen. / Es mangelte mir an vertrauenswürdigen Informationen.	trustworthy information / lacked trustworthy information
DD-45	Ich hatte genug Informationen. / Es mangelte mir an Informationen.	enough information / lacked information
DD-46	Ich hatte Zeit zum Überlegen. / Es mangelte mir an Zeit zum Überlegen.	had time to consider / lacked time to consider
DD-47	Ich brauchte keine Expertise. / Ich brauchte mehr Expertise.	didn't need expertise / needed more expertise

Item #	Wording in German	Wording in English
Low pressure situation		
DD-48	Die Entscheidung musste getroffen werden. / Die Entscheidung hinauszuzögern hatte keine Konsequenzen.	decision had to be made / no consequence to delay
DD-49	Ich stand unter Zeitdruck. / Es gab keinen Zeitdruck.	under time pressure / no time pressure
DD-50	Ich habe mich selbst unter Druck gesetzt. / Ich habe mich nicht selbst unter Druck gesetzt.	pressure on myself / no pressure on myself
DD-51	Es bestand Druck von anderen. / Es bestand kein Druck von anderen.	pressure from others / no pressure from others

Item #	Wording in German	Wording in English
Uncertain about results		
DD-52	--	clear goals / fuzzy goals
DD-53	Die Entscheidung brachte mich weiter in meinem Plan/Ziel. / Ich habe nicht an einen Plan oder ein Ziel gedacht.	helped my plan or goals / not thought of plan or goal
DD-54	Ich wusste, welches Ergebnis ich wollte. / Das gewünschte Ergebnis war mir unklar.	knew result I wanted / wanted result was unclear
DD-55	Ich wusste, was das Ergebnis sein würde. / Ich war ungewiss bzgl. der Ergebnisse.	knew what result would be / uncertain about results
DD-56	Ich war zuversichtlich. / Ich war unsicher.	confident / unsure

Item #	Wording in German	Wording in English
Unpopular decision		
DD-57	Die Entscheidung ist bei anderen beliebt. / Die Entscheidung ist bei einigen unbeliebt.	popular with others / unpopular with some
DD-58	Jeder stimmt der Entscheidung zu. / Es gibt viele Meinungen zu der Entscheidung.	everyone agrees / lots of opinions
DD-59	Es war einfach, sich auf die Entscheidung zu einigen. / Die Entscheidung war kontrovers.	easily agreed upon / controversial

Item #	Wording in German	Wording in English
Unchangeable decision		
DD-60	Die Entscheidung kann ungeschehen gemacht werden. / Die Entscheidung kann niemals ungeschehen gemacht werden.	can be undone / never can be undone
DD-61	Die Entscheidung ist einfach rückgängig zu machen. / Die Entscheidung ist schwer rückgängig zu machen.	easy to reverse / hard to reverse
DD-62	Die Entscheidung kann abgeändert werden. / Die Entscheidung kann nicht abgeändert werden.	can be modified / cannot be modified

Item #	Wording in German	Wording in English
Highly uncertain setting		
DD-63	Die Zukunft war vorhersehbar. / Die Zukunft war unvorhersehbar.	future predictable / future unpredictable
DD-64	Die Dinge blieben ungefähr gleich. / Die Dinge änderten sich.	things about the same / things were changing
DD-65	Es bestand keine Gefahr, dass äußere Dinge die Entscheidung über den Haufen werden konnten. / Äußere Dinge konnten die Entscheidung über den Haufen werfen.	no chance of mess up / things could mess up decision
DD-66	Das Risiko war niedrig. / Das Risiko war hoch.	low risk / high risk
DD-67	Die Umstände waren sicher. / Die Umstände waren unsicher.	certain environment / uncertain environment

Item #	Wording in German	Wording in English
Serve individual interest		
DD-68	Leute haben mich unterstützt. / Niemand hat mich unterstützt.	people lobbied me / no one lobbied me
DD-69	Ich habe das gemacht, was jemand anderes wollte. / Ich habe das gemacht, was ich für am besten hielt.	did what someone else wanted / what I thought best
DD-70	Andere haben den eigenen Vorteil gesucht. / Niemand hat den eigenen Vorteil gesucht.	others sought selfish gains / no one tried to gain

Item #	Wording in German	Wording in English
Inconsistent effort		
DD-71	Ich habe ständig an der Entscheidung gearbeitet. / Ich habe immer mal wieder an der Entscheidung gearbeitet.	worked on constantly / worked on it on and off
DD-72	Ich habe mich die ganze Zeit mit dem Entscheiden beschäftigt. / Das Entscheiden war ein Prozess des abwechselnden Anhaltens und Durchstartens.	at it all the time / a stop and go process
DD-73	Die Entscheidung war mir ständig im Sinn. / Ich habe selten an die Entscheidung gedacht.	constantly on my mind / seldom thought about it

Item #	Wording in German	Wording in English
Individual decision		
DD-74	Ich habe mich bei der Entscheidung auf andere verlassen. / Ich habe mich bei der Entscheidung auf mich selbst verlassen.	relied on others / relied on myself
DD-75	Ich habe die Entscheidung anderen zugeschoben. / Ich habe mein eigenes Urteilsvermögen genutzt.	deferred to others / use my own judgment
DD-76	Ich habe Input von anderen erbeten. / Ich habe alleine gehandelt.	sought input from others / acted alone

Item #	Wording in German	Wording in English
Short term impact		
DD-77	Die Entscheidung könnte die Zukunft ändern. / Die Entscheidung hat nicht viel Bedeutung für die Zukunft.	may change the future / not much future impact
DD-78	Die Entscheidung hatte eine langfristige Wirkung. / Die Entscheidung hatte eine kurzfristige Wirkung.	long term impact / short term impact
DD-79	Die Entscheidung hatte große Auswirkungen für mich. / Die Entscheidung hatte kaum Auswirkungen für mich.	high impact on me / not much impact on me

Item #	Wording in German	Wording in English
Self-initiated		
DD-80	Die Entscheidung wurde von anderen angestoßen. / Die Entscheidung wurde von mir eingeleitet.	initiated by others / initiated by me
DD-81	Die Entscheidung wurde von den Umständen bestimmt. / Die Entscheidung wurde von mir bestimmt.	dictated by circumstances / dictated by me
DD-82	Jemand anders hätte entscheiden können. / Das Entscheiden war mir überlassen.	someone else could have decided / it was up to me

Item #	Wording in German	Wording in English
Rational decision		
DD-83	Die Entscheidung war intuitiv. / Die Entscheidung basierte auf Informationen.	intuitive / based on information
DD-84	Die Entscheidung erforderte ein gutes Gespür. / Die Entscheidung erforderte Logik und vernünftiges Nachdenken.	required good sense / required logic and reasoning

Note. Type of Scale and Anchorage in German + [English]: 5-point bipolar scale, end points labeled according to item content, values ranging from 1 to 5, no values displayed to participants. Introductory sentence: *Wie sehr treffen die folgenden Eigenschaften auf die geschilderte Situation zu?* [How much do the following characteristics apply to the situation described?]. NB: Two items (items #32 and #52) got "lost in translation" and were thus not part of this study; this is marked in the respective subtables by "- -".

J.a Excursus: What type of information do the eight Decision Categorization Scales provide? All questionnaires gathered together in this study, of course, allow an allocation of any specific decision to their respective categories. This is most clearly the case with the Situational Eight DIAMONDS Scale S8-II (e.g.: Is this a decision involving *Duty*?) and the one-item-per domain questionnaires, namely the Evolutionary Domains Mini-Scale (e.g.: Is this a decision involving *Affiliation*?), the Moral Foundations Mini-Scale (e.g.: Is this a decision involving *Harm*?), and the Domains of Risk Mini-Scale (e.g.: Is this a *Financial decision*?). If the purpose were a clear-cut allocation of any one decision to the domains/categories of the above listed questionnaires, a dichotomous yes/no response scale would allow for the most straightforward results.[374] [375]

The 14BiPole-Value Questionnaire requires a more elaborate statistical treatment where as its result each respondent (in this case: each decision) gets located in the two-dimensional space of Openness vs. Conservation and Self-Enhancement vs. Self-Transcendence.

The most 'classic' questionnaire of this study is probably the Dimensions of Decisions Scale (by Franz & Kramer, 2010) where each dimension/aspect is represented by a subscale of several items. Since the Dimensions of Decisions Scale has a bipolar response scale and a length of 21 dimensions/subscales, a profile chart would be an adequate depiction of the ratings regarding one specific decision or a group of decisions. The same holds for the Semantic Differential Scale.[376]

Now, what about the last of the questionnaires, the Characteristics of Decision Situations Scale (based on Jungermann et al., 2005)? With respect to its origin, a set of theoretical distinctions, it is similar to the Dimensions of Decisions Scale (Franz &

[374] Likewise one could, of course, statistically reduce the information from the multi-point Likert or bipolar response scales to a dichotomous outcome.

[375] Note that with this description I am treating the aforementioned questionnaires simply as 'categorizers' as if there were no measurement error. With this description *I am not* treating them as psychometric instruments with the decision in the place of the subject to be evaluated.

[376] But note that profile charts of semantic differential scales are usually depicted on item-level rather than subscale-level.

Kramer, 2010) – both were constructed according to a top-down approach. Analogously, the next step for the Characteristics of Decision Situations Scale would have been to construct subscales with more than one item each. However, I decided against this procedure, mostly due to practical considerations: the study as a whole could not bear another long questionnaire (– remember that the Dimensions of Decisions Scale alone already comprises 84 items). Instead, the Characteristics of Decision Situations Scale is a coalition of one-item 'subscales', that is: every aspect of interest only received one item. As a consequence, a factor analytical treatment of this scale only makes mediocre sense, because the items were not chosen such that they could easily lump together on the basis of high intercorrelations. Instead (as becomes visible in Table 9.22) the items allocated to one category (e.g. to the category "Goals") are rather meant to span a range of aspects that could be interesting regarding this category, that is: explore the breadth of the category rather than form (highly 'internally consistent') subscales on the basis of redundancy (cf. also footnotes 380 and 383 from the upcoming section A in 9.3.2.3 regarding these points). On the other hand, with this questionnaire, too, some method of data reduction is necessary – simply because the information of 36 singular items is difficult to handle. That said, there will be a little more input on heterogeneous scales in the aforementioned section A from 9.3.2.3 which will also outline the further data analytical treatment of the Characteristics of Decision Situations Scale.

9.3.1.3 Participants

Participants were recruited via mailing list from Leuphana University Lüneburg. $N = 107$ participants started the online questionnaire and $n = 79$ finished it – of which only one participant failed the *Diligence* criterion ($n = 78$).[377] However, two further participants had to be removed from the data set (cf. footnote 378), such that the final sample size comprised $n = 76$ participants.[378] Recruitment took place between July and September 2015 (first data entry 02/07/2015, last data entry 20/09/2015). The vast majority of participants were students from Leuphana University ($n = 68$/ 89%), $n = 8$/11% (had) studied at other universities. Regarding their field of study, surprisingly only $n = 10$/13% of participants (had) majored in Psychology whereas $n = 65$/87% (had) majored in various other subjects, $n = 1$ did not enter a major. Age ranged from 18-66 years, with a mean of $M_{\text{age}} = 24$ years ($Mdn_{\text{age}} = 23$ years, $SD_{\text{age}} = 6.5$ years). 80% ($n = 61$) of participants were female and 20% ($n = 15$) were male. On average, participants took $M_{time} = 21$ min to complete the questionnaire ($SD_{time} = 4.5$ min, $Mdn_{time} = 21$ min).

[377] For further information on the variable *Diligence* cf. Table 7.2 from section 7.2.1. Participants reporting a value <4 were excluded from further analysis.

[378] Upon visual inspection of the data set one participant stuck out having entered "bla bla bla" instead of a decision situation right in the beginning and otherwise having clicked the same response value on all items. Shockingly, this individual did not identify their non-usable data by self-rated *Diligence*. Upon this impression I scrutinized outliers using identify_outliers{rstatix} on the system generated variables *TIME_SUM* and *DEG_TIME*. These analyses suggested the exclusion of two further participants including the individual without variance. For further information on the aforementioned system generated variables, please refer to Table 7.1 from section 7.2.1.

9.3.2 Results

9.3.2.1 Collegiate Decision Situations

The provided decision situations were coded according to content by two independent raters. The procedure was as follows: After the first coding to explore the potential categories, the two raters agreed upon 21 categories. The second coding then was the main coding; Cohen's Kappa for inter-rater reliability was calculated, $\kappa = 0.84$ (95% CI, 0.76 to 0.93), $p < 0.001$, indicating a strong level of agreement. From the $N = 76$ cases, there was agreement in $n = 65/86\%$ of cases and disagreement in $n = 11/14\%$ of cases. These remaining 11 cases of disagreement were discussed and resolved.

The following Table 9.26 lists the 21 categories of collegiate decision situations in German and English as well as their frequencies, Figure 9.5 provides a visual display ordered by count.

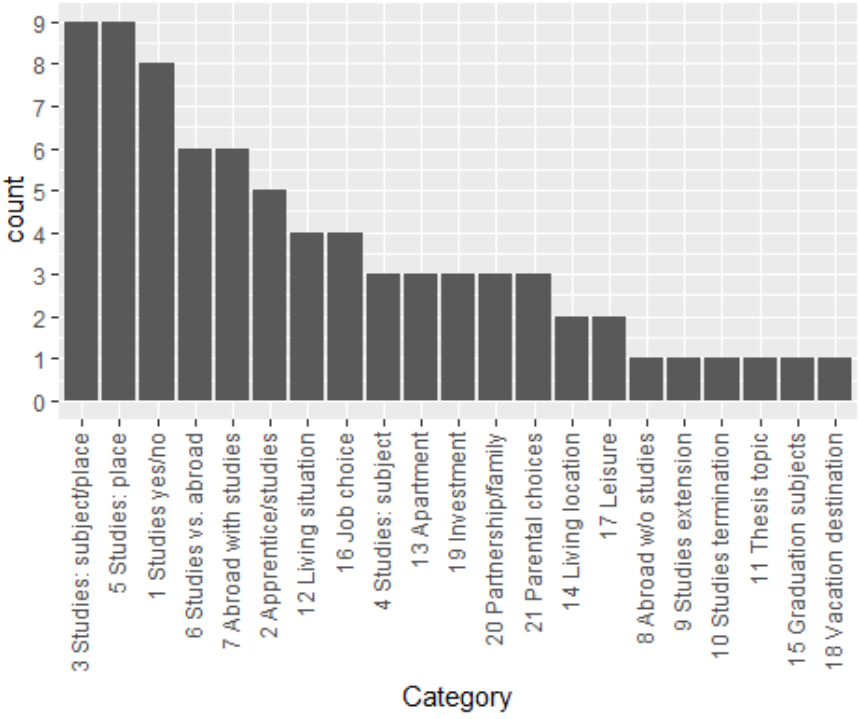


Figure 9.5 Ordered barplot of the frequencies of the Collegiate Decision Situations.

Table 9.26 Categories of the Collegiate Decision Situations including their frequency.

	Category		Frequency
#	Wording in German	Wording in English	
1	Studium ja/nein	[Academic] Studies yes/no	8
2	Ausbildung (oder Studium)	Apprenticeship/[academic] studies	5
3	Studium, Fach + Ort	[Academic] Studies: subject/place	9
4	Studium, Fach	[Academic] Studies: subject	3
5	Studium, Ort	[Academic] Studies: place	9
6	Studium versus Ausland/Auszeit	[Academic] Studies vs. abroad[/time off]	6
7	Ausland mit Studium	Abroad with [academic] studies	6
8	Ausland ohne Studium	Abroad w/o [academic] studies	1
9	Verlängerung Studium	Studies extension	1
10	Abbruch Studium	Studies termination	1
11	Abschlussarbeit (Thema)	Thesis topic	1
12	Wohnsituation	Living situation	4
13	Wohnung	Apartment	3
14	Wohnort	Living location	2
15	Abiturfächer	Graduation subjects [(high school)]	1
16	Job (Wahl)	Job choice	4
17	Freizeit	Leisure	2
18	Urlaub (Ziel)	Vacation destination	1
19	Investition	Investment	3
20	Partnerschaft/Familie	Partnership/family	3
21	Schule/Kindergarten (Eltern)	Parental choices	3
			N = 76

Note. These are the frequencies of categories within the final data set of $N = 76$ participants after filtering for completion and diligence. Since the task to describe a decision situation was located at the very beginning of the online questionnaire, some of the participants that were later excluded due to non-completion still had entered a codable decision situation. This was the case for $n = 19$ participants (which vice versa means that $n = 12$ participants of the total number of $N = 107$ participants had entered nonsense or blank space). Of course, all codable entries were made part of the coding process; that is, they contributed to shaping the number and wording of categories. However, since all further analysis will be conducted on the final data set of $N = 76$ cases, only these cases are presented here, too. In the English translation, words in square brackets are left out in plots for reasons of brevity.

In sum, it is plainly obvious that most categories evolve around the choice to study (yes/no, where, what, now/later), academic choices related to studying (drop out, extend, study abroad, thesis topic), and further common choices students face (live where, with whom). Yet there are also a few other categories that are less tied to student life only (job, leisure, vacation, investment, partnership/family/children).

One might, of course, consider gathering together some of the categories into larger super-categories, e.g. choice of occupation, academic choices, living arrangements, pri-

vate life. Yet keeping the relatively large amount of 21 categories also preserves a lot of information: from the label alone one can imagine what might be an according decision situation.

Here are a few examples of categories and participant entries of decision situations (English translation only):

- **Living situation**: "Deciding whether to move into a shared apartment with others or into a single apartment alone."
- **Living location**: "Move to another city with the children (change of schools) after separation."
- **Abroad with academic studies**: "Decision to do a semester abroad in Turkey and apply for it in the first place."
- **Leisure**: "Although I had a cold, I wanted to attend a Houston Ballet performance. Then, although I had a strong interest in attending, I decided against it."
- **Partnership/family**: "Visit the grandfather with cancer and dementia one more time before his death or remember him healthy."

9.3.2.2 Data Analytical Procedure

The use of the eight Decision Categorization Scales in one study was a largely exploratory undertaking. Remember section B from 9.3.1.2 where it was pointed out that:

- three questionnaires were used in full (namely the Situational Eight DIAMONDS Scale S8-II, the 14BiPole-Value Questionnaire, and the Dimensions of Decisions Scale),
- three questionnaires were basically one-item-per-domain super-short face-valid questionnaires that were based on published theorizing regarding domains and/or respective (sub)scales (namely the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale),
- one Semantic Differential Scale included items that were both meant to fit the purpose of the study as well as represent the classic three factors Evaluation, Activity, and Potency, and
- last, one questionnaire was based on a textbook on decision making, such that all items had to be newly generated (the Characteristics of Decision Situations Scale).

In sum, it is obvious that these scales are very divers – which is also, of course, why they were gathered together. However, their diversity also means that certain analytical procedures won't make very much sense. For example, a factor analytical treatment of all employed questionnaires/items together could not succeed: some scales refer to content domains, others refer to decision characteristics, or values, or rather metaphorical attributes (in case of the Semantic Differential Scale). It would be nonsensical to try to find a new order out of such a mumbo-jumbo – especially, since it already includes

structured material.[379]

Thus, what can and will be done is this:

(1) A factor analysis will be run on the following questionnaires: the Semantic Differential Scale (12 items) and the Characteristics of Decision Situations Scale based on Jungermann et al. (2005) (36 items); it will not be run on the Dimensions of Decisions Scale by Franz and Kramer (2010) (82 items).

(2) Internal consistency (Cronbach's α) will be calculated for the factors/subscales resulting from the factor analyses from above, as well as for the subscales of the Dimensions of Decisions Scale by Franz and Kramer (2010). It will not be calculated for any of the so-called mini-scales that distinguish content domains with one item per domain/subscale.

(3) A correlation matrix will be calculated for all scales that distinguish content domains (namely: the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale).

(4) Descriptive statistics (correlation matrices as well as measures of central tendency, dispersion and shape) will be reported for all scales. Furthermore, additional plotting including the 21 collegiate decision situations can be found in the Appendix.

(5) The 14BiPole-Value Questionnaire is a special case. Its descriptive analysis entails relating the gathered data points to the two-dimensional content model of values at its theoretical base.

(6) Last, exploratory cluster analyses will be calculated.

(7) Stepping out of the scope of questionnaire validation, descriptive as well as exploratory inferential statistics will be calculated for the factor/subscale *Satisfaction with decision* from the Dimensions of Decisions Scale in relation to three one-item variables from the Characteristics of Decision Situations Scale (before factoring) pertaining to decision strategy.

The subsequent sections will follow the above enumeration, but results pertaining to the same questionnaire/scale will be kept together. Factor analyses and internal consistency calculations will be subsumed under section *Psychometric Validation* (section 9.3.2.3 on the following page), which will be followed by a section on Quality Assessment (section 9.3.2.4 on page 301).

The section *Descriptive Statistics* (section 9.3.2.5 on page 308), after a short introduction (A), will include *Correlation Matrices* (B) and *Measures of Central Tendency, Dispersion, and Shape* (D), the analysis of the 14BiPole-Value Questionnaire (C), a

[379] This is an argument from content. From a statistical perspective there are insanely too many items on insanely too few participants. Additionally the response scales are too divers.

short summary (E), and the references to *Additional Plotting* (F) and *Cluster Analysis* (G) transferred to the Appendix. The *Results* section will be concluded by the section *Decision Strategy and Satisfaction* (section 9.3.2.6 on page 337).

9.3.2.3 Psychometric Validation

A Factor Analyses As noted above, two of the questionnaires, the Semantic Differential Scale and the Characteristics of Decision Situations Scale, will be subjected to factor analysis. General best practice criteria as well as a very thorough procedure for scale construction have been described in section A from 9.2.2.1 and implemented with the Decision Style Questionnaire (DSQ).

However, in this section I will deviate from these criteria. In the case of the Semantic Differential Scale a 'quick and dirty' approach will be used: Factorability will not be tested, factor retention will be solely based on parallel analysis, item deletion will only mostly follow the principles described in the above referenced section, scale-length optimization will be skipped. This approach affords a tremendous abbreviation and the quality of results will be sufficient for present purposes.

Regarding the Characteristics of Decision Situations Scale the deviation from 'best practice' and its justification is quite different. In section J.a from 9.3.1.2, the Excursus on the *Type of Information provided by the eight Decision Categorization Scales*, I already pointed out that the Characteristics of Decision Situations Scale is not really suitable for factor analysis – simply because it was not constructed such that several items were meant to measure 'the same thing', but rather each item was supposed to capture one singular defining aspect – thereby forming a one-item subscale – such that all 36 items together would capture the breadth of the construct "decision situation" as portrayed in Jungermann et al. (2005).[380] Therefore, it was likely that factoring solutions would not be straightforward: e.g. lacking simple structure or containing small loadings. It stood to reason that strictly following the mentioned guidelines from section A in 9.2.2.1 would not lead to desirable results.[381] In sum, if there is to be a refined

[380] Graham, Nosek, Haidt, Iyer, Koleva, and Ditto (2011) regarding the construction of the Moral Foundations Questionnaire make an argument for this approach: "Throughout the several rounds of item generation and selection, we sought to minimize conceptual and empirical redundancy among items. On this point, we differ from some approaches to scale development that prioritize high internal consistency. Internal consistency is important but so is comprehensive coverage of the various facets of the construct (the scale development work of Harrison Gough, 1979, 1984, is a good example of this balance; see also John & Soto, 2007). From our point of view, it is better to have dissimilar items that are moderately correlated but that each capture a different facet of a foundation than it is to have similar items that are highly correlated and capture only a small amount of the foundation's scope. As such, our aim in item analysis was not to maximize internal consistency via item redundancy. Instead, we sought a balance between achieving (a) sufficient internal consistency to believe that there was a common core and (b) maximal item heterogeneity to increase confidence that we were representing the foundation in full." (p.370).

[381] This consideration was put to the test in conducting three factor analyses based on the mentioned criteria, but performing the three aspects of item deletion (cf. section A from 9.2.2.1, point *#3. Item deletion*) in different order. Specifically: (i) conducting an EFA after each step, (ii) implementing all steps in one go before conducting another EFA, and (iii) deleting factors <3 items and crossloadings first and only deleting items <0.32 in the fore-last step. Interestingly, all three attempts led to

questionnaire based on those 36 items on characteristics of decision situations, a strict following of procedure is counter-indicated. Consequently, the factor analysis on the Characteristics of Decision Situations Scale will be run with changed criteria:

- Factors containing only 2 items will not be deleted even if the two items do not correlate with $r > 0.70$, unless they lack semantic similarity.
- Items with small loadings will only be deleted once their loading falls below 0.20 (instead of 0.32). The criterion of a communality >0.40 will not be implemented.
- Crossloading items will only be deleted once the difference between two loadings is <0.15, but not once a crossloading is >0.32. In case the difference between two loadings is <0.15, but one loading is $\geq$ 0.32, and the crossloadings are <0.3, then semantic criteria will be decisive.
- Semantic criteria will always be prioritized.
- Importantly, once there are only one or two items left to delete upon the above criteria, the previous number of factors as indicated by parallel analysis will be perpetuated for the subsequent EFA even if parallel analysis on the new data set should indicate a smaller number of factors.[382]

Furthermore, due to the described construction principle of one-item-subscales, even once a factoring solution is attained, reaching high internal consistencies (Cronbach's α) within factors should be unlikely or even undesirable, since a high alpha is based on homogeneity of items – or in other words: redundancy.[383] Hence, regarding the point *Scale-length optimization* from the guidelines in section A from 9.2.2.1, there will be a

different results in terms of what items – and factor(s) respectively – were retained. On the other hand, the three attempts had major similarities: (a) the factoring solutions were very unstable: when steps of item deletion were performed (that is: deletion of factors with <3 items, items with <0.32 loadings, and crossloadings >0.32), then the subsequent factoring solution again produced one or more instances designated for deletion, rendering the deletion process infinite; (b) the questionnaire was bit by bit eradicated by the procedure: the three attempts lead to two, one and even zero factors in the end, each with very few – mostly two – items.
NB: These three factor analyses are reported in the Appendix, cf. section C.2.2.1 on page 614. Their results, similarities and the discussion thereof is also informative to the main version which will be reported in the following (cf. section A.b within the present part 9.3.2.3), but I strongly recommend reading about the main version first and then follow up on it with the three additional factor analyses. Another footnote will refer you there when the time is right.

[382] This last point might be the most important provision to counteract the described self-deletion of the questionnaire (cf. footnote 381), because it provides a stopping rule for the otherwise potentially endlessly reiterating process of item deletion and factor reduction.

[383] John and Soto (2007) challenge the singular importance of a high coefficient alpha: "Note that these items are essentially paraphrases of each other and represent the same item content [...] stated in slightly different ways. Cattell (1973) considered scales of this kind to be "bloated specifics" – they have high alphas simply because the item content is extremely redundant and the resulting interim correlations are very high. Thus, alphas in the high .80's or even .90's, especially for short scales, may not indicate an impressively reliable scale but instead signal redundancy or narrowness in item content. [...] broadband measures [...] can predict a wider range of outcomes or behaviors but generally do so with lower fidelity. This phenomenon is known as the bandwidth-fidelity trade-off (Cronbach & Gleser, 1957) [...]." (p.471). Cf. also footnote 380.

deviation, too: Obtaining a high coefficient alpha will not be first priority. Here, too, semantic criteria and the goal to explore a characteristic more broadly will be decisive.

For all factor analyses maximum likelihood will be used as optimization method and promax as an oblique rotation.

A.a The Semantic Differential Scale Items #SD-10, #SD-11, and #SD-12 (cf. Table 9.17 for the wording) were excluded from analysis since they were not expected to load on the three classic factors Evaluation, Activity, and Potency. Unfortunately there were 88 missing values in the remaining data set of 9 items and $n = 76$ participants. Therefore, the analysis was conducted twice: (1) with all rows with missing values excluded, resulting in $n = 36$ cases (in the following dubbed V1), and (2) with all missing values replaced by the column average, thus retaining all $n = 76$ participants (in the following dubbed V2). Fortunately the structure of the results was quite similar for both versions. Therefore, reported results will pertain to both versions unless otherwise noted. In case of conflict, V2 will be prioritized.

Parallel analysis suggested 2 factors. Forcing 3 factors on the data only led to a third one-item factor containing singularly item #SD-5. Therefore, the suggested two-factor solution was pursued in spite of its theoretical inadequacy. Table 9.27 displays the loadings of both versions V1 and V2.

Table 9.27 Loadings of nine items of the Semantic Differential Scale for two versions V1 and V2.

Item		Version 1 (V1)		Version 2 (V2)	
#	Wording	Factor 1	Factor 2	Factor 1	Factor 2
SD-01	bad – good	0.74		0.66	
SD-02	ugly – beautiful	0.87	0.34	0.78	
SD-03	unpleasant – pleasant	0.82		0.80	
SD-04	passive – active		0.40		0.33
SD-05	slow – fast				
SD-06	excited – calm	0.36		0.48	-0.33
SD-07	weak – strong	0.44	0.49		0.66
SD-08	small – large		0.67		0.41
SD-09	obedient – powerful				0.40

Note. The first three items were meant to represent the dimension Evaluation, the second three items the dimension Activity, and the last three items the dimension Potency.

- There were items not producing any loadings >.3, namely item #SD-5 in V2 and both items #SD-5 and #SD-9 in V1.
- Crossloading items with a loading at .32 or higher were item #SD-6 in V2 and items #SD-2 and #SD-7 in V1.[384]

Looking at both patterns of V1 and V2, but prioritizing V2, the following items were retained: items #SD-1, #SD-2, and #SD-3 on Factor 1 and items #SD-7, #SD-8, and

[384] Please refer to section A from 9.2.2.1, point *#3. Item deletion* for general best practice criteria that were adhered to here, too.

#SD-9 on Factor 2. Factor 1 thus represents the dimension Evaluation, and Factor 2 represents Potency, while the third dimension, Activity did not prevail here.

The internal consistency (Cronbach's α) of Factor 1 (Evaluation) was good with $\alpha = 0.86$, and the corrected item total correlations[385] of the three items were good, too, with $r = \{0.69, 0.76, 0.76\}$. The internal consistency of Factor 2 (Potency), however, was poor with $\alpha = 0.51$ as were the corrected item total correlations with $r = \{0.36, 0.26, 0.38\}$.[386] Thus, Factor 2 (Potency) does not qualify as a reliable measure and should not be employed in further analyses. Accordingly, the employed Semantic Differential Scale is now reduced to Factor 1 (Evaluation) and will henceforth be termed "the Semantic Differential *Evaluation* Scale".

A.b The Characteristics of Decision Situations Scale A factor analysis was conducted based on the changed criteria outlined in section A from 9.3.2.3. For the initial factoring solution (36 items) parallel analysis suggested 7 factors; cumulative variance explained was 47%. In four successive EFAs a total of 16 items were deleted, interestingly in all 16 cases due to crossloadings. The fifth factoring solution was the pre-final one (with cumulative variance explained at 50%).[387] For the first two factoring solutions parallel analysis had suggested 7 factors, for the following two factoring solutions 6 factors and for the last/fifth factoring solution 6 or 5 factors. The pre-final fifth factoring solution was then run with 6 factors to avoid further item deletion as described above (cf. section A from 9.3.2.3).[388] Cf. Table 9.28 for the retained items and their loadings.

[385] Note that according to the respective R documentation the corrected item total correlations from psych::alpha are listed under "r.drop".

[386] A common rule of thumb demands that the corrected item total correlation of an item be >0.30.

[387] Deleted items per factoring solution (FS): FS1: 9 items, FS2: 4 items, FS3: 2 items, FS4: 1 item.

[388] Out of curiosity I explored what would happen when retaining only 5 factors instead of 6 factors in the fifth factoring solution. In fact, after the deletion of two further items (that previously had made up their own factor) the process ended with the sixth solution and nearly identical allocations and content; cumulative variance explained was 46%.

Table 9.28 Pre-final factoring solution for the Characteristics of Decision Situations Scale.

#	Item Wording (English transl.)	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
CD-01	The consequences of the decision were strongly influenced by factors over which I had no control.				**0.37**		
CD-06	Weighing desired and undesired possible consequences of the decision was difficult.	**0.65**					
CD-08	When making the decision, my goals were clear to me.				-0.21	**0.50**	0.29
CD-10	My goals were concrete (not abstract).				-0.21	**0.84**	
CD-16	Adherence to certain rules and principles played an important role in the decision.				**0.61**		
CD-19	The possible consequences of the options were known.			**0.64**			
CD-20	The probability of the consequences occurring could be estimated.			**1.04**			
CD-21	I felt that my uncertainty in making the decision was great.	**0.66**				-0.34	
CD-23	The uncertainty referred to external causes, i.e. a lack of information about the world.				**0.58**	-0.25	
CD-25	Further decisions depended on the decision.				**0.43**		
CD-26	The decision was unique, i.e. the decision situation would not be repeated.						**0.72**
CD-27	I had made similar decisions many times before.						**-0.30**
CD-28	The decision-making process took a long time.		**0.89**				
CD-29	The decision was very important.				0.28		**0.72**
CD-30	The decision could not be taken back.				0.23	**0.40**	
CD-31	The decision was difficult.	**0.73**	0.20				
CD-32	I experienced the decision situation as a conflict.	**0.71**			0.22		
CD-33	One of the possible options was clearly better than all the others.				**0.44**		
CD-35	The process of deliberation and decision-making was largely deliberate.		**0.37**	0.22		0.22	
CD-36	The process of deliberation and decision-making was fast.		**-0.83**				

Note. The cut-off for the display of loadings was 0.2. Loadings in bold font signify allocation to the respective factor.

A.c – Pre-final Factoring Solution and Scale-Length Optimization In the following, each factor from the pre-final factoring solution will be labeled and shortly presented including reliability statistics. Based on the latter – as the last step towards a final version of the Characteristics of Decision Situations Scale – measures of scale-length optimization will be proposed as well as item reformulations for future use of the scale. A summary of the results of the scale-length optimization procedure can be

found in the subsequent section A.d and its Table 9.35 (both within the present part 9.3.2.3).

Factor 1: Difficulty (4 items)

- Weighing desired and undesired possible consequences of the decision was difficult. (CD-06)
- I felt that my uncertainty in making the decision was great. (CD-21)
- The decision was difficult. (CD-31)
- I experienced the decision situation as a conflict. (CD-32)

Table 9.29 Reliability statistics of Factor 1 *Difficulty* (4 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.79	0.51-0.69	0.49	no	w/o CD-06: α=0.74 w/o CD-31: α=0.70

Factor 1 includes two clearly redundant items (items #CD-06 and #CD-31). I would suggest to drop item #CD-06, since the item is phrased awkwardly (too complicated) and Cronbach's alpha would be equally acceptable with $\alpha = 0.74$, cf. Table 9.29.

Also in the context of this factor it stands to reason that regarding item #CD-21 participants rather understood the German word "Unsicherheit" to signify 'unsteadiness' rather than 'uncertainty' (which was the technical term intended).[389]

Factor 2: Duration (3 items)

- The decision-making process took a long time. (CD-28)
- The process of deliberation and decision-making was largely deliberate. (CD-35)
- The process of deliberation and decision-making was fast. (CD-36)

Table 9.30 Reliability statistics of Factor 2 *Duration* (3 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.72	0.34-0.73	0.46	yes, w/o CD-35: α=0.85	w/o CD-28: α=0.53 w/o CD-36: α=0.42

Items #CD-28 and #CD-36 of Factor 2 are rather redundant, too. However, it is not advisable to drop either, because Cronbach's alpha would decrease unacceptably, cf. Table 9.30. Reversely, Cronbach's alpha would increase considerably when dropping item #CD-35. Yet, I would advice against it, because this item gives a more diverse and rounded character to Factor 2, and its Cronbach's alpha is still quite acceptable. Regarding item formulations, item #CD-35 should be simplified to "The process of making the decision was largely deliberate." or more to the point: "The process of making the decision involved a lot of deliberation".

[389] For future use of this item in English language, consider the following alternatives to 'uncertainty': insecurity, unsteadiness, uncertainness, self-consciousness, incertitude.

Factor 3: Predictability (2 items)

- The possible consequences of the options were known. (CD-19)
- The probability of the consequences occurring could be estimated. (CD-20)

Table 9.31 Reliability statistics of Factor 3 *Predictability* (2 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.78	0.64	0.64	no	not applicable

Factor 3 includes two items that produce a quite acceptable Cronbach's alpha of $\alpha = 0.78$. That these two items form a factor together is quite lucky, because *analytically* they very straightforwardly refer to the technical definition of risk and uncertainty (cf. footnote 370). However, since the difference between "risk" and "uncertainty" is the difference of whether the probabilities of the consequences are *known* (risk) or can only be *estimated* or gauged (uncertainty) item #CD-20 cannot distinguish between the two.

Factor 4: Control (5 items)

- The consequences of the decision were strongly influenced by factors over which I had no control. (CD-01)
- Adherence to certain rules and principles played an important role in the decision. (CD-16)
- The uncertainty referred to external causes, i.e. a lack of information about the world. (CD-23)
- Further decisions depended on the decision. (CD-25)
- One of the possible options was clearly better than all the others. (CD-33)

Table 9.32 Reliability statistics of Factor 4 *Control* (5 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.57	0.23-0.52	0.21	no	not applicable

Factor 4 clearly comes with very bad statistical properties: the mean inter-item correlation is very low, from the corrected item total correlations there are two $<.3$ and there are two more $<.4$, and still dropping an item would not increase Cronbach's alpha. Alpha would, however, remain at $\alpha = 0.57$ when dropping item #CD-33. This dire diagnosis also prevails once looking at content: it is hard to see any similarities in content. Therefore, it is not recommendable to employ this factor in its current state since it is unclear what it is that it measures (validity), and what it measures it does not measure well (reliability).

Thus, further scale-length optimization was applied. The criterion was a corrected item total correlation $\geq .3$. This process led to the deletion of items #CD-33, #CD-25, and #CD-16 (in that order). The remaining two items (items #CD-01 and #CD-23) produced a Cronbach's alpha of $\alpha = 0.60$ and correlated with $r = 0.43$.

Furthermore, item #CD-23 is not well formulated and needs rephrasing, e.g. "My uncertainty regarding the decision's consequences were due to a lack of information (about external events).".[390]

Factor 5: Clarity (3 items)

- When making the decision, my goals were clear to me. (CD-08)
- My goals were concrete (not abstract). (CD-10)
- The decision could not be taken back. (CD-30)

Table 9.33 Reliability statistics of Factor 5 *Clarity* (3 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.59	0.22-0.52	0.32	yes, w/o CD-30: α=0.73	not applicable

Factor 5 starts out with unsatisfactory properties, that can, however, be easily remedied: item #CD-30 – which is also the only item with a corrected item total correlation $<.3$ – should be deleted. As a consequence, Cronbach's alpha rises to $\alpha = 0.73$, the common content is easy to describe, and the remaining two items correlate with $r = 0.58$.

Factor 6: Significance (3 items)

- The decision was unique, i.e. the decision situation would not be repeated. (CD-26)
- I had made similar decisions many times before. (CD-27)
- The decision was very important. (CD-29)

Table 9.34 Reliability statistics of Factor 6 *Significance* (3 items).

Cronbach's α	Corrected Item Total Correlations	Mean Inter-item Correlation	Increase in α if an Item is Dropped?	Decrease in α without Redundant Item
0.58	0.28-0.45	0.31	yes, w/o CD-27: α=0.64	w/o CD-26: α=0.34 (w/o CD-27: α=0.64)

Factor 6 presents dissatisfactory properties as well. However, these can be somewhat improved by deleting item #CD-27 (again the only item with a corrected item total correlation $<.3$), which raises Cronbach's alpha to $\alpha = 0.64$ – a number still considered questionable under common conventions. The remaining two items correlate with $r = 0.47$ and show interpretable content similarity. Yet, in case one won't use this factor due to its mediocre properties, I would still recommend to retain its two items, since they are very much to the point and cover interesting aspects in themselves possessing face-validity.

[390] This phrasing is still a bit too technical and complicated. The part in parentheses could be discarded.

A.d – Summary of Scale-Length Optimization Results In sum, after item deletion from scale-length optimization, four of the six factors (Factor 1, 2, 3, and 5) show acceptable properties as regards Cronbach's alpha with $\alpha > .7$ and corrected item total correlations of $r_{int-it} > .3$.[391] Factors 4 and 6 remain at $.6 < \alpha < .7$, but are semantically consistent and interpretable. Three of the retained items should get rephrased. In total, the questionnaire now comprises 14 items. Table 9.35 below sums up these results from scale-length optimization.

Table 9.35 Internal consistency coefficients of the Characteristics of Decision Situations Scale after scale-length optimization.

	M (*SD*)	Number of Items	Cronbach's alpha	Mean Inter-item Correlation	Corrected Item Total Correlations
Characteristics of Decision Situations Scale		**14**	**0.64**	**0.17**	**0.13-0.42**
Factor 1: Difficulty[1]	3.46 (0.96)	3	0.74	0.49	0.51-0.61
Factor 2: Duration[2]	3.53† (0.94)	3	0.72	0.46	0.34-0.73
Factor 3: Predictability	3.58 (0.94)	2	0.78	0.64	0.64
Factor 4: Control[3]	2.94 (1.14)	2	0.60	0.43	0.43
Factor 5: Clarity	3.72 (1.00)	2	0.73	0.58	0.58
Factor 6: Significance	3.89 (1.03)	2	0.64	0.47	0.47

Note. The superscripts 1-3 behind factor labels mark factors where an item should get rephrased (for details cf. section A.c from the present part 9.3.2.3). The dagger (†) behind the mean of Factor 2 signifies that here one item needed reverse-coding (item #CD-36).

In conclusion, from the perspective of conventional conventions, (a) the factors with $\alpha < .7$ should not be used (namely Factor 4 and Factor 6), and (b) the two-item factors with a correlation of their items of $r < .7$ should not be used either (namely – additionally to the above mentioned two factors – Factor 3 and Factor 5). This leaves Factor 1 and Factor 2 with three items each, covering the contents "Difficulty" and "Duration". As argued above, these strict conventions will not be followed here.

A.e – Consolidation of the Final Factoring Solution In order to consolidate the factor structure of this potentially final solution after scale-length optimization, of course another EFA is due (cf. e.g. Worthington & Whittaker, 2006). Thus, another EFA was performed on the final 14 items, set to 6 factors.

[391] Note: The index "int-it" denominates "item total correlations" in case of several items. In case of a factor with only two items the item total correlation of both items is identical to the inter-item correlation – which, of course, is identical to their simple correlation.

This EFA confirmed the previous factor structure of the 20-item pre-final factoring solution. All but one crossloading were <0.32, all item loadings were >0.32. Cf. Table 9.36 for the final factoring solution comprising 14 items. Cumulative variance explained was 65%. Intercorrelations of factors are displayed in Table 9.37.

Table 9.36 Final factoring solution for the Characteristics of Decision Situations Scale and reliabilities.

#	Item Wording (English transl.)	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
CD-01	The consequences of the decision were strongly influenced by factors over which I had no control.				**0.45**		
CD-08	When making the decision, my goals were clear to me.					**0.42**	0.32
CD-10	My goals were concrete (not abstract).					**1.04**	
CD-19	The possible consequences of the options were known.			**0.65**			
CD-20	The probability of the consequences occurring could be estimated.			**1.04**			
CD-21	I felt that my uncertainty in making the decision was great.*	**0.64**					
CD-23	The uncertainty referred to external causes, i.e. a lack of information about the world.†				**1.02**	-0.25	
CD-26	The decision was unique, i.e. the decision situation would not be repeated.						**0.75**
CD-28	The decision-making process took a long time.		**0.86**				
CD-29	The decision was very important.						**0.70**
CD-31	The decision was difficult.	**0.73**	0.20				
CD-32	I experienced the decision situation as a conflict.	**0.77**				0.28	
CD-35	The process of deliberation and decision-making was largely deliberate.†	-0.21	**0.42**	0.22			
CD-36	The process of deliberation and decision-making was fast.		**-0.87**				
--	**Cronbach's Alpha**	**0.74**	**0.72**	**0.78**	**0.60**	**0.73**	**0.64**

Note. Loadings in bold font signify allocation to the respective factor. The asterisk (*) with item CD-21 cautions regarding the interpretation of 'uncertainty' there (cf. the presentation of Factor 1 in section A.c within the present part 9.3.2.3). The dagger (†) on items CD-23 and CD-35 marks items to be rephrased.

Table 9.37 Intercorrelations of the final six factors of the Characteristics of Decision Situations Scale.

Factor Label	Intercorrelations				
	1	2	3	4	5
Factor 1: Difficulty					
Factor 2: Duration	0.35				
Factor 3: Predictability	0.25	0.32			
Factor 4: Control	-0.13	-0.43	-0.19		
Factor 5: Clarity	0.17	0.14	0.05	0.21	
Factor 6: Significance	0.13	0.33	0.14	-0.13	0.25

Note. These intercorrelations are taken from the factor analysis output from the R function factanal{stats}. They are *not* identical to so-called *scale score correlations* that would emerge by averaging the items per factor and correlating these average scale scores, cf. e.g. Rönkkö and Cho (2022, pp.14-16).

None of the factor intercorrelations was ≥ 0.50. Furthermore, they show a sensible pattern: Factor 1 *Difficulty* correlated most highly with Factor 2 *Duration* ($r = 0.35$, the more difficult, the more time and deliberation) and Factor 3 *Predictability* ($r = 0.25$, the more knowledge about consequences, the more difficult). Factor 2 *Duration* showed three correlations $>.25$, namely with Factor 3 *Predictability* ($r = 0.32$, the more knowledge about consequences, the more time and deliberation), with Factor 6 *Significance* ($r = 0.33$, the more unique and important the decision, the more time and deliberation), and the highest correlation of all intercorrelations of $r = -0.43$ with Factor 4 *Control*: Interestingly, this correlation is negative, that is, the more deliberation and time invested in the decision making, the less it is the case that there is a lack of information or a strong influence of uncontrollable external factors. There were no further correlations >0.25 by Factor 3 *Predictability* or Factor 4 *Control*. Factor 5 *Clarity* correlated with $r = 0.25$ with Factor 6 *Significance* (the more important the decision, the clearer the goals). Factor 4 *Control* correlated negatively with all factors but Factor 5 *Clarity* ($r = 0.21$, the more lack of information and uncontrollable factors, the clearer the decision goals). Apart from these four negative correlations with Factor 4 *Control*, there were no further negative correlations between factors.

A.f – Summary and Discussion This enterprise – to generate a questionnaire from Jungermann et al. (2005) – was only partially successful: Using factor analysis and scale-length optimization methods at relaxed conditions indeed resulted in a questionnaire with – again partially – acceptable properties, but the process of arriving at this result revealed that the arrived at result is somewhat random, that is: non-stringent to a non-negligible degree. This impression is due to the fact that only slightly different criteria or a different order of executing the steps of item-deletion within factor analysis led to quite different results.[392]

[392] The final factoring solution presented here was factoring attempt number four – the three previous attempts, their specific procedure and results are to be found in the Appendix, section C.2.2.1 on page 614. Cf. also footnote 381 to that point.

Furthermore, some of the items were phrased in a very complicated and rather theory-focused rather than participant-adapted way. Also their presentation to participants in random order was an additional and unnecessary inconvenience. Thus there were significant problems already at the root of this questionnaire (item formulation and presentation).

These set aside, I already discussed why this questionnaire is mostly inappropriate for factor analysis (cf. section A within the present part 9.3.2.3): because in its conception each aspect was only covered by one item, thus it was not conceptualized such that preconceived factors covering a certain aspect were meant to emerge from 3-5 items formulated precisely to produce these factors. This was the approach that Franz and Kramer (2010) chose (– the psychometric properties of their questionnaire of 84 items reached within this sample will be presented in section B.a within the present part 9.3.2.3). Since the present questionnaire was not build accordingly, the difficulties in reaching an acceptable factor structure is not surprising. On the other hand, one might conceive the chosen approach (one item per aspect) as truly exploratory, since no factors were projected, but item generation was singularly based on theoretical distinctions. That way, the nevertheless resulting factors might be interesting in their own right, because they are based on items that were not constructed to be redundant, but rather on items that cover different aspects, but may still belong to a latent construct.

One might conclude from the presented factoring results that based on an array of theoretical distinctions regarding the character of a decision situation, there were six broad aspects of particular importance to participants in this study:

– "How difficult was the decision?" (*Difficulty*, Factor 1),
– "How much time and though went into the decision?" (*Duration*, Factor 2),
– "How much did I know about the possible consequences?" (*Predictability*, Factor 3),
– "How much did external, uncontrollable factors play a role?" (*Control*, Factor 4),
– "How clear were my goals to me?" (*Clarity*, Factor 5), and
– "How unique and important was the decision?" (*Significance*, Factor 6).

These are psychologically and intuitively valid dimensions: Think back of a decision that you spent some time with in your own life (e.g. what or where to study, whether to move etc.), go through the six categories, and ask yourself: (i) Can I easily rate each of these dimensions?, and (ii) Is there an aspect of the decision situation that needs mention, but does not belong to any of the categories?

This last question will not be further discussed here for the moment. But I think conceptualizing these six dimensions as characteristics of decision situations that are *psychologically important* rather than theoretical distinctions that promise to fully define a construct does them most justice and makes them worthwhile.[393]

I will now turn to the second analytical procedure as listed in section 9.3.2.2 on page 284, namely reliability analyses.

[393] Remember to jump to the Appendix, section C.2.2.1 on page 614, for deviating factoring solutions.

B Internal Consistency

B.a The Dimensions of Decisions Scale The following Table 9.38 displays the reliability coefficients of the 21 factors of the Dimensions of Decisions Scale.

Table 9.38 Reliability coefficients of the Dimensions of Decisions Scale.

	Number of Items	Cronbach's alpha	Mean Inter-item Correlation	Corrected Item Total Correlations
Decision Dimensions Questionnaire				
1- Simple, easy decision	11	0.84 (0.93)	0.34	0.17/0.44-0.69
2- Satisfaction with decision	4	0.89 (0.93)	0.68	0.65-0.85
3- Limited knowledge based dec.	6 (5)[1]	0.55 (0.81)	0.17	0.16-0.36/0.51
4- Unimportant decision	4	0.73 (0.88)	0.40	0.27/0.45-0.64
5- Slow/delayed decision	4	0.66 (0.89)	0.33	0.35-0.60
6- Easy to implement decision	3 (4)[2]	0.43 (0.83)	0.20	0.14-0.37
7- Few options considered	4	0.60 (0.82)	0.27	0.26-0.47
8- Uncommon decision	3	0.74 (0.85)	0.49	0.49-0.60
9- Web of decisions	4	0.68 (0.80)	0.35	0.41-0.50
10- Incomplete information	4	0.70 (0.76)	0.37	0.38-0.45/0.75
11- Low pressure situation	4	0.42 (0.76)	0.17	0.15-0.16/0.52
12- Uncertain about results	4 (5)[3]	0.47 (0.81)	0.18	0.08/0.30-0.37
13- Unpopular decision	3	0.75 (0.87)	0.51	0.55-0.64
14- Unchangeable decision	3	0.83 (0.83)	0.61	0.65-0.70
15- Highly uncertain setting	5	0.68 (0.75)	0.30	0.26/0.46-0.51
16- Serve individual interest	3	0.43 (0.70)	0.20	0.20-0.36
17- Inconsistent effort	3	0.69 (0.75)	0.43	0.45-0.60
18- Individual decision	3	0.59 (0.70)	0.32	0.30-0.37/0.57
19- Short term impact	3	0.77 (0.74)	0.53	0.51-0.74
20- Self-initiated	3	0.53 (0.63)	0.27	0.26-0.42
21- Rational decision	2	0.57 (0.48)	0.40	0.40

Note. Regarding three of the subscales there was a divergence from the number of items reported in Franz and Kramer (2010). In these cases the number of items reported in the original study is given in parentheses in the according first column: In the first case (Factor 3) there were six items listed, but the authors stated that the scale had only five items, in the second and third case (Factors 6 and 12) I simply failed to include all items of the subscale (this is also marked in the respective subtables of Table 9.25 from section J in 9.3.1.2). In the second column, after the Cronbach's alpha of the present study, the alpha achieved in the original study is added in parentheses. In the last column, corrected item total correlations are given as a range, but outliers are indicated additionally (e.g. in case of Factor 1, ten of the eleven items fell between $r = \{0.44 - 0.69\}$, but there was an outlier with $r = 0.17$).

Comparing the achieved reliabilities in this study ($N = 76$) with those from the original study ($N = 439$), it is obvious that the latter were almost always substantially higher; there were only two cases where the present study reached a higher alpha (Factor 19 and Factor 21) and one case where the alpha was identical (Factor 14). Mean alpha over all factors was 0.65 for this study and 0.79 for the original study. Cf. Table 9.39 which compares the number of factors reaching each decile of alpha in the two studies.

Table 9.39 Reached alphas of the Dimensions of Decisions Scale in this study versus the original.

	α ≥.9	α ≥.8 <.9	α ≥.7 <.8	α ≥.6 <.7	α ≥.5 <.6	α ≥.4 <.5	Sum
This Study	0	3	5	5	4	4	21
Original Study	2	10	7	1	0	1	21

Using $\alpha \geq .7$ as a rule of thumb to determine which factors could be employed for future research and/or further analyses, all but two factors from the original study qualify – only Factor 20 (Self-initiated) with $\alpha = 0.63$ and Factor 21 (Rational decision) with $\alpha = 0.48$ fail the criterion. Based on the reliability results from the present study, only eight factors qualify:

- Factor 1, "Simple, easy decision", $\alpha = 0.84$, 11 items
- Factor 2, "Satisfaction with decision", $\alpha = 0.89$, 4 items
- Factor 4, "Unimportant decision", $\alpha = 0.73$, 4 items
- Factor 8, "Uncommon decision", $\alpha = 0.74$, 3 items
- Factor 10, "Incomplete information", $\alpha = 0.70$, 4 items
- Factor 13, "Unpopular decision", $\alpha = 0.75$, 3 items
- Factor 14, "Unchangeable decision", $\alpha = 0.83$, 3 items
- Factor 19, "Short term impact", $\alpha = 0.77$, 3 items

Why are the reliabilities of the present study overall so much worse than those from the original? Sample size does not have a direct effect on Cronbach's alpha, however, of course it has an effect on the standard error of correlations – that is: the reliability results from the present study with its $N = 76$ participants are simply not as trustworthy as those from the original with $N = 439$ participants. Yet, the larger confidence intervals go both ways and therefore do not explain the uni-directionally lower alphas.

Alternatively, one might consider that the data quality of the present study was lower than that of the original due to e.g. less motivated participants. This, however, is impossible to compare between studies lacking a common indicator (such as response times).

Another aspect is the translation: The items from the original study were *reported* as partial sentences, but the authors did not clarify whether they were actually displayed to participants in this format. At any rate, in the German translation I used full sentences (cf. footnote 373 and Table 9.25 from section J in 9.3.1.2) which thus could have been a formal difference. Furthermore, any translation introduces differences in its own right. In this study, this became particularly apparent when it turned out that two items

of the German translation had to be reverse-scored (namely item #DD-05 "rational/ emotional" and item #DD-68 "people lobbied me/no one lobbied me", cf. Table 9.25) – which was not the case in the original study.

In sum, whatever the reasons were: overall the reliabilities were notably lower in the present study than the original and if one wanted to use the 21 factors proposed by the authors, one would have to scrutinize and improve the item translations (e.g. by means of back-translation or other translation quality assessment techniques, cf. e.g. Colina, Marrone, Ingram, & Sánchez, 2017) and evaluate the resulting refined version on a larger sample (cf. e.g. Bonett, 2002; Kennedy, 2021).

The following Table 9.40 displays the intercorrelations of the eight factors of the Dimensions of Decisions Scale that reached a Cronbach's Alpha of $\alpha \geq .7$. None of the correlations is $> .7$, there is one large positive correlation of $r = 0.66$ between "Short term impact" and "Unimportant decision", several correlations cluster around an r of 0.40, and several further correlations are quite low with $r \leq 0.20$.

Table 9.40 Intercorrelations of the eight factors of the Dimensions of Decisions Scale that reached acceptable alphas in the present study.

Factor Label	Intercorrelations						
	1	2	4	8	10	13	14
Factor 1: Simple, easy decision							
Factor 2: Satisfaction \w decision	-0.39**						
Factor 4: Unimportant decision	0.33**	0.16					
Factor 8: Uncommon decision	-0.17	0.17	-0.28*				
Factor 10: Incomplete information	-0.43**	0.38**	0.01	0.14			
Factor 13: Unpopular decision	-0.36**	0.17	-0.13	0.23*	0.13		
Factor 14: Unchangeable decision	0.07	-0.03	0.07	0.10	-0.09	0.20	
Factor 19: Short term impact	0.38**	0.01	0.66**	-0.27*	-0.20	-0.02	0.06

Note. As opposed to the intercorrelations of the Characteristics of Decision Situations Scale's factors in Table 9.37, the intercorrelations displayed here are indeed so-called *scale score correlations*, because there was no factor analysis run for the presented Dimensions of Decisions Scale. * indicates $p < 0.05$ and ** indicates $p < 0.01$.

C Summary of Psychometric Validation In the above section 9.3.2.3, *Psychometric Validation*, two types of analysis were performed:

(a) factor analyses for the Semantic Differential Scale and the Characteristics of Decision Situations Scale and
(b) reliability analyses (internal consistency/Cronbach's alpha, item total correlations) for the two scales above as well as the Dimensions of Decisions Scale.

Descriptive statistics will be reported in the subsequent section 9.3.2.5. Also refer back to section 9.3.2.2 for the complete overview.

In short, the results of the psychometric validation of the three scales were as follows:

C.a The Semantic Differential Scale Two factors with three items each emerged representing the dimension Evaluation and Potency. The second dimension, Potency, showed poor corrected item total correlations as well as an unacceptable Cronbach's alpha of $\alpha = 0.51$ and was therefore discarded. The remaining dimension Evaluation exhibited good properties regarding corrected item total correlations as well as Cronbach's alpha with $\alpha = 0.86$. The scale was therefore renamed "the Semantic Differential *Evaluation* Scale" and includes 3 items.

C.b The Characteristics of Decision Situations Scale After factor analysis and scale-length optimization the final scale included 14 items loading onto 6 factors. Cumulative variance explained was 65%. The highest factor intercorrelation was $r = -0.43$. The 6 factors were labeled *Difficulty* (3 items, $\alpha = 0.74$), *Duration* (3 items, $\alpha = 0.72$), *Predictability* (2 items, $\alpha = 0.78$), *Control* (2 items, $\alpha = 0.60$), *Clarity* (2 items, $\alpha = 0.73$), and *Significance* (2 items, $\alpha = 0.64$).

A seventh factor accrued in a less strict factoring process (reported in section C.2.2.1 on page 614 within the Appendix). This factor was labeled *Magnitude*, included 3 items, and showed a Cronbach's alpha of $\alpha = 0.80$. A factoring solution including this 7th factor was confirmed by EFA, thus contained 17 items, and cumulative variance explained was 69%. The high Cronbach's alpha as well as the high cumulative variance explained speak in favor of using this 7-factor solution in spite of its non-stringent origin. Content-wise, *Magnitude* adds the important aspect of considering the consequences of a decision.

C.c The Dimensions of Decisions Scale From the 21 factors only 8 factors reached a Cronbach's alpha of $\alpha \geq .7$, whereas in the original study all but 2 factors qualified. These eight factors include 35 items in total: all but one factor contain three or four items and *Simple, easy decision* includes 11 items. Among the remaining eight factors the highest intercorrelation was $r = 0.66$. An additional factor analysis to confirm the 21-factors structure from the original publication was not undertaken.

In the subsequent section 9.3.2.5, *Descriptive Statistics*, correlation matrices (section B) as well as measures of central tendency, dispersion, and shape (section D) will be reported. The introductory paragraph (section A) outlines the focus of these descriptive scrutinies. The 14BiPole-Value Questionnaire will receive special treatment (section C).

9.3.2.4 Quality Assessment

The purpose of the present study was to gather together scales that (can) describe and distinguish decision situations, use them on the real-life decision situations participants had provided in the beginning, and reach an assessment of their usefulness regarding their capacity to find meaningful differences.

How can this usefulness be established? That is, what would make a decision categorization scale useful? The least technical answer is that a scale to distinguish decision situations should indeed be able to do so, that is: pick up on (important) differences between decision situations that do indeed occur in reality.

From a conceptual perspective, of course, the question is: *What are important differences between decision situations?* This question was answered both by Jungermann et al. (2005) (cf. section I from 9.3.1.2) on theoretical grounds as well as by Franz and Kramer (2010) (cf. section J from 9.3.1.2) on rather empirical grounds.[394] The distinctions made by Jungermann et al. (2005) constituted the basis of the Characteristics of Decision Situations Scale and the existing questionnaire by Franz and Kramer (2010) was translated, adapted, and labeled the Dimensions of Decisions Scale in this study. That is, the differences deemed important by these two teams of researchers went into the present study.

From an empirical perspective the point that a questionnaire made to distinguish decision situations should indeed do so is simply a question of validity. Which validities are relevant here?

- **Content validity**: How much does the (sub)scale represent all aspects of the construct "decision (situation)"?
- **Construct validity**: Does the (sub)scale indeed measure the construct to be measured (convergent/discriminant construct validity)?
- **Criterion validity**: Does the (sub)scale coincide with or predict a respective external criterion (concurrent/predictive criterion validity)?

A Content Validity Content validity is said to be subjective of sorts, since the question of whether all aspects of a construct are covered by a questionnaire cannot be answered empirically. Instead, the underlying definition of the construct is conceptual.[395] The construct "decision (situation)" implicates a rather wide scope: this construct necessitates several subscales to look at several aspects of decision situations.

– Let's look at *personality* instead of (decision) *situation* for a moment in order to get a better grasp by analogy: the Big Five personality model (e.g. McCrae & Costa, 1987, 2008) at questionnaire level references the construct "personality". This questionnaire includes five subscales, and each subscale again operationalizes a construct, e.g. "agreeableness".[396] Taken together, the Big Five's five subscale-constructs are supposed to cover all dimensions or aspects that are important to describe and discriminate personalities, i.e. all (factor-level) characteristics that personalities may vary on.

The construct "decision (situation)" functions analogously: all subscales taken together are supposed to cover the full range of dimensions or characteristics that are aspects of decision situations and that different decision situations may vary on.

[394] *Empirical grounds* in the sense that the empirical basis for their compilation of dimensions was "previous literature" not further defined.

[395] Of course, one must define the scope of the construct: Is it a subscale or a whole questionnaire with several subscales? Or is it even a whole study with several questionnaires? – The two further validities, construct validity and criterion validity, must always refer to subscales, because they are determined by statistical values, namely correlation coefficients, which necessitates referencing one-dimensional or at least highly internally consistent constructs, i.e. subscales rather than whole questionnaires. Content validity is more flexible.

[396] These five subscales (openness to experience, conscientiousness, extraversion, agreeableness, neuroticism) may furthermore be split into so-called facets (e.g. McCrae & Costa, 1992) which again refer to a construct, e.g. "compliance" (within agreeableness). Thus, constructs can be multi-layered.

For the purpose of this study, the eight Decision Categorization Scales (or their conceptual basis in case of the Semantic Differential Scale and the Characteristics of Decision Situations Scale, both of which were not ready-made) were chosen with care to cover a range of taxonomies focusing on situational characteristics. Among them, two scales specifically focus on decision situations (the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale) and one further scale, the Domains of Risk Mini-Scale, distinguishes general decision domains. Taken together, the questionnaires of this study were meant to span both: aspects of situations more generally as well as aspects of decision situations specifically. Therefore, in terms of content validity, the compilation of questionnaires in this study tries to rather err on the side of too many than too few – and the task at hand will be to filter the abundance of aspects in order to reach a manageable, focused, and useful set covering the central contents of the construct "decision (situation)".

Table 9.41 below displays all eight Decision Categorization Scales and their subscales. In sum and subjectively, content validity seems given for each single questionnaires/ scale regarding its specific focus. Taken together, as argued above, the contents spanned by all questionnaires together is rather to wide and needs convergence.

Table 9.41 The eight Decision Categorization Scales and their subscales.

Scale	Subscales (# Items)
Situational Eight DIAMONDS Scale S8-II	Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, Sociality
Semantic Differential *Evaluation* Scale	Evaluation (3)
14BiPole-Value Questionnaire	Two dimensions: Universality (14) vs. Tradition (14)
Evolutionary Domains Mini-Scale	Affiliation, Social status, Self-protection, Mate acquisition, Relationship maintenance, Familial care
Moral Foundations Mini-Scale	Care/harm, Fairness/cheating, Loyalty/betrayal, Authority/subversion, Sanctity/degradation, Liberty/oppression
Domains of Risk Mini-Scale	Financial decision, Health/security decision, Recreational decision, Moral decision, Social decision
Characteristics of Decision Situations Scale	Difficulty (3), Duration (3), Predictability (2), Control (2), Clarity (2), Significance (2), Magnitude (3)
Dimensions of Decisions Scale	Simple, easy decision (11), Satisfaction with decision (4), Unimportant decision (4), Uncommon decision (3), Incomplete information (4), Unpopular decision (3), Unchangeable decision (3), Short term impact (3)

Note. The S8-II Scale and the three "mini-scales" include 1 item per subscale only which is thus not noted. The two dimensions of the 14BiPole-Value Questionnaire both include all weighted items. For the Dimensions of Decisions Scale only those eight factors/subscales are listed that exceeded the Cronbach's alpha criterion of $\alpha \geq .7$ in this study.

B Construct Validity Construct validity – split into convergent and discriminant validity – is difficult to apply here for the following reasons: To assess convergent or discriminant validity one needs (at best: well-established) questionnaires that claim to

measure the same thing (convergent) or a similar thing that, though, should *not* be the same (discriminant). With the Decision Categorization Scales, however, this poses some problems:[397]

First, the purpose of these scales was to measure (differences between) decision situations. Yet, in this study, there were only two scales that focused on decision situations specifically (and not situations more generally): the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale. The first was created for this study and the latter was devised in 2010, but never employed since. At the time this study was conceptualized, there were no further questionnaires dealing with the differentiation of decision situations or dimensions of decisions. Therefore, both convergent as well as discriminant validity can only be looked at by comparing these two scales or their subscales internally.

Second, the two scales specifically focusing on decisions or decision situations (i.e., the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale) lack similarity in that they do not have identical or almost identical subscales. Table 9.42 provides an overview.

[397] Note that among the eight Decision Categorization Scales, only the newly constructed Characteristics of Decision Situations Scale is up for validation. Three of the scales are already established (the Dimensions of Decisions Scale, the 14BiPole-Value Questionnaire, and the Situational Eight DIAMONDS Scale S8-II). The Semantic Differential *Evaluation* Scale is not much of theoretical interest. And the remaining three "mini-scales" (the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale) only included one item per subscale face-valid items, that were constructed on theoretical grounds and methodologically based on the example of the established Situational Eight DIAMONDS Scale S8-II, which, too, only includes one item per subscale. – This does not mean that these "mini-scales" should not be validated regarding construct and criterion validity, but (i) their validation is not urgent since their face-valid items are very simple (e.g. "The decision was of the following nature: financial decision.", rated on a 5-point Likert scale on how much it does apply), and (ii) there are no alternative measures that these mini-scales could be compared with. Cf. section 9.3.1.2 on page 250 for the details.

Table 9.42 Comparison of the factors of the Characteristics of Decision Situations Scale with the factors of the Dimensions of Decisions Scale.

Dimensions of Decisions Scale	Characteristics of Decision Situations Scale	Fit
1- Simple, easy decision very stressful / not very stressful frustrating / not frustrating lots of effort / not much effort hard / easy rational / emotional complex / simple worried a lot / not worried lots of analysis / no-brainer anxious / not anxious lots to consider / one thing to consider required persistence / no persistence	**Difficulty (Factor 1):** I felt that my uncertainty in making the decision was great. The decision was difficult. I experienced the decision situation as a conflict.	G
2- Satisfaction with decision satisfied / dissatisfied happy or proud / regretful good / bad comfortable / uneasy	n/a	
3- Limited knowledge based dec. knowledge / not depend on knowledge facts / facts not considered experience / not depend on experience input from others / little input from others common sense / common sense no help	**Control (Factor 4):** The consequences of the decision were strongly influenced by factors over which I had no control. The uncertainty referred to external causes, i.e. a lack of information about the world.	B
4- Unimportant decision mattered a lot / didn't matter much highly significant / not very significant highly engaged / not very engaged affects my future / won't affect future	**Significance (Factor 6):** The decision was unique, i.e. the decision situation would not be repeated. The decision was very important.	M
5- Slow/delayed decision timely / late on time or early / last minute did not delay / delayed as long as possible speedy / slow	**Duration (Factor 2):** The decision-making process took a long time. The process of deliberation and decision-making was largely deliberate. The process of deliberation and decision-making was fast.	M
6- Easy to implement decision lots of work or energy / little work or energy lots of resources or funds / few resources big commitment / little or no commitment (long commitment / no commitment)	n/a	
7- Few options considered screened many options / didn't screen choose from good alternatives / few alternatives evaluated many alternatives / evaluated few creativity needed / creativity not involved	n/a	
8- Uncommon decision frequently make decision like this / not frequent similar to previous decision / not like other routine / non-routine	**Significance (Factor 6):** The decision was unique, i.e. the decision situation would not be repeated. The decision was very important.	M
9- Web of decisions unrelated decision / group of decisions stand-alone decision / dependent on other decisions one thing to consider / lots of things to consider single stage decision / multiple stage decision	**Clarity (Factor 5):** When making the decision, my goals were clear to me. My goals were concrete (not abstract).	B
10- Incomplete information trustworthy information / lacked trustworthy information enough information / lacked information had time to consider / lacked time to consider didn't need expertise / needed more expertise	**Control (Factor 4):** The consequences of the decision were strongly influenced by factors over which I had no control. The uncertainty referred to external causes, i.e. a lack of information about the world.	M

11- Low pressure situation decision had to be made / no consequence to delay under time pressure / no time pressure pressure on myself / no pressure on myself pressure from others / no pressure from others	n/a	
12- Uncertain about results clear goals / fuzzy goals helped my plan or goals / not thought of plan or goal knew result I wanted / wanted result was unclear knew what result would be / uncertain about results confident / unsure	**Predictability (Factor 3):** The possible consequences of the options were known. The probability of the consequences occurring could be estimated. **Clarity (Factor 5):** When making the decision, my goals were clear to me. My goals were concrete (not abstract).	M G
13- Unpopular decision popular with others / unpopular with some everyone agrees / lots of opinions easily agreed upon / controversial	n/a	
14- Unchangeable decision can be undone / never can be undone easy to reverse / hard to reverse can be modified / cannot be modified	n/a	
15- Highly uncertain setting future predictable / future unpredictable things about the same / things were changing no chance of mess up / things could mess up decision low risk / high risk certain environment / uncertain environment	**Predictability (Factor 3):** The possible consequences of the options were known. The probability of the consequences occurring could be estimated.	M
16- Serve individual interest people lobbied me / no one lobbied me did what someone else wanted / what I thought best others sought selfish gains / no one tried to gain	n/a	
17- Inconsistent effort worked on constantly / worked on it on and off at it all the time / a stop and go process constantly on my mind / seldom thought about it	n/a	
18- Individual decision relied on others / relied on myself deferred to others / use my own judgment sought input from others / acted alone	n/a	
19- Short term impact may change the future / not much future impact long term impact / short term impact high impact on me / not much impact on me	**Magnitude (Factor 7):** The decision had a variety of consequences. The consequences of the decision had a long-term impact. The consequences of the decision were of high importance.	M
20- Self-initiated initiated by others / initiated by me dictated by circumstances / dictated by me someone else could have decided / it was up to me	n/a	
21- Rational decision intuitive / based on information required good sense / required logic and reasoning	**Duration (Factor 2):** The decision-making process took a long time. The process of deliberation and decision-making was largely deliberate. The process of deliberation and decision-making was fast.	B

Note. The 7 factors of the Characteristics of Decision Situations Scale are mapped onto the 21 factors of the Dimensions of Decisions Scale. The last column to the right, "Fit", gives an intuitive evaluation of the fit between the respective factors, where "G" indicates "good", "M" indicates "medium", and "B" indicates "bad". The eight factors from the Dimensions of Decisions Scale that showed a sufficiently high Cronbach's alpha of $\alpha \geq .7$ are displayed on grey background. Note that for reasons of brevity the items of the Dimensions of Decisions Scale are listed as reported in the original publication, whereas in this study the item poles were transformed to full sentences as displayed in the *Materials* section, cf. Table 9.25 from 9.3.1.2.

According to the intuitive fit index, distinguishing good, medium, and bad fit, there are two pairs of subscales with relatively good fit (*Simple, easy decision* and *Difficulty*, *Uncertain about results* and *Clarity*), seven pairs of subscales with medium fit, and three pairs of subscales with rather bad fit (*Limited knowledge based decision* and *Control*, *Web of decisions* and *Clarity*, *Rational decision* and *Duration*). However, comparing the items even of the factors deemed having relatively good fit, differences in content and purpose (and certainly label!) are quite obvious, such that speaking of "the same construct" (convergent validity) is hardly warranted.[398]

Therefore, convergent and discriminant construct validity cannot be established in conventional ways here – correlating the same and a similar, but different construct from an established questionnaire.[399]

C Criterion Validity Criterion validity requires an external criterion variable (concurrent or predictive), maybe a behaviorally based variable (but not necessarily so). For example, if the questionnaire of interest were a test of mathematical intelligence, a plausible external criterion variable would be math grades in school. With the present questionnaires, however, such a criterion variable is not easy to think of. One might, for example, venture that a criterion variable to *Significance* of a decision could be the amount of times that one thinks of that decision during some follow-up time period. This example, however, comes with an assumption that would need justification: namely that a significant decision is something that one thinks of more often later on than a non-significant one. This idea is intuitive, but would have to be based on according research results to that point.

At any rate, there were no external criterion variables planned within this study such that criterion validity cannot be established.

D Summary Subjectively ruled, content validity is given for each questionnaire/scale. Regarding the totality of the eight Decision Categorization Scales the contents covered are rather too wide than too narrow with respect to the construct "decision (situation)". Convergent or discriminant construct validity on subscale level cannot be determined due to (i) the lack of established questionnaires regarding decision (situations) and (ii)

[398] Furthermore, the three levels of the intuitive fit index were allocated based on the similarity of *the items* of each pair of factors – which does not correspond to the regular procedure where the identity of two constructs would rather be established based on their purported measuring objective as e.g. revealed by *their labels* or questionnaire instructions. Based on labels, a similar construct could be expected in four cases, namely *Simple, easy decision* and *Difficulty*, *Unimportant decision* and *Significance*, *Slow/delayed decision* and *Duration*, *Uncertain about results* and *Predictability*. All but the first pair – based on item (dis)similarity – were deemed having only mediocre fit.

[399] There is one factor from the Characteristics of Decision Situations Scale, *Clarity (Factor 5)*, that is assigned to have a bad fit with *Web of decisions* and a good fit with *Uncertain about results*. None of the other factors from the Characteristics of Decision Situations Scale showed both a good as well as a bad fit with subscales from the Dimensions of Decisions Scale. Thus, at least the factor *Clarity (Factor 5)* from the Characteristics of Decision Situations Scale could be somewhat evaluated regarding its construct validity (both convergent and discriminant). However, both subscales that *Clarity (Factor 5)* would be evaluated against failed the criterion of a Cronbach's alpha of $\alpha \geq .7$ and thus should not be employed.

the lack of similarity between the two questionnaires focusing on decision (situations) in this study. Criterion validity cannot be determined due to (i) the difficulty to conceptualize an external criterion for any of the subscales from the two questionnaires focusing on decision (situations) and (ii) the fact that respective data was not collected within the present study.

While this summary regarding quality assessment does not seem too promising, please be reminded that this study was largely an exploratory venture piloting possibilities to measure decision situations. However, future research can build on the present findings – refine items, use larger samples, use further questionnaires for validation, run confirmatory factor analysis. Furthermore, the following section *Descriptive Statistics* will carefully scrutinize the eight Decision Categorization Scales and their items such that recommendation as to their usefulness will result.

9.3.2.5 Descriptive Statistics

A What to look for? In section 9.3.2.4, *Quality Assessment*, validity was discussed. In this section, *Descriptive Statistics*, correlation coefficients as well as measures of central tendency, dispersion and shape will be looked at by means of various presentation formats. Descriptive statistics provide basic summary information about variables and are therefore the most important descriptors of the data set, which is why – in spite of a certain lengthiness – they must be reported.

Now, apart from this general purpose: Which of the statistics to follow are also quality assessors? What do we ideally expect from the variables in this study and their relationships?

Before turning to this question, please be reminded that this study comprises four different types of scales/questionnaires:

(a) four scales where each item represents its own subscale (the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale),
(b) two scales derived by factor analysis (the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale),
(c) the Semantic Differential *Evaluation* Scale, also derived by factor analysis, but reduced to one factor of three items only,
(d) the 14BiPole-Value Questionnaire that characterizes situations along the Schwartz Value Circle.

The type of questionnaire determines what to look for. What to look for:

(1) *Association Between Subscales*
Subscales should not correlate with an $r > .7$, which is a rule-of-thumb for subscales derived by factor analysis where their shared variance should be below 50%

$(0.7 * 0.7 = 49\%)$. This criterion holds for all questionnaires of type [a] and [b] and will be determined by correlation analyses.[400]

(2) *Variation Between Items*
There should be sufficient variation between the items of questionnaire types [a] and [d], i.e.: their items' means should sufficiently differ. I am not aware of any descriptive criterion to determine "sufficient" variation between items (that refers to means not correlations). Therefore, a repeated-measures ANOVA will be calculated. These ANOVAs – in spite of being inferential, not descriptive – will be added to section D below.

(3) *Variation Within Items*
Every item's response scale should at best get fully utilized. That is, there should not be a floor or a ceiling effect (both imply skewness), and the distribution should not be too narrow (may come with kurtosis, but does not imply it). I do not know of any strict definition of a floor or ceiling effect, therefore the practical definition used here will be such that a floor or ceiling effect is said to have occurred once the median of an item is very close or equal to the response scale's poles. Regarding the narrowness of the distribution let's say that ideally the middle 50% of data (i.e., the box of a boxplot, the interquartile range) should span half of the response scale (i.e., $Q3 - Q1 = y_{max}/2$). Both criteria can be judged by visual inspection and should hold for all questionnaire types [a] through [d].

(4) *Normal Distribution*
Many, if not most of the 171 items sampled in this study are not normally distributed.[401] Therefore, a note on the normality assumption is in order: In very short, (i) the normality assumption is relevant to inferential statistics carried out by means of parametric tests from the general linear model family (including t-test, regression, ANOVA), but has no bearing on descriptive statistics, apart from the Pearson correlation, and (ii) regarding Pearson's r and the according significance test I will refer to the early studies by Zeller and Levine (1974) and Havlicek and Peterson (1977) that found Person's r to be very robust, as did the more recent paper by Bishara and Hittner (2012).[402] In sum, the lack of normality in the observed data will not be lamented.

B Correlation Matrices Among the eight Decision Categorization Scales, there are four scales that depict a taxonomy of content domains. All four are constructed such,

[400] The item intercorrelations for the questionnaires of type [a] can be found in the following section B, the intercorrelations of the final six factors of the Characteristics of Decision Situations Scale are presented in Table 9.37 from section A.e within 9.3.2.3, and the intercorrelations of the eight factors from the Dimensions of Decisions Scale that yielded sufficiently high reliabilities (Cronbach's α) in the present study are displayed in Table 9.40 from section B.a within 9.3.2.3.

[401] For the count of 171 items please refer back to section B from 9.3.1.2.

[402] The commonly recommended alternative to Pearson's product-moment correlation is Spearman's rank-order correlation (cf. e.g. Bishara & Hittner, 2012; Ventura-León, Peña-Calero, & Burga-León, 2022), whereas Ventura-León et al. (2022, p.3) advocate the more innovative *Pearson Winzorized* coefficient.

that each item measures one domain – this construction principle has already been reported in section B from 9.3.1.2. Three of those scales were generated for this study (the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale), and one scale is a published and validated short form of a general situation taxonomy (the Situational Eight DIAMONDS Scale S8-II).

In the present section B, the item intercorrelations of all of these four scales will be presented and discussed – both in tabular format as well as visually by means of a clustered correlation plot which affords a quick impression of how the items/domains relate to each other.[403]

B.a The Situational Eight DIAMONDS Scale S8-II Table 9.43 displays means, standard deviations, and correlations and Figure 9.6 gives a visualization of the clustered correlations. The latter shows a cluster of positive and significant correlations between pOsitivity, Mating and Sociality, as well as between Negativity, Deception and Adversity. Furthermore, Duty correlates positively and significantly with Intellect and both Negativity and Adversity correlate negatively and significantly with pOsitivity. The largest association with $r = 0.49$ holds between Mating and Sociality; there is no correlation $> |.7|$.

Table 9.43 Means, standard deviations, and correlations of the Situational Eight DIAMONDS Scale S8-II.

#	Variable	*M*	*SD*	1	2	3	4	5	6	7
1	S8-01 Duty	5.61	1.81							
2	S8-02 Intellect	4.51	2.08	0.31**						
3	S8-03 Adversity	2.89	1.84	0.08	0.10					
4	S8-04 Mating	3.09	2.22	-0.11	0.12	0.07				
5	S8-05 pOsitivity	5.28	1.65	0.12	0.16	-0.27*	0.27*			
6	S8-06 Negativity	3.87	1.80	0.20	-0.05	0.42**	-0.01	-0.33**		
7	S8-07 Deception	1.89	1.65	0.01	-0.03	0.44**	0.16	-0.22	0.42**	
8	S8-08 Sociality	5.57	1.74	0.09	0.11	0.14	0.49**	0.36**	0.12	0.21

Note. * indicates $p < 0.05$ and ** indicates $p < 0.01$. The description of the Situational Eight DIAMONDS Scale S8-II can be found in section C from 9.3.1.2.

[403] Please note that means and standard deviations are also added to the correlation tables, but will only be discussed in the forth-following section D.

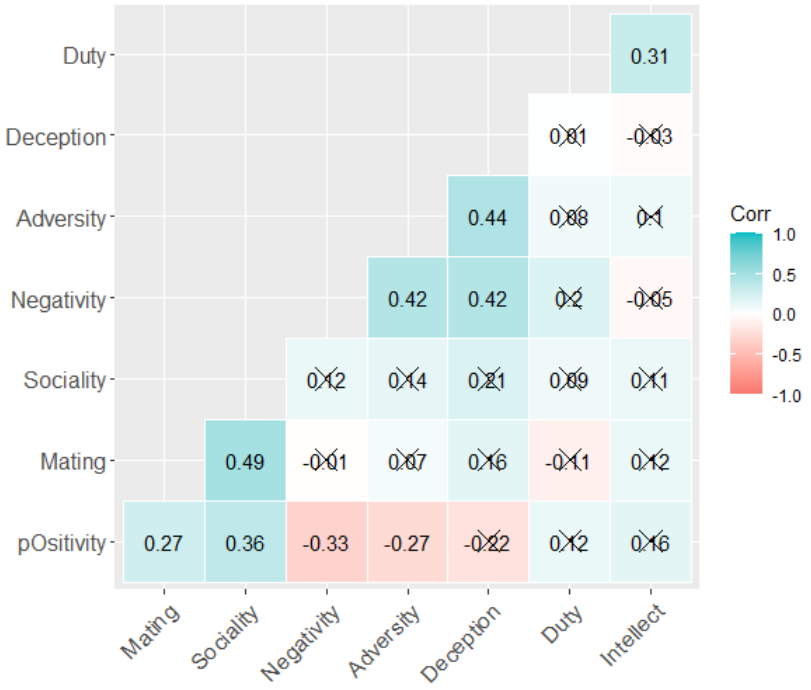


Figure 9.6 Clustered correlation plot of the Situational Eight DIAMONDS Scale S8-II.
Note. Non-significant correlations ($p > 0.05$) are crossed-out.

B.b The Evolutionary Domains Mini-Scale Table 9.44 displays means, standard deviations, and correlations and Figure 9.7 gives a visualization of the clustered correlations. Interestingly, between the evolutionary domains there were only positive correlations. The strongest positive associations were between Mate acquisition and Relationship maintenance ($r = 0.43$), Mate acquisition and Familial care ($r = 0.39$) and Social status and Affiliation ($r = 0.34$); there is no correlation $> |.7|$.

Table 9.44 Means, standard deviations, and correlations of the Evolutionary Domains Mini-Scale.

#	Variable	*M*	*SD*	1	2	3	4	5
1	ED-01 Affiliation, coalition formation	4.00	1.12					
2	ED-02 Social status	3.13	1.32	0.34**				
3	ED-03 Self-protection	2.96	1.46	0.28*	0.22			
4	ED-04 Mate acquisition	1.93	1.28	0.25*	0.15	0.23*		
5	ED-05 Relationship maintenance	2.68	1.60	0.23*	0.04	0.03	0.43**	
6	ED-06 Familial care	2.17	1.42	0.16	0.15	0.26*	0.39**	0.28*

Note. * indicates $p < 0.05$ and ** indicates $p < 0.01$. The description of the Evolutionary Domains Mini-Scale can be found in section F from 9.3.1.2.



Figure 9.7 Clustered correlation plot of the Evolutionary Domains Mini-Scale.
Note. Non-significant correlations ($p > 0.05$) are crossed-out.

B.c The Moral Foundations Mini-Scale Table 9.45 displays means, standard deviations, and correlations and Figure 9.8 gives a visualization of the clustered correlations. Here, too, basically all correlations were positive. The highest correlations were observed between Cheating-Fairness and Betrayal-Loyalty ($r = 0.53$), Subversion-Authority and Oppression-Liberty ($r = 0.46$), and Harm-Care and Betrayal-Loyalty ($r = 0.41$); there is no correlation $> |.7|$.

Table 9.45 Means, standard deviations, and correlations of the Moral Foundations Mini-Scale.

#	Variable	*M*	*SD*	1	2	3	4	5
1	MF-01 Harm-Care	3.37	0.78					
2	MF-02 Cheating-Fairness	3.43	0.87	0.25*				
3	MF-03 Betrayal-Loyalty	3.50	0.82	0.41**	0.53**			
4	MF-04 Subversion-Authority	3.17	0.70	0.30**	0.27*	-0.01		
5	MF-05 Degradation-Sanctity	3.01	0.38	0.16	0.30**	0.15	0.39**	
6	MF-06 Oppression-Liberty	4.04	0.93	-0.02	0.18	0.08	0.46**	0.19

Note. * indicates $p < 0.05$ and ** indicates $p < 0.01$. The description of the Moral Foundations Mini-Scale can be found in section G from 9.3.1.2.

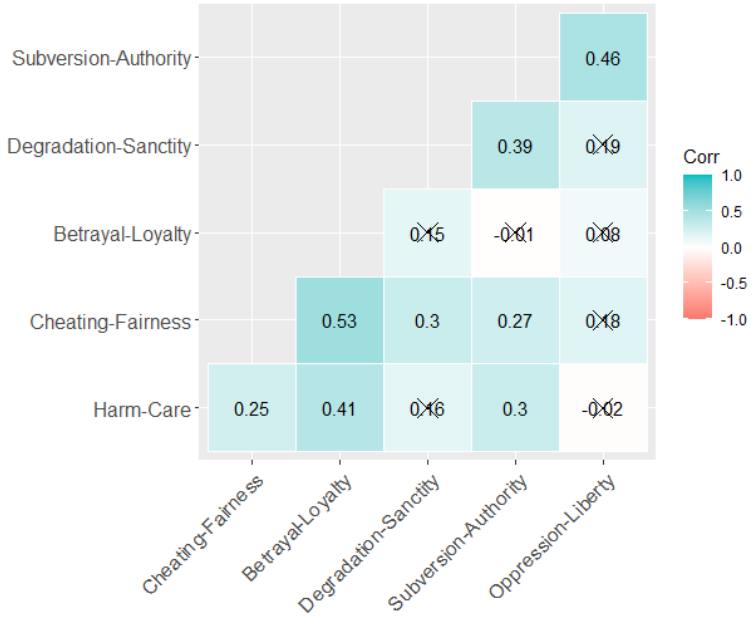


Figure 9.8 Clustered correlation plot of the Moral Foundations Mini-Scale.
Note. Non-significant correlations ($p > 0.05$) are crossed-out.

B.d The Domains of Risk Mini-Scale Table 9.46 displays means, standard deviations, and correlations and Figure 9.9 gives a visualization of the clustered correlations. There were two negative, but non-significant correlations between Recreational decision and Financial decision on the one hand and Moral decision on the other hand. The highest positive correlation was found between Financial decision and Health/security decision ($r = 0.42$); there is no correlation $> |.7|$.

Table 9.46 Means, standard deviations, and correlations of the Domains of Risk Mini-Scale.

#	Variable	*M*	*SD*	1	2	3	4
1	DR-01 Financial decision	3.74	1.31				
2	DR-02 Health/security decision	2.95	1.51	0.42**			
3	DR-03 Recreational decision	3.34	1.49	0.11	0.15		
4	DR-04 Moral decision	2.71	1.43	-0.16	0.18	-0.15	
5	DR-05 Social decision	3.87	1.16	0.24*	0.22	0.14	0.28*

Note. * indicates $p < 0.05$ and ** indicates $p < 0.01$. The description of the Domains of Risk Mini-Scale can be found in section H from 9.3.1.2.



Figure 9.9 Clustered correlation plot of the Domains of Risk Mini-Scale.
Note. Non-significant correlations ($p > 0.05$) are crossed-out.

B.e Summary In sum, concerning bullet point [1] from section A on page 308, none of the associations between the subscales/items of the four questionnaires of type [a] (the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale) presented here show an $r > |.7|$. The same holds for the intercorrelations of factors of the two questionnaires of type [b] (the Characteristics of Decision Situations Scale and the

Dimensions of Decisions Scale) as presented in Table 9.37 and Table 9.40 from section 9.3.2.3. Thus – in a non-narrow and non-statistical sense! – it may be concluded that all subscales (both one-item subscales from [a] as well as aggregates from [b]) are sufficiently *independent* from each other, as they should be.

C Two-Dimensional Content Model of Values

C.a The 14BiPole-Value Questionnaire The 14BiPole-Value Questionnaire in this study was used to measure *situational* values instead of *personal* values (cf. section E from 9.3.1.2). That is, in this case it is not each participant that is located within the Schwartz Value Circle, but each decision situation that participants described in the beginning of the study. For the theoretical underpinnings please refer to section E from 9.3.1.2.

The results are best reported visually. Figure 9.10 displays the decision situations located within the dimensions "Universality" and "Tradition" of the Schwartz Value Circle, whereas Figure 9.11 adds to that display the 21 coded collegiate decision situation domains as well as a visual allocation to the ten motivational types of the theoretical model of the Schwartz Value Circle.[404]

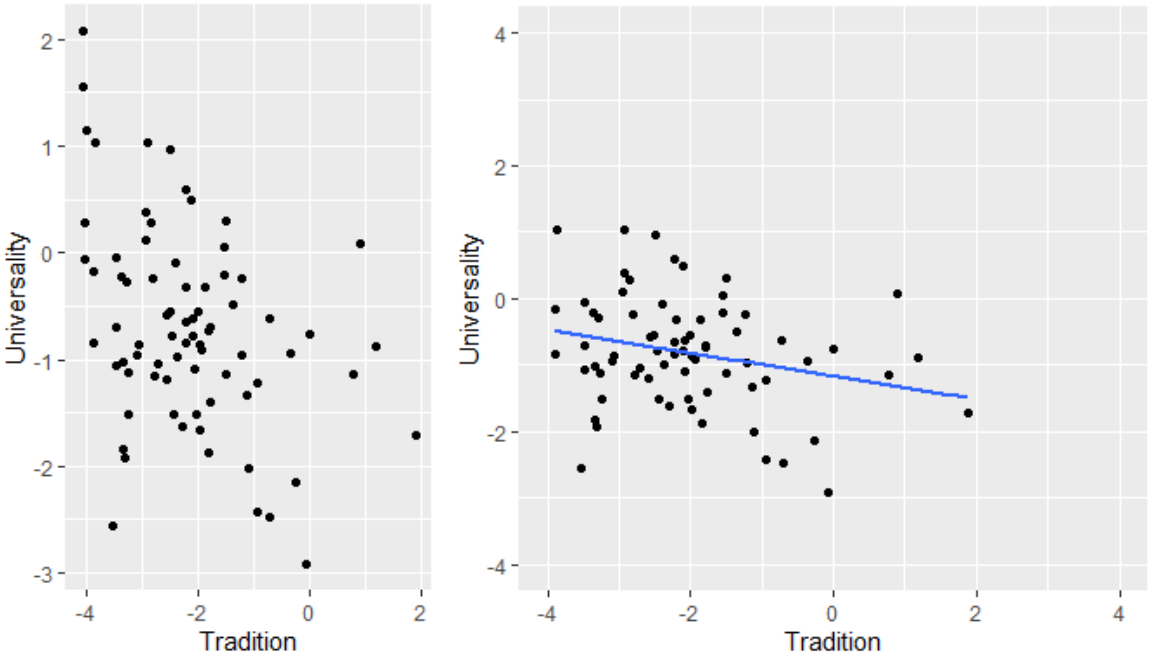


Figure 9.10 Scatterplots of the situational values present in the decision situations plotted within the dimensions *Universality* and *Tradition*.

Note. On the left hand side the plot's axes are adjusted to maximum visibility of all dots, whereas on the right hand side the scaling of both axes was set to {-4,4}. Furthermore the plot on the right includes the regression line of the correlation between *Universality* and *Tradition*.

[404] The formula necessary to calculate the coordinates on the two dimensions from the raw data was kindly given to me by Micha Strack in 2016. Cf. also section C.2.2.2 on page 620 within the Appendix for an analysis with a closer look at the according coordinates.

Looking at the right hand side plot of Figure 9.10, it becomes apparent that by far most decision situations are located in the lower left quadrant: that is, scoring low on *Universality* ($M = -0.70, SD = 0.95$) and very low on *Tradition* ($M = -2.17, SD = 1.29$). The correlation between the two dimensions was negative and significant, $r = -0.39, t(74) = -3.61, p < 0.001$.

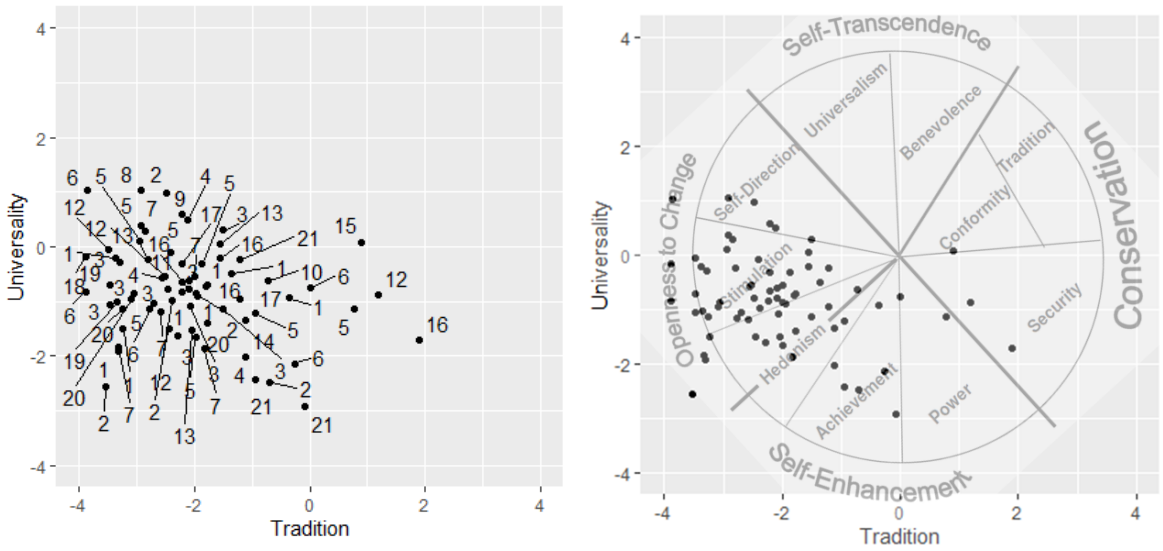


Figure 9.11 Scatterplots of the situational values coded by domain as well as allocated to the theoretical model of the ten motivational types.

Note. On the left each decision situation is labeled with the code referring to the 21 categories of collegiate decision situations (cf. section 9.3.2.1). On the right the decision situations are visually allocated to the ten motivational types of the theoretical model.

Looking at the left hand side plot of Figure 9.11, it is impossible to find a pattern at first glance.[405] One might ask whether the same categories (i.e., the same numbers) are located close to each other, that is: whether decision situations coded to belong to one content domain are also rated as similar regarding the values attached to these situations. Please refer to the Appendix (section C.2.2.2 on page 620) where this question is followed up on regarding Code #1 "Studies yes/no".

On the right hand side plot of Figure 9.11 the $N = 76$ decision situations are allocated within the theoretical model of the Schwartz Value Circle with its ten motivational types.[406] By far most of the decisions are to be found in the wedge "Stimulation", second ranges "Hedonism". There are a few in both "Achievement" as well as "Self-direction", and very few in "Power", "Security", and "Conformity". There are none in "Universalism", "Benevolence", and "Tradition".

[405] For the allocation of numbers to content please refer back to section 9.3.2.1. Roughly, numbers 1-10 narrowly refer to academic decisions (e.g. what and where to study), whereas numbers 11-21 refer to broader and more divers domains (e.g. living situation, job choice, leisure). Also note that of the $N = 76$ decisions more than two-thirds are among the codes 1-10 and thus less than one third of decisions is coded 11-21.

[406] Please be aware that the allocation to the ten motivational types as done here is only approximate.

That is, the collegiate decision situations reported by participants, many of which being academic choices that would put a person's professional life on a certain path (e.g. whether, where and what to study), were on average rated to be mostly about a varied and exciting life ("Stimulation"), pleasure and enjoyment ("Hedonism"), as well as aspects of ambition, success, influence ("Achievement"), and creativity, curiosity, freedom ("Self-direction").[407] These allocations seem quite fitting.[408]

D Measures of Central Tendency, Dispersion, and Shape In this section each of the eight Decision Categorization Scales will be portrayed in terms of their location and distribution parameters, both tabulated and visualized. Additionally, an exploratory repeated-measures ANOVA will be calculated for each of the scales as explained in bullet point [2] from section A.

Most of all, this section will be concerned with bullet points [3] and [4] from section A. That is, by means of visual inspection all scale items/variables will be scrutinized regarding floor or ceiling effects as well as the shape of their distribution in terms of skewness and narrowness.[409]

The first among the eight Decision Categorization Scales to be analyzed such will be the Situational Eight DIAMONDS Scale S8-II. Note that the written description here will be thorough as well as it will be explained which aspects of the visual displays can be interpreted and how. For all following scales, however, the written descriptions will be kept short and there will be no reference to the indicators of certain characteristics, relying on the readers' ability to see for themselves.

Please be reminded that all parameters and plots presented below represent aggregate values over all the (relatively divers) collegiate decision situations that participants had provided in the beginning of the study.

D.a The Situational Eight DIAMONDS Scale S8-II Cf. Table 9.47 for means and standard deviations and Figure 9.12 for a visualization by boxplots, histograms, and violin plots.

The exploratory repeated-measures ANOVA over the eight items of the Situational Eight DIAMONDS Scale S8-II yielded a significant result with $F(5, 383) = 47.76$, $p < 0.001$ – showing that overall there is variability between the items of the scale as there should be.

[407] For the theoretical explication of the motivational types cf. section E from 9.3.1.2.

[408] In the Appendix (section C.2.2.2 on page 620) you can find the original descriptions of the eight decision situations coded #1 "Studies yes/no" in German and English as well as their coordinates such that they can be found in the according scatterplot within the Schwartz Value Circle. Upon these examples the fit between the decision situation description provided by participants on the one hand and the decision's allocation within the Schwartz Value Circle based on participants' ratings by the 14BiPole-Value Questionnaire on the other can be retraced.

[409] Please note that I am aware that there are tests for normality as well as descriptors of skewness and kurtosis that I could provide for each item or aggregate variable. However, this would simply be too much information – especially since the deviation from normality in the observed data really is without consequence in the context of this study.

Table 9.47 Means and standard deviations of the Situational Eight DIAMONDS Scale S8-II.

	S8-01 Duty	S8-02 Intellect	S8-03 Adversity	S8-04 Mating	S8-05 pOsitivity	S8-06 Negativity	S8-07 Deception	S8-08 Sociality
M	5.61	4.51	2.89	3.09	5.28	3.87	1.89	5.57
SD	1.81	2.08	1.84	2.22	1.65	1.8	1.65	1.74

Note. The item intro read "Does the situation involve...?", and the 7-point Likert scale was labeled "not at all" (1) and "absolutely" (7).

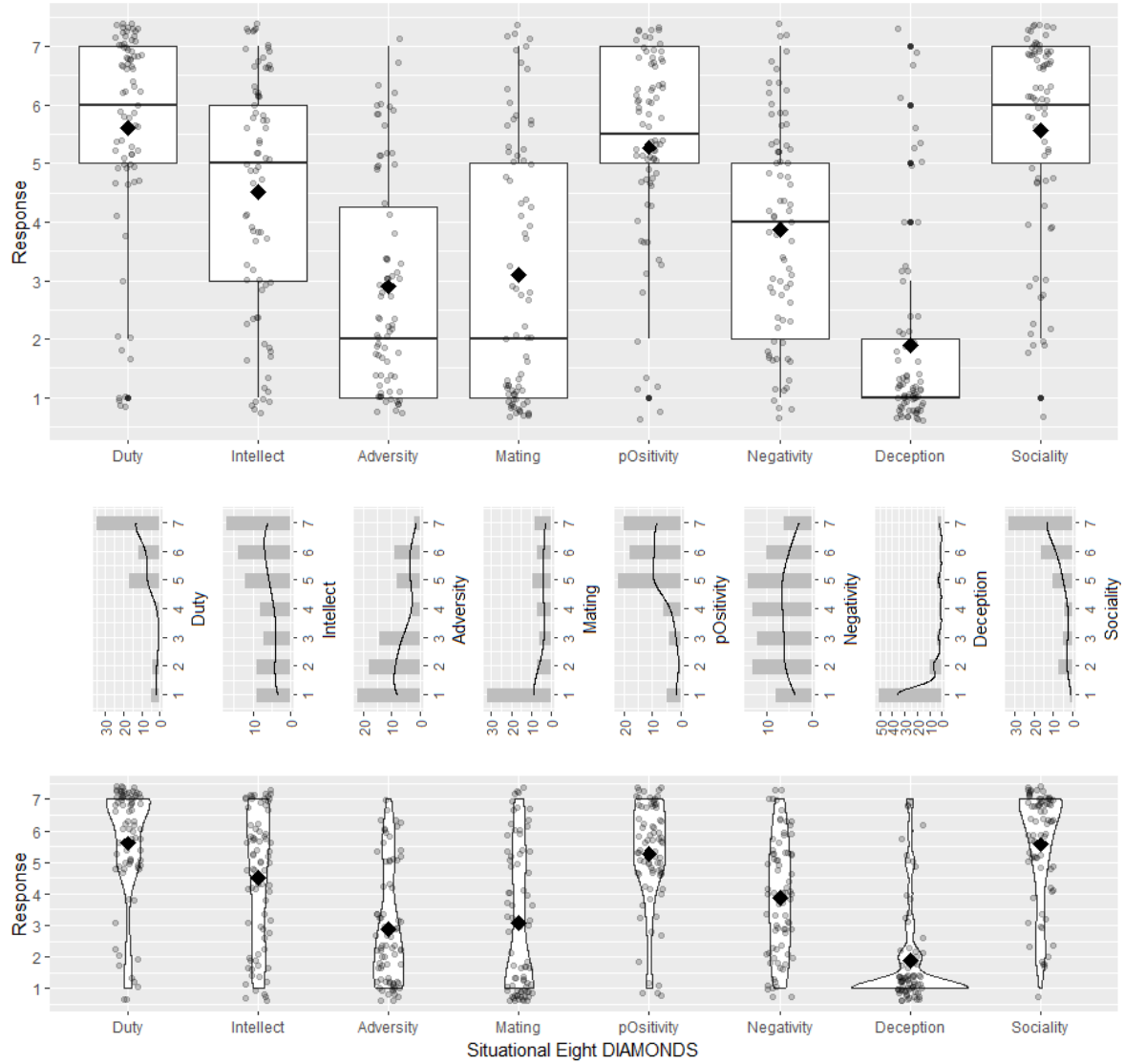


Figure 9.12 Boxplots, histograms, and violin plots of the eight items of the Situational Eight DIAMONDS Scale S8-II.

Note. The response scale 1-7 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency.

Looking at the histograms and violin plots, none of the eight items shows a normal distribution, which was confirmed by Shapiro-Wilk's test for normality which produced significant results for all eight items, thus confirming that they significantly diverge from normality.[410] Looking at the boxplots, upon the criterion from section A, there is a clear floor effect for *Deception*, where the median (the 50% quartile) is identical to the first quartile (the 25% quartile).[411] Furthermore, *Duty*, *Adversity*, *Mating*, *pOsitivity*, and *Sociality* are notably skewed; *Intellect* and *Negativity* show a rather flat, i.e.: uniform distribution.[412] Once more interpreting the boxplots, looking at the interquartile range, foremost *Deception*, and secondly *Duty*, *pOsitivity*, and *Sociality* show a lack of dispersion. Last, symmetry is indicated (but not guaranteed) only once mean and median coincide in the middle of the box, which is (almost) the case for *Negativity*.[413]

In terms of content, *Deception* seems to not have played much of a role in the collegiate decision situations recalled by participants. Further, *Mating* as well as *Adversity* were on average not much part of these decision situations either. On the other hand, referencing their mean values, *Duty* and *Sociality* range highest, followed by *pOsitivity* and *Intellect*. *Negativity* is symmetrically and quite evenly distributed around a mean and medium in the middle of the response scale's range.

Recommendation: In spite of the floor effect of *Deception* this scale should be used in full integrity, since it is the short form of a well-established and validated questionnaire measuring a taxonomy of situations.[414]

D.b The Semantic Differential *Evaluation* Scale Cf. Table 9.48 for means and standard deviations and Figure 9.13 for visualizations.

[410] For reasons of brevity, test statistics and p-values will not be reported.

[411] This quite counterintuitive result may happen when there is a high number of identical low values in the data set. Imagine the following ordered values of a very small data set: {1, 2, 2, 2, 3, 5, 6}. The median – the value of the point in the data that splits the data set into two halves of the same number of observations – is $Mdn = 2$ (the "2" right in the middle of the line of numbers). The first quartile – the value of the point in the data that 25% of observations fall below – is the second number in line, $Q1 = 2$. Thus, $Mdn = Q1 = 2$. The above small data example was taken from mkt (2019).

[412] The shape of the distributions can most easily be grasped looking at the histograms, however, the less common violin plots do offer the same conclusion.
Alternatively looking at the boxplots, the median not being in the middle of the interquartile range (= the box) indicates skewness, cf. e.g. *Adversity* and *Mating*. However, with the boxplots it is additionally important to check whether the median and the box are close to the response scales poles: e.g. with the present response scale from 1-7 a median of $Mdn \geq 6$ or $Mdn \leq 2$ means that half of observations range within 2/7th of the response scale's range. *Duty* and *Sociality* provide the respective examples, where the median is in the middle of the interquartile range, but the median as well as the whole box are close to the response scale's pole, therefore indicating skewness. In sum, while the conclusions regarding the distribution shapes from interpreting the boxplots – namely that only *Intellect* and *Negativity* are not majorly skewed – are the same as the conclusions drawn from the histograms or violin plots, the interpretation is clearly easier and more reliable looking at the latter two.

[413] However, symmetry does not imply unimodality, which cannot be inferred from boxplots.

[414] The floor effect might disappear when the scale is applied to more general decision situations than the present *collegiate* decision situations.

The exploratory repeated-measures ANOVA over the three items of the Semantic Differential *Evaluation* Scale yielded a significant result with $F(2, 102) = 20.85$, $p < 0.001$ – speaking in favor of overall variability between the items.[415] However, Cronbach's alpha of the scale was $\alpha = 0.86$ (cf. section A.a from 9.3.2.3), and the intercorrelations between the items were $r = 0.66$, $r = 0.62$, and $r = 0.69$. Therefore the significant repeated-measures ANOVA is no need for concern.

Table 9.48 Means and standard deviations of the Semantic Differential *Evaluation* Scale.

	SD-01 bad-good	SD-02 ugly-beautiful	SD-03 unpleasant-pleasant	Factor *Evaluation*
M	68.41	63.02	49.61	61.48
SD	24.39	24.00	25.75	22.21

Note. On the bipolar response scale ranging from 1-101, "1" is the negative pole (bad, ugly, unpleasant) and "101" is the positive pole (good, beautiful, pleasant).

[415] Post-hoc pairwise comparisons without adjustment showed significant differences between SD-01 and SD-03 and between SD-02 and SD-03.

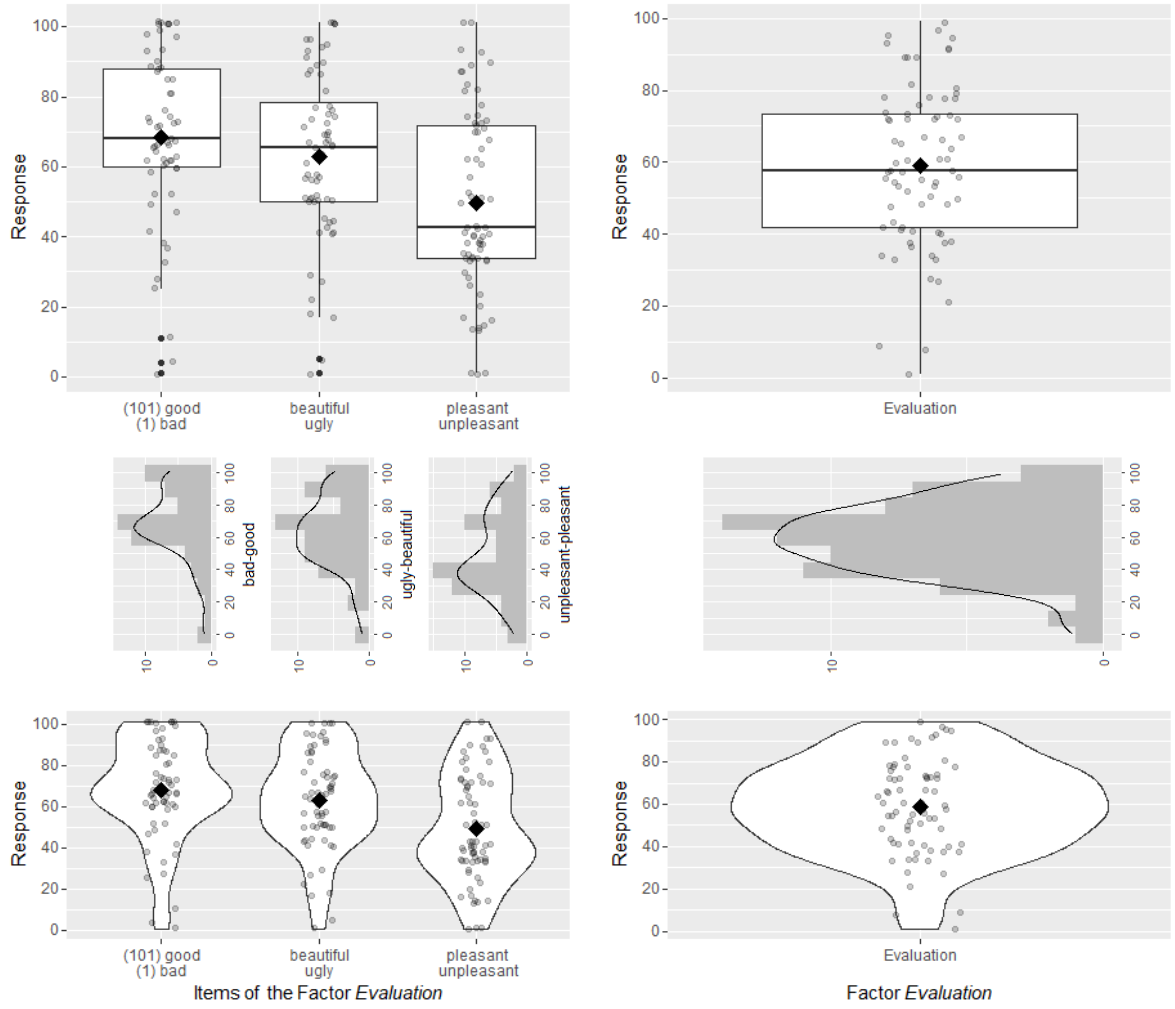


Figure 9.13 Boxplots, histograms, and violin plots of the Semantic Differential *Evaluation* Scale.
Note. The response scale 1-101 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The data points are "jittered" to be discriminable. Due to missing data, the items have varying sample sizes with $n = 61$, $n = 64$, and $n = 70$ participants, whereas the aggregate measure, the Factor *Evaluation*, includes $n = 75$ participants (= one missing value over all three items). The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. On the bipolar response scale ranging from 1-101, "1" is the negative pole (bad, ugly, unpleasant) and "101" is the positive pole (good, beautiful, pleasant).

The aggregate measure, the Factor *Evaluation*, upon visual inspection looks sufficiently normally distributed. An assessment by Shapiro-Wilk's test confirmed this impression, $W = 0.98$, $p = 0.295$.[416]

[416] This is a good example for the advantages of aggregate measures, since both SD-01 (with $W = 0.93$, $p = 0.002$) and SD-03 (with $W = 0.97$, $p = 0.047$) slightly diverged from normality; SD-02 (with $W = 0.97$, $p = 0.088$), however, did not. Also, the items for the Semantic Differential Scale were truly metric with their response scale from 1-101, not ordinal as all of the other response scales.

Recommendation: The high Cronbach's alpha of $\alpha = 0.86$ and the confirmed normal distribution speak in favor of this short scale measuring a general *Evaluation* of a situation.[417]

D.c The 14BiPole-Value Questionnaire Cf. Table 9.49 for means and standard deviations and Figure 9.14 for visualizations.

Unsurprisingly, the exploratory repeated-measures ANOVA yielded a significant result with $F(6, 483) = 27.18$, $p < 0.001$ – confirming the variability between items.

Table 9.49 Means and standard deviations of the 14BiPole-Value Questionnaire.

	VC01	VC02	VC03	VC04	VC05	VC06	VC07	VC08	VC09	VC10	VC11	VC12	VC13	VC14
M	3.17	3.05	3.83	2.43	3.16	2.17	2.84	3.46	3.41	1.96	4.11	2.38	1.84	2.86
SD	1.17	0.95	1.28	1.07	1.17	1.05	1.21	0.92	1.3	0.9	1.11	1.32	1.13	1.44

Note. The 5-point bipolar scale ranged from -2 over 0 to +2. Below the violin plots from Figure 9.14 all value pairs are quoted (abbreviated). The first line of values had been displayed at the positive pole (scale value = 5) and the second line of values had been displayed at the negative pole (scale value = 1). This allocation is additionally marked at the first pair of values displayed below the violin plots.

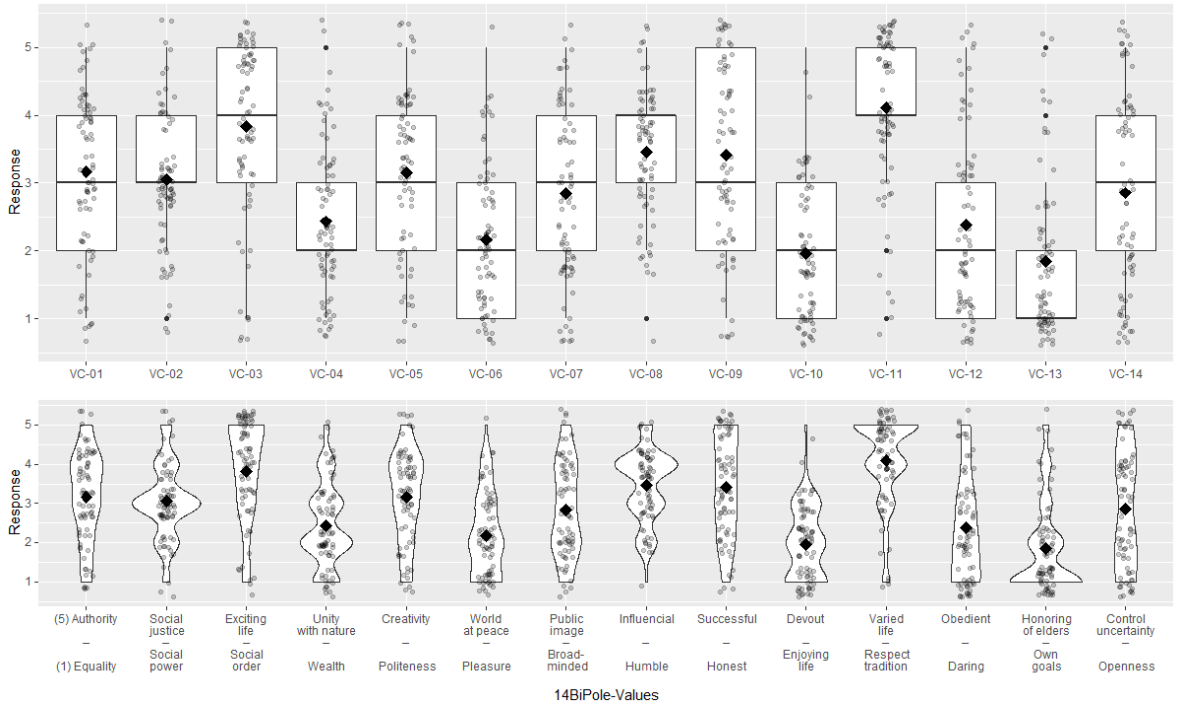


Figure 9.14 Boxplots and violin plots of the 14BiPole-Value Questionnaire.
Note. The black diamond shape indicates the mean. The data points are "jittered" to be discriminable.

Upon visual inspection none of the 14 items shows a normal distribution, which was confirmed by Shapiro-Wilk's test for normality producing significant results for

[417] The introductory sentence read "How do you assess the situation described?".

all fourteen items, thus confirming that they significantly diverge from normality.[418] Several items are not unimodal, a few items are skewed, two items display a ceiling or floor effect (VC-11 and VC-13), and two items appear to be rather uniform (VC-09 and VC-14).

Looking at the mentioned four items in terms of content, the decision situation participants had judged regarding the question which values had been present in this situation, their recalled decision situations were clearly more about a "Varied life" than "Respect for tradition" (VC-11) and "Choosing own goals" than "Honoring elders" (VC-13). On the other hand, on average their decision situations were spread over all levels of "Success" vs. "Honesty" (VC-09), as well as over all levels of "Control of uncertainty" vs. "Openness" (VC-14). All of these descriptive findings seem to be well in accord with participants being mostly students and their decision situations being mostly about student life.

Recommendation: While the behavior of most single items is not too convincing as looked at from the point of normal distribution, this questionnaire indeed is well-established, validated and theory-driven. Furthermore, when statistically analyzed according to instructions as presented in section C above, the results are both plausible and interesting. Thus, this questionnaire is a keeper.

D.d The Evolutionary Domains Mini-Scale Cf. Table 9.50 for means and standard deviations and Figure 9.15 for visualizations.

The exploratory repeated-measures ANOVA returned a significant result, $F(4, 272) = 28.29$, $p < 0.001$ – speaking in favor of variability between items.

Table 9.50 Means and standard deviations of the Evolutionary Domains Mini-Scale.

	ED-01 Affiliation	ED-02 Social status	ED-03 Self-protection	ED-04 Mate acquisition	ED-05 Relationship maintenance	ED-06 Familial care
M	4	3.13	2.96	1.93	2.68	2.17
SD	1.12	1.32	1.46	1.28	1.6	1.42

Note. The item intro read "The following aspects were relevant in the situation:...", and the 5-point Likert scale was labeled "does not apply at all" (1) and "does absolutely apply" (5).

[418] For reasons of brevity, test statistics and p-values will not be reported.

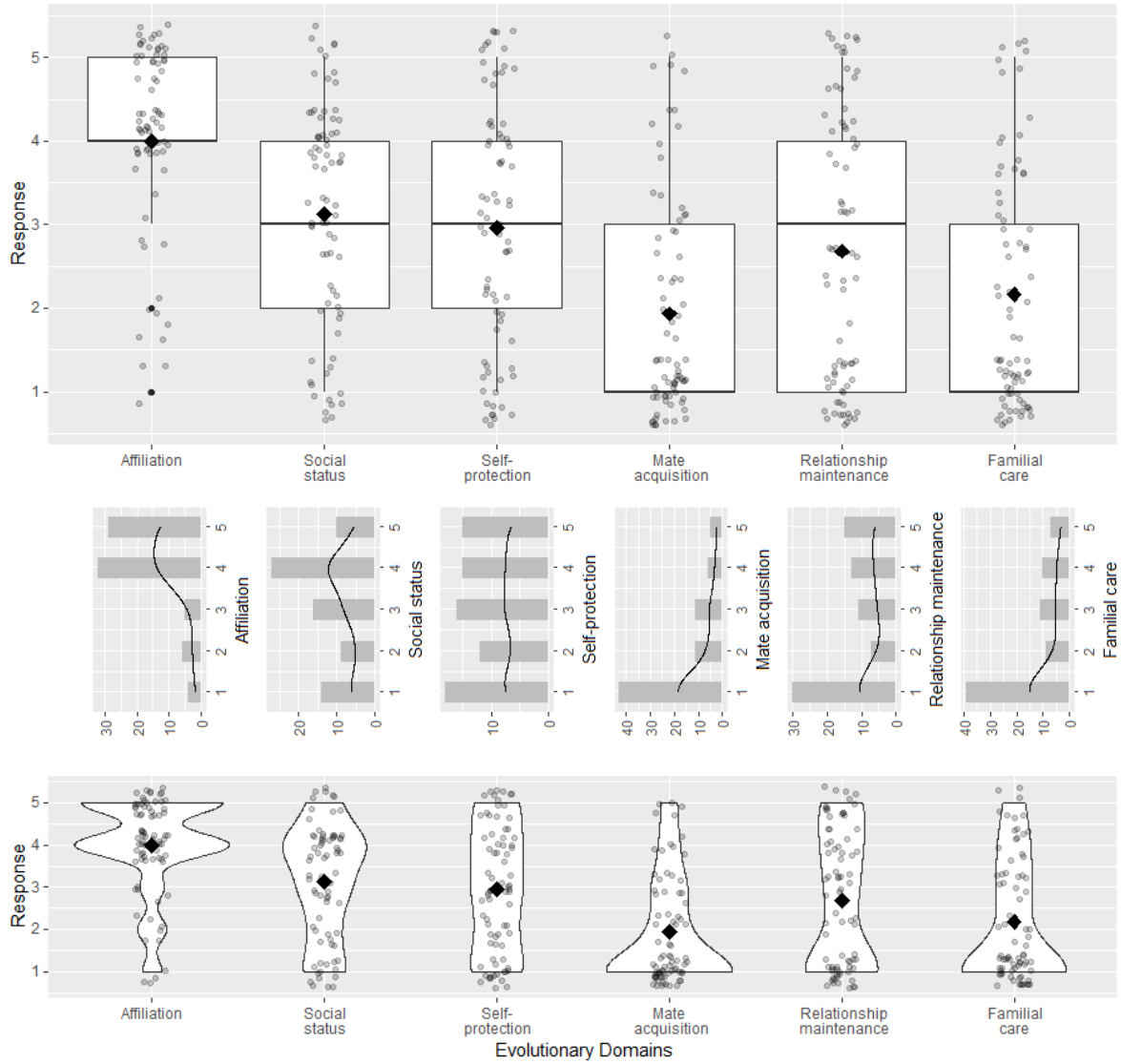


Figure 9.15 Boxplots, histograms, and violin plots of the Evolutionary Domains Mini-Scale.
Note. The response scale 1-5 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. The density line for *Affiliation* was set to "adjust=2" within geom_density{ggplot2}.

To the eye, none of the six items is normally distributed, which was confirmed by Shapiro-Wilk's test for normality that produced a significant result for all six items, thus confirming that they significantly diverge from normality.[419] Two items exhibit a floor effect, *Mate acquisition* and *Familial care*. *Affiliation* (towards agreement) and *Relationship maintenance* (towards disagreement) are quite skewed. *Social status* visually is closest to normal distribution, and *Self-protection* is quite uniformly distributed.

[419] For reasons of brevity, test statistics and p-values will not be reported.

In terms of content, *Mate acquisition* and *Familial care* did thus on average not play much of a role in participants' recalled decision situations. Somewhat more dispersed, but mostly unimportant, too, was *Relationship maintenance*. These results seem fitting in that the reported collegiate decision situations were mostly not about partnership or family. *Affiliation*, on the other hand, was on average the most important aspect of participants' decision situations. This speaks to the fact that "forming and maintaining cooperative alliances with others" (cf. Table 9.19 from section F in 9.3.1.2 for the complete item formulations) is a pervasive part of student life. *Social status* on average rather played a role which makes sense since educational advancement does relate to social status. The even distribution of the levels of *Self-protection* over situations is a little surprising, because the explication given to participants read "protecting oneself and significant others from threats". Threats (in an evolutionary sense) seem to not usually come up in collegiate decision situations. But participants might have understood this aspect in a rather metaphorical sense pointing towards self-care and the avoidance of negatively stressful environments.

Recommendation: The compilation of these evolutionary domains is very theory-driven, purporting that they are ubiquitously important aspects of life. Their importance, of course, does phase-wise vary during a person's life (e.g. mate acquisition and relationship maintenance are usually not important at the same time; familial care for elders and children generally comes up only after adolescence or later), therefore floor and ceiling effects are to be expected from a rather homogeneous sample. However, participants' answers on these items were plausible and interesting – speaking in favor of the scale's further use.

D.e The Moral Foundations Mini-Scale Cf. Table 9.51 for means and standard deviations and Figure 9.16 for visualizations.

The exploratory repeated-measures ANOVA was significant, $F(4, 272) = 20.58$, $p < 0.001$ – speaking in favor of variability between items.

Table 9.51 Means and standard deviations of the Moral Foundations Mini-Scale.

	MF-01 Harm-Care	MF-02 Cheating-Fairness	MF-03 Betrayal-Loyalty	MF-04 Subversion-Authority	MF-05 Degradation-Sanctity	MF-06 Oppression-Liberty
M	3.37	3.43	3.5	3.17	3.01	4.04
SD	0.78	0.87	0.82	0.7	0.38	0.93

Note. The item intro read "The situation was about...", and the response scale was a 5-point bipolar scale where "1" marked the negative pole (Harm, Cheating, Betrayal, Subversion, Degradation, Oppression) and "5" marked the positive pole (Care, Fairness, Loyalty, Authority, Sanctity, Liberty).

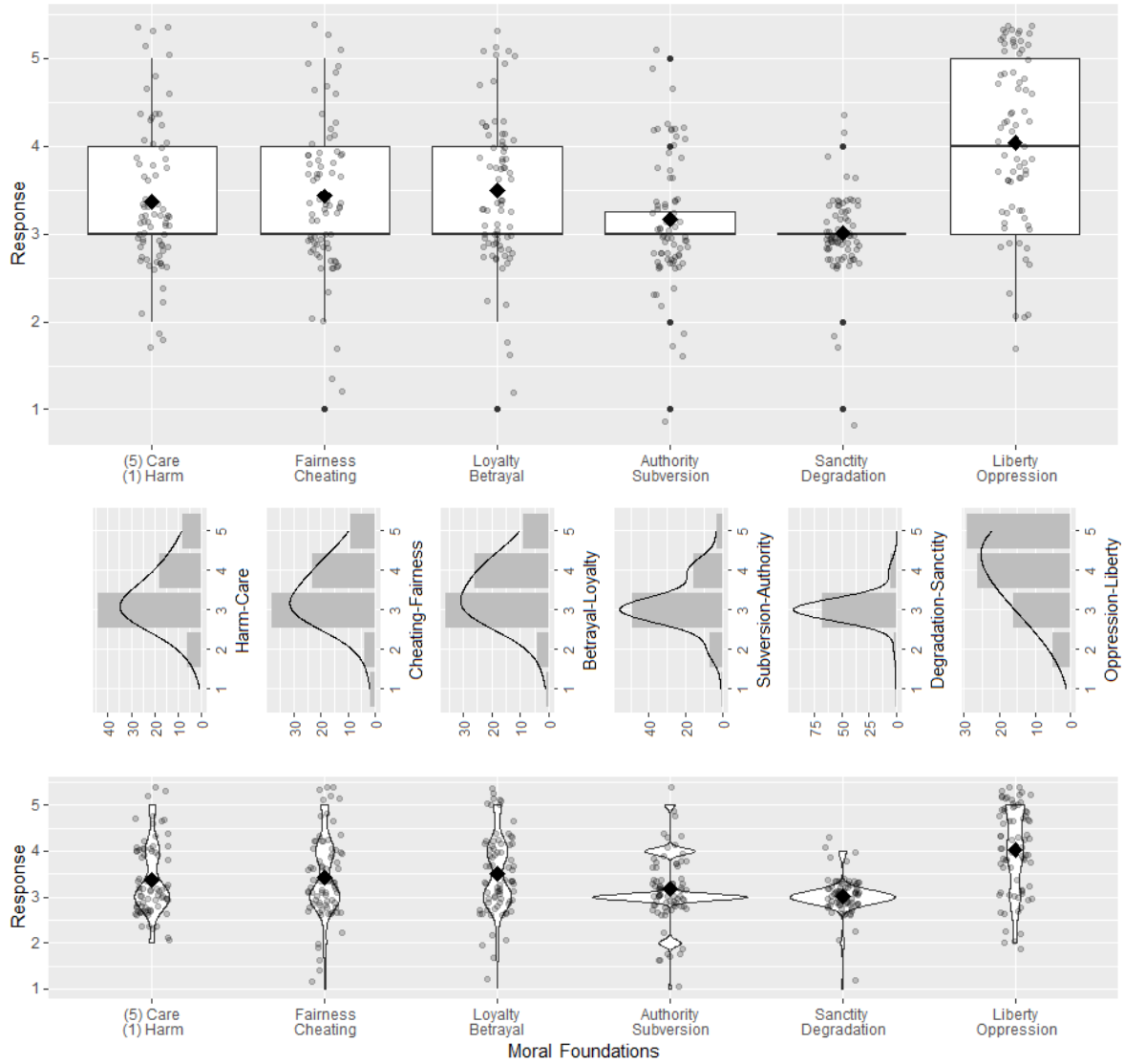


Figure 9.16 Boxplots, histograms, and violin plots of the Moral Foundations Mini-Scale.
Note. The response scale 1-5 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. The density line for all items was smoothed via "adjust" within geom_density{ggplot2}. Mind that the histogram of *Degradation - Sanctity* has a differently scaled y-axis.

Apart from *Oppression-Liberty* which is heavily skewed to the pole of "Liberty", the histograms look relatively normally distributed, but the boxplots clearly do not.[420] A Shapiro-Wilk test for normality yielded significant results for all six items, thus confirming that they significantly diverge from normality.[421] For all items but *Oppression-*

[420] The violin plots seem to have reacted heavily to the non-continuous nature of the ordinal variables. I cannot give any reason for this phenomenon, since the R code was identical to the previous violin plots that, too, were calculated for ordinal scales.
[421] For reasons of brevity, test statistics and p-values will not be reported.

Liberty the median (cf. the boxplots) and mode (cf. the histograms) was $Mdn = Mo = 3$. Thus, participants on average did not find either of the poles of these five items fitting to describe what their recalled decision situation was about. Most explicitly this was the case with *Degradation-Sanctity* where almost all participants opted for the middle category. In some sense, all of these items display a floor effect: most responses were located at the farthest possible point from agreement to either pole. Regarding the four items *Harm-Care*, *Cheating-Fairness*, *Betrayal-Loyalty*, and *Subversion-Authority*, on average there was a tendency towards the positive pole. Thus, overall participants viewed their decision situations rather to be about the positive side of the coin, or possibly rather looked at what they wanted to achieve than what they wanted to avoid (but this, of course, is mere speculation). In sum, participants seem to have had a hard time to apply the categories of Moral Foundations Theory to their collegiate decision situations, and thus the Moral Foundations Mini-Scale does not qualify as an appropriate measure here.

Recommendation: As to the report above, this scale does not qualify for use in this context: Participants could not make sense of the bipolar items, *Liberty* being the only exception.

D.f The Domains of Risk Mini-Scale Cf. Table 9.52 for means and standard deviations and Figure 9.17 for visualizations.

The exploratory repeated-measures ANOVA was significant, $F(3, 256) = 11.25$, $p < 0.001$ – speaking in favor of variability between items.

Table 9.52 Means and standard deviations of the Domains of Risk Mini-Scale.

	DR-01 Financial decision	DR-02 Health/security decision	DR-03 Recreational decision	DR-04 Moral decision	DR-05 Social decision
M	3.74	2.95	3.34	2.71	3.87
SD	1.31	1.51	1.49	1.43	1.16

Note. The item intro read "The decision was of the following nature...", and the 5-point Likert scale was labeled "does not apply at all" (1) and "does absolutely apply" (5).

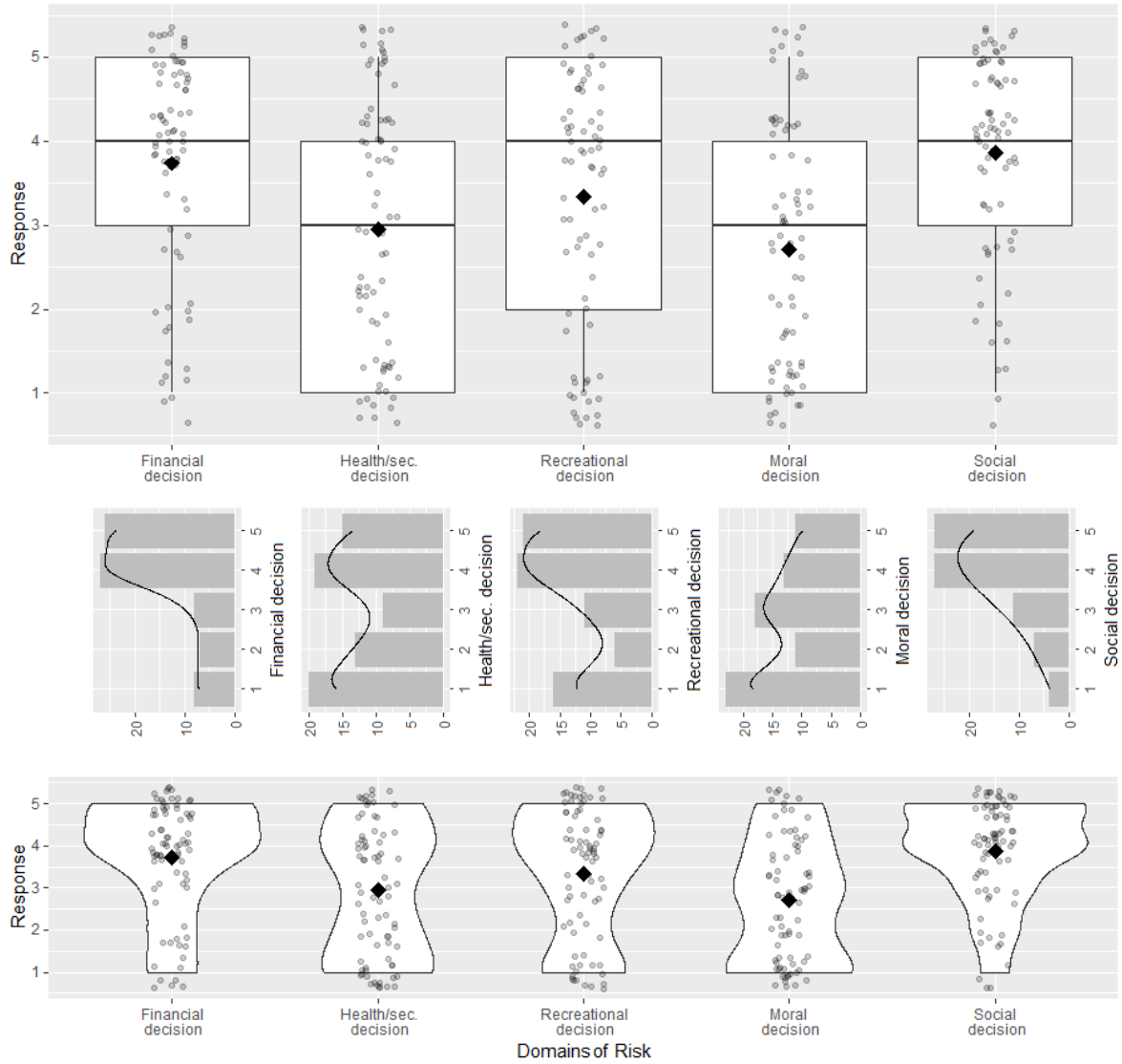


Figure 9.17 Boxplots, histograms, and violin plots of the Domains of Risk Mini-Scale.
Note. The response scale 1-5 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. The density line for all items was smoothed via "adjust" within geom_density{ggplot2}.

A look at the histograms suggests that none of the variables is normally distributed, which was confirmed by Shapiro-Wilk's test for normality producing significant results for all five items, thus confirming that they significantly diverge from normality.[422] None of the items produced a floor or ceiling effect. *Financial decision* and *Social decision* were quite skewed towards agreement, *Moral decision* was rather skewed towards disagreement, and both *Health/security decision* and *Recreational decision* were bimodal such that two of the middle categories were least frequented. On average, the nature

[422] For reasons of brevity, test statistics and p-values will not be reported.

of most decisions participants reported was either financial, recreational, or social and they were less likely to be health/security or moral decisions.

Recommendation: This scale, differentiating five content domains of decisions, clearly makes sense in this context and should thus stay.

D.g The Characteristics of Decision Situations Scale Cf. Table 9.53 for means and standard deviations and Figure 9.18 for visualizations.

The exploratory repeated-measures ANOVA was significant, $F(5, 368) = 9.81$, $p < 0.001$ – speaking in favor of variability between items.

Table 9.53 Means and standard deviations of the Characteristics of Decision Situations Scale.

	Difficulty	Duration	Predictability	Control	Clarity	Significance	Magnitude
M	3.46	3.53	3.58	2.94	3.72	3.89	4.02
SD	0.96	0.94	0.94	1.14	1.00	1.03	0.93

Note. The item intro read "How much do the characteristics apply to the situation?", and the 5-point Likert scale was labeled "does not apply at all" (1) and "does absolutely apply" (5). The seventh factor, *Magnitude*, was added on the basis of additional factor analyses reported in the Appendix, cf. A.f for the final description of the 7-factor solution including *Magnitude*.

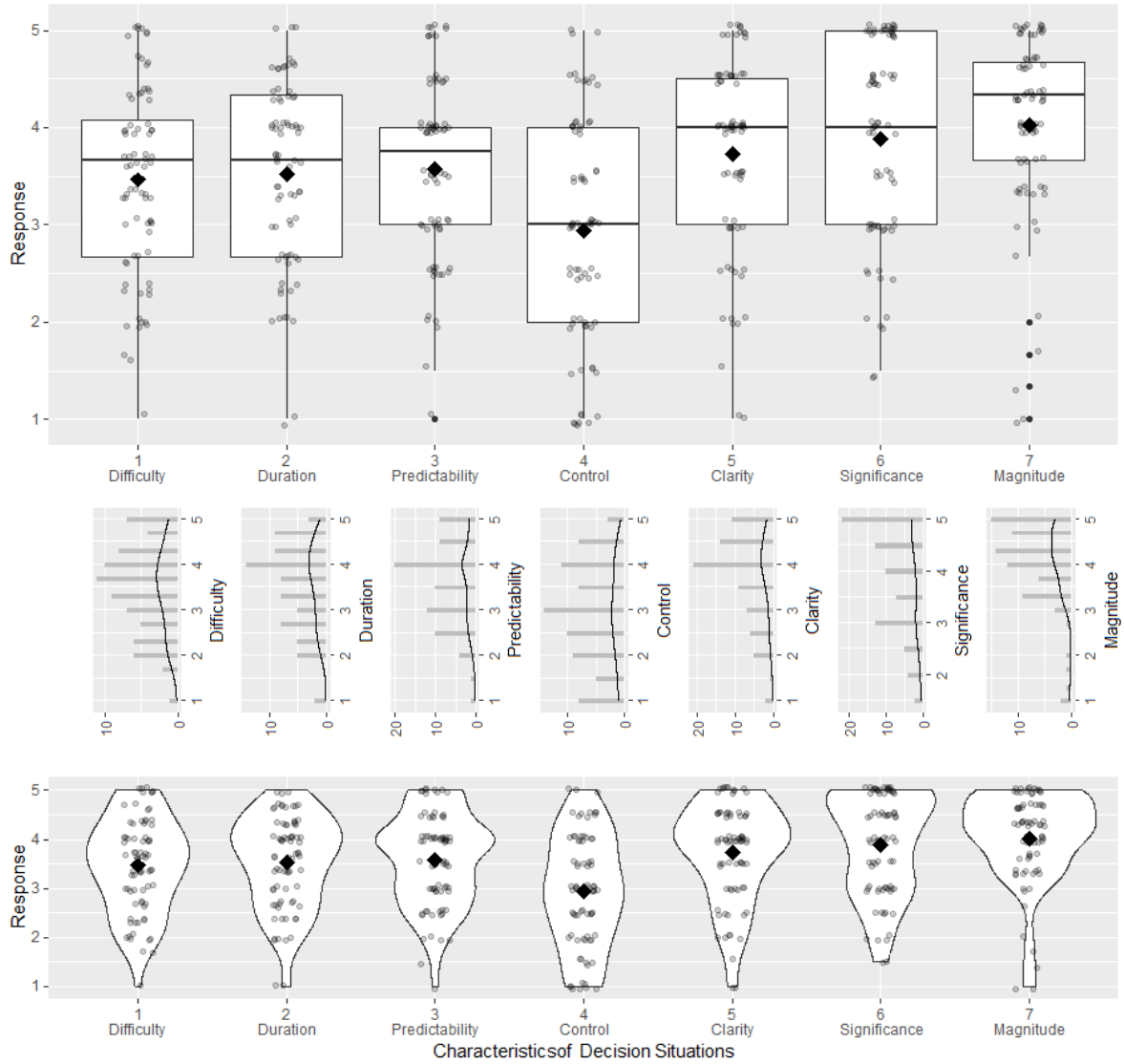


Figure 9.18 Boxplots, histograms, and violin plots of the Characteristics of Decision Situations Scale. **Note.** The response scale 1-5 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. Factors 1, 2, and 7 include three items, Factors 3, 4, 5, and 6 include two items – which is the reason for the differing spacing of bars in the histograms. Mind, too, that within the histograms, the x-axis of *Significance* is differently scaled (in that it starts with "2").

In terms of normality the seven factors do look acceptable, but the Shapiro-Wilk test for normality produced significant results for all seven variables, thus confirming that they significantly diverge from normality.[423] There are no floor or ceiling effects, but *Clarity*, *Significance*, and *Magnitude* are rather skewed towards agreement. The interquartile range is smallest for *Predictability* and *Magnitude*. *Control* is rather uniformly distributed, as are *Difficulty* and *Duration* with a slight skew towards agreement.

[423] For reasons of brevity, test statistics and p-values will not be reported.

The contents of the seven factors as summarized in section A.f from 9.3.2.3:[424]

- "How difficult was the decision?" (*Difficulty*, Factor 1)
- "How much time and though went into the decision?" (*Duration*, Factor 2)
- "How much did I know about the possible consequences?" (*Predictability*, Factor 3)
- "How much did external, uncontrollable factors play a role?" (*Control*, Factor 4)
- "How clear were my goals to me?" (*Clarity*, Factor 5)
- "How unique and important was the decision?" (*Significance*, Factor 6)
- "How long-term and important were the consequences of the decision?" (*Magnitude*, Factor 7)

Significance and *Magnitude* are rated highest (as concerns the mean value), suggesting that overall participants found their recalled decision situations rather important, which fits well with these situations often being about academic decisions setting a path for the future. Participants on average also found that their goals were rather clear to them (*Clarity*) and that they felt rather knowledgeable about possible consequences (*Predictability*). The extent that uncontrollable factors played a role was distributed over all levels of *Control*. On average decisions were mostly difficult (*Difficulty*) and mostly took time and thought (*Duration*), but there were also quite a few decisions that ranged in the lower levels of these factors.

Recommendation: In spite of the fact that most of the factors only comprise two items, which is generally considered too few, the seven factors were indeed able to collect sensible responses. Still, this questionnaire should be regarded as a pilot version only: As explicated above (cf. section A on page 286 from 9.3.2.3) its construction was unusual in that no factors were preconceived and items were not made to cluster around certain themes, but rather stood alone with their specific content. This unusual origin, yet based on good theorizing, makes the emergence of these specific factors a valuable and truly exploratory result. Future research should semantically start with these seven factors/themes and then follow conventional construction principles by creating items to specifically grasp these themes.

D.h The Dimensions of Decisions Scale Cf. Table 9.54 for means and standard deviations and Figures 9.19 and 9.20 for visualizations.

The exploratory repeated-measures ANOVA was significant, $F(5, 367) = 102.58$, $p < 0.001$ – speaking in favor of variability between items.

[424] For the seventh factor, *Magnitude*, please refer to the Appendix, section A.f.

Table 9.54 Means and standard deviations of the Dimensions of Decisions Scale.

	M	*SD*
1 - Simple, easy decision	2.39	0.71
2 - Satisfaction with decision	1.97	0.97
3 - Limited knowledge based dec.	2.41	0.61
4 - Unimportant decision	1.58	0.59
5 - Slow/delayed decision	2.43	0.88
6 - Easy to implement decision	2.24	0.82
7 - Few options considered	2.90	0.85
8 - Uncommon decision	4.14	0.88
9 - Web of decisions	3.50	0.91
10 - Incomplete information	2.48	0.86
11 - Low pressure situation	2.21	0.69
12 - Uncertain about result	2.41	0.75
13 - Unpopular decision	2.88	1.01
14 - Unchangeable decision	3.89	1.16
15 - Highly uncertain setting	3.46	0.78
16 - Serve individual interest	4.12	0.76
17 - Inconsistent effort	2.40	0.89
18 - Individual decision	3.55	0.78
19 - Short term impact	1.45	0.67
20 - Self-initiated	3.75	0.91
21 - Rational decision	2.80	1.00

Note. The item intro read "How much do the characteristics apply to the situation?", and the response scale was a 5-point bipolar scale. In the original study, usually "1" marked the *negative pole* regarding the factor name. That is, for Factor 1 "Simple, easy decision" (1 = *not* simple), Factor 4 "Unimportant decision" (1 = *important*), Factor 8 "Uncommon decision" (1 = *common*), Factor 10 "Incomplete information" (1 = *sufficient* information), Factor 13 "Unpopular decision" (1 = *popular*), Factor 14 "Unchangeable decision" (1 = *changeable*), and Factor 19 "Short-term impact" (1 = *long term* impact). Only in case of factor 2 "Satisfaction with decision", "1" marked the *positive pole* regarding the factor name (i.e., 1 = *satisfied*). – This mumbo-jumbo is quite unfortunate, as are the negation-based factor names. However, I decided to stick with the original studies decisions regarding naming and scaling in order to avoid additional confusion.

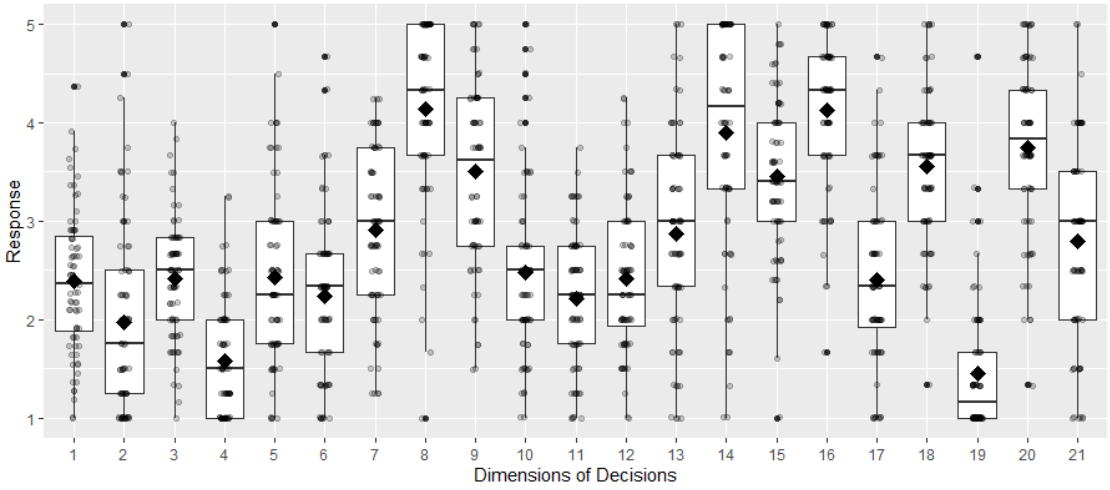


Figure 9.19 Boxplot of all 21 factors of the Dimensions of Decisions Scale.
Note. The black diamond shape indicates the mean. The data points are "jittered" to be discriminable.

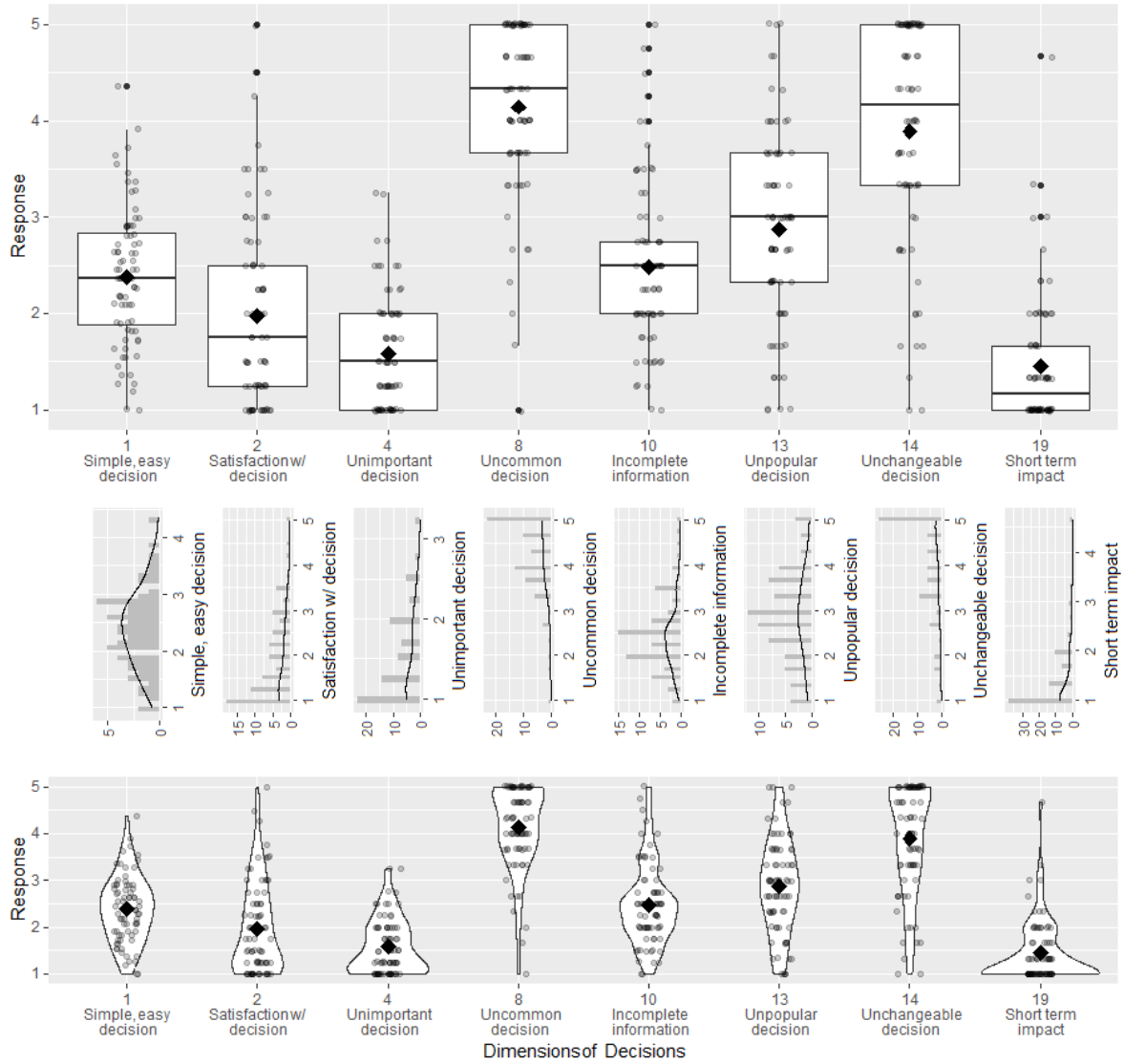


Figure 9.20 Boxplots, histograms, and violin plots of the eight reliable factors of the Dimensions of Decisions Scale.

Note. The response scale 1-5 is the y-axis of boxplots and violin plots, but the x-axis of the rotated histograms. In the boxplots and violin plots, the black diamond shape indicates the mean. The $N = 76$ data points are "jittered" to be discriminable. The black line in the histograms indicates the empirical density. In the histograms the y-axis is response frequency. Mind that within the histograms, the x-axis of Factors 1, 4, and 19 is differently scaled (in that it does not reach up to "5"). Mind, too, that only with *Satisfaction* lower numbers mark the positive pole (here: "satisfied").

According to Shapiro-Wilk's test for normality, two of the Factors were normally distributed, namely *Simple, easy decision* ($W = 0.99$, $p = 0.767$) and *Unpopular decision* ($W = 0.98$, $p = 0.157$), whereas the remaining six factors significantly diverged from normality.[425] *Short term impact* exhibited a floor effect, meaning that on average participants found their recalled decision situations to absolutely be of *long* term impact.

[425] For reasons of brevity, test statistics and p-values will not be reported.

Satisfaction,[426] *Uncommon decision*, and *Unchangeable decision* were skewed towards their positive pole, whereas *Unimportant decision* was skewed towards its positive pole, as was *Incomplete information*, but to a lesser degree.

Thus, in terms of content, participants mostly favored the middle categories regarding the simplicity of the decision (Factor 1) and the popularity of the decision (Factor 13), which both were indeed normally distributed. Regarding their informedness (Factor 10), which came close to normal distribution, participants on average reported to rather having had sufficient information. On average, decisions were rated to be (more than not) satisfactory (Factor 2), important (Factor 4), uncommon (Factor 8), and unchangeable (Factor 14). These descriptive results again fit well with the contents of the collegiate decision situations often being about participants' academic and professional future.

Recommendation: 21 factors with more than 80 items are clearly too many for practical purposes, especially since they are bipolar which even increases the reading load for participants. On the other hand, these themes were carefully gathered by the authors and cover a large array of content. Unfortunately, only eight of the factors qualified for further use in this study by producing a sufficiently high Cronbach's alpha of $\alpha \geq .7$. This subset of subscales with sufficient internal consistency, however, seems eclectic in content. Furthermore, I will admit that I am not a fan of the items within their subscales (cf. section J on page 271 and the Table 9.25 on page 273 from 9.3.1.2 for all items): they do seem diverse and unfocused and thus I am not surprised about the lack of internal consistency. Future research should start out from the 21 factors/themes, but create a wholly new set of items that is more consistent per subscale.

E Summary of Descriptive Statistics

Correlation Matrices Item intercorrelations were calculated for the four questionnaires that depict a taxonomy of content domains (the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale). For all scales, there were no intercorrelations of $r > |.7|$ and the patterns of associations made sense semantically as well as theoretically. The same holds for the Characteristics of Decision Situations Scale and the (eight reliable factors of the) Dimensions of Decisions Scale.[427]

Two-Dimensional Content Model of Values The 21 coded collegiate decision situations were fit into the Schwartz Value Circle by using the 14BiPole-Value Questionnaire. The collegiate decision situations mostly clustered within the motivational types of stimulation, hedonism, achievement, and self-direction – which corresponds well with their semantic content mostly being about choices regarding academic and professional life. The 14BiPole-Value Questionnaire – originally devised to measure personal values – did well in capturing situational values in this study.

[426] Remember that *Satisfaction* was reverse-coded, cf. the note beneath Table 9.54.

[427] Intercorrelations were not calculated for the Semantic Differential *Evaluation* Scale and the 14BiPole-Value Questionnaire, cf. also footnote 437 on page 344.

Central Tendency, Dispersion, and Shape From the eight Decision Categorization Scales, the following five were recommended fur further use in this context: the Situational Eight DIAMONDS Scale S8-II, the Semantic Differential *Evaluation* Scale, the 14BiPole-Value Questionnaire, the Evolutionary Domains Mini-Scale, and the Domains of Risk Mini-Scale. The Moral Foundations Mini-Scale was recommended to be dropped, since participants were unable to apply its categories. The two long questionnaires focusing on decision situations specifically, the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale, were recommended for revision. Regarding the Dimensions of Decisions Scale, the recommendation is to rewrite the items for the 21 factors/themes; regarding the Characteristics of Decision Situations Scale, the recommendation similarly is to follow conventional construction principles in order to newly devise sets of items to capture the 7 factors that were found in a rather exploratory manner.

F Additional Plotting As described in section 9.3.2.1 on page 282, the decision situations provided by participants were coded by content domain which resulted in 21 categories of collegiate decision situations. It seemed interesting to plot the responses on the Decision Categorization Scales split by these 21 categories. It seemed reasonable to assume that situations being similar as regards content domain (e.g. "Studies: subject/place", "Studies: subject", and "Studies: place") should exhibit a similar pattern on the Decision Categorization Scales. This indeed was somewhat the case. However, the description of these similarities turned out to be tedious and lengthy with only mediocre benefit, if any. Yet, the graphs are very pretty and took me quite some time to build which is why they can be found in the Appendix, cf. section A on page 623 within C.2.3.1.

G Cluster Analysis Cluster analysis is an exploratory method of data reduction, somewhat similar to exploratory factor analysis (EFA). The visual output of a cluster analysis is a so-called dendrogram that visualizes the hierarchical clusters. That what is clustered are the cases N (i.e.: participants). That according to which is clustered is a chosen set of variables. That is, cases are grouped together according to the extent and the quality of their similarities regarding a set of variables (e.g. a questionnaire).[428] An interpretation of a clustering solution would look at all the cases that belong to one cluster and try to pinpoint what exactly is the similarity to human understanding that the mathematical algorithm found.

Cluster analyses were calculated for seven of the eight Decision Categorization Scales and certain combinations of them. Instead of case numbers cases were labeled with their collegiate decision situation category. That is, these cluster analyses were constructed to cluster decision situations not participants which in this case is coextensive, because each participant provided one situation (which then was coded into one of the 21 categories of collegiate decision situations).

[428] Which is the difference to factor analysis, where (not cases, but) variables are grouped according to latent variables.

Although a cluster analytical approach seemed promising as well as appropriate, the resulting clusters resisted interpretation. It was simply impossible to find similarities based on the collegiate decision situation categories. A more thorough attempt surely would have included re-reading the original decision situation descriptions in order to spot similarities beyond the coded content domain. However, this more thorough approach seemed irresponsibly time-consuming which is why it was not attempted. Nevertheless all dendrograms are for display in the Appendix, cf. section A on page 631 within C.2.3.2.

9.3.2.6 Decision Strategy and Satisfaction

This work is about satisfaction with two decision strategies, *deciding by reasons* versus *deciding by principle*. Therefore, we will have a quick look at according variables within this study. Please refer to Table 9.55, where the respective variables are listed.

Table 9.55 Variables within this study tracing satisfaction and decision strategy.

Name	Items	Origin
Satisfaction with decision	satisfied / dissatisfied happy or proud / regretful good / bad comfortable / uneasy	Dimensions of Decisions Scale
CD-14 – Reasons	Reasons for and against the options in the decision situation played an important role.	Input variable from the Characteristics of Decision Situations Scale before factoring
CD-15 – Intuition	I relied on my feelings and decided intuitively.	Same as above
CD-16 – Principles	Adherence to certain rules and principles played an important role in the decision.	Same as above

Note. Note that for reasons of brevity the items of *Satisfaction with decision* from the Dimensions of Decisions Scale are listed as reported in the original publication, whereas in this study the item poles were transformed to full sentences as displayed in the *Materials* section, cf. Table 9.25 on page 273 from 9.3.1.2. | All variables were scaled 1-5 with *Satisfaction* being bipolar and the three decision strategy variables ranging from "does not apply at all" (1) to "does absolutely apply" (5). *Satisfaction* and *Intuition* had been reverse-scaled, but for the present analyses were recoded such that "1" signifies the negative pole (not satisfied, does not apply) and "5" signifies the positive pole (satisfied, does apply).

A Data Analytical Procedure and Hypotheses The general idea of this work is that the two decision strategies *deciding by reasons* and *deciding by principle* differ from each other regarding their effect on participants' satisfaction as the dependent measure of interest. A third strategy, *deciding by intuition* is used as a control condition in some of the studies, but is not in itself in focus.

The four variables above include three decision strategies, namely "deciding by reasons" (here: *Reasons*), "deciding by principle" (here: *Principles*), and "deciding by intu-

ition" (here: *Intuition*),[429] as well as the subscale *Satisfaction* from the Dimensions of Decisions Scale with its Cronbach's alpha of $\alpha = 0.89$.

Of course, this is not an experimental study where decision strategy is an independent variable with two or three levels. Here, all variables are repeated measures of the same rank and refer to the decision situation participants reported in the beginning of the study. Furthermore, *Satisfaction* refers to the decision in general (cf. Table 9.25 on page 273 from 9.3.1.2), and does not differentiate between satisfaction with the outcome, the options, or the strategy as was implemented in the Pilot Study from chapter *Pilot Study* (chap. 8). Therefore, when looking at the results from the following analyses these limitations and differences must be kept in mind.

The following statistical analyses will be performed: bivariate correlation analyses between all variables, a multiple regression analysis with *Satisfaction* as the dependent measure, and a repeated measures ANOVA on the three strategies (*Reasons*, *Principles*, *Intuition*).

Hypotheses:

Correlations Both, *Reasons* and *Principles* show a negative correlation with *Intuition*, because both of the former strategies are deliberational strategies and the latter is not. (H1.1)

Reasons and *Principles* do not correlate positively, because they are conceptualized as two strategies of reasoning that relate to each other as "either-or": Either you decide by weighing reasons or you decide by returning to a valued principle.[430] (H0.2)

Regression no hypothesis / exploratory

ANOVA There are differences between the means of *Reasons*, *Principles*, and *Intuition* (global, non-directional). (H1.3)

B Results

B.a Correlations Cf. Table 9.56 for the correlation matrix and further descriptive statistics.

[429] Note that the item wording here is not identical to the very consistent formulations across all of the experimental studies.

[430] The statistical hypothesis thus is the disjunctive hypothesis of the alternative hypothesis assuming a negative correlation and the null hypothesis of assuming a null correlation.

Table 9.56 Means, standard deviations, and correlation coefficients of the three decision strategy items and *Satisfaction*.

#	Variable	*M*	*SD*	1	2	3
1	Reasons	4.05	0.91			
2	Principles	2.87	1.30	0.01		
3	Intuition	3.74	1.14	-0.12	0.15	
4	Satisfaction	4.03	0.97	-0.24*	0.03	0.14

Note. * indicates $p < 0.05$.

There is only one significant correlation, namely the negative correlation between *Reasons* and *Satisfaction*. All other correlations are non-significant.

(H1.1) – hypothesizing negative correlations between both *Reasons* and *Principles* with *Intuition* – could not be confirmed. The correlation between *Reasons* and *Intuition* is descriptively negative, but small and non-significant; the correlation between *Principles* and *Intuition* is descriptively positive, but also small and non-significant. Therefore, from the point of inferential statistics, there is no correlation between *Intuition* and the two deliberational decision strategies.

(H0.2) – hypothesizing the non-existence of a positive correlation between *Reasons* and *Principles* – could be maintained: with $r = 0.01$ the correlation between these two strategies is almost null.[431]

Interpreting these results, it is interesting to see that (descriptively) there really is no relation between the three decision strategies – they have nothing to do with each other. It is *not* the case that the more deliberation regarding reasons or principles, the less intuition (which was the point of H1.1), and furthermore the two deliberational strategies show a null correlation (the point of H0.2). That is, there is no pattern be-

[431] To be fair, to use a null hypothesis as the desired hypothesis requires a power analysis. One possibility to set parameters is this: Givens are the sample size of $N = 76$ and a small effect size of $\rho = 0.05$. As calculated with G*Power (type: "Criterion"), $1 - \beta$ is set to 0.9 such that $\beta = 0.1$. This means that the probability of falsely maintaining the null hypothesis while the alternative hypothesis really is the case is only 10% (i.e. $\beta = Pr\ (maintain\ H0|H1\ is\ true) = 0.1$) – and this is the important thing here: to not falsely maintain the (desired) null hypothesis. As a consequence, the last parameter, alpha, results to be $\alpha = 0.80$, meaning that the probability of falsely accepting the alternative hypotheses while the null hypothesis is true is 80% (i.e. $\alpha = Pr\ (accept\ H1|H0\ is\ true) = 0.8$) – which is certainly not ideal, but not as important as controlling beta in this case. I think, with this setup, the above H0.2 can reasonably be maintained.
However, as stated above in footnote 430, H0.2 really is a disjunctive hypothesis of a null and an alternative hypothesis, namely: $(H1 : \rho < 0)\ OR\ (H0 : \rho = 0)$ – leaving excluded $\rho > 0$. While I am aware of how to adjust for a disjunctive hypothesis of either two null hypotheses or two alternative hypotheses, this combination is uncommon: Do both alpha and beta cumulate? Or neither? – Since the reliability of the result of the above H0.2 is very minor within the grand scheme of things, I will leave it at this: a cautionary note.

tween these three variables: having used reasons, principles or intuition only chaotically coincides. Figure 9.21 affords a visual display of the findings from the two hypotheses.

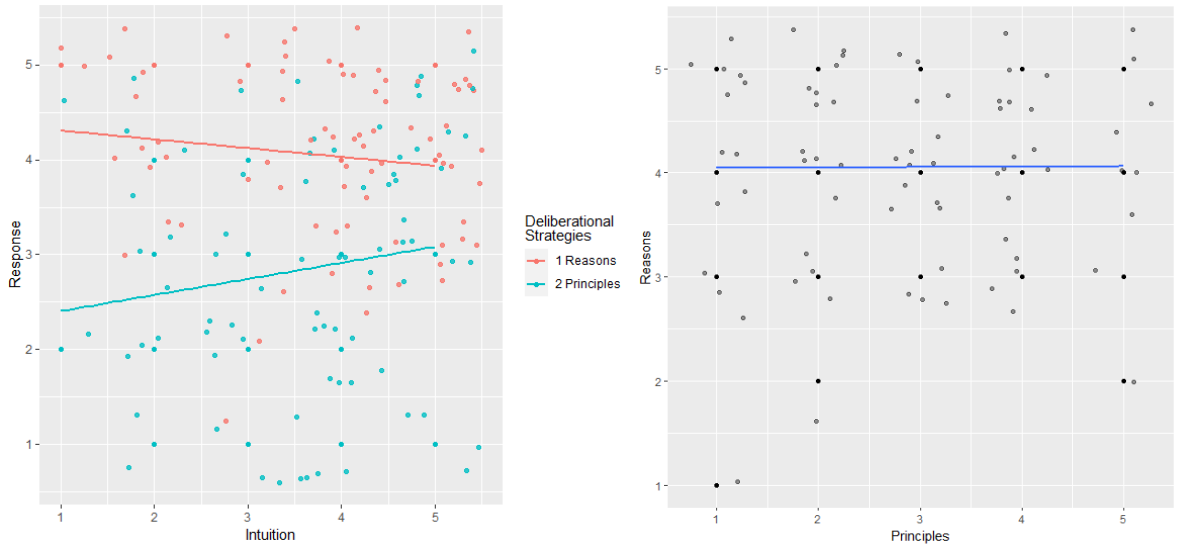


Figure 9.21 Scatterplots of *Reasons*, *Principles*, and *Intuition*.

Note. Both scatterplots are heavily "jittered" because none of the variables is continuous. To the left a visualization of the findings from H1.1 and to the right the findings from H0.2.

B.b Regression Multiple regression analysis was used to test whether the three decision strategies significantly predicted participants' *Satisfaction* ratings. However, the model was not significant, $F(3, 72) = 1.86$, $p = 0.144$. The three predictors explained 3% of the variance, *adjusted* $R^2 = 0.03$. Among the three predictors, *Principles* and *Intuition* remained insignificant, whereas *Reasons* significantly predicted *Satisfaction*, $\beta = -0.23$, $p = 0.046$.[432] In sum, as had already been visible in the regression table (cf. Table 9.21 above), only *Reasons* showed a significant negative, but weak relation to *Satisfaction*: The more reasons played an important role in the decision situation, the less satisfied participants were with the decision. Figure 9.22 provides a visual display.

[432] The standardized coefficients (beta) were calculated using lm (data.frame (scale (model_name $model))).

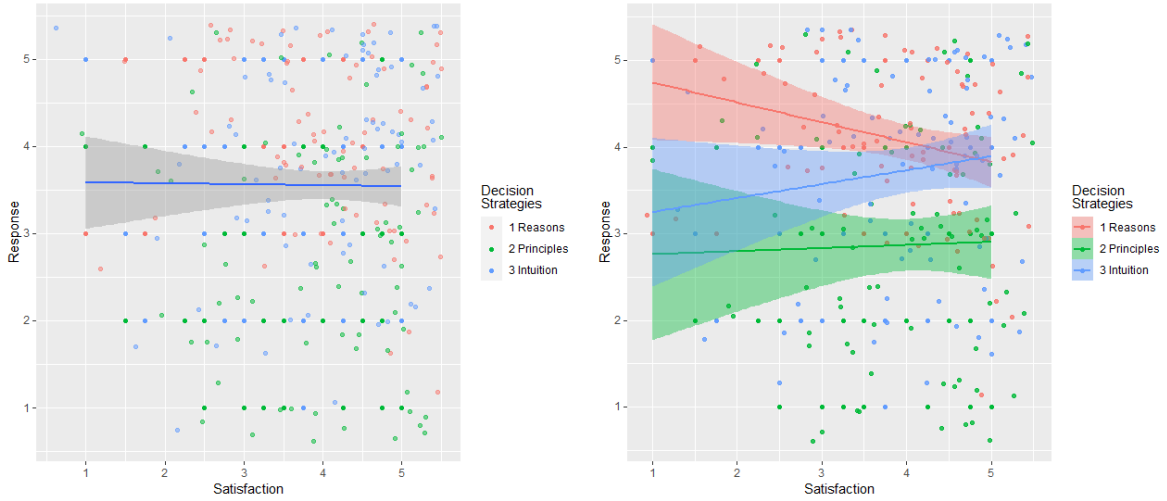


Figure 9.22 Scatterplots with regression lines, regressing *Satisfaction* on *Reasons*, *Principles*, and *Intuition*.

Note. Both scatterplots are heavily "jittered" because none of the variables is continuous.

B.c ANOVA The repeated measures ANOVA over the three decision strategy variables was significant, $F(2, 150) = 23.19$, $p < .001$. Pairwise comparisons revealed a significant difference between *Reasons* and *Principles* ($t(75) = 6.53$, $p < 0.001$) and between *Principles* and *Intuition* ($t(75) = -4.75$, $p < 0.001$). Between *Reasons* and *Intuition* there was a marginally significant difference ($t(75) = 1.79$, $p = 0.077$).[433] Figure 9.23 provides a visual display.

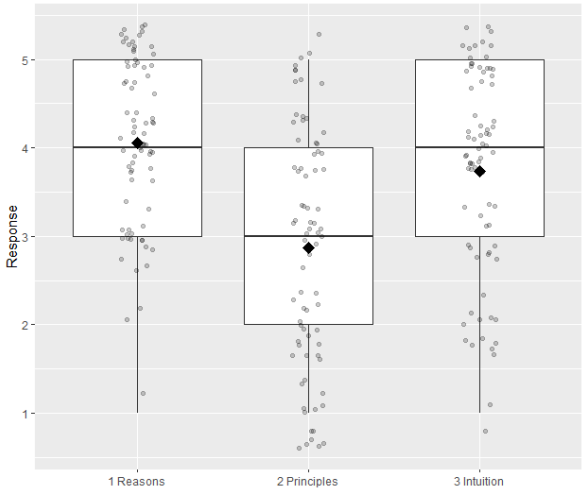


Figure 9.23 Boxplots of the three decision strategy variables.

Note. The black diamond shape indicates the mean. The data points are "jittered" to be discriminable.

[433] The p-values were not adjusted. Please refer to footnote 534 from section 10.2.2 in chapter *Reasons vs. Principles* (chap. 10) for an explanation.

(H1.3) was confirmed in that there are significant differences between the means of the three decision strategy variables overall. In sum, participants more often relied on reasons and intuition in their decision making than on principles.

C Summary The correlations between *Reasons*, *Principles*, and *Intuition* were all insignificant. The lack of a negative correlation between *Reasons* and *Principles* on the one hand and *Intuition* on the other hand disconfirmed (H1.1), while the lack of a significant correlation between *Reasons* and *Principles* spoke in favor of (H0.2).

The regression model regressing *Satisfaction* on the three decision strategies did not turn significant. Among the predictors only *Reasons* significantly and negatively predicted *Satisfaction*: the more use of reasons, the less satisfaction.

The means of the three decision strategy variables significantly differed overall, confirming (H1.3). On average, the use of principles was least common.

9.3.3 Summary and Discussion

This was a long chapter, right? (It took me about half a year, by the way.) What did it yield?

The main purpose[434] was to empirically approach the question of what are (the) dimensions of decisions. What dimensions do different decisions or decision situations vary on? Which dimensions delineate differences between individual decisions or decision situations and may comprehensively establish subgroups of decisions/decision situations?[435] – This was an attempt at definition or even at taxonomization.

This present section *Summary and Discussion* will entail a summary of results (section 9.3.3.1), an evaluation of achieved purpose (section 9.3.3.2 on page 345), a scrutiny of limitations and suggestions for future research (section 9.3.3.3 on page 353), and a conclusion (section 9.3.3.4 on page 362).

9.3.3.1 Reminder of all Results

Collegiate Decision Situations The decision situations provided by participants were coded into 21 quite fine-grained "collegiate decision situations" (cf. section 9.3.2.1 on page 282). Most common were choices about studying (what, where, at all?, ...).

As described in section *Additional Plotting* (section F on page 336 from 9.3.2.5), in section C.2.3.1 on page 623 within the Appendix, the 21 categories were visually related to the Decision Categorization Scales (DCSs) in order to examine whether those scales would show a reasonable pattern per collegiate decision situation category. This was somewhat the case regarding the Situational Eight DIAMONDS Scale S8-II (cf. section A on page 623 within the Appendix), but further attempts at interpretation were not

[434] You may want to refer back to section 9.3 on page 250 for comparison.

[435] Which dimensions are individually necessary and collectively sufficient to define "decision" (or: "decision situation")?

undertaken for any of the other scales (cf. section F on page 336 for an explanation of this decision).

Psychometric Validation A psychometric validation was conducted for the Semantic Differential Scale and the Characteristics of Decision Situations Scale by factor analysis. Internal consistencies were additionally calculated for the Dimensions of Decisions Scale. Cf. also section C on page 300 from 9.3.2.3 for a more detailed summary.

The Semantic Differential Scale From the three theoretical factors Evaluation, Activity, and Potency only *Evaluation* emerged. It included three items and had a Cronbach's alpha of $\alpha = 0.86$. The scale was thereafter renamed the Semantic Differential *Evaluation* Scale.

The Characteristics of Decision Situations Scale In two processes of analysis (cf. footnote 392 on page 296 and section C on page 300 from 9.3.2.3) seven factors emerged: *Difficulty* (3 items, $\alpha = 0.74$), *Duration* (3 items, $\alpha = 0.72$), *Predictability* (2 items, $\alpha = 0.78$), *Control* (2 items, $\alpha = 0.60$), *Clarity* (2 items, $\alpha = 0.73$), *Significance* (2 items, $\alpha = 0.64$), and *Magnitude* (3 items, $\alpha = 0.80$). The 7-factor version includes 17 items and variance explained is 69%.

The Dimensions of Decisions Scale Only 8 from the 21 factors reached a Cronbach's alpha of $\alpha \geq .7$,[436] namely: *Simple, easy decision* (11 items, $\alpha = 0.84$), *Satisfaction with decision* (4 items, $\alpha = 0.89$), *Unimportant decision* (4 items, $\alpha = 0.73$), *Uncommon decision* (3 items, $\alpha = 0.74$), *Incomplete information* (4 items, $\alpha = 0.70$), *Unpopular decision* (3 items, $\alpha = 0.75$), *Unchangeable decision* (3 items, $\alpha = 0.83$), *Short term impact* (3 items, $\alpha = 0.77$).

Conclusion From the point of view of factor analysis and reliability analysis (internal consistency), the three questionnaires/scales above qualify for further use.

Quality Assessment and Descriptive Statistics The three validities content validity, construct validity, and criterion validity were discussed regarding the eight Decision Categorization Scales (cf. section 9.3.2.4 on page 301 as well as section D on page 307 for a summary). Descriptive statistics (correlation matrices, measures of central tendency, dispersion and shape, and the 14BiPole-Value Questionnaire within the value circle) were presented (cf. section 9.3.2.5 on page 308).

Validity Content validity is given for each of the eight scales, but in their totality the scope of the Decision Categorization Scales is rather too wide in that most of the scales refer to situations in general instead of decision situations or decisions specifically. Convergent or discriminant construct validity as well as criterion validity could not be determined. Cf. also section D on page 307 for a more detailed summary.

[436] In the original study only two factors failed the criterion – a discrepancy that is discussed in section B.a on page 298 from 9.3.2.3.

Usability To ameliorate the lack of strict validity assessment, the results from descriptive statistics were scrutinized as to what they can reveal regarding quality and usability of the eight Decision Categorization Scales and their items (cf. section A on page 308 from 9.3.2.5 for a detailed explanation). Cf. also section E on page 335 from 9.3.2.5 for a more detailed summary.

Correlation Matrices suggested a sufficient independence (in a non-strict sense) of the subscales/factors of the evaluated questionnaires/scales (cf. section B.e on page 314 from 9.3.2.5 for the summary).[437]

The 14BiPole-Value Questionnaire as plotted within the value circle was well able to capture situational values (cf. section C on page 315 from 9.3.2.5 as well as the additional analysis in the Appendix, section C.2.2.2 on page 620).

Measures of central tendency, dispersion and shape spoke in favor of dropping the Moral Foundations Mini-Scale. The Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale (i.e. the two questionnaires really focusing on decisions or decision situations) should be revised (for details cf. the last paragraph *Recommendations* in D.g on page 329 for the Characteristics of Decision Situations Scale and in D.h on page 331 for the Dimensions of Decisions Scale, both within 9.3.2.5). The remaining five scales (the Situational Eight DIAMONDS Scale S8-II, the Semantic Differential *Evaluation* Scale, the 14BiPole-Value Questionnaire, the Evolutionary Domains Mini-Scale, and the Domains of Risk Mini-Scale) may well be further used in the present context (cf. section E on page 336 from 9.3.2.5 for the summary).

Conclusion From the point of view of quality assessment by descriptive statistics, five scales immediately qualify for further use, the two scales focusing on decision situations should be revised, and one scale, the Moral Foundations Mini-Scale, did not qualify.[438]

[437] The criterion is that intercorrelations are to be $r < |.7|$. Two of the eight questionnaires/scales were not evaluated on the basis of intercorrelations: the Semantic Differential *Evaluation* Scale (because it only consists of one factor) and the 14BiPole-Value Questionnaire (because the above criterion would not be appropriate to this questionnaire).

[438] It is important to remember, though, that the eight Decision Categorization Scales were used on the decision situations participants provided in the beginning of the study. Coding by content resulted in 21 categories and the label "collegiate decision situations", because the vast majority of these decision situations were about student life and academic decisions. Therefore, the set of decision situations used to test the eight Decision Categorization Scales was quite limited in terms of content. That is, that the Moral Foundations Mini-Scale was not useful on these decision situations does not mean that in general this scale could not be used on decision situations or that there are no decision situations where the Moral Foundations categories could point to useful differences. That the Moral Foundations Mini-Scale mostly produced bottom effects simply was a matter of a lack in fit: the collegiate decision situations simply were not of the kind where the Moral Foundations categories could be applied.

9.3.3.2 Purpose Evaluation

The declared purpose of this study was to categorize and distinguish decisions or decision situations.[439] Thereby, it was pointed out several times that the eight Decision Categorization Scales were of different type and origin (cf. section A on page 308 from 9.3.2.5 and section 9.3.2.2 on page 284).[440] The following list will again distinguish the eight scales by type:[441]

Domain Scales	The Situational Eight DIAMONDS Scale S8-II
	The Evolutionary Domains Mini-Scale
	The Moral Foundations Mini-Scale
	The Domains of Risk Mini-Scale
Content Model	The 14BiPole-Value Questionnaire
Evaluation Rating	The Semantic Differential *Evaluation* Scale
Nature of Decisions	The Characteristics of Decision Situations Scale
	The Dimensions of Decisions Scale

The differences between these four categories have sufficiently been described elsewhere (cf. e.g. the excursus entitled *Excursus: What Type of Information do the eight Decision Categorization Scales provide?*, section J.a on page 280 from 9.3.1.2).

In short: the Domain Scales distinguish content domains, the Content Model of values places each rated object within the two dimensions of *Universality* versus *Tradition*, the Evaluation Rating simply provides a global evaluation, and the Nature of Decisions distinguished by the two scales specifically focusing on decisions or decision situations latch onto theoretical differentiations from according literature.

In the following, the scales subsumed under the above four scale type categories will be once more shortly portrayed.

The Domain Scales The domain scales distinguish the following categories:

Eight DIAMONDS	Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, Sociality
Evolutionary Domains	Affiliation, Social status, Self-protection, Mate acquisition, Relationship maintenance, Familial care

[439] Cf. the introductory paragraph to this section (section 9.3.3 on page 342), and the introduction to the study in the very beginning (section 9.3 on page 250).

[440] Cf. also Table 9.41 on page 303 from section *Quality Assessment* (section 9.3.2.4) that lists all eight Decision Categorization Scales and their respective subscales.

[441] Cf. also the excursus entitled *Excursus: What Type of Information do the eight Decision Categorization Scales provide?*, section J.a on page 280 from 9.3.1.2 regarding this distinction.

Moral Foundations	Care/harm, Fairness/cheating, Loyalty/betrayal, Authority/subversion, Sanctity/degradation, Liberty/oppression
Domains of Risk	Financial decision, Health/security decision, Recreational decision, Moral decision, Social decision

Thus, in spite of the fact that these scales refer to situations in general rather than decision situations specifically (as already discussed in section *Content Validity*, cf. section A on page 302 from 9.3.2.4), if one wanted to place any one decision (situation) within one of these sets of categories, one could. That is to say: in spite of being general, the usefulness of these scales depends on the interest of the researcher.[442]

The Content Model The 14BiPole-Value Questionnaire is a short form that allows placing each rated object within the Schwartz Value Circle. The theoretical background has been sufficiently described in section E on page 254 from 9.3.1.2. The analysis of the raw data (i.e.: the ratings on the 14 bipolar items) entails using certain weights per item (cf. footnote 404 on page 315) such that the coordinates within the two dimensions *Tradition* and *Universality* result. That which resulted in application of this questionnaire semantically made sense when compared to the coded or original contents of the collegiate decision situations (cf. section C.a on page 315 from 9.3.2.5). Therefore, the 14BiPole-Value Questionnaire can be used on situations in general and decision situations specifically. Whether a placement of specific decision situations within the Schwartz Value Circle is useful, again, depends on the interests of the researcher.

The Evaluation Rating The Semantic Differential *Evaluation* Scale entails three bipolar items (good-bad, beautiful-ugly, pleasant-unpleasant) and simply affords a very general rating on a positive-negative type dimension. In itself, it is not specifically informative, but still the evaluation of a (decision) situation, of course, is an important aspect psychologically.

The Nature of Decisions The two scales specifically focusing on decisions or decision situations, the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale, distinguish the following categories:

Characteristics	Difficulty, Duration, Predictability, Control, Clarity, Significance, Magnitude
Dimensions	*Simple, easy decision*; *Satisfaction with decision*; Limited knowledge based dec.; *Unimportant decision*; Slow/delayed decision; Easy to implement decision; Few options considered; *Uncommon decision*; Web of decisions; *Incomplete information*; Low pressure situation; Uncertain about result; *Unpopular decision*; *Unchangeable decision*; Highly uncertain setting;

[442] Please also refer to footnote 438 on page 344 pointing to the fact that the eight Decision Categorization Scales were tested upon rather limited contents, namely collegiate decision situations.

Serve individual interest; Inconsistent effort; Individual decision; *Short term impact*; Self-initiated; Rational decision[443]

In spite of having been both derived upon theoretical considerations and according literature, it is obvious that these two scales are very different from each other (cf. also Table 9.42 on page 305 from 9.3.2.4 where they are compared in detail). Regarding the Characteristics of Decision Situations Scale it was already noted that the six or seven factors of this scale seem to depict *psychologically important* dimensions (cf. the summary in section A.f on page 296 from 9.3.2.3), whereas the 21 factors of the Dimensions of Decisions Scale seem more technical in nature where its categories rather correspond to theoretically interesting distinctions. Once more I will note that the Characteristics of Decision Situations Scale, too, was based on very theoretical distinctions (cf. the summary referenced above), but still these rather psychological dimensions resulted.

For both scales revision and confirmation was suggested. But in the case that their factors/subscales would remain rather similar after revision to the present status, the two scales might complement each other quite well. They also might instigate a discussion on the relative importance and specific usefulness of theoretically versus psychologically important distinctions.

Interim Summary The purpose was to find questionnaires to empirically categorize and distinguish decisions or decision situations. Having looked at the four types of questionnaires/scales used in this study – namely the four *Domain Scales*, the *Content Model* of situational values, the *Evaluation Rating* as the remainder from the Semantic Differential Scale, and last, the two questionnaires on the *Nature of Decisions* – it seems that on the whole this endeavor was successful: all of these scales[444] can be informatively used to rate and distinguish decision situations. Whether the results from using them are indeed interesting and useful, however, depends on the researcher's interest. In the present study these results – that is, the average and specific ratings of the reported decision situations on the eight Decision Categorization Scales – stood alone, but the next step would be relating them to other aspects of interest or searching for patterns. For example: Do people more or less tend to revise their decision if said decision was rated to have been difficult and taken a lot of time? Are financial decisions more stressful than social decisions? Are decisions within the realm of duty more dependent on personality characteristics than decisions in the realm of sociality? Questions like these and more complex ones could be tackled using the Decision Categorization Scales.

In the subsequent two sections (i) the average and (ii) specific ratings of reported decision situations will be gathered together.[445]

[443] The factors/subscales reaching a Cronbach's alpha $\alpha > .7$ within this study are italicized.

[444] Regarding the Moral Foundations Mini-Scale cf. footnote 438 on page 344.

[445] The average results [i] have already been reported in the respective sections within section D on page 317 from 9.3.2.5, but they have not been depicted together. Specific ratings of decision situations [ii] have not been looked at so far.

Content-Related Average Results Regarding the Sample of this Study The content-related descriptive results[446] for each of the eight Decision Categorization Scales were reported within section *Measures of Central Tendency, Dispersion, and Shape* (section D on page 317 within 9.3.2.5, fore-last paragraph of each section). Obtaining these results was not part of the purpose of this study, that is: it was not my main interest to determine within this study's sample how, on average, participants categorized and rated their reported decision situations. However, it was my interest to fathom whether the scales employed would be able to deliver such results. Therefore, these results will be gathered together here.

Results From the Domain Scales

Within the Situational Eight DIAMONDS Scale S8-II, *Deception*, *Mating*, and *Adversity* did not play much of a role in participants' decision situations. Most common were the categories *Duty* and *Sociality*, followed by *pOsitivity* and *Intellect*. Both *Intellect* and *Negativity* showed a mixed picture. Cf. Figure 9.12 on page 318 for the details.

Within the Evolutionary Domains Mini-Scale *Mate acquisition*, *Familial care*, and *Relationship maintenance* were not much part of participants' decision situations. *Affiliation*, however, was the most important category, and *Social status* played a role, too. *Self-protection* showed a mixed picture. Cf. Figure 9.15 on page 324 for the details.

Within the Moral Foundations Mini-Scale only *Oppression-Liberty* was rated such that liberty was an important aspect of participants' decision situations. The remaining five items exhibited a floor effect where ratings clustered around the middle category, thus showing disagreement with either pole. The most extreme floor effect was found for *Degradation-Sanctity*. Cf. Figure 9.16 on page 326 for the details.

Within the Domains of Risk Mini-Scale, descriptive statistics revealed that most of the reported decision situations were of financial, recreational or social nature, and only a minority of decisions was about health/security or morality. Cf. Figure 9.17 on page 328 for the details.

Results From the Content Model According to the 14BiPole-Value Questionnaire, regarding its items two clear-cut results revealed that participants' decision situations were much more about a "Varied life" than "Respect for tradition" (item VC-11) as well as "Choosing own goals" than "Honoring elders" (item VC-13), cf. Figure 9.14 on page 322 for the details.

Positioned within the Schwartz Value Circle participants' decision situations were mostly located within the motivational types of *Stimulation*, *Hedonism*, *Achievement* and *Self-direction*. Cf. section C.a on page 315 for the details.

Results From the Evaluation Rating The aggregate variable *Evaluation* on average picked up a value that was almost in the middle of the response scale: with a mean of round about $M \approx 60$ ($SD \approx 20$) on the scale from 1-101 participants on average

[446] That is, results not pertaining to normal distribution, bottom or ceiling effects etc., but results regarding participants' ratings on the respective subscales.

evaluated their decision situations as neither positive nor negative, but mediocre. Cf. section D.b on page 319 for details.

Results Regarding the Nature of Decisions

Within the Characteristics of Decision Situations Scale participants' reported decision situations were rated highest on *Significance* and *Magnitude*, followed by *Clarity*, *Predictability*, *Duration*, and *Difficulty* – all of their medians being well within the "does apply" part of the response scale. *Control* showed mixed results and on average was rated lowest. Cf. Figure 9.18 on page 330 for the details.

Within the Dimensions of Decisions Scale results were quite diverse as seen in Figure 9.19 on page 333. Among the eight sufficiently reliable factors/subscales, *Unpopular decision* and *Incomplete information* were rather rated "neither-nor": neither popular nor unpopular, neither lacking information nor sufficient information. *Simple, easy decision*, while also being strong in the neither-nor range, tended towards simple and easy. *Satisfaction* on average was high, and *Unimportant decision* as well as *Short term impact* were rated to be very low, meaning that decisions were rather important and long-term impact. Last, *Uncommon decision* and *Unchangeable decision* also received relatively high ratings, meaning decisions were rather uncommon and rather unchangeable. Cf. Figure 9.20 on page 334 for the details.

Summary As commented in the respective sections of *Measures of Central Tendency, Dispersion, and Shape* (section D on page 317 within 9.3.2.5), the vast majority of these results made sense when compared to what we know regarding the contents of the reported decision situations: namely that they were decisions within the realm of student life (therefore: "collegiate decision situation"), and that quite a few of them centered around long-term professional decisions regarding studying: like whether to study at all, where to study, what to study, or going abroad. Cf. section 9.3.2.1 on page 282 and Figure 9.5 on page 282 for the details.

Table 9.57 displays a summary of these results in tabular format:

Table 9.57 Summary of all content-related average results per Decision Categorization Scale.

Name of Scale	Aspects Present	Aspects not Present
Domain Scales		
Situational Eight DIAMONDS Scale S8-II	(1) Duty, Sociality (2) pOsitivity, Intellect mixed: Intellect, Negativity	Deception, Mating, Adversity
Evolutionary Domains Mini-Scale	(1) Affiliation (2) Social status mixed: Self-protection	Mate acquisition, Familial care, Relationship maintenance
Moral Foundations Mini-Scale	Liberty (from Oppression-Liberty)	Degradation-Sanctity Harm-Care, Cheating-Fairness, Betrayal-Loyalty, Subversion-Authority
Domains of Risk Mini-Scale	Financial decision, Recreational decision, Social decision	Health/security decision, Moral decision
Content Model		
14BiPole-Value Questionnaire (motivational types)	Stimulation, Hedonism, Achievement, Self-direction	(1) Universalism, Benevolence, Conformity/Tradition (2) Security, Power
Evaluation Rating		
Semantic Differential *Evaluation* Scale	--	--
Nature of Decisions		
Characteristics of Decision Situations Scale	(1) Significance, Magnitude (2) Clarity, Predictability, Duration, Difficulty mixed: Control	Control
Dimensions of Decisions Scale	satisfied (from Satisfaction), important (from Unimportant decision), long-term impact (from Short term impact), uncommon (from Uncommon decision), unchangeable (from Unchangeable decision)	(1) Unpopular decision, Incomplete information (2) Simple, easy decision

Note. The Decision Categorization Scales are listed in the same order as above. In general, "Aspects Presents" means that there were descriptively and on average rather high ratings in the respective category, whereas "Aspects not Present" means that these categories received low ratings. In case "Aspects (not) Present" were grouped into "(1)" and "(2)", the first aspects were more present than the second aspects. "Mixed" refers to aspects that were spread out over the whole response scale with a rather uniform distribution. In case of the bipolar scales (concerns the Moral Foundations Mini-Scale and the Dimensions of Decisions Scale), the poles were specified.

Content-Related Specific Results Regarding two Decisions From This Study

In order to once more evaluate the purpose of this study, namely to find scales that may categorize and distinguish decisions or decision situations, two specific *prima facie* seemingly quite different decisions were taken from the sample and compared. Table 9.58

presents the original wording in German and its English translation. Furthermore, you will find the responses of participants #191 and #385 on the *Domain Scales* (Figure 9.24), within the *Content Model* (Figure 9.26 on the next page) as well as on the 14BiPole-Value Questionnaire (Figure 9.25), on the items of the Semantic Differential *Evaluation* Scale (the *Evaluation Rating*, Figure 9.27 on the following page), and on the two scales concerned with the *Nature of Decisions* (Figure 9.28 on page 353).

Table 9.58 Two decision situations reported by participants.

CASE	German Original	English Translation
191	Auslandssemester machen, obwohl dort nicht studiert, sondern ein nicht studienrelevantes Praktikum absolviert werden würde -> ja oder nein?	Doing a semester abroad, although not studying there but doing an internship not relevant to my studies -> yes or no?
385	den krebs- und demenzkranken Großvater vor seinem Tod noch ein Mal besuchen oder ihn gesund im Gedächtnis behalten	Visit the grandfather ill with cancer and dementia one more time before his death or keep him in memory healthy



Figure 9.24 Responses for CASE #191 (green) and CASE #385 (red) on the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale (the *Domain Scales*).

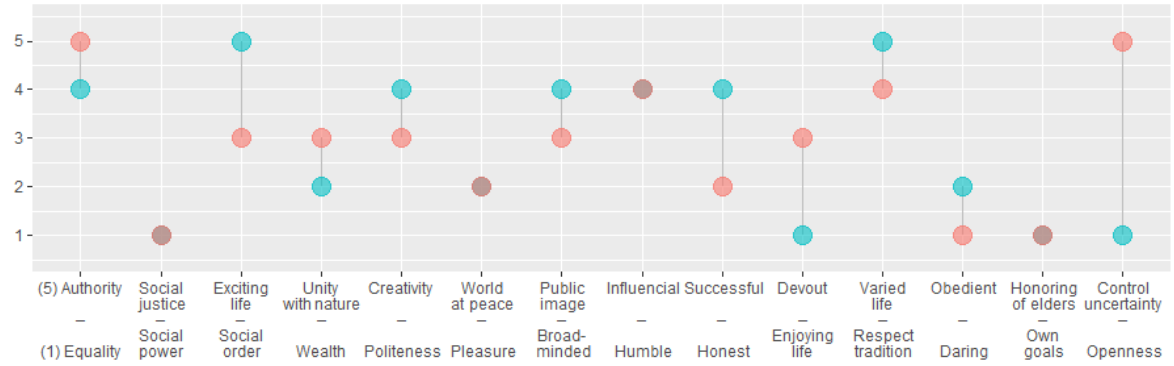


Figure 9.25 Responses for CASE #191 (green) and CASE #385 (red) on the 14BiPole-Value Questionnaire.

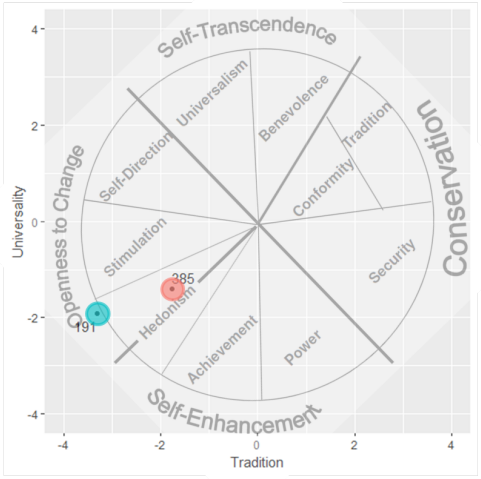


Figure 9.26 CASE #191 (green) and CASE #385 (red) within the Schwartz Value Circle (the *Content Model*).

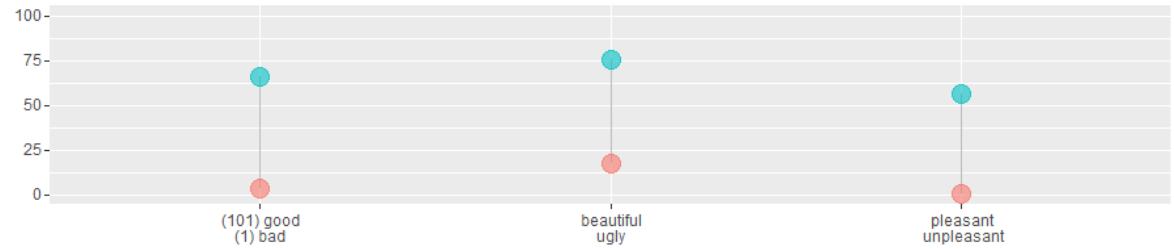


Figure 9.27 Responses for CASE #191 (green) and CASE #385 (red) on the three items of the Semantic Differential *Evaluation* Scale (the *Evaluation Rating*).

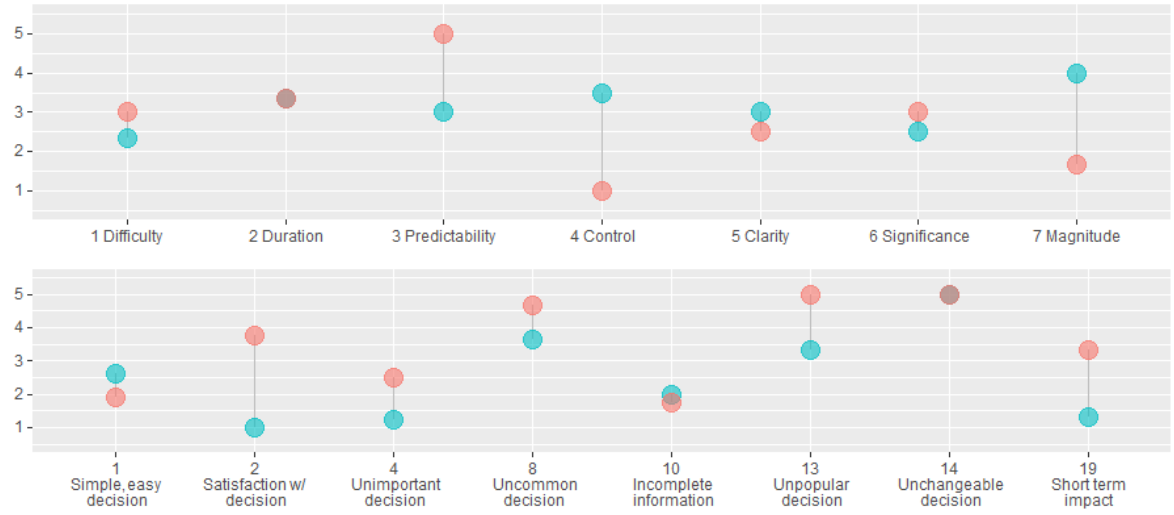


Figure 9.28 Responses for CASE #191 (green) and CASE #385 (red) on the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale (the *Nature of Decisions*).

I will not provide descriptions of these visualizations, because the details – apart from their general plausibility regarding the contents of the two reported decision situations – are not the important part. However, what is important is that all of the eight Decision Categorization Scales, inferred from visual inspection, were able to find differences between these two decision situations that indeed were very different in content.

A Conclusion It seems fair to conclude that the purpose of this study – finding and using questionnaires/scales that could categorize and distinguish decisions or decision situations – was rather successful. All of the eight Decision Categorization Scales may be used on decisions or decision situations.

Limitations will be discussed in the forth-following section.

9.3.3.3 Limitations and Future Research

Sample Characteristics – Participants and Decision Situations The final sample size of $N = 76$ participants (cf. section 9.3.1.3 on page 281) was, of course, gravely too small, especially for questionnaire validation. All validation results are, therefore, to be regarded as non-reliable and up for replication.[447]

The sample was completely made up of university students, and most of them were female. At least, they studied a range of subjects, and only a small minority were psychology students. Still, this convenience sample clearly includes a specific set of people. This became quite obvious when coding participants' reported decision situation which then were named "collegiate decision situations": the vast majority of their reported decisions were about studying matters. Both, the specificity of the sample and the limited

[447] The study included two questionnaire constructions that were subjected to factor analysis: the Semantic Differential Scale and the Characteristics of Decision Situations Scale. Furthermore, the reliability (internal consistency) of the 21 factors of the Dimensions of Decisions Scale was determined. Cf. section 9.3.3.3 on page 355 to this point.

scope of the reported decision situations, are a limitation to questionnaire validation, too. For example, as pointed to in footnote 438 on page 344, the recommendation for the Moral Foundations Mini-Scale to be dropped might not have come up based on a wider scope of decision situations. The same holds for the distinguishing capacity of any of the eight scales: only upon a larger array of different decision situations larger differences could have been registered. On the other hand, testing the eight scales on this limited array of *collegiate* decision situations and having them still find differences does speak in favor of their sensitivity.

A Closer Look on the Reported Decision Situations as Entry Variables The eight Decision Categorization Scales were tested on the individual decision situations that participants reported. This may seem unusual at first sight: why not give the same decision situation(s) to everyone?

Option (i), giving one decision situation to everyone, would have evaluated *that decision*, but not the questionnaires. In this case, in the ratings one should expect to receive many identical values or even a constant on certain items.

Option (ii), giving a preconceived set of decision situations to participants, thereby trying to somewhat control the scope of contents, would in some sense forestall the research interest of determining important dimensions of decisions – in that creating fictional input scenarios already requires to decide on which dimensions to vary. Furthermore, the Dimensions of Decisions Scale alone comprised over 80 items, a rating of which multiplied by several scenarios could not have been asked from unpaid participants.

(iii) A comparison to the measurement of personality has already been drawn (cf. section A on page 302 from 9.3.2.4). Here, the analogy might convince, too: If one wanted to test a personality questionnaire, of course one would have a sample of ordinary people rate their own personality by means of said questionnaire. The same thing was done here: a sample of ordinary people were asked to rate one of their own decision situations.

Conclusion Thus, the employed setup – having participants rate one of their own decisions, and only one decision – seems valid, or even unavoidable. Building on this limited scope of decision situations certainly is not ideal for scale construction – a point, though, that only pertains to the Characteristics of Decision Situations Scale and the Semantic Differential Scale (where the former was the much more important research endeavor). Strictly speaking, having constructed and validated (as good as possible) the Characteristics of Decision Situations Scale upon a sample of *collegiate* decision situations, it really is the Characteristics of *Collegiate* Decision Situations Scale. Analogously, one would not want to construct a general personality measure on a personality-wise limited sample like a student sample – and if one still did, the result would be a student personality measure. However, be reminded that the authors of the Dimensions of Decisions Scale in their study asked participants to recall and rate their decision to go to college, which is an even much more limited scope of decision situations.

In sum, looking at the sample of participants and decision situations: the more participants the better, and a limited scope of entry decision situations has advantages (sensitivity) as well as disadvantages (non-generality). Also remember that this study was a first exploratory attempt – with encouraging results, but still far from delivering a well-calibrated and well-validated questionnaire (cf. also the upcoming section on validation).

Validation Results Which procedure of questionnaire validation do we ideally expect? Well, we would expect two samples: careful questionnaire construction, piloting and pretesting on at least one sample, and validation of the final set of questionnaire items on *another* sample, plus this validation sample fulfilling desired characteristics (e.g. being diverse in education, profession, and age), and being large.[448] This is not what was done here. Instead, both steps were performed on one and the same sample, and this sample was very small. This is the first big limitation in validation quality.

The second limitation in validation quality is the impossibility to determine convergent and discriminant construct validity (cf. section B on page 303 from 9.3.2.4). Convergent construct validity is simply established by correlating the subscales of the to-be-validated measure with an established instrument that purports to measure the same construct. However, at the time there were no further questionnaires concerned with decision characteristics or decision dimensions besides the Dimensions of Decisions Scale by Franz and Kramer (2010). Their questionnaire's subscales, though, were hardly similar to the subscales from the newly constructed Characteristics of Decision Situations Scale to be validated (cf. Figure 9.42 on page 305 and the according section for a detailed comparison and discussion).[449]

However, by means of descriptive statistics all scales and their items were extensively scrutinized – the logic of which was described in section A on page 308 from 9.3.2.5. The conclusion of this validation was to drop the Moral Foundations Mini-Scale[450] and keep all of the other Decision Categorization Scales, with the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale to be revised and re-validated.

Consequences for Taxonomization and Scenario Construction One further limitation certainly is the lack of unification among the Decision Categorization Scales in two regards:

[448] These rather high demands on a conventional validation sample are not to be confused with the requirements for a norming sample that would provide norms by age and gender in order to calculate individual confidence intervals for individual testing. Here, we are only concerned with group means.

[449] Please refer to footnote 397 on page 304 from the above referenced section B on page 303 explaining that from the eight Decision Categorization Scales only the Characteristics of Decision Situations Scale was up for validation regarding construct validity.

[450] But cf. also footnote 438 on page 344 to that point.

(i) In terms of contents, there is no overarching taxonomy that could result from these eight scales. Each scale has its own focus, or, speaking metaphorically, is "round" in itself.

For example, do the Domains of Risk (*Financial decision*, *Health/sec. decision*, *Recreational decision*, *Moral decision*, *Social decision*) lack a dimension? Would they profit from adding a dimension from one of the other scales, e.g. *Intellect* from the Situational Eight DIAMONDS to become *Intellectual decision*?[451] This example is difficult to decide intuitively, and thus a decision should either be based on theoretical grounds (i.e., the theoretical origins of the Domains of Risk) or on empirical grounds by, for example, looking at frequencies when rating a diverse pool of decisions.

At any rate, each of the scales (maybe apart from the Semantic Differential *Evaluation* Scale) comes with its own claim to full coverage of a certain content domain. For example, the well-founded Situational Eight DIAMONDS purport to be a sufficient taxonomy of situations (*Duty*, *Intellect*, *Adversity*, *Mating*, *pOsitivity*, *Negativity*, *Deception*, and *Sociality*). What about recreation, health, and finances (from the Domains of Risk)? They would probably go to pOsitivity, Adversity, and, well, "finances" could go to Intellect (buying a stock), Adversity (too little money to afford food), pOsitivity (go on a long dreamt-of holiday), or Deception (a friend denying he borrowed your money). Thus, specific situations that might go to one category within the Domains of Risk might just as well be subsumed under another category within the Situational Eight DIAMONDS. And this is not even a mistake: both categorizations are likely "justified", they just latch onto different aspects of the specific situation or use a differing level of explanation or abstraction. Category determines perspective. A specific decision as rated by one scale might not be recognizably the same decision when rated by another scale.

Is it even desirable to reach one overarching taxonomy based on the eight Decision Categorization Scales? What would it be a taxonomy of? Well, we were looking to characterize decision situations as a special subgroup of situations simpliciter. Only the newly developed Characteristics of Decision Situations Scale (*Difficulty*, *Duration*, *Predictability*, *Control*, *Clarity*, *Significance*, and *Magnitude*, cf. also the verbalization within section A.f on page 297 from 9.3.2.3) and the Dimensions of Decisions Scale (for its 21 dimensions, cf. e.g. Table 9.42 on page 305 from 9.3.2.4) are sufficiently specific to *decision* situations.

At the same time, they are presumably too specific regarding situations in general: say, the target situation is "your mother being over to visit" – could this situation simpliciter be evaluated on these two scales? To answer this question please take a look at the above referenced Table 9.42 on page 305 from 9.3.2.4 and use the subscales in an abstract and reformulated version not referring to "decision". – I think, the result is that

[451] I certainly can think of an "intellectual decision": after all, deciding to add this footnote rather than not is exactly that, an intellectual decision, and it is not concerned with finances, health/security, recreation, morality or sociality. Of course, the question arises, what is the "size" of a decision in the context of the Domains of Risk? Is maybe the decision to add a footnote to small to range with the other five dimensions? Do intellectual decisions tend to be "small"? Or are intellectual decisions not risky, thus not legitimately part of a taxonomy of risk?

all of the subscales of the Characteristics of Decision Situations Scale can reasonably be used,[452] and most of the subscales of the Dimensions of Decisions Scale.[453]

On the other hand, what about those of the Decision Categorization Scales that are too unspecific (namely the *Domain Scales*, the *Content Model*, and the *Evaluation Rating*)? Is all information we gain from using them irrelevant to *decision* situations? Is it uninteresting whether a decision situation is more about *Duty* or *Intellect* (Situational Eight DIAMONDS), more about *Social status* or *Familial care* (Evolutionary Domains), more about *Loyalty/Betrayal* or *Liberty/Oppression* (Moral Foundations), more about finances or health (Domains of Risk), more about *Hedonism* or *Achievement* (14BiPole-Value Questionnaire/Schwartz Value Circle), more positive or negative (Evaluation)? – I think, this is not uninteresting. Each scale's perspective adds information and description.

Take CASE #385, the person asking themselves whether to visit their fatally ill grandfather one last time or preserve a healthy memory, and look at the ratings from section 9.3.3.2 on page 350. From the ratings on the Characteristics of Decisions Scale we know e.g. that the decision was medium difficult, possible consequences were well-known, and uncontrollable factors did not play much of a role at all. From the Dimensions of Decisions Scale we get e.g. that the decision was rather uncommon, unpopular and unchangeable. – And this is all rather technical. But adding the information from the other scales, we understand that the situation was much about Negativity and Sociality and little about Intellect, it was much about both Self-protection and Familial care, and little about Social status, it was much about Loyalty and Liberty and little about Sanctity/Degradation, it was very much a Moral decision and not at all about finances, health or recreation. How is that not interesting? Do we not understand more about this decision situation than looking only at the two scales focusing on decision situations specifically? I think, we do.

Therefore: no, there is no overarching taxonomy that could result from the eight Decision Categorization Scales and neither is this desirable. And it is not desirable, because it would melt all these fantastic, differing bubbles of information into just one uniform level of explanation, level of abstraction or realm of perspective. The loss of information and variability would be greater than the gain in uniformity.

(ii) The second lack in unification is of technical nature: the response scales of the eight Decision Categorization Scales are too different from each other. While a difference in the number of scale points (e.g. 7-point Likert scale versus 5-point Likert scale) could be easily remedied, unipolarity versus bipolarity is based on a different construction principle: half of the eight scales were bipolar scales and half of the scales were Likert scales. Cf. Table 9.59 for an overview.

[452] Yes, the motherly visit was difficult, took a long time and its consequences were unknown!

[453] The motherly visit was easy, I was satisfied, its success did not depend on knowledge, and the visit mattered a lot to me!

Table 9.59 Response scales and introductory sentences of the eight Decision Categorization Scales.

Name of Scale	Response Scale	Introductory Sentence
Domain Scales		
Situational Eight DIAMONDS Scale S8-II	7-point Likert scale, end points labeled *überhaupt nicht* [not at all] (1) and *absolut* [absolutely] (7).	To what extent do the following properties apply to the depicted scenario? The situation contains...
Evolutionary Domains Mini-Scale	5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5).	The following areas of social life were relevant in the situation described:
Moral Foundations Mini-Scale	5-point bipolar scale, end points labeled according to item content, values ranging from 1 ("negative pole") to 5 ("positive pole"), no values displayed to participants.	The situation was about:
Domains of Risk Mini-Scale	5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5).	The decision was of the following nature:
Content Model		
14BiPole-Value Questionnaire	Bipolar 5-point scale positioned in between each pair of individual values, end points labeled according to item content, item values ranging from 1 (left pole) to 5 (right pole), no numbers/item values displayed to participants.	Which values were present in the situation? In the following, 14 values each are juxtaposed. The pairs often do not really form opposites, sometimes they are rather to be understood in a figurative sense. Please choose one number per line in the direction of the value that was more present in the situation, or played a greater role.
Evaluation Rating		
Semantic Differential *Evaluation* Scale	Bipolar visual analogue scale (VAS), end points labeled according to item content, values ranging from 1 ("negative pole") to 101 ("positive pole"), no values displayed to participants, mid-point marked and labeled *neutral* [neutral].	How do you assess the situation described? Please position the sliders according to your spontaneous impression.
Nature of Decisions		
Characteristics of Decision Situations Scale	5-point Likert scale, end points labeled *trifft gar nicht zu* [does not apply at all] (1) and *trifft absolut zu* [does absolutely apply] (5), mid-point labeled *teils/teils bzw. weder/noch* [in part or neither/nor].	How much do the following characteristics apply to the situation described?
Dimensions of Decisions Scale	5-point bipolar scale, end points labeled according to item content, values ranging from 1 to 5, no values displayed to participants.	How much do the following characteristics apply to the situation described?

Note. All bipolar scales are displayed on grey background.

For all established scales, their original response scale was adopted. Two of the four bipolar scales fall into this category: the 14BiPole-Value Questionnaire and the Dimensions of Decisions Scale. A semantic differential scale, too, is classically a bipolar scale. And last, the Moral Foundations Mini-Scale, while adapted to be a "mini-scale" was based on the original scale that was bipolar, too. Furthermore, the established Situational Eight DIAMONDS Scale S8-II came with a 7-point Likert scale. The remaining three scales where I was free to choose a response scale were rated on a 5-point Likert scale, of which only one scale (the Characteristics of Decision Situations Scale) also had its mid-point labeled.

In sum, this is quite a potpourri of response scales. Some response scales were unavoidable, e.g. the bipolar scale of the 14BiPole-Value Questionnaire, where the analysis that calculates the two dimensions of the Schwartz Value Circle from this questionnaire is adapted to this format. On the other hand, not all of the scales could have been transformed to a bipolar format, due to a lack of content for the second pole. For example, regarding the Domains of Risk Mini-Scale: what would have been the opposing pole to *Financial decision*? It could only have been its negation, "non-financial decision", which would not have resulted in a reasonable bipolar scale. The same holds for the Evolutionary Domains Mini-Scale and the Situational Eight DIAMONDS Scale S8-II (which, additionally, is established to be rated on a Likert scale). The Characteristics of Decision Situations Scale could maybe have been constructed to be measured on a bipolar scale, similar to the Dimensions of Decisions Scale. However, in contrast, my questionnaire construction intuition tells me that rather the Dimensions of Decisions Scale should be transformed to have a unipolar response scale. This criticism was mentioned within the last paragraph *Recommendations* in D.h on page 331 for the Dimensions of Decisions Scale from within 9.3.2.5.

In conclusion, it is impossible or at least undesirable to have the same type of response scale for each of the eight Decision Categorization Scales. Thus, unification in this respect cannot be achieved.

Interim Summary There are two regards in which there is a lack in unification among the Decision Categorization Scales: First, each of them is its own "universe", its own taxonomy of situations or decision situations, and they cannot be combined to one big taxonomy – nor would this be desirable. Second, they include a potpourri of response scales, which, too, cannot be unified, because some scales require a bipolar and others a unipolar response scale.

Conclusion on Taxonomization Taxonomization is the idea that within a certain "universe" the object entities (e.g. personalities, situations) can be classified or at least rated on a set of dimensions that is both necessary and sufficient to cover that universe – and thus necessary and sufficient to describe the object entity (within the perspective of that universe).

The Big Five (e.g. McCrae & Costa, 1987, 2008) are such a taxonomy for personality. Still, personality can be looked at from the point of view of other universes, for example the Dark Triad (Paulhus & Williams, 2002), or any clinical measure of personality (disorders) based on the DSM (American Psychiatric Association, 2013), e.g.

the SCID-5-PD (First, Williams, Benjamin, & Spitzer, 2016). The same holds for this potpourri of scales: the established Situational Eight DIAMONDS Scale S8-II claims to provide a taxonomy of situations. But this is just one "universe". Each of the Decision Categorization Scales comes with its own theory and makes up its own universe. Take, for example, another very theory-based scale, the 14BiPole-Value Questionnaire: would it be desirable or even possible to merge it with the Situational Eight DIAMONDS Scale S8-II? I think not. The 14BiPole-Value Questionnaire covers another universe than the Situational Eight DIAMONDS Scale S8-II – and still both can justifiably declare to be a taxonomy of situations.

In conclusion, if one wanted to settle on a taxonomy of decision situations or dimensions to define decisions or decision situations, one could simply go with both the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale – which, too, should not be merged. But both of them should be revised and re-validated as described in the last paragraph *Recommendations* in D.g on page 329 for the Characteristics of Decision Situations Scale and in D.h on page 331 for the Dimensions of Decisions Scale, both within 9.3.2.5.

However, as shown in the present elaborations (cf. 9.3.3.2 on page 350) referencing the decision situation reported by CASE #385, the other scales are able to add interesting information to the above two scales specifically concerned with decisions. Therefore, the totality of the eight Decision Categorization Scales should be viewed as a multi-taxonomy: that is, each scale (apart from the Semantic Differential *Evaluation* Scale) is its own taxonomy – or, termed differently, depicts the dimensions of its specific universe. Which one of these scales or combination of them could be useful to rate decision situations depends on the interest of the researcher (as already pointed out in section 9.3.3.2 on page 345).

Consequences for Scenario Construction If there was a unifying taxonomy (or one just chose one of the Decision Categorization Scales) one might want to use it for scenario construction. Scenario construction already was extensively discussed in section 8.5.2 on page 210 from 8.5. The idea behind basing scenario construction on a taxonomy is that thereby (all) important dimensions can be both covered and varied. Research that necessarily is based on (fictional) scenarios (as explicated in the above referenced section) always may face accusations that its results are too much dependent on the *specifics* of the scenarios used.[454] Therefore, being able to say (a) that the set of scenarios used is predicated on an established taxonomy and (b) that the single scenarios as rated on this taxonomy's dimensions follow a describable and controlled-for pattern (as determined through pretesting) – would clearly refute such accusations since a set of scenarios resting on an established taxonomy would (ideally) cover the universe covered by said taxonomy. Thereby, the contents of the input scenarios would be well-balanced with respect to the according universe. Let's say we use the Situational Eight DIAMONDS as taxonomy: Scenarios could be constructed such that a target

[454] Of course, this accusation is part of a much more general problem of psychological experimenting and the operationalization of independent variables: results may always be too much dependent on the specifics of an experiment. This is why replication is so important.

dimension, e.g. *Duty* or *Intellect*, receives a high rating and all of the other dimensions receive a low rating. Having covered all relevant content of a universe, the research results resting on such a set of scenarios could truly claim to be generalizable – within the extent of that universe, at least.[455]

As suggested above, the Decision Categorization Scales are rather to be thought of as a multi-taxonomy, each scale is its own universe and they cannot be combined to a unified taxonomy. For this reason alone it should be difficult to construct a set of scenarios that incorporates all of their contents. Furthermore, the combined amount of dimensions would likely be impossible to integrate. And last, the resulting number of scenarios would be quite huge.

Thus, if one wanted to base one's scenarios on a taxonomy one would simply have to choose among the Decision Categorization Scales.

Summary of Limitations The sample of participants as well as their reported decision situations were rather specific (students reporting collegiate decisions), which has advantages as well as disadvantages. The sample was too small. The general setup of having participants rate one of their own decision situations is unavoidable and appropriate. Cf. section 9.3.3.3 on page 354.

Questionnaire validation according to construct validity was not possible, but an an extensive scrutiny by means of descriptive statistics partially amended this lack. Construction and validation was performed on the same sample, which is a methodologically unfavorable procedure. Cf. section 9.3.3.3 on page 355.

The eight Decision Categorization Scales lack uniformity as regards content as well as format, cf. section 9.3.3.3 on page 359. They should be though of as a multi-taxonomy, cf. section 9.3.3.3 on page 359. Scenario construction based on a taxonomy is advantageous, but must choose only one of the Decision Categorization Scales, cf. section 9.3.3.3 on the previous page.

Future Research While the setup of having participants rate one of their own decision situations is appropriate, a more diverse and much larger sample of participants should be sought. The Characteristics of Decision Situations Scale should be revised by creating new items for the found seven dimensions. The Dimensions of Decisions Scale should be revised by creating more stringent and unipolar items for its 21 dimensions. Calculating construct as well as criterion validity should be made possible by adding according established questionnaires/variables to the validation study. Questionnaire construction and validation should be performed on two different samples. The Decision Categorization Scales not forming one taxonomy is unproblematic, but requires the researcher to choose.

[455] This presentation makes it seem rather easy to construct scenarios along the lines of a taxonomy. For an emphasis on the difficulties of such an endeavor, cf. section 8.5.2 on page 210 from 8.5, as referenced above.

9.3.3.4 Conclusion

The eight Decision Categorization Scales were scrutinized in every way possible, and limitations were discussed. The main result is that overall they are able to identify interesting differences in decision situations, even if not designed specifically for decision situations, and that they cannot be reduced to just one taxonomy. While especially the long scales derived by factor analysis are deserving of revision, the improvement of the scales is just the first step: the possibility to reliably distinguish characteristics of decision situations can give rise to a multiplicity of further research questions.

10 Reasons vs. Principles

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This chapter *Reasons vs. Principles* (chap. 10) ties in with and builds on both previous chapters, *Pilot Study* (chap. 8) and *Questionnaires* (chap. 9), in order to further examine the question which of two deliberational decision strategies – particularistic (reason-based) or principled (rule-based) decision making – leads to greater satisfaction. All experimental studies presented here have in common that *Decision Strategy* is the independent variable, that is: participants are randomly allocated to the decision strategies and are forced to decide according to these strategies – a setup which was tested and approved within the Pilot Study. Furthermore, each of the upcoming scenario-based experiments (the Trolley Experiment and the MADM Experiment) will

be realized within a certain well-established paradigm – a conclusion drawn from both the Pilot Study as well as the Decision Categorization Scales (DCSs) regarding the pervasive influence of scenario content and the impossibility to control for it. The third study within this chapter is a Field Experiment in which participants reported decisions they came across within their everyday lives and were instructed to make those decisions based on one of three decision strategies.

In sum, this chapter is designed to reach a conclusion regarding the effects of 'deciding by reasons' versus 'deciding by principle' on satisfaction.

The Trolley Experiment: 10.1 on the following page

The MADM Experiment: 10.2 on page 407

The Field Experiment: 10.3 on page 439

10.1 Reasons vs. Principles in the Trolley Paradigm

In moral psychology it is common to distinguish between consequentialism and deontology when it comes to moral choices (e.g. Cushman, 2013). However, there is another, more basic distinction: principled (rule-based) versus particularistic (reason-based) reasoning and decision making (cf. e.g. Dancy, 2013). While in the former case, one would decide according to a general rule, in the latter case one would look at the reasons present in the particular situation, see what speaks in favor or disfavor of each option and decide accordingly. These are two ways of reflectively arriving at a decision, thus they are both deliberational decision strategies.

The Trolley Problem thought experiment (Foot, 1967; Thomson, 1976) has fostered the dichotomy of consequentialism and deontology. Greene (e.g. Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001) famously assimilates this dichotomy with a distinction between a quick, affect-based and a slow and rational cognitive system, the former being associated with deontological and the latter with consequentialist decision making. Now, how does this distinction fare against the distinction between principled and particularistic decision making? The conceptual differences are these: (i) both consequentialism and deontology are principled theories, while only particularism is something else and (ii) both principled and particularistic decision making is deliberate, while deontological decision making is thought of as quick, emotional and intuitive (cf. e.g. Greene et al., 2008, 2001).

While there is abundant empirical literature on the consequentialism/deontology distinction, to my knowledge there was none on the principled/particularistic distinction at the time of the conception of this study (2016). There was some literature on rule-based and reason-based deciding (cf. e.g. the reviews by Crossley & Highhouse, 2005; Hsee et al., 2008), but it takes a different angle. In a more recent article Cornelissen, Bashshur, Rode, and Le Menestrel (2013) equate a deontological perspective with a rule-based mind-set and a consequentialist perspective with an outcome-based one. While in the former case this mind-set might be a similarity between deontological and principled deciding, particularistic (i.e. reason-based) deciding is very different to an exclusive focus on outcomes: all facts can be reasons (including moral facts as a realist in meta-ethics, cf. e.g. Dancy, 2013).

This study's aim was to determine whether the two distinctions between decision strategies – consequentialist/deontological and particularistic/principled – are not only analytically, but also psychologically distinct.

In order to investigate this question, the above decision strategies were combined with a trolley dilemma manipulation based on the material of Waldmann and Dieterich (2007).

There is a classic pair of trolley dilemmas dating back to Foot (1967) and Thomson (1976). In the first scenario, a runaway trolley is on its way to kill five people on its track. An informed bystander can use a lever to divert the trolley to a side track where it will kill one person instead. The second scenario requires the bystander to push a fat man

from a footbridge onto the tracks in order to stop the trolley and save the five.[456] Trolley scenarios are used to distinguish a consequentialist from a deontological preference in moral decision making: sacrificing the few for the many is a consequentialist/utilitarian choice, refusing to kill an innocent person to save five, to use a person as a means, or to weigh lives against each other counts as a deontological choice. The first scenario ("the Switch") usually evokes a consequentialist choice and the second ("the Footbridge") a deontological one.

Of course, there are plenty of differences between the Switch and the Footbridge, e.g. physical contact, which have – among other factors – been discussed extensively in both disciplines, philosophy as well as psychology, over the past few decades.[457] The most important difference between the two classic scenarios, however, is a structural difference where in the first case the death of the one person is a negative side effect of saving the five, whereas in the second case the so-called "fat man" indeed serves as a means to the end of stopping the trolley to save the five.[458]

The research of Waldmann and Dieterich (2007) is extremely valuable, because they manage to show that the difference in intuition between "the Switch" and "the Footbridge" – the difference of whether the scenario triggers consequentialist or deontological thinking – may well be traced to the underlying causal pathway of the bystander's intervention, the *locus of intervention* – rather than the distinction between side effect and means. In short, according to the authors, it makes a difference who gets moved: the threat or the unwitting savior.[459] This could be shown in a so-called loop case.[460]

The present experiment made use of the reliable evocation of consequentialist versus deontological intuitions by Switch versus Footbridge type scenarios to be able to contrast this distinction with the distinction between principled versus particularistic decision making. The materials of Waldmann and Dieterich (2007) (Experiment 1) were

[456] The original scenarios can be found in the Appendix, cf. section D.1.1.1 on page 637.

[457] In fact, the body of literature is vast: Entering *"trolley problem" OR "trolley dilemma"*, Google Scholar produced 11.000 hits, APA PsycInfo set to "all fields" found 723 articles between 1992 and 2023, and the search engine Semantic Scholar referenced 660 results within 70 years with a peak of 77 publications in the year 2020 (searches performed in Mai 2023). The immensity of the trolley literature and according research despite its limitations led to the mock name "Trolleyology", (cf. e.g. Lillehammer, 2014, 2023; Osorio & Palchik, 2022). Cf. e.g. Fried (2012) for a critique of its extensive use in philosophy.

[458] This structural difference has been captured, named and explained in various and partially co-extensive ways, the distinction between side effect and means being one of them. Furthermore, consider *The Doctrine of Double Effect* credited to Thomas Aquinas, distinguishing between foreseen and intended harm (c.f. e.g. McIntyre, 2019), the distinction between doing vs. allowing harm (cf. e.g. Woollard & Howard-Snyder, 2022), or between killing and letting die (refer to the classic here: Thomson, 1976).

[459] Following the terminology in force-dynamics theory, moving the threat is called "agent intervention" and moving the savior is called "patient intervention".

[460] Cf. Figure D.1 on page 637 from section D.1.1.2 within the Appendix for a depiction. So-called "loop cases" are scenarios within Trolleyology that avoid the side effect/means difference in that the uninvolved second party (the savior) is strictly used as a means due to a setup where the side track loops back to the main track such that hitting the second party is *necessary* to save the first party: hitting the second party here therefore is not merely a side effect, but a means to an end.

used and the terminology of agent versus patient intervention was maintained.[461] In this otherwise classic trolley experiment participants were additionally either instructed to decide by principle, by the weighing of reasons (= particularistically) or were given no instructions (intuitive/control).

10.1.1 Method

10.1.1.1 Design and Hypotheses

The experiment was a 2 (*Scenario Type*:[462] "agent intervention" vs. "patient intervention") * 3 (*Decision Strategy*: "by principle" vs. "by reasons" vs. "by intuition"/control) factorial design (between) with 5 scenario contents (within). After the classic *Trolley question* ("Should [the agent] [act]?", DV1) participants were asked to rate their *Decision satisfaction* (DV2).

Furthermore, as part of the decision strategy manipulation participants were required to enter principles or reasons for *and* against both options in free text fields. These free text entries were coded regarding consequentialist versus deontological content, cf. section B on page 372 and Hypothesis H1.3 below.

The following hypotheses were derived:

The first hypothesis on DV1 relies on the idea that on the one hand when having to decide by principle, the agent scenario[463] will inspire the utilitarian maximizing principle, while the patient scenario will inspire deontological principles such as not using people as means (thus opposites). On the other hand, when having to decide by reasons, the process of carefully gathering and weighing reasons pro and contra will produce about the same reasons in both scenario types. Therefore, deciding by principle will lead to a more extreme perspective, while deciding by reasons will reach a more global viewpoint:

(H1.1) On DV1, the difference between agent/patient will be greater when deciding "by principle" than "by reasons".

The idea underlying the second hypothesis on DV2 is the fact that in both conditions, "decide by reasons" and "decide by principle", deliberation is involved. Since the decision to be made – how many people to kill or let die – is a potentially guilt-inspiring one, the guided deliberation and instructed decision making according to said deliberation will likely have a relieving and justifying effect.

(H1.2) On DV2, ratings will be higher in the groups "by reasons" and "by principle" as compared to "by intuition"/control.

[461] Note that the scenarios used were not loop cases. However, eliminating the side effect/means difference from the pairs of scenarios was not necessary, since the evocation of consequentialist versus deontological thinking was wanted and its origin was not of interest.

[462] This factor could alternatively be termed *Intervention Type*.

[463] In terms of capitalization: "agent scenario" and "patient scenario" as well as "agent intervention" and "patient intervention" will be treated as a common nouns, and therefore these terms will not be capitalized, unless in title case.

Last, participant's text entries were coded according to consequentialist versus deontological content. On the one hand each scenario type has a certain "pull" towards either consequentialist or deontological decision making; i.e., the agent scenario type (the standard type) rather entices consequentialist thinking, whereas the patient scenario type rather entices deontological thinking (cf. e.g. Waldmann & Dieterich, 2007). On the other hand, principled decision making is rather associated with deontology, whereas particularistic decision making, the weighing of reasons, might be associated with consequentialism. However, while it is relatively easy to argue theoretically that both possible identifications do not hold, I want to show that empirically, too, this is not the case:

(H1.3) Both strategies, principled as well as particularistic decision making, can easily be used (i) in both scenario types (agent/patient) and (ii) with consequentialist or deontological content.

Reverse hypotheses: Based on the assumption that the scenarios have a specific pull towards either consequentialist thinking (agent) or deontological thinking (patient) there should be additive effects if deciding "by reasons" and "by principle" were exemplifications of exactly those ways of thinking (which I argue against). The following would thus disprove my claim:

(H1.4) In the agent intervention scenario (= pull towards consequentialism) answers on DV1 should be even more consequentialist in the group "by reasons" than "by intuition"/control (additive), but less consequentialist in the group "by principle" than "by intuition"/control (subtractive).

(H1.5) In the patient intervention scenario (= pull towards deontology) answers on DV1 should be even more deontological in the group "by principle" than "by intuition"/control (additive), but less deontological in the group "by reasons" than "by intuition"/control (subtractive).

10.1.1.2 Procedure

The study was conducted online, the link was circulated via newsletter. After the welcome page, participants were asked to answer four demographic questions (*Age*, *Gender*, *Occupation*, and *Field of study*, cf. Table 7.3 on page 166), as well as the item *Device* (cf. Table 7.2 on page 165, both from section 7.2.1).[464] Thereafter they were presented with the five scenarios, where each participant either received the agent or the patient version of the scenarios (factor 1). On the page following each scenario the decision strategy manipulation either did not specify any decision process (control group) or led participants to either decide by principle or by reasons (factor 2). On the same page of the decision strategy manipulation participants were required to rate the two dependent

[464] Behind the scenes participants were then randomly assigned to 24 experimental groups of a factorial design, made up of factor 1 with two levels (*Scenario Type*: "agent" vs. "patient"), factor 2 with three levels (*Decision Strategy*: "by principle" vs. "by reasons" vs. "by intuition"/control), and a factor controlling for scenario order effects with four levels (order of presentation of the five scenarios as derived by a *Latin rectangle*).

variables. On the last page of the questionnaire, participants were asked to answer the items *Diligence*, *Comments*, and *Lottery* (cf. Table 7.2 on page 165 as above), as well as whether they had an idea what the study was about and how many studies with a similar topic they already had participated in.

10.1.1.3 Materials

A Trolley Scenarios (IV) The scenarios were part of the original experimental material from Waldmann and Dieterich (2007).[465] There were five trolley scenario contents, featuring a bus on train tracks (classic trolley), a spreading virus infection, a rogue torpedo, a bomb in a restaurant, and a shooting rampage at a university. Each content was laid out as a so-called "agent" version as well as a "patient" version. The agent intervention moves the threat. That is – e.g. in the classic trolley case – the runaway train (the "agent") is moved to another track where it harms the few as side effect victims, but spares the many. The patient intervention, on the other hand, moves these alternative victims into harms way. That is, the trolley with the few (the "patient") is moved into the path of the runaway trolley, thus again sparing the many – by using the few as a means.[466] Cf. Table 10.1 on the following page for both versions of the Bus Scenario[467] as an example. All scenarios can be found in the Appendix (cf. Table I.1 on page 691 from section I.1).

[465] I kindly received the original scenarios through personal communication, since Waldmann and Dieterich (2007) only report abbreviated versions.

[466] Cf. footnote 461 on page 369 as to why the side effect/means difference between scenarios is not a problem here.

[467] In terms of capitalization: The names of the specific scenarios will be treated as proper nouns, therefore capitalized.

Table 10.1 Agent and patient version of the Bus Scenario (German and English translation).

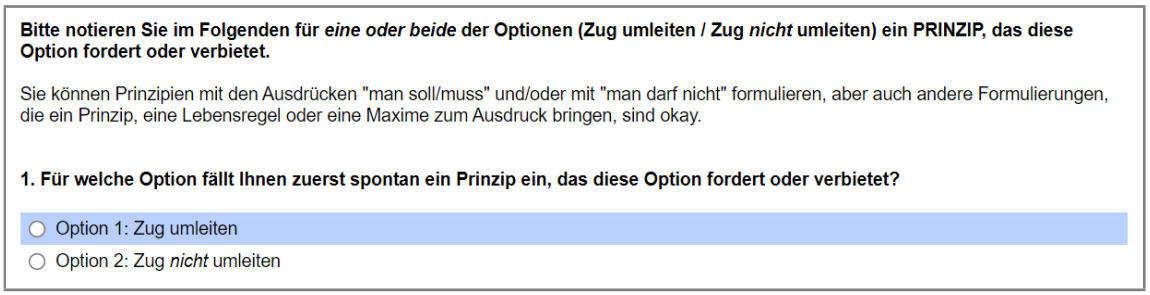
Scenario Content	Scenario Type: Agent	Scenario Type: Patient
Bus	Ein Kleinbus mit zehn Insassen steht aufgrund eines Motorschadens auf einem Zuggleis. Ein Zug fährt mit hoher Geschwindigkeit heran, so dass für die Businsassen keine Möglichkeit besteht, rechtzeitig auszusteigen. Ein Gleiswärter sieht die Situation. Er könnte den Zug durch Verstellen eines Gleises so umleiten, dass der Zug auf eine andere Kreuzung zufährt, wo er einen Bus mit zwei Insassen erfassen würde. In beiden Fällen würden die Businsassen schwer verletzt werden.	Ein Kleinbus mit zehn Insassen steht aufgrund eines Motorschadens auf einem Zuggleis. Ein Zug fährt mit hoher Geschwindigkeit heran, so dass für die Businsassen keine Möglichkeit besteht, rechtzeitig auszusteigen. Ein Gleiswärter sieht die Situation. Er befindet sich auf dem Weg zur Arbeit und steht mit seinem Lastwagen in der Autoschlange hinter dem Fahrzeug auf den Gleisen. Er könnte durch Anschieben der vor ihm stehenden Fahrzeuge den Bus von der Kreuzung schieben. Dies würde aber dazu führen, dass er einen anderen Bus mit zwei Insassen auf die Kreuzung schieben würde, der dann vom Zug erfasst würde. In beiden Fällen würden die Businsassen schwer verletzt werden.
English Translation	A minibus with ten occupants is parked on a train track due to engine failure. A train is approaching at high speed, so that there is no possibility for the bus occupants to get out in time. A track attendant sees the situation. He could reroute the train by adjusting a track so that the train approaches another crossing where it would hit a bus with two occupants. In both cases, the bus occupants would be seriously injured.	A minibus with ten occupants is parked on a train track due to engine failure. A train is approaching at high speed, so that there is no possibility for the bus occupants to get out in time. A track attendant sees the situation. He is on his way to work and with his truck is standing in the queue of cars behind the vehicle on the tracks. He could push the bus off the crossing by pushing the vehicles in front of him. However, this would cause him to push another bus with two occupants into the intersection, which would then be hit by the train. In both cases, the bus occupants would be seriously injured.

B Decision Strategy Manipulation (IV) Three decision strategies were manipulated: "by principle", "by reasons", and "by intuition"/control (= without any instructions).[468] The manipulation of the decision strategies "by principle" and "by reasons" involved some writing on the part of participants in order to ensure that they did decide

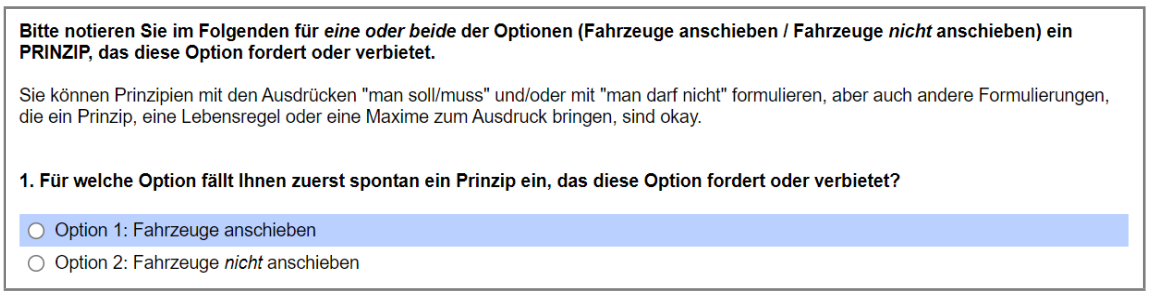
[468] Note that the condition "by intuition"/control was foremost conceptualized as a control group by not entailing any instructions on how to decide. However, not receiving any instructions may just as well be conceptualized as representing the strategy "decide by intuition" – which is why this group is denoted "by intuition"/control. The term "intuition" here is used naively (i.e., not tied to any elaborate conceptualization of "intuition") just as it is used in many psychological studies where participants are asked to answer spontaneously or intuitively as opposed to employing deliberation. In this study, there is no specific research interest tied to a more elaborate sense of intuitive decision making – the addition "(decide) by intuition" simply stresses the fact that (i) in the control group deliberation was unrequested and (ii) that not involving deliberation may also be a decision strategy.

along the specified decision strategy. The decision strategy manipulation (sections B.a, B.b on the next page, and B.c on page 376) and the two dependent measures (cf. section C on page 376) were displayed on the same page of the online questionnaire.

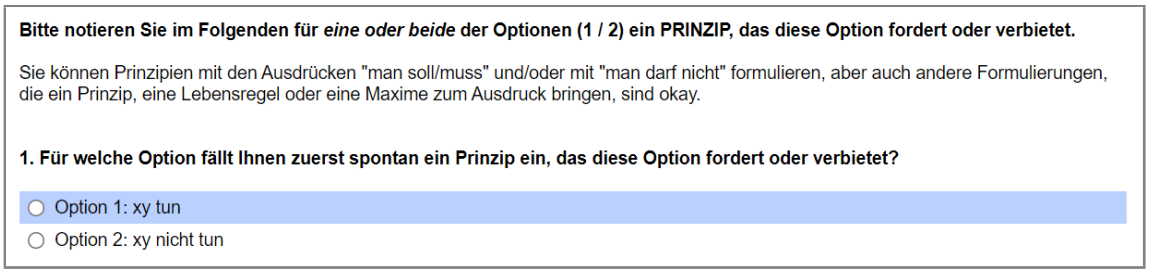
B.a Decide by Principle The experimental manipulation of the decision strategy "decide by principle" is displayed in Figures 10.1 and 10.2 on the next page. Figure 10.1 illustrates that instructions were closely adjusted to scenario content and thus varied semantically (but not formally) between agent and patient versions.



(a) Agent Intervention Version, Bus Scenario.



(b) Patient Intervention Version, Bus Scenario.



(c) Formal Version.

Figure 10.1 Decision strategy manipulation "decide by principle" within the Trolley paradigm I.
Note. The translation of the formal version [c] can be found in the main text. The formal version was not part of the experiment. As regards the two experimental versions for the Bus Scenario, the two options read: "divert train", "*not* divert train" (agent intervention version [a]) and "push vehicles", "*not* push vehicles" (patient intervention version [b]). The options displayed to participants were always adjusted to scenario content.

The instructions read (Figure 10.1, (c) Formal Version):[469]

[469] The so-called *Formal Version* was not part of the experiment. It is displayed here to elucidate the underlying structure of the two experimental versions.

> Please note below for *one or both* of the options (1 / 2) a PRINCIPLE that requires or prohibits this option.
>
> You can formulate principles with the expressions "one should/must" and/or with "one must not", but other formulations expressing a principle, a rule of life or a maxim are also okay.
>
> For which option do you first spontaneously think of a principle that requires or prohibits this option?
>
> Option 1: do xy
>
> Option 2: *not* do xy

Next, participants were instructed to note the principle that came to them first. Thereafter, they were asked to also note an opposing principle in case that they had thought of one. Cf. Figure 10.2.

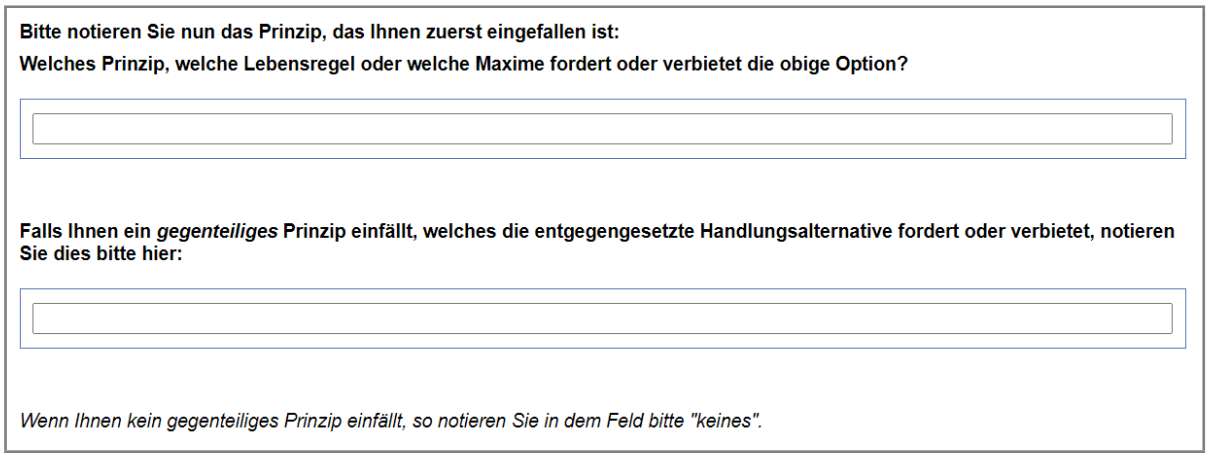


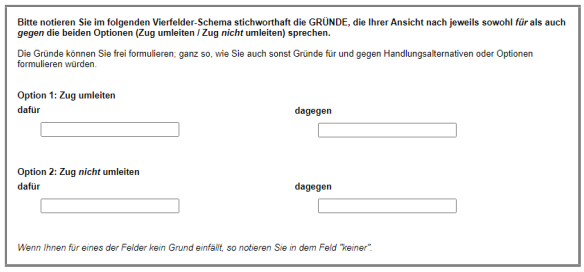
Figure 10.2 Decision strategy manipulation "decide by principle" within the Trolley paradigm II.

The instructions read:

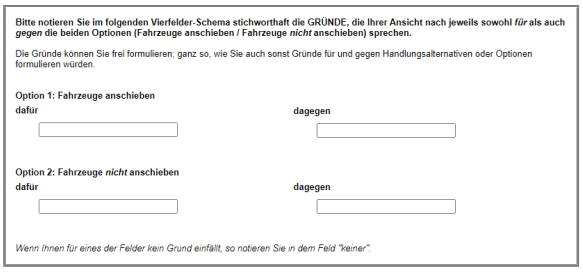
> Now please write down the principle that came to your mind first: Which principle, rule of life or maxim requires or forbids the above option?
>
> If you can think of an opposing principle that requires or prohibits the opposite alternative action, please note it here:
>
> If you cannot think of a principle to the contrary, please note "none" in the box.

Last, introducing the two dependent variables, participants were told to decide based on one of these principles (cf. Table 10.2 on page 377 for the details).

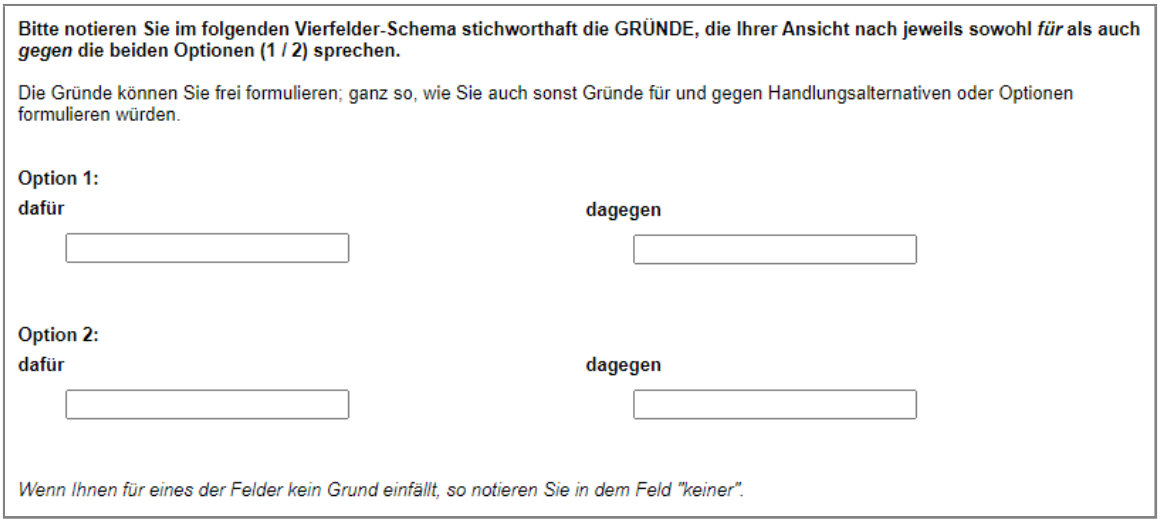
B.b Decide by Reasons In the experimental manipulation of the decision strategy "by reasons" participants were instructed to note reasons for and against each of the two options along a four-field diagram as displayed in Figure 10.3 on the following page.



(a) Agent Intervention Version.



(b) Patient Intervention Version.



(c) Formal Version.

Figure 10.3 Decision strategy manipulation "decide by reasons" within the Trolley paradigm.
Note. The translation of the formal version [c] can be found in the main text. The formal version was not part of the experiment. As regards the two experimental versions for the Bus Scenario, the two options read: "divert train", "*not* divert train" (agent intervention version [a]) and "push vehicles", "*not* push vehicles" (patient intervention version [b]). The options displayed to participants were always adjusted to scenario content. The programming of the online questionnaire was made such that with each reason entered, another empty text field would appear below the previous one such that the reasons could be properly listed.

The instructions read:[470]

> In the following four-field diagram, please note down in brief the REASONS which, in your opinion, speak both for and against the two options (1 / 2).
>
> You can formulate the reasons freely; just as you would otherwise formulate reasons for and against alternative actions or options.
>
> Option 1: do xy [pro / con]
>
> Option 2: *not* do xy [pro / con]
>
> If you cannot think of a reason for one of the fields, write "none" in the box.

Last, introducing the two dependent variables, participants were told to decide based on the consideration of their reasons listed above (cf. Table 10.2 on page 377 for the details).

[470] Again, the so-called *Formal Version* was not part of the experiment.

B.c Decide by Intuition / Control Group Participants in the control group did not receive any instructions regarding how to arrive at a decision. That is, the decision strategy manipulations as reported in section B.a on page 373 for the principles case and in section B.b on page 374 for the reasons case simply had no equivalent in the control group. Instead, participants were immediately confronted with the two dependent measures *Trolley question* and *Decision satisfaction*. Cf. Figure 10.4 from the subsequent section for a visualization.

C Dependent Measures There were two dependent variables as listed in Table 10.2; for a visual display cf. Figure 10.4. The wording of the dependent measures varied by decision strategy (by reasons/by principle/control), by scenario type (agent/patient) and by scenario content (Bus, Virus, Torpedo, Bomb, Rampage). The details are to be found in Table 10.2.

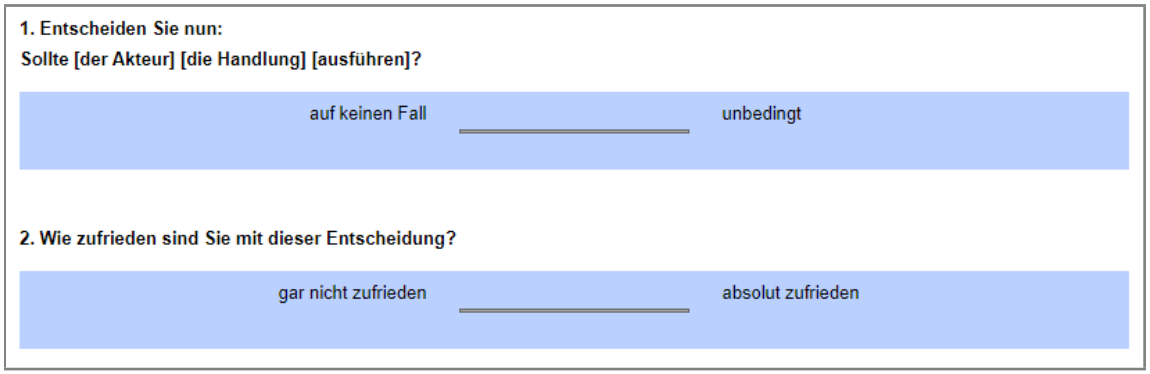


Figure 10.4 Formal version of condition "by intuition"/control of the two dependent variables.
Note. The introductory sentence to *Trolley question* as displayed here for the condition "by intuition"/control read "Decide now:", but was different for each decision strategy. The details can be found in Table 10.2 on the next page. The same holds for the second dependent variable *Decision satisfaction*.

Table 10.2 List of dependent variables, wording in German and English, and scale information.

DV#	Dependent Variable Name	Wording in German + English translation	Type of Scale and Anchorage in German + [English]
DV1	Trolley Question	Sollte [der Akteur] [die Handlung] [ausführen]? e.g. bus scenario, agent version: *Sollte der Gleiswärter den Zug umleiten?* Should [the actor] [perform] [the action]? e.g. bus scenario, agent version: *Should the track attendant reroute the train?*	Visual Analogue Scale (VAS), end points labeled *auf keinen Fall* [on no account] (1) and *unbedingt* [absolutely] (101). No values displayed to participants. Introductory sentence: *control*: "Decide now:" *by principle*: "Now decide based on one of your principles listed above:" *by reasons*: "Now decide based on the consideration of your reasons listed above:"
DV2	Decision Satisfaction	Wie zufrieden sind Sie mit dieser Entscheidung [auf Grundlage des Prinzips / auf Grundlage der Gründe]? How satisfied are you with this decision [based on the principle / on the basis of the reasons]?	Visual Analogue Scale (VAS), end points labeled *gar nicht zufrieden* [not at all satisfied] (1) and *absolut zufrieden* [absolutely satisfied] (101). No values displayed to participants.

10.1.1.4 Participants

Participants were recruited via mailing list from FOM University of Applied Sciences Hamburg, Leuphana University Lüneburg, as well as from further German universities via the mailing lists of their respective student representative bodies. The complete data set included $N = 539$ participants, of which $n = 187$ were recruited at FOM University, $n = 132$ at Leuphana University and $n = 220$ from other universities. Recruitment took place between November 2016 and February 2017 (first data entry 29/11/2016, last data entry 28/02/2017).

After filtering for self-rated diligence,[471] $N = 488$ of originally $N = 539$ participants remained for analysis (that is, $n = 51$ did not pass the filter criterion). Of these, $n = 34$ did not enter a home university, $n = 124$ participants (27%) studied or worked at Lüneburg University, $n = 101$ participants (22%) studied at FOM University, $n = 133$

[471] Based on the 6-point scale of the variable *Diligence*, where 6 denoted the highest value of diligence, participants reporting a value <4 were excluded from further analysis. For further information on the variable *Diligence*, cf. Table 7.2 on page 165 from section 7.2.1.
This cut-off was cross-validated with the system variable *DEG_TIME*, where a value of $DEG_{\text{i}} \geq 100$ points would indicate insufficient data quality. For further information on this variable, cf. Table 7.1 on page 164 from section 7.2.1. With a mean of M_{DEG}=26 and a median of Mdn_{DEG}=15 it can be assumed that the data quality of this study was good. After filtering for self-rated diligence, there remained $n = 26$ participants with a value of $DEG_{\text{i}} \geq 100$ points.

participants (29%) came from the University of Lübeck[472] and n=96 participants (21%) were affiliated with various other universities.

Asked for their occupation (cf. Table 7.3 on page 166 from section 7.2.1), $n = 372$ participants (76%) were students and $n = 88$ of participants (18%) were employees; all other categories received negligible numbers. Less than half of students were psychology majors.[473] Age ranged from 18-57 years, with a mean of $M_{\text{age}} = 24$ years ($Mdn_{\text{age}} = 23$ years, $SD_{\text{age}} = 4$ years). 72% ($n = 351$) of participants were female and 28% ($n = 137$) were male.

On average, participants took $M_{time} = 10$ min to complete the questionnaire ($SD_{time} = 5.5$ min, $Mdn_{time} = 8$ min).[474]

10.1.2 Results

This section is organized into two parts: First, general results will be reported (section 10.1.2.1), where "general" means that all major aspects of the data set will be scrutinized: The differences between vignettes (section A) and the correlations between dependent measures (section B on the next page) will be looked at, the analytical strategy will be explained (section C on page 380), and the effects on the two dependent measures *Trolley question* (section D on page 380) and *Decision satisfaction* (section E on page 383) will be portrayed by means of descriptive as well as inferential statistics. Last, but importantly the string variables will be analyzed (section F on page 385) according to formal adequacy (section F.a on page 386) as well as ethical affiliation (section F.b on page 387).

Second, the formulated hypotheses (cf. section 10.1.1.1 on page 369) will be tested (section 10.1.2.2 on page 390). This second part will be structured according to said hypotheses. Last, all results will be summarized (section 10.1.2.3 on page 401).

10.1.2.1 General Results

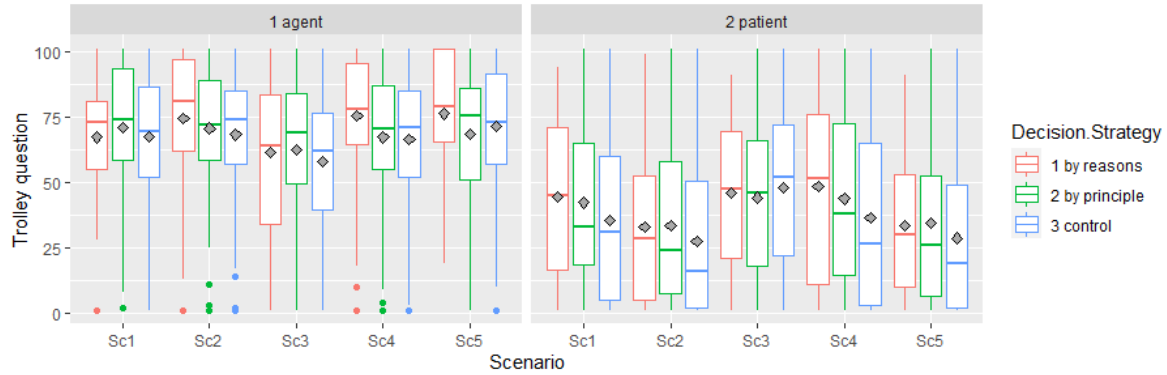
A Visual Inspection of Vignette Differences per Dependent Measure The vignettes or scenarios used in this study were taken from Waldmann and Dieterich (2007), thus they had already proven their sufficient similarity. Nevertheless, this was confirmed by visual inspection of the average ratings per scenario per dependent measure, split

[472] This was a random result: for some and unknown reason a lot of Lübeck students/employees participated in the study.

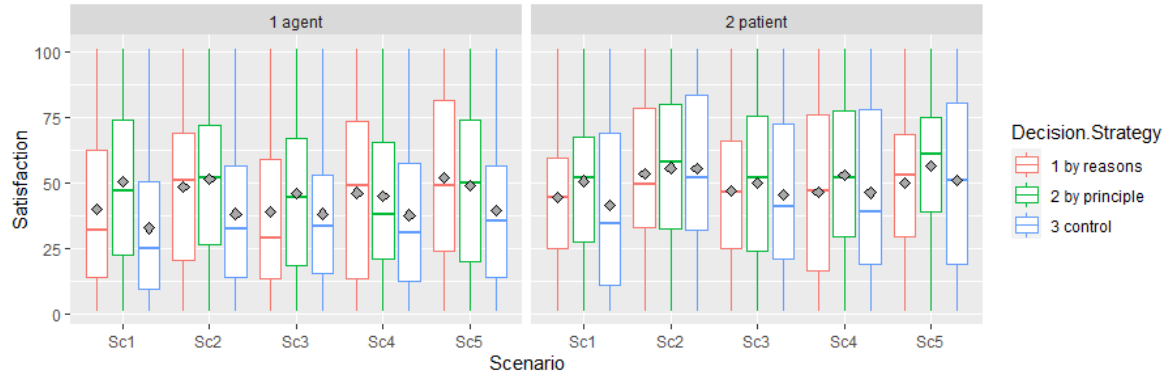
[473] Unfortunately I failed to ask the students from Lüneburg University what subject they were majoring in. However, the link to the study was usually sent to Industrial Psychology majors only. Therefore: (a) in case all Lüneburg students are rated as missings, $n = 241$ did not indicate their major, and of the remaining participants $n = 34$ (14%) majored in Psychology and $n = 213$ (86%) in other fields; (b) in case all Lüneburg participants are rated as Psychology majors, $n = 117$ did not indicate their major, and of the remaining students $n = 158$ (43%) were Psychology students and $n = 213$ (57%) students of diverse subject matters. At any rate, Psychology majors did not make up the majority in this sample.

[474] The large standard deviation is due to the fact that the manipulation in the control group was much less extensive, and thus participants in the control group could reasonably finish the study in a much shorter amount of time.

by all independent variables, cf. Figure 10.5. The contents of the five scenarios can be found in the Appendix, cf. Table I.1 on page 691 from section I.1.



(a) *Trolley question* by *Scenario*, *Decision Strategy* (legend), and *Scenario Type* (facets).



(b) *Decision satisfaction* by *Scenario*, *Decision Strategy* (legend), and *Scenario Type* (facets).

Figure 10.5 Boxplots including mean values per dependent variable by *Scenario*, *Decision Strategy*, and *Scenario Type*.

B Correlations Between Dependent Measures Correlations between DV1 *Trolley question* and DV2 *Decision satisfaction* are displayed in Table 10.3. Visibly, *Scenario Type* made a difference. A positive correlation coefficient means that the more participants opted to have the agent act – that is: sacrifice the one for the many – the more satisfied they were with that decision. Reversely, in the patient intervention condition: the more participants voted in favor of acting, the less satisfied they were with that decision. Cf. Figure 10.4 for a visual display of how the two dependent variables were presented to participants. A non-formatted table of the correlation coefficients between the two dependent variables additionally split by scenario can be found in the Appendix, cf. Table D.1 on page 639 from section D.1.2.1.[475]

[475] NB: Correlations were calculated on the aggregated data averaged over scenarios (wide format data) with the R function cor_test{rstatix}. An attempt was made to calculate correlations on long format data with the R function rmcorr{rmcorr} that is recommended for repeated measures data. However, the results were strikingly different from those calculated on the aggregated data – which I failed to find a reason for. Therefore, the correlation coefficients additionally split by scenario as presented in

Table 10.3 Correlations between DV1 *Trolley question* and DV2 *Decision satisfaction* by *Decision Strategy* and *Scenario Type*.

IVs	*r*	*p*	*n*
Scenario Type: agent intervention			
Decision Strategy: by reasons	0.34	0.009**	59
Decision Strategy: by principle	0.19	0.112	70
Decision Strategy: control	-0.04	0.703	112
Scenario Type: patient intervention			
Decision Strategy: by reasons	-0.36	0.003**	68
Decision Strategy: by principle	-0.35	0.005**	63
Decision Strategy: control	-0.28	0.002**	116

Note. ** $p \leq 0.01$. Correlation coefficients split by *Decision Strategy* only: $r_{reas} = -0.07, n.s.$, $r_{prin} = -0.10, n.s.$, and $r_{contr} = -0.27, p < 0.001$. Correlation coefficients split by *Scenario Type* only: $r_{agent} = 0.14, p = 0.032$, $r_{patient} = -0.31, p < 0.001$.

C Analytical Strategy

This data is repeated measures data since five scenarios were presented within-subjects in a row. Therefore, this data could be analyzed by means of a mixed ANOVA or via multilevel modeling adding the repeated measures factor *Scenario* as a second random effect (besides participants). However, this study was analyzed by means of a conventional two-way ANOVA on aggregated data averaged over scenarios. The reason is simplicity.[476] Assumptions will be tested.

D DV1 – *Trolley question*

D.a Summary Statistics

Table 10.4 displays the decriptives for DV1 *Trolley question* and Figure 10.6 offers a visual impression.

the Appendix (cf. section D.1.2.1 on page 638) were calculated, because this perspective represents the highest resolution possible: the ordinary correlation of two dependent variables measured just once – and it stands to reason that there is really no mistake in calculations possible here. Inspecting these correlations additionally split by scenario made the correlation coefficients as calculated on the aggregated data via cor_test{rstatix} seem quite reasonable. This is why I chose to present these coefficients rather than the results from rmcorr{rmcorr}. Cf. footnote 521 on page 416 for a similar problem.

[476] Multilevel modeling was employed to analyze other studies, cf. e.g. section C on page 418 from 10.2.2.1. More importantly, these scenarios were taken from a previous study (Waldmann & Dieterich, 2007) and likely had not been analyzed as repeated measures data, let alone by multilevel modeling, there. Furthermore, visual inspection of the scenarios' similarity as displayed in Figure 10.5 on the preceding page did not give reason for concern that the data could not be aggregated.

Table 10.4 Descriptives for DV1 *Trolley question*.

IVs	*M*	*SD*	*n*
Scenario Type: 1 agent			
Decision Strategy: 1 by reasons	70.78	16.44	59
Decision Strategy: 2 by principle	67.83	21.17	70
Decision Strategy: 3 control	66.16	17.40	112
Scenario Type: 2 patient			
Decision Strategy: 1 by reasons	40.97	19.30	68
Decision Strategy: 2 by principle	39.52	22.62	63
Decision Strategy: 3 control	35.17	21.04	116

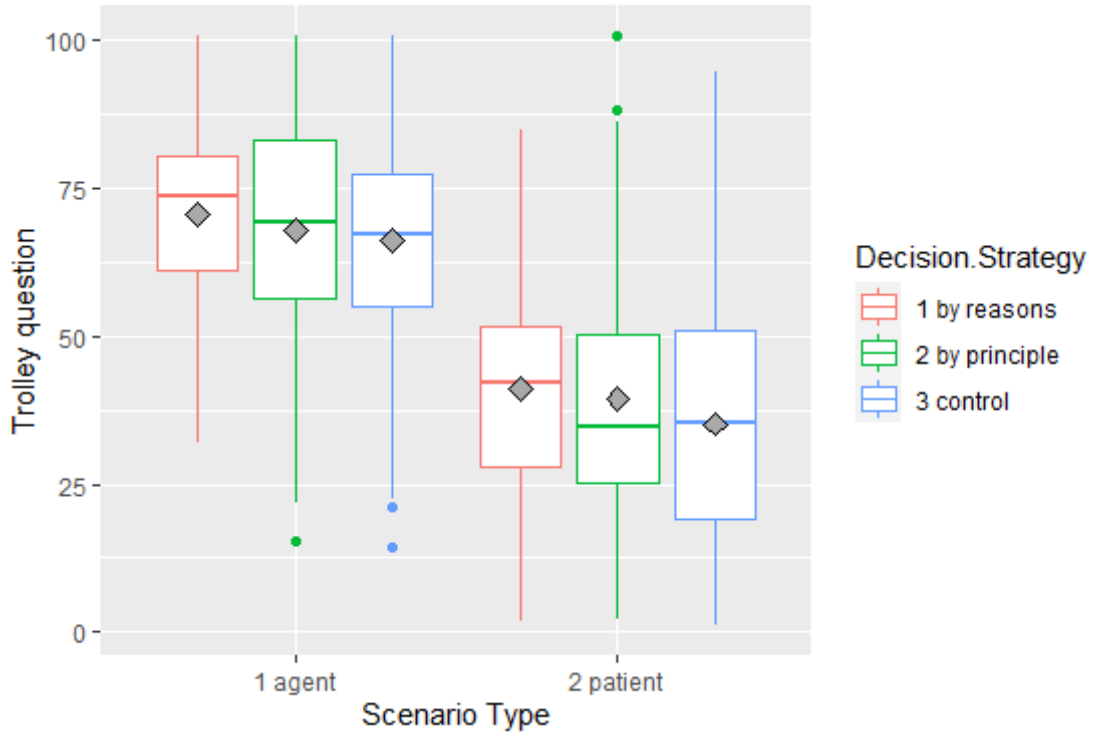


Figure 10.6 Boxplots of *Trolley question* by *Scenario Type* * *Decision Strategy*.
Note. Means per condition are marked by the grey diamond shape.

D.b Test of Assumptions for two-way ANOVA There were no extreme outliers.[477] In the overall QQ plot all points fell approximately along the reference line, and the Shapiro-Wilk test of normality was non-significant ($W = 0.997, p = 0.601$),[478] thus normality can be assumed overall. However, testing normality by groups, the variable *Trolley question* was not normally distributed for three out of the six cells of the design

[477] The R function employed was identify_outliers{rstatix}.
[478] The Shapiro-Wilk test was taken from *rstatix* (shapiro_test{rstatix}) and used on the model residuals.

according to Shapiro-Wilk's test. But upon visual inspection of the QQ plots of each cell, all points fell approximately along the reference line. Last, homogeneity of variances was tested with Levene's test[479] which was non-significant ($W = 1.87, p = 0.099$), thus homogeneity of variances can be assumed in the different groups.

Since the violation of normality does not seem immense, I will rely on ANOVA's robustness.

D.c Inferential Statistics A two-way ANOVA was calculated.[480] There was a significant main effect of *Scenario Type* ($F(1, 482) = 256.79, p < 0.001$), and a marginally significant main effect of *Decision Strategy* ($F(2, 482) = 2.99, p = 0.051$). The interaction of *Scenario Type* and *Decision Strategy* was not significant ($F(2, 482) = 0.19, p = 0.823$).

The main effect of *Scenario Type* shows that participants in the agent intervention condition did tend significantly more towards the option to sacrifice the few for the many, i.e. a consequentialist choice ($M_{agent} = 67.78, SD_{agent} = 18.37, n_{agent} = 241$), than did participants in the patient intervention condition ($M_{patient} = 37.88, SD_{patient} = 21.08, n_{patient} = 247$). This is in line with the original results from Waldmann and Dieterich (2007).

The marginally significant main effect of *Decision Strategy* needs further analysis. Descriptively, there is little difference between the conditions "by reasons" ($M_{reasons} = 54.82, SD_{reasons} = 23.35, n_{reasons} = 127$), "by principle" ($M_{principle} = 54.42, SD_{principle} = 26.00, n_{principle} = 133$), and "by intuition"/control ($M_{control} = 50.40$, $SD_{control} = 24.77$, $n_{control} = 228$) – in disregard of *Scenario Type*.

Computing pairwise comparisons averaged over the levels of *Scenario Type*[481] revealed a significant difference between "deciding by reasons" and "by intuition"/control, $t(482) = 2.38, p = 0.018$.[482][483]

Looking at the most fine-grained pairs of comparisons including the levels of *Scenario Type*, there was only a marginally significant difference between "by reasons" and "by intuition"/control, and only in the patient intervention condition, $t(482) = 1.93, p = 0.055$.[484]

D.d Summary and Interpretation Looking back at Figure 10.6 on the previous page, the visual impression was confirmed by inferential statistics: there was a clear effect of *Scenario Type*, whereas *Decision Strategy* had almost no effect on participants' preference towards either a rather consequentialist or a rather deontological position in the trolley dilemma.

[479] The R function used was levene_test{rstatix}.

[480] The R package *rstatix* was used.

[481] The R function employed was lsmeans{emmeans} run on the complete model. The function emmeans_test{rstatix} produces the same results.

[482] NB: Any p-value adjustment was switched off. Reasons for this decision can be found in footnotes 534 on page 421 and 500 on page 391 from within the upcoming study. However, in this study I will report Bonferroni adjusted statistics in the footnotes.

[483] Bonferroni-adjusted, the difference between "by reasons" and "by intuition"/control was marginally significant with $p = 0.053$.

[484] Bonferroni-adjusted for 3 tests: no significant differences.

E DV2 – *Decision satisfaction*

E.a Summary Statistics Table 10.5 displays the decriptives for DV2 *Decision satisfaction* and Figure 10.7 offers a visual impression.

Table 10.5 Decriptives for DV2 *Decision satisfaction*.

IVs	*M*	*SD*	*n*
Scenario Type: 1 agent			
Decision Strategy: 1 by reasons	44.99	25.41	59
Decision Strategy: 2 by principle	48.25	27.02	70
Decision Strategy: 3 control	37.18	23.58	112
Scenario Type: 2 patient			
Decision Strategy: 1 by reasons	48.18	22.51	68
Decision Strategy: 2 by principle	53.05	23.60	63
Decision Strategy: 3 control	47.85	26.87	116

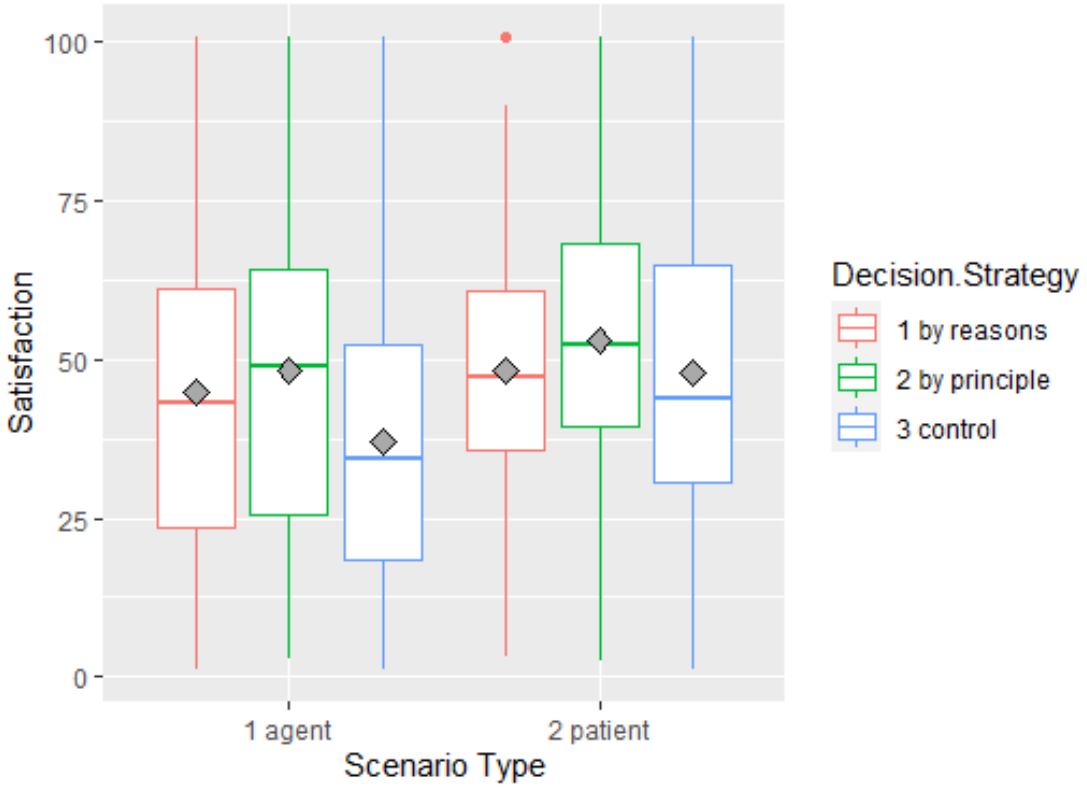


Figure 10.7 Boxplots of *Decision satisfaction* by *Scenario Type* * *Decision Strategy*.
Note. Means per condition are marked by the grey diamond shape.

E.b Test of Assumptions for two-way ANOVA There were no extreme outliers.[485] In the overall QQ plot most points fell approximately along the reference line, yet the Shapiro-Wilk test of normality was significant ($W = 0.985, p < 0.001$), thus normality cannot be assumed overall. Testing normality by groups, the variable *Satisfaction* was not normally distributed for (again) three out of the six cells of the design according to Shapiro-Wilk's test. Upon visual inspection of the QQ plots of each cell, utmost points fell approximately along the reference line. Last, homogeneity of variances was tested with Levene's test which was non-significant ($W = 1.27, p = 0.274$), thus homogeneity of variances can be assumed in the different groups.

Since, again, the violation of normality does not seem immense, I will rely on ANOVA's robustness. Furthermore, there are no non-parametric alternatives to the two-way ANOVA (Kassambara, n.d.-b).

E.c Inferential Statistics A two-way ANOVA was calculated.[486] There was a significant main effect of *Scenario Type* ($F(1, 482) = 7.03, p = 0.008$), as well as a significant main effect of *Decision Strategy* ($F(2, 482) = 4.54, p = 0.011$). The interaction of *Scenario Type* and *Decision Strategy* was not significant ($F(2, 482) = 1.12, p = 0.331$).

The main effect of *Scenario Type* shows that participants in the agent intervention condition were significantly less satisfied with their decision ($M_{agent} = 42.31, SD_{agent} = 25.44, n_{agent} = 241$) than were participants in the patient intervention condition ($M_{patient} = 49.27$, $SD_{patient} = 24.92$, $n_{patient} = 247$). This result may surprise, since the patient intervention condition does require a more uncomfortable decision. Yet we know that participants in the patient intervention condition tended towards a deontological choice (not sacrifice the few for the many, cf. section D.c on page 382). To further scrutinize this point, the variable *Trolley question* signifying participants' choice tendency could be included in an ANCOVA.[487]

The significant main effect of *Decision Strategy* needs further analysis due to its three levels. Descriptively, we see the same pattern in both types of scenario (cf. Figure 10.7 on the previous page and Table 10.5 on the preceding page): the condition "by reasons" takes a middle position as to decision satisfaction ($M_{reasons} = 46.70, SD_{reasons} = 23.86, n_{reasons} = 127$), the condition "by principle" produced the comparatively most satisfied participants ($M_{principle} = 50.53, SD_{principle} = 25.47, n_{principle} = 133$), and the control condition included the least satisfied participants ($M_{control} = 42.61, SD_{control} = 25.81, n_{control} = 228$).

Computing a one-way ANOVA at each level of *Scenario Type* revealed that *Satisfaction* only significantly differed between the three decision strategies in the condition agent intervention ($F(2, 482) = 4.68, p = 0.010$), but not in the condition patient intervention ($F(2, 482) = 0.98, p = 0.378$).

[485] All R functions employed were exactly as above in section D.b on page 381.
[486] All R packages used were the same as in section D.c on page 382.
[487] For reasons of brevity, this additional analysis was not performed.

Computing pairwise comparisons averaged over the levels of *Scenario Type*[488] revealed a significant difference between "deciding by principle" and "control", $t(482) = 2.98, p = 0.003$.[489][490] The remaining two pairs did not significantly differ.

The most fine-grained pairs of comparisons including the levels of *Scenario Type* yielded no significant differences between decision strategies in the patient intervention condition. In the agent intervention condition, there was a marginally significant difference between "by reasons" and "by intuition"/control, $t(482) = 1.94, p = 0.053$,[491] and a significant difference between "by principle" and "by intuition"/control, $t(482) = 2.91, p = 0.004$.[492]

E.d Summary The main effect of *Scenario Type* was not of major interest here, but its surprising direction – participants in the patient intervention scenario being more satisfied than those in the agent intervention scenario – is a reminder to undertake an analysis of *Decision satisfaction* while controlling for *Trolley question*.[493] The main effect of *Decision Strategy* boiled down to just one single significant difference in *Satisfaction*, namely between "by principle" and "by intuition"/control in the agent intervention scenario. This singular significant difference is well visible in Figure 10.7 on page 383. Participants here were more satisfied with their decision when they had had to decide by principle rather than when they were not given any decision strategy guidelines.

F Analysis of String Variables As depicted in section B on page 372 and Figures 10.2 on page 374 and 10.3 on page 375 as part of the decision strategy manipulation participants were requested to enter principles or reasons (dependent on their experimental group), both for and against the two choice options given in each scenario.

The resulting string variables were coded (i) in terms of their formal adequacy to be a principle or a reason respectively[494], as well as (ii) in terms of their ethical affiliation, i.e.: their content being either consequentialist or deontological in nature.

Specific hypotheses dealing with these string variables are hypotheses H1.3, H1.4, and H1.5 below. Therefore, I will not present any results in this section yet, but rather depict the employed coding principles as well as provide some descriptive (or: anecdotal) impressions during coding.

[488] The R function employed was lsmeans{emmeans} run on the complete model.
[489] Cf. footnote 482 on page 382 on adjustment policy in this study.
[490] Bonferroni-adjusted, the difference between "by principle" and "by intuition"/control was still significant with $p = 0.009$.
[491] Bonferroni-adjusted for 3 tests: not significant, $p = 0.158$.
[492] Bonferroni-adjusted, the difference between "by principle" and "by intuition"/control was still significant with $p = 0.011$.
[493] Cf. footnote 487 on the preceding page regarding this point.
[494] Due to the high amount of time required for coding, *formal adequacy* was coded only for one of the five scenarios, namely the Bus Scenario.

All coding was done by me only, thus there is no inter-rater reliability to be reported.[495]

F.a To be or not to be... a Principle or a Reason A thorough yet suitable-for-everyday-use kind of explanation of what principles or reasons are was e.g. given to participants in the Pilot Study (cf. section A.b on page 178 from 8.3.1.3). In this present study, as described in section B on page 372 and according figures, the instruction to participants was much shorter and more simple, yet there was advice included as to how principles and reasons might be formulated in terms of formal correctness.

During coding it became obvious quickly that – in terms of formal adequacy – participants had had much more trouble formulating principles than reasons.[496]

Therefore, a non-dichotomous coding was chosen with 1 = formally adequate, 2 = formally mediocre, 3 = not formally a principle/reason, and 0 = no entry.

Here are some examples for the coding of *principles*:

(1) adequate
- One must not kill to save. (#28)
- One should, if possible, minimize the damage. (#35)
- Always think positive. (#180)

(2) mediocre
- Save many lives. (#7)
- Least damage. (#81)
- Charity. (#122)

(3) inadequate
- Not so many die. (#14)
- One has to reroute the train. (#101)
- Under pressure one decides for what one spontaneously considers to be right. (#224)

Category 1 entails thus entries that either follow the formulation advice given in the study (use "one should/must" or "one must not") or clearly demarcate a life rule or maxim. Category 2 entails formulations that are formally not quite correct, but could easily be adjusted such (e.g. "*one should* save many lives", "*one should bring about* least damage"), or name a virtue ("charity") or generic term ("utilitarianism", "damage control"). Category 3 entails formulations that are rather reasons formulations ("not so

[495] Coding for *ethical affiliation* was carried out in 2017 with coding principles documented. A minor recoding of "principles" (but not "reasons") was carried out in 2021. Coding for *formal adequacy* (cf. the upcoming section F.a) was realized in 2022.

[496] After all, we are quite used to being asked for and provide reasons in every day life – while we are usually not required to cite general maxims or life rules including their claim of universal applicability. That is, in every day life we might be trained to rather think particularistically ("which are the unique reasons in this specific case?") rather than principled ("it is always right to do X"). Furthermore it is easy to formulate reasons (since all facts can be reasons, cf. Dancy (2000), and facts are easily stated), whereas achieving formal adequacy in formulating a principle is much more tricky, since such a formulation should at the very least entail a principle's claim to generality.

many die") or not general enough ("one has to reroute the train") or otherwise inadequate ("under pressure one decides for what one spontaneously considers to be right").[497]

Here are some examples for the coding of *reasons*:

(1) adequate	- Fewer dead. (#6) / Fewer people get hurt. (#149)
	- Offsetting lives against each other is wrong. (#498)
(2) mediocre	- Reasonable in terms of utilitarianism. (#363)
	- People always die. (#188)
(3) inadequate	- Gain of time? (#297)
	- Fate (#489)

Here, too, the subjective component in allocating the text entries to Categories 1-3 is obvious. However, there were extremely few entries that I categorized as 2 or 3 (cf. section C on page 392 from 10.1.2.2 for the statistics), so being even more "lax" (= shifting more entries to Category 1) would not make much of a difference in percentages. Being more "strict" (= shifting more entries out of Category 1) would not have a great effect either: the utmost entries were along the lines of "fewer people get hurt" in very similar formulations, thus clearly and adequately citing a reason. The second example above ("offsetting lives against each other is wrong") could be taken as a principle (in spite of the "always" missing), however, citing a principle as a reason for or against an action seems completely legitimate as well as common practice.

F.b Consequentialist or Deontological? In most general terms, the decision rule to categorize the free text entries was such: statements were categorized as consequentialist when they showed a weighing of consequences, whereas they were categorized as deontological when they referred to the intrinsic value of the action in question.

However, going through the text entries suggested that more that two categories were necessary. Therefore, the following categories were chosen in case of reasons: -9 = not classifiable, 1 = consequentialist, 2 = deontological, 3 = referring to God or fate. In case of principles the category of not classifiable statements (-9) was split into 4 = not classifiable and 5 = no entry.[498]

Further categorization rules in more detail:

- All statements that are formally adequate, but (without context) cannot be classified as consequentialist or deontological (e.g. in case of principles, "one should help where one can", "sometimes one must make sacrifices") receive 4/-9.

[497] I am fully aware that in spite of my effort to justify these categories and allocations, many of my allocations are debatable and do not reach the level of objectivity that we attribute to our quantitative studies.

[498] This partial recoding was not extended to reasons due to the immense time investment with questionable necessity.

- All statements that are *not* formally adequate, but are clearly classifiable as consequentialist or deontological are coded accordingly (e.g. in case of principles, “save many lives", “utilitarianism").
- “Fate”, “God”, “intervene”, “influence” etc. is coded 3, but mind that it is related to deontological content (e.g., “You must not divert the train, because you must not influence fate and decide about other people’s lives.").
- Statements whose reference is unclear (e.g. “see previous answer") receive 4/-9.
- Statements whose direction (regarding consequentialist/deontological) is not absolutely clear (e.g. “one must protect the life of others", “one should help where one can", “every life counts") receive 4/-9.[499]
- Statements such as “you don’t get to decide that" and “you don’t get to make that decision for others" are classified 2 (deontological), but are very similar to 3 (fate/God).
- Statements entailing keywords such as “minimize”, “lesser harm”, “lesser evil” are coded 1 (consequentialist).
- A frequently made point (esp. in case of reasons) referred to “being responsible”, “bearing guilt”, “being accused”, “conscience” etc. These statements were coded 4/-9.

During coding a more fine grained approach suggested itself. In addition to the hitherto employed categories (consequentialist, deontological, reference to God/fate), the following aspects came up:

- **Omission Bias**
  - One should not interfere with the events. (#210)
  - In a situation like that, I don’t want to get involved and would stay out of it. (#65)
- **Commission Bias**
  - At least try something and act. (#271)
  - I must be able to do something. (#378)
- **Conscience / Psychological Strain / Own Guilt**
  - Fear of bad conscience. (#415) / Clear conscience. (#183)
  - Strong psychological stress after the action. (#1)
  - I am to blame for the death of the two people. (#191)
- **Gain Frame / Loss Frame**
  - Save more people. (#9) / One has to save more people. (#61)
  - Kill six people. (#369) / One must not kill. (#336)

[499] Note that participants conclude from statements such as “every life counts (equally)” / “all human lives are worth the same" / “one life is worth as much as another’s" both consequentialist (e.g. “...therefore better save more") as well as deontological claims (e.g. “therefore do not outweigh")!

- **Decision Making**
  - One must not decide about life and death. (#35)
  - No right to decide this, impossible to weigh. (#500)
- **Innocent / Uninvolved**
  - Innocent people die. (#163) / Not endanger innocent people. (#7)
  - Bystanders are injured/killed. (#182) / Bystanders must not be harmed. (#327)
- **Further Aspects:**
  - self protection
  - probability considerations
  - potential victims should decide themselves
  - reinterpretation of scenarios (i.e.: suggest an option that was not given)

Going through these aspects, it becomes quite obvious that these are not exclusive categories – but rather aspects or perspectives one might additionally code for. Due to time constraints this additional exploratory coding was not undertaken, but might be interesting to future research.

The analysis of string variables will be picked up in the following section and reported along the lines of the according hypotheses.

F.c Summary and Interpretation In this section, coding principles were explained and examples were given for both the scrutiny of *formal adequacy* (section F.a on page 386) as well as *ethical affiliation* (section F.b on page 387). Regarding formal adequacy, participants were much more able to provide formally rather correct reasons than formally rather correct principles – which may simply be due to the fact that we are very used to providing reasons in everyday life, but not principles (cf. footnote 496 on page 386). During coding of ethical affiliation several further distinct aspects besides consequentialism/deontology came up – an additional coding for which might be interesting to future research.

Statistics will be reported in response to hypothesis H1.3 (cf. section C on page 392).

G Summary of General Results Visual inspection of the five vignettes used in this study did not lead to concern. The correlations between the two dependent measures *Trolley question* and *Decision satisfaction* already pointed to the effect of *Scenario Type*: There was a positive correlation in case of "agent intervention", where participants were more satisfied the more they had opted for the agent to act (consequentialist decision to sacrifice the one for the many). Contrarily, there was a negative correlation in case of "patient intervention", meaning that participants were more satisfied the more they had opted for the agent *not* to act (deontological decision to *not* sacrifice an uninvolved bystander).

Inferential statistics regarding *Trolley question* (DV1) confirmed the findings from Waldmann and Dieterich (2007) where *Scenario Type* determined the preference for

either a consequentialist choice (in the "agent intervention" condition) or a deontological choice (in the "patient intervention" condition). Averaging over *Scenario Type*, *Decision Strategy* had a significant effect on DV1 such that participants who had had to decide "by reasons" tended more towards a consequentialist decision (have the agent act to sacrifice the few for the many) than participants in the control condition who did not have to follow any decision strategy (but their intuition). This difference did not remain significant at the next more fine-grained level of analysis.

Inferential statistics regarding *Decision satisfaction* showed a main effect of *Scenario Type*, where participants were more satisfied in the "patient intervention" condition than in the "agent intervention" condition. The analysis of the second significant main effect, the effect of *Decision Strategy*, showed that when averaging over *Scenario Type* participants who had had to decide by principle were more satisfied than participants in the control condition. This significant difference between "by principle" and "by intuition"/control remained significant at the next more fine-grained level of analysis for the "agent intervention" condition, with participants being clearly more satisfied having had to decide by principle. However, there was no significant difference in satisfaction between the two decision strategies "decide by principle" and "decide by reasons".

The analysis of the string variables revealed that participants were more familiar with citing formally correct reasons than principles. Furthermore, it was possible to code for ethical affiliation regarding consequentialism versus deontology, but several further distinct aspects came up. Descriptive statistics for the coded string variables will be presented in the following section (section 10.1.2.2).

10.1.2.2 Hypothesis Testing

A H1.1 – *Trolley question* (H1.1) On DV1, the difference between agent/patient will be greater when deciding "by principle" than "by reasons".

That is, $(M_{prin_ag} - M_{prin_pat}) - (M_{reas_ag} - M_{reas_pat}) > 0$. Referring to Table 10.4 on page 381, this hypothesis does not even hold descriptively: $(67.83 - 39.52) - (70.78 - 40.97) = -1.50$. Therefore, using inferential statistics for this directional hypothesis is not even necessary. Hypothesis (H1.1) must be rejected: the difference between agent/patient is not greater when deciding "by principle" than "by reasons". In fact, there is almost no difference by strategy between these differences of means (and note that the interaction of *Scenario Type* and *Decision Strategy* had not been significant, cf. section D.c on page 382).

The idea behind (H1.1) had been that deciding by principle would enhance both the consequentialist as well as the deontological pull as effected by *Scenario Type*, whereas deciding by reasons would rather diminish these effects (cf. section 10.1.1.1 on page 369). But this was not the case: the pull towards consequentialism versus deontology was not enhanced when using the decision strategy "decide by principle" or diminished when using reasons to decide. *Decision Strategy* did not have a moderating effect on participants' ethical preferences.

B H1.2 – *Decision satisfaction* (H1.2) On DV2, ratings will be higher in the groups "by reasons" and "by principle" as compared to "by intuition"/control.

There are two analytical possibilities for this hypothesis.

First, this hypothesis may be understood as entailing two statistical hypotheses, namely $(M_{reas} > M_{con}) \wedge (M_{prin} > M_{con})$.[500] Pairwise comparisons in disregard of *Scenario Type* were already reported along the lines of significant results (cf. section E.c on page 384). But here are the details for the two directional hypotheses:[501] There was a marginally significant difference between the groups "by reasons" and "by intuition"/control, $t(482) = 1.47$, $\frac{p}{2} = 0.071$, and there was a significant difference between the groups "by principle" and "by intuition"/control, $t(482) = 2.98$, $\frac{p}{2} = 0.002$. Now, conservatively the conjunctive hypothesis (H1.2) would have to be rejected. However, considering the point made in footnote 500, one might opt to regard (H1.2) as confirmed. – Let's look at another analytical possibility:

Second, this hypothesis may be understood as comparing "with decision strategy" (i.e., by reasons, by principle) to "without decision strategy" (i.e., "by intuition"/control). In terms of a statistical hypothesis: $(M_{reas} + M_{prin})/2 > M_{con}$. Understood such, this hypothesis can be tested using custom contrasts.[502] In this case, there was a significant difference between the groups with given decision strategy (by reasons, by principle) and the group without decision strategy (by intuition/control), $t(482) = 2.69$, $\frac{p}{2} = 0.004$. Thus, according to this interpretation, (H1.2) can clearly be confirmed. The according descriptive statistics, tabulated as well as visualized, are to be found in section E.a on page 383.

That is, *Decision satisfaction* indeed was significantly higher when participants had been given a decision strategy to use instead of none. This difference between the control group and the two strategy groups was descriptively larger in the "agent intervention" than "patient intervention" scenario.

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[500] In case of a conjunctive hypothesis α does not cumulate, but β does, cf. e.g. Hager (2004, p.197). Therefore the probability of making a type II error (falsely rejecting the H1) is twice the original size here.
I never did an a priori power analysis, mostly because an a priori power analysis is done to determine the required sample size, but I could not have influenced the incoming number of participants easily. Participants were mostly recruited via student mailing lists and owners of these mailing lists try to avoid repeated requests to minimize traffic. Also, admittedly, I just relied on the old rule of thumb of "30 subjects per cell" (cf. e.g. Wilson Van Voorhis & Morgan, 2007).
Doing a post hoc power analysis does not make very much sense (cf. e.g. Dziak, Dierker, & Abar, 2020; Hoenig & Heisey, 2001), mostly because it entails entering the *empirical* effect size – and this just makes it uninformative. What can be done, however, is a power analysis (or "test planning", Hager, 2004) post hoc, but Hager-style, entering (achieved/empirical) N and a *critical* effect size (e.g. of medium size) – and then play around with the *critical* values for alpha and beta to achieve a bearable compromise. G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) actually offers such a type of power analysis, and indeed they call it "compromise". Since the results of such a compromise can be quite unconventional, especially when a test is underpowered, I skipped it here. However, I ventured out to such a compromise calculation in footnote 545 on page 428 from section D within 10.2.2.

[501] The p-value accordingly was divided by 2.

[502] Contrasts were calculated using contrast{emmeans} used on aov_ez{afex}. The ANOVA results of aov_ez{afex} were checked to be identical to anova_test{rstatix}, both using Type III SSq. Contrasts were calculated without p-value adjustments unless otherwise noted.

C H1.3 – Formal Adequacy and Ethical Affiliation (H1.3) Both strategies, principled as well as particularistic decision making, can easily be used (i) in both scenario types (agent/patient) and (ii) with consequentialist or deontological content.

This hypothesis is rather an existential claim than a statistical hypothesis. That is, (i) $\exists(principle)$ AND $\exists(reason)$ in both scenario types and (ii) $\exists(principle)$ with consequentialist and deontological content AND $\exists(reason)$ with consequentialist or deontological content.

Reading the existential quantifier ($\exists(F)$) as "there exists at least one F" would result in these claims to be confirmed as soon as at least one participant would provide an F as specified above. Statistically that would not be too impressive. Yet, which percentage would be a "significant", i.e., a meaningful amount? 20%? 10%? Since there is no reference percentage to go by, I will leave these existential claims as such.

However, I will reformulate both parts of H1.3 as descriptive questions (bearing in mind that any one incident would confirm these hypotheses):

(i) How many adequately formulated (a) principles and (b) reasons are there per scenario type (agent/patient)?

(ii) How many principles and reasons are there with (a) consequentialist and (b) deontological content per scenario type (agent/patient)?

C.a Number of Adequately Formulated Principles and Reasons per Scenario Type Figure 10.6 displays the number of adequately formulated principles in both scenario types. To enter a "Principle con" was optional (cf. Figure 10.2 on page 374) which explains why about half of participants did not enter a second principle. Looking at "Principle pro", in both the agent and patient scenarios half (47% in the agent scenario) or more than half (61% in the patient scenario) of entered principles were adequately formulated.

Table 10.6 Number of adequately formulated principles in the Bus Scenario.

	Agent			Patient		
Code	Principle pro (% $n_{subj._agent}$)	Principle con (% $n_{subj._agent}$)	total (% $n_{prin._agent}$)	Principle pro (% $n_{subj._patient}$)	Principle con (% $n_{subj._patient}$)	total (% $n_{prin._patient}$)
1	29 (47%)	19 (31%)	48 (39%)	35 (61%)	14 (25%)	49 (43%)
2	19 (31%)	6 (10%)	25 (20%)	13 (23%)	7 (12%)	20 (18%)
3	11 (18%)	11 (18%)	22 (18%)	8 (14%)	7 (12%)	15 (13%)
0	3 (5%)	26 (42%)	29 (23%)	1 (2%)	29 (51%)	30 (26%)
Σ	$n_{subj._agent}$ = 62 (100%)		$n_{prin._agent}$ = 124	$n_{subj._patient}$ = 57 (100%)		$n_{prin._patient}$ = 114

Note. 1=adequate, 2=formally mediocre, 3=not formally a principle, 0=no entry. For a display of the original manipulation asking participants to enter a principle in favor of the action ("principle pro") and a principle in disfavor of the action ("principle con"), refer to Figure 10.2 on page 374. Note that the adequacy of principles was only coded for the Bus Scenario. As regards the indexing, n_{subj_agent} and $n_{subj_patient}$ denote the number of participants per scenario type; n_{prin_agent} and $n_{prin_patient}$ denote the amount of principles per scenario type.

Figure 10.7 displays the number of adequately formulated reasons in both scenario types. The vast majority of reasons in both scenario types was adequately formulated with 79% in the agent scenario and 78% in the patient scenario.

Table 10.7 Number of adequately formulated reasons in the Bus Scenario.

	Agent					Patient				
Code	pro Opt.1	pro Opt.2	con Opt.1	con Opt.2	total	pro Opt.1	pro Opt.2	con Opt.1	con Opt.2	total
1	45 (87%)	39 (75%)	41 (79%)	40 (77%)	165 (79%)	52 (87%)	41 (68%)	47 (78%)	46 (77%)	186 (78%)
2	2	2	2	2	8	3	8	7	2	20
3	2	1	0	2	5	1	4	4	1	10
0	3	10	9	8	30	4	6	2	11	23
Σ	$n_{subj._agent}$ = 52 (100%)				$n_{reas._agent}$ = 208	$n_{subj._patient}$ = 60 (100%)				$n_{reas._patient}$ = 239

Note. 1=adequate, 2=formally mediocre, 3=not formally a reason, 0=no entry. For a display of the original manipulation asking participants to enter both reasons for and against the action as well as for and against the inaction, refer to Figure 10.3 on page 375. Note that the adequacy of reasons was only coded for the Bus Scenario. In the Bus Scenario the options to cite reasons for and against were as follows: in the agent condition: Option 1 = "divert train", Option 2 = "not divert train"; in the patient condition: Option 1 = "push vehicles", Option 2 = "not push vehicles". For the complete scenario contents cf. Table 10.1 on page 372. As regards the indexing, n_{subj_agent} and $n_{subj_patient}$ denote the number of participants per scenario type; n_{reas_agent} and $n_{reas_patient}$ denote the amount of reasons per scenario type.

C.b Number of Principles and Reasons With Consequentialist Versus Deontological Content per Scenario Type

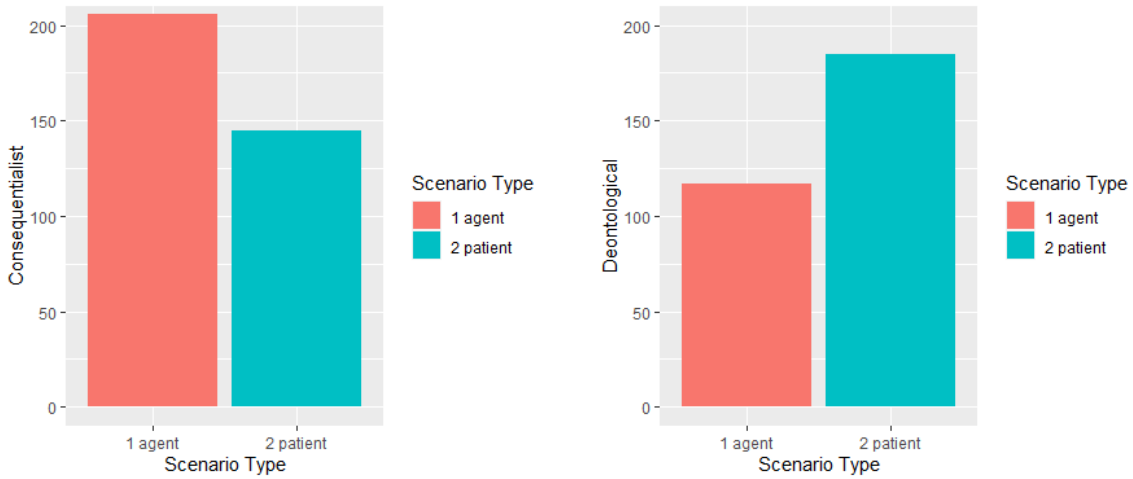
Principles As displayed in Table 10.8, about one fifths to one third of principles per scenario type had consequentialist or deontological content (codes 1 and 2) as compared to the remaining categories (codes 3-5). Thereby, the "pull" of scenario type (agent: pro consequentialist, patient: pro deontological) is visible, but not immense. Importantly, there are viable numbers/percentages of consequentialist as well as deontological principles to be found in both scenario types.

Table 10.8 Number of principles with consequentialist versus deontological content per scenario type.

Code	Agent	Patient	Σ
1 – consequentialist	**206 (33%)**	**145 (25%)**	351 (30%)
2 – deontological	**117 (19%)**	**185 (33%)**	302 (25%)
3 – referring to God or fate	19 (3%)	17 (3%)	36 (3%)
4 – not classifiable	145 (23%)	86 (15%)	231 (19%)
5 – no entry	132 (21%)	136 (24%)	268 (23%)
Σ	619 (100%)	569 (100%)	1188 (100%)

Note. 1 = consequentialist, 2 = deontological, 3 = referring to God or fate, 4 = not classifiable, and 5 = no entry. Note that ethical affiliation of principles was coded for all five scenario contents.

Figure 10.8 gives a visual impression of the numbers of consequentialist versus deontological principles per scenario type. Descriptively, the difference due to scenario type in the number of consequentialist and deontological principles is quite similar: there are about one third more consequentialist principles in the agent scenario than in the patient scenario and reversely, there are about one third more deontological principles in the patient scenario than in the agent scenario.



(a) Absolute # of consequentialist principles.

(b) Absolute # of deontological principles.

Figure 10.8 Barplots of consequentialist versus deontological principles per scenario type.

Alternatively this result may be described as an interaction between scenario type and ethical affiliation of principles reported. The consequentialist pull of the "agent intervention" scenario and the deontological pull of the "patient intervention" scenario is well in accord with the results regarding the variable *Trolley question* within this study (cf. section D on page 380) as well as the original results from Waldmann and Dieterich (2007). However, which is new and important is that empirically, too, principles may be both consequentialist or deontological by affiliation.

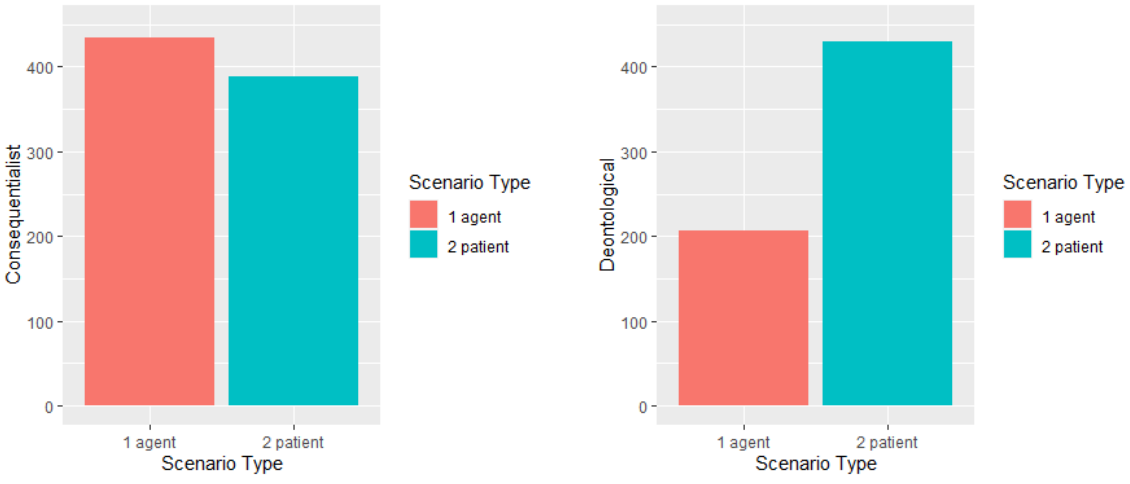
Reasons Table 10.9 displays the number of reasons with consequentialist or deontological affiliation per scenario type and Figure 10.9 affords a visual impression. Here, similar to the principles case, one fifth to two fifths of reasons reported are attributable to consequentialist or deontological rationales per scenario type. About one third of reasons was not classifiable/no entry and very few referred to God or fate.

Table 10.9 Number of reasons with consequentialist versus deontological content per scenario type.

Code	Agent	Patient	Σ
1 – consequentialist	**434 (42%)**	**388 (32%)**	822 (37%)
2 – deontological	**207 (20%)**	**430 (36%)**	637 (28%)
3 – referring to God or fate	22 (2%)	24 (2%)	46 (2%)
4 – not classifiable / no entry	377 (36%)	358 (30%)	735 (33%)
Σ	1040 (100%)	1200 (100%)	2240 (100%)

Note. 1 = consequentialist, 2 = deontological, 3 = referring to God or fate, -9 = not classifiable/no entry. Note that ethical affiliation of reasons was coded for all five scenario contents.

However, in contrast to the principles case where scenario type and ethical affiliation was relatively symmetrical, here in the reasons case, there is a difference both between scenario types as well as between ethical affiliation. That is, (i) regarding scenario type the number of principles with consequentialist versus deontological content is quite similar in the "patient intervention" scenario (32% vs. 36%), but quite dissimilar in the "agent intervention" scenario (42% vs. 20%), cf. Table 10.9; and (ii) between scenario types, the amount of consequentialist reasons is relatively equal, but the amount of deontological reasons is not, cf. Figure 10.9.



(a) Absolute # of consequentialist reasons.

(b) Absolute # of deontological reasons.

Figure 10.9 Barplots of consequentialist versus deontological reasons per scenario type.

Descriptively and visually the same interaction as in the principles case is still visible, but it is driven by the difference in the "agent intervention" condition only: only here there are notably fewer deontological than consequentialist reasons reported. Another perspective of description is this: in contrast to the principles case, there are *not* fewer consequentialist (than deontological) reasons reported in the "patient intervention" condition. In fact, looking at the total percentages of consequentialist versus deontological reasons in disregard of scenario type (cf. Table 10.9 on the previous page), the difference is almost ten percent with 37% consequentialist and 28% deontological reasons. This total difference (same direction) was only 5% in the principles case (cf. Table 10.8 on page 394).

C.c Summary and Interpretation Hypothesis (H1.3) while not being a conventional statistical hypothesis, but rather the conjunction of two existential claims, still latches onto two very important aspects of this study:

(i) Are participants able to provide formally (relatively) adequate reasons and principles? On the one hand, this question may count as a manipulation check, but on the other hand it does even more fundamentally ask: are participants able to see the difference between reasons and principles, does this difference empirically exist?

The second question pertains to another fundamental assumption of this whole research endeavor: namely that the two decision strategies "decide by reasons" and "decide by principle" *are not* equivalent to the distinction between consequentialism and deontology. On the contrary, both decision strategies are supposed to be flexible as regards their output (i.e. the decision/choice) – strategy may not determine choice, in this case: ethical position. Thus, the question is:

(ii) Are participants able to use both reasons and principles to argue for both a consequentialist as well as a deontological position?

The short answer to both questions is "yes". Yes, participants are able to provide formally rather correct reasons as well as principles (i) and yes, participants are able to use both reasons and principles for consequentialist as well as deontological content (ii). How did they fare in more detail?

Adding adequately formulated principles and those rated as "formally mediocre", the total average is 60% as compared to 15,5% of incorrect principles and 24,5% of missings (cf. Table 10.6 on page 392). In the reasons case, there were so few reasons rated as "formally mediocre" and incorrect that percentages were not calculated for these categories (cf. Table 10.7 on page 393). Thus, the total average of adequately formulated reasons only is 78,5%.

This discrepancy between principles (60% adequate and mediocre) and reasons (78,5% adequate only) showing participants' greater ease when handling reasons rather than principles had already been notable during coding and was mentioned above (cf. section F.a on page 386). However, the average percentage of incorrect principles is not high with 15,5% and shows that overall participants did rather well. That is, both the manipulation worked *and* reasons and principles are empirically distinguishable.

As regards consequentialism and deontology, overall we see the same pattern in both the principles and the reasons case: the pull towards consequentialism by the "agent intervention" scenario and the pull towards deontology by the "patient intervention" scenario is visible in the descriptive interaction of scenario type and ethical affiliation as displayed in Figures 10.8 on page 394 and 10.9 on page 395.

Yet, there are differences between reasons and principles. The effect of scenario type (the pull towards consequentialism versus deontology) was more symmetrical in the principles than in the reasons case when looking at the barplots (cf. Figures 10.8 on page 394 and 10.9 on page 395).

Let's have a look at the numbers (cf. Table 10.10):

Table 10.10 Number of principles and reasons with consequentialist versus deontological content per scenario type.

Ethical Affiliation	Agent		Patient		Σ	
	incl. other	excl. other	incl. other	excl. other	incl. other	excl. other
Principles						
consequentialist	206 (33%)	206 (64%)	145 (25%)	145 (44%)	351 (30%)	351 (54%)
deontological	117 (19%)	117 (36%)	185 (33%)	185 (56%)	302 (25%)	302 (46%)
other	296 (48%)	--	239 (42%)	--	535 (45%)	--
Σ	619 (100%)	323 (100%)	569 (100%)	330 (100%)	1188 (100%)	653 (100%)
Diff (cons-deont)	89 (14%)	89 (28%)	-40 (-7%)	-40 (-12%)	49 (4%)	49 (8%)
Reasons						
consequentialist	434 (42%)	434 (68%)	388 (32%)	388 (47%)	822 (37%)	822 (56%)
deontological	207 (20%)	207 (32%)	430 (36%)	430 (53%)	637 (28%)	637 (44%)
other	399 (38%)	--	382 (32%)	--	781 (35%)	--
Σ	1040 (100%)	641 (100%)	1200 (100%)	818 (100%)	2240 (100%)	1459 (100%)
Diff (cons-deont)	227 (22%)	227 (35%)	-42 (-4%)	-42 (-5%)	185 (8%)	185 (13%)

Note. The numbers displayed on grey background in the columns entitled "incl. other" are the same as the numbers from Tables 10.8 on page 394 and 10.9 on page 395 with one difference: the categories *referring to God or fate*, *not classifiable*, and *no entry* were merged into the new category *other*. Percentage calculations in the columns "incl. other" are based on the total number of principles/reasons. In the columns entitled "excl. other" percentage calculations are based on the sum of all principles/reasons classified as consequentialist or deontological only. The basis for percentage calculations is displayed in row Σ. Row "Diff (cons-deont)" gives the difference of the amount of consequentialist minus deontological principles/reasons per scenario type.

The pattern when including versus excluding the category "other" remains the same in all respects. However, the percentage of entries classified "other" is exactly 10% higher in the principles case than in the reasons case for both the agent intervention condition

(48% prin. vs. 38% reas.) and the patient intervention condition (42% prin. vs. 32% reas.). For ease of comparison I will henceforth refer to the numbers excluding the category "other".

The interaction of scenario type and ethical affiliation is visible in numbers in both the principles and the reasons case. However, looking at the size of the difference between the number of consequentialist/deontological entries per scenario type per strategy as displayed in row "Diff (cons-deont)", we realize that the difference of differences in the principles case (28% agent vs. 12% patient) is smaller than the difference of differences in the reasons case (35% agent vs. 5% patient).[503]

Yet, the difference in the difference of differences between principles and reasons is not grave neither in the agent scenario (28% prin. vs. 35% reas.) nor in the patient scenario (12% prin. vs. 5% reas.). Furthermore, the pattern is the same with a larger difference in the agent scenario than the patient scenario.

Three questions:

(1) Why is the difference in the number of consequentialist versus deontological entries larger in the agent than the patient scenario for both principles and reasons?

On the one hand, the pull towards consequentialism in the agent scenario might be stronger than the pull towards deontology in the patient scenario. On the other hand, like we are more used to using reasons than principles, we might be more used to think about the utility of consequences than the intrinsic value of an act. Upon this second thought, the pull of the patient scenario need not be less strong than the pull of the agent scenario, but rather the deontological pull of the patient scenario has to counteract a general tendency towards consequentialism, which in turn reinforces the consequentialist pull of the agent scenario.

(2) Why is the difference in the size of the difference between agent/patient more pronounced in the reasons than the principles case?

Building on the explanation offered above, the same mechanism (a general tendency towards consequentialism) might simply be enhanced in the reasons case or reversely be diminished in the principles case. This would be the idea that deciding by reasons is more similar to consequentialist thinking and deciding by principle is more similar to deontological thinking.[504]

(3) How to explain the three-way interaction with the difference between the number of consequentialist versus deontological entries (row "Diff (cons-deont)") being larger in the reasons case in the agent scenario (35% reas. vs. 28% prin.), but vice versa being larger in the principles case in the patient scenario (12% prin. vs. 5% reas.)?

[503] The smaller difference in the patient scenario in the reasons case also is the reason for the above mentioned less symmetrical interaction as seen in the boxplots.

[504] Of course, philosophically, this "similarity" would have to be scrutinized: How is it similar? Is it a structural similarity? How exactly is it structurally similar? Psychologically one would have to try to distinguish form and content. And the question would be: What is the (psychological) association that is triggered such that the consequences of this similarity arise?

Here, too, we can rely on the previous explanation: On the one hand, the consequentialist pull of the "agent intervention" condition seems to affect reasons more than principles, or the other way around: principles are more immune to a consequentialist pull than are reasons – which is why there are more consequentialist entries and fewer deontological entries in the reasons case in the agent scenario as compared to the principles case in the agent scenario. On the other hand, under the spell of the deontological pull of the "patient intervention" condition, contrariwise principles are more affected than reasons or, in other words, reasons are more immune to a deontological pull than are principles – which is why there are more deontological entries and fewer consequentialist entries in the principles case in the patient scenario as compared to the reasons case in the patient scenario.

In sum, there is the same pattern in the principles and the reasons case – both are affected by the scenario type manipulation in the same way. Yet, descriptively there are interpretable differences that speak to the idea that the two decision strategies are differentially sensitive to the deontological versus consequentialist pull of the two scenario types. However, these descriptive differences are not big and looked at by inferential statistics they might not be significant.[505]

D Reverse Hypotheses Remember that confirming the following two hypotheses would discredit my line of argument that the distinction between deciding by reasons and deciding by principle is distinct from the distinction between consequentialist and deontological decision making. This is why they are called *reverse hypotheses*, cf. section 10.1.1.1 on page 369.

Both hypotheses refer to DV1, i.e.: "Should [the agent] [act]?", the classic trolley question. Please be reminded that a more consequentialist answer would be indicated by a higher mean on DV1, whereas a more deontological answer would be indicated by a lower mean on DV1. For scale information refer to Table 10.2 on page 377.

D.a H1.4 – Additive Effects in the Agent Scenario (H1.4) In the agent intervention scenario (= pull towards consequentialism) answers on DV1 should be even more consequentialist in the group "by reasons" than "by intuition"/control (additive), but less consequentialist in the group "by principle" than "by intuition"/control (subtractive). That is:

$$M_{ag_reas} > M_{ag_con} \text{ AND } M_{ag_prin} < M_{ag_con}$$

D.b H1.5 – Additive Effects in the Patient Scenario (H1.5) In the patient intervention scenario (= pull towards deontology) answers on DV1 should be even more deontological in the group "by principle" than "by intuition"/control (additive), but less deontological in the group "by reasons" than "by intuition"/control (subtractive). That is:

[505] Inferential statistics were not employed here for reasons of time. However, note that even if the discussed differences were statistically significant, effect sizes might still be too small to be practically significant.

$M_{pa_prin} < M_{pa_con}$ AND $M_{pa_reas} > M_{pa_con}$

The answer to hypotheses (H1.4) and (H1.5) can already be found in section D.c on page 382 (cf. also Table 10.4 on page 381 for the means), where it was noted that calculating pairwise comparisons for *Scenario Type*Decision Strategy* did not reveal any significant differences even without adjustment. Cf. Table 10.11 for the statistics.

Table 10.11 Pairwise comparisons for *Scenario Type*Decision Strategy* without p-value adjustments.

IVs		*t* (482)	*p*
Scenario Type: 1 agent			
1 by reasons	vs. 2 by principle	0.85	0.398
1 by reasons	vs. 3 control	1.45	0.147
2 by principle	vs. 3 control	0.55	0.580
Scenario Type: 2 patient			
1 by reasons	vs. 2 by principle	0.42	0.674
1 by reasons	vs. 3 control	1.92	0.055
2 by principle	vs. 3 control	1.41	0.160

Thus, hypotheses (H1.4) and (H1.5) could not be confirmed: there were no significant differences between any of the three groups. Additive or subtractive effects due to decision strategy as (reversely) hypothesized could not be found. Accordingly, my claim that consequentialist vs. deontological decision making and deciding by reasons vs. deciding by principle are not the same has *not* been discredited here.

E Summary of Hypothesis Testing

Please refer back to section 10.1.1.1 on page 369 for the introduction to all hypotheses.

With (H1.1) it was hypothesized that deciding by principle would make participants' ethical position (as measured on DV1) even more consequentialist in the agent scenario and even more deontological in the patient scenario, whereas deciding by reasons would diminish the effects of scenario type. This hypothesis could not be confirmed: the difference of differences was almost the same in the principles and the reasons case.

(H1.2) latched onto the fact that both deciding by reasons as well as deciding by principle (as conceptualized and instructed here) are deliberational decision strategies, whereas participants in the control group could deliberate, but were not told to do so. Furthermore, participants in the two experimental groups were guided through a decision making process which resulted in the demand to decide according to one of their principles or the consideration of their reasons, whereas there was no guidance for participants in the control group. Following a decision making process might lead to a greater sense of content, justification and security. Accordingly, it was hypothesized that participants in the two experimental groups would have a higher decision satisfaction (DV2) than participants in the control group. This hypothesis could be confirmed:

indeed participants rated their decision satisfaction to be greater when they had had to decide by principle or by reasons rather than intuitively/unguided.

(H1.3) required the coding and analysis of participants' string variables citing their principles and reasons. Participants' principles and reasons were coded regarding formal adequacy (is this really a principle/reason?) and regarding ethical affiliation (consequentialist vs. deontological content). (H1.3) claimed that (i) both (adequately formulated) principles and reasons can be used in both scenario types (agent vs. patient) and that (ii) both principles and reasons can have consequentialist as well as deontological content. Both hypotheses could be confirmed. This speaks in favor of my point that the distinction between deciding by principle versus deciding by reasons is distinct from the distinction between deontological versus consequentialist decision making.

The two reverse hypotheses (H1.4) and (H1.5) additionally tested the assumption (which I argue against) that "deciding by reasons" is equivalent to consequentialist decision making and "deciding by principle" is equivalent to deontological decision making. The two hypotheses rested on the idea that if these equivalences were the case, then we should be able to see additive and subtractive effects on DV1 (measuring participants rather consequentialist or deontological answer to the dilemma) when combining the decision strategies (by reasons, by principle) with the scenario types (agent, patient) and their consequentialist and deontological pull. These additive and subtractive effects could not be found and (H1.4) and (H1.5) could not be confirmed. Thus, my point that these equivalences do not hold could not be disproved.

In sum, the main point regarding the non-equivalence of deciding by reasons/deciding by principle on the one hand and consequentialist/deontological decision making on the other hand found sufficient evidence. A difference between deliberational and non-deliberational (or: guided and non-guided) decision making presented itself on *Decision satisfaction*, but there was no difference between the two decision strategies. Neither did the two decision strategies differentially affect participants' ethical preference on *Trolley question*.

10.1.2.3 Summary

For the more detailed summaries, please refer to section G on page 389 for the *Summary of General Results* and to section E on the preceding page for the *Summary of Hypothesis Testing*.

General Results As found in the original study by Waldmann and Dieterich (2007), *Scenario Type* determined participants' ethical preferences as measured by *Trolley question* (DV1): the agent intervention scenario on average inspired a rather consequentialist choice, whereas the patient intervention scenario on average led to a rather deontological choice. Pairwise comparisons within scenario type did not reveal significant differences due to *Decision Strategy*.

In terms of *Decision satisfaction* (DV2), *Scenario Type* showed a main effect such that participants in the patient intervention condition on average were more satisfied

with their decision than participants in the agent intervention condition. Regarding *Decision Strategy* pairwise comparisons within scenario type revealed that in the agent intervention condition participants having had to decide by principle were more satisfied with their decision than participants in the control group. There was no significant difference between the two deliberational decision strategies "decide by reasons" and "decide by principle".

Hypothesis Testing Four hypotheses were tested:

(H1.1) hypothesizing that deciding by principle would enhance the effect of scenario type on participants' ethical preferences (DV1) could not be confirmed. (-)

(H1.2) hypothesizing that participants having had to use one of the deliberational decision strategies would be more satisfied (DV2) than participants from the control group could be confirmed. (+)

(H1.3) referring to the string variables and claiming (i) that principles as well as reasons can be used in both scenario types and (ii) that both principles as well as reasons can have both consequentialist and deontological content was confirmed. (+)

(H1.4) as reverse hypotheses testing the point that deciding by reasons/principle is equivalent to deciding consequentially/deontologically was not confirmed. (+)

This amounts to three positive results out of four in terms of what I had hoped to show.

Conclusion Regarding the effect of *Scenario Type* on ethical preference (DV1) there were no surprises; this was the strongest effect. The effect on satisfaction (DV2) with participants in the patient intervention condition being more satisfied with their decision than participants in the agent intervention condition remains rather unexplained to date.

The effects of *Decision Strategy* were rather weak overall. Regarding ethical preference (DV1), there was no unhypothesized effect within the general results and (H1.1) could not be confirmed. Regarding decision satisfaction (DV2), there was a significant difference between the deliberational decision strategies and the control group with (H1.2) being confirmed, but among the general results not based on hypotheses there was no significant difference in satisfaction between the two deliberational strategies.

Most importantly, however, the analyses of string variables (H1.3) as well as the reverse hypotheses (H1.4) very much support my claim that the distinction between deciding by reasons vs. deciding by principle is not the same as the distinction between consequentialist vs. deontological decision making.

10.1.3 Discussion

10.1.3.1 Reminder of all Results

For the summary of all results, please refer to section 10.1.2.3 on the previous page.

10.1.3.2 Purpose Evaluation

Apart from testing the effects of decision strategy on satisfaction within the trolley paradigm, the main purpose of this experiment was to show that – psychologically – deciding by reasons is not equivalent to deciding consequentially (i.e., as a consequentialist) and that deciding by principle is not equivalent to deciding deontologically. This claim was tested by inferential statistics with (H1.4) as well as by an analysis of participants' string variables. (H1.4) did not disconfirm my claim of non-equivalence, and more importantly the analysis of string variables clearly showed that participants were able on the one hand to give principles that spoke in favor of a consequentialist decision as well as principles that spoke in favor of a deontological decision and on the other hand to give reasons that spoke in favor of a deontological decision as well as reasons that spoke in favor of a consequentialist position.

Thus I take it to be shown that the distinction between deciding by reasons and deciding by principle – psychologically – is not the same as the distinction between consequentialist and deontological decision making.

10.1.3.3 Possible Limitations, Solutions, and Interpretations

Sample Characteristics With almost $N = 500$ participants the experiment was sufficiently powered to support a factorial design with 6 conditions (main effects and interactions) assuming a medium to small effect size.[506] However, regarding its further characteristics, the sample was mainly a student sample (76%), about half of participants were psychology majors, and the majority was female (72%).

Measures The decision strategy manipulations "decide by reasons" and "decide by principle" had been piloted within the Pilot Study. The scenarios were taken from previous research. The dependent measure *Trolley question* (DV1) is a classic, and *Decision satisfaction* (DV2) was formulated in a very simple and straightforward way, having face validity. In sum, the measures used did not give cause for concern.

Design and Operationalizations The factorial design was rather simple. The manipulation of *Scenario Type* (factor 1) was identical to the original by Waldmann and Dieterich (2007) with the addition of *Decision Strategy* (factor 2).

Scenario Type This study is not "Trolleyology", because its interest was not understanding which factors psychologically determine or at least affect our moral intuitions,

[506] A power analysis was not conducted beforehand, since the design was set and the sample size could not have been increased anyway. Using G*Power's (Faul et al., 2007) "Compromise" option to compute implied α and power, entering a medium effect size ($f = 0.25$) resulted in $\alpha = 0.002$ and $1 - \beta = 0.98$, which are fantastic numbers. However, entering a small effect size ($f = 0.10$) and keeping α at 0.05, implied power dropped to $1 - \beta = 0.51$. In a third calculation, keeping α at 0.05 and $1 - \beta$ at 0.80, the smallest effect size that could have been found was $f = 0.14$, which is a rather small effect size (the criteria as cited by G*Power being: $f = 0.10$ – small, $f = 0.25$ – medium, $f = 0.40$ – large). Accordingly, the experiment was sufficiently powered.

but rather it simply made use of the empirically well-founded fact that certain scenario types on average reliably lead to either consequentialist or deontological choices. Therefore, as long as this effect of *Scenario Type* would show, the operationalization was successful, which it was.

Nevertheless, here are a few critical considerations regarding this experimental factor:

As already pointed out in the introduction (cf. footnote 461 on page 369), the two levels of *Scenario Type* not only varied regarding the *locus of intervention*, but they also varied regarding whether the harm to the "patient" was a foreseen, but unintended side effect of saving a greater number of people or whether this harm was a necessary concomitant circumstance of the saving act, thereby making the "patient" a means to an end.[507] Since the side effect/means distinction or *The Doctrine of Double Effect* (also refer to footnote 458 on page 368 within the introduction for references to more fine-grained philosophical distinctions) is a prominent alternative explanation for the difference in intuition between Switch and Footbridge type scenarios, this is a major confound, which is why Waldmann and Dieterich (2007) could make their point only using a loop case, which they did.

Carefully scrutinizing the five scenarios Bus, Virus, Torpedo, Bomb, Rampage (cf. Table I.1 on page 691 within the Appendix for the original scenarios in German), there are further differences between scenarios, especially in the patient intervention condition, e.g.: using body parts not the whole person/body (Virus Scenario), length of decision time and operation (Virus Scenario, Rampage), partaking of the patients (Torpedo), physical contact (Bomb Scenario), deception of the patients (Rampage) – to cursorily name a few.

Furthermore, throughout all scenarios and conditions, acting always equaled a consequentialist choice. That is, the bystander's action would always sacrifice the few for the many: answering the *Trolley question* "Should [the agent] [act]?" towards a yes thus always signified a consequentialist preference. Why might this be problematic? Because of omission/commission bias where on average humans tend to regard harm resulting from inaction as more acceptable or morally preferable compared to equal or lesser harm caused by taking action (cf. e.g. J. Baron & Ritov, 2004). Some situational

[507] This, at least, is how this point is usually discussed, just as Waldmann and Dieterich (2007) do, too: "In the stories we used in Experiment 1, people who had not been asked to consent were used as means in the patient-intervention versions. For example, in the case of the trolley dilemma, if the employee pushed the cars so that the bus with fewer passengers would move onto the track and replace the bus with a larger number of passengers, he was using the people in the pushed bus as a means to save the passengers in the other bus. In contrast, if the employee redirected the train, the resulting harm to the people on the side track would be a side effect of saving the people on the main track." (p.250). My philosophical brain, however, partially disagrees: While in the classic "Footbridge" the body of the so-called "fat man" is directly used as a means to stop the runaway trolley, in Waldmann and Dieterich's (2007) Bus Scenario, contrarily, it is not the two victims' physical bodies doing the work, but the bus they are riding, cf. Table 10.1 on page 372 presenting the original scenario. Therefore, here, too, one might argue that the harm to the two victims in the patient intervention version of the Bus Scenario is a side effect of the saving act. Why is that so? Well, the presence of the two passengers within the bus pushed in the way of the runaway trolley is by no means necessary for the saving maneuver to work: the bus pushed might just as well be empty.

factors may increase omission bias, such as situation clarity/ambiguity, or simply the perceived difficulty of the decision (Brooks, 2011). If the patient intervention condition or, more general, Footbridge type scenarios were perceived as more conflicting, confusing, or difficult than agent intervention/Switch type scenarios, omission bias would be an additional explanation for the difference in intuition and ratings.

Decision Strategy The two deliberational decision strategies "decide by reasons" and "decide by principle" had been piloted within the Pilot Study, but the third level/condition "decide by intuition"/control was a new addition to the factor *Decision Strategy*. As explained in footnote 468 on page 372 from section 10.1.1.3, there was no elaborate concept of intuition or theory of intuitive decision making tied to naming this condition "by intuition", which simply mimicked how in psychological research participants are oftentimes asked to answer spontaneously or intuitively (cf. e.g. Kung, Kwok, & Brown, 2018, p.267).[508] However, the condition "decide by intuition"/control did not specifically ask participants to answer spontaneously/intuitively, but rather it included no instructions whatsoever: participants were simply confronted with the dependent measures.[509] While this is still an accurate depiction of a standard where participants are not given any strategy on how to answer or decide, it does introduce a confounding factor, namely "strategy/guidance given" versus "no strategy/guidance given". Differences on the dependent measures between the two deliberational strategies (guidance given) and the control group (no guidance given) might thus be due to this formal difference – of whether there were instructions on how to decide at all – rather than that these differences were due to deliberation versus intuition.[510]

Accordingly, a better test of deliberational versus non-deliberational decision making strategies would involve instructions or guidance regarding the non-deliberational or spontaneous/intuitive strategy that would be equal in form and length to the instructions/guidance regarding the deliberational strategies. However, this poses a problem: While it would be easily possible to simply instruct participants to answer spontaneously/intuitively, an instruction like that would still be formally very different to the instructions for the conditions "decide by reasons" and "decide by principle" where participants had to write down reasons and principles (cf. section B on page 372 from 10.1.1.3). While the two deliberational strategies in their conceptualization require that the decision maker either weighs reasons or commits to a principle, and that in the process of doing so they pull these reasons or principles up in front of their mind and verbalize them, the decision maker in the case of intuitive/spontaneous decision

[508] It is common in psychological surveys to ask participants to respond spontaneously or intuitively to capture immediate reactions and implicit attitudes. This approach aims to access information that might not be fully accessible through controlled, reflective processes. By requesting intuitive responses, researchers can gain insights into automatic and impulsive mental processes that underlie social behavior. (This background information was generated by ChatGPT and approved by me.)

[509] In fact, there was the introductory sentence "Decide now:" in the control condition, cf. the note to Figure 10.4 on page 376 as well as Table 10.2 on page 377 detailing the differences in the introductory sentences of the three conditions. However, the phrase "decide now" is neither a specific request to decide intuitively nor does it give any guidance on how to decide.

[510] Hypothesis H1.2 capitalized on this difference and the point of guidance vs. no guidance is discussed in section E on page 400 within 10.1.2.2.

making on the contrary is supposed to *not* do exactly that: the intuitive/spontaneous decision maker shall *not* note down intuitions, weigh them, choose them – they shall *just choose*. It follows that it is impossible to achieve formal parallelism in instructions and procedure between deliberational strategies (as operationalized here) and an intuitive/spontaneous strategy – because there simply *is* a formal difference that cannot be evened out.

The alternative to adapting the intuitive/spontaneous strategy to the deliberational strategies is attempting an adaptation the other way around: Could the instructions and the procedure of the two deliberational strategies be made more similar to the intuitive/spontaneous strategy? One possibility might be to *train* participants in the use of the three decision strategies "decide by reasons", "decide by principle", and "decide by intuition" beforehand. Prepared like that in the actual experimental part the simple instruction "Now decide [by reasons / by principle / by intuition]" should suffice and would be perfectly parallel. – But would this really solve the issue at hand: namely that differences found on dependent measures between the two deliberational strategies and an intuitive/spontaneous strategy could simply be due to the fact that the two deliberational strategies involve a specific and guided procedure leading to the choice whereas the intuitive/spontaneous decision maker has no such guidance? No, it would not, since this difference would still exist in the pre-experimental training session. Hence I conclude: the confound between a (non-)deliberational decision strategy and a (non-)guided decision procedure cannot be (easily) disentangled.

This conclusion begs the question whether the aspect I have been calling "guidance" in this discussion – namely the characteristic of the two deliberational decision strategies (as operationalized here) of involving a certain procedure to arrive at a choice – simply is a *conceptual* ingredient of deliberational decision strategies. That is, a deliberational decision strategy necessarily involves a procedure – even if the procedure is not as tight-knit as in my idealized operationalizations of using reasons or principles – and therefore it is a necessary characteristic of deliberational decision strategies to include a "guided" process. One might wonder thus: when there are differences on dependent measures (between deliberational / intuitive strategies), is it due to the structural/formal aspect that *there is a procedure* or is it due to the content that *there is deliberation*?

10.1.3.4 Conclusion

This study showed, as it was supposed to, that not only conceptually, but psychologically, too, the distinction between 'deciding by reasons' and 'deciding by principle' *is not the same* as deciding consequentialistically and deciding deontologically. Furthermore, there was a significant difference in satisfaction between the two deliberational decision strategies and the intuitive control group, but the two deliberational strategies did not differ on satisfaction. Possible interpretations of the first difference were discussed, the second non-difference might indicate that a difference of 'deciding by reasons' versus 'deciding by principle' either is difficult to find or does not exist.

10.2 Reasons vs. Principles in a Multi-Attribute Decision Making Paradigm

Multi-attribute decision making (MADM)[511] refers to decision situations where there are two or more alternatives, each coming with two or more attributes (cf. e.g. Pfister et al., 2017, p. 97; Westenberg & Koele, 1994, p. 66).[512] Such decision situations are quite common in real life, e.g. most consumer choices are of this type: Which pizza to choose, which apartment to choose?[513]

The beginning of multi-attribute decision making theory is traced back to Churchman, Ackoff, and Arnoff (1957) by Pena, Nápoles, and Salgueiro (2020, p. 3127), and by Yoon and Hwang (1995, p. 4) even to Benjamin Franklin's famous letter (Franklin, 1772) advising his friend to write a pros and cons list in order to arrive at a decision. Surely this shows that despite its technical name multi-attribute decision making is a rather natural way of systematically comparing objects or actions (i.e.: alternatives) that differ in their characteristics (i.e.: attributes).[514]

Furthermore, multi-attribute decision making tasks usually portray decision situations under certainty (cf. e.g. Pfister et al., 2017, p. 236; Westenberg & Koele, 1994, p. 66); an extension to situations of risk and uncertainty is possible, but less common (cf. e.g. Zysset et al., 2006, p. 1380). The paradigm can be used to represent preferential choices (e.g. classic consumer choices such as choosing an apartment as above) as well as probabilistic inferences (e.g. the determination which of two cities is larger, cf. e.g. Söllner et al., 2014).[515]

In terms of display, multi-attribute decision making tasks are usually displayed in matrix format (cf. e.g. Pfister et al., 2017, p. 32, p. 107; Riedl et al., 2008, p. 795) with alternatives and attributes as rows and columns. Attribute values may be binary, ordinal or even continuous (cf. e.g. Pachur & Bröder, 2013, p. 673).

Within the multi-attribute decision making paradigm, decision rules (cf. Pfister et al., 2017, p. 237, for this choice of terminology), meta-decisions among these rules, as well as models attempting to describe decision rule selection have been extensively researched. For an overview of such rules cf. e.g. Pfister et al. (2017, p. 105), Pachur and Bröder (2013, p. 670), or Westenberg and Koele (1994, p. 75), as well as Dhar (1996,

[511] In spite of psychology's fondness of acronyms, the acronym "MADM" does not seem to be used by default. H. Wu and Xu (2022, p. 512) denote the term "multiple criteria decision making" to be synonymous. Busemeyer and colleagues (e.g. Busemeyer et al., 2019) seem to prefer the term "multi-attribute, multi-alternative" decision.

[512] Here again, the terminology varies a little: "alternatives" might also be called "options"; "attributes" can also be termed "criteria", "dimensions", and – revealing the provenance from cognitive psychology: "cues".

[513] There is no lack of examples, cf. e.g. Dhar 1996, p. 275 or Westenberg and Koele 1994, p. 66. The choice between apartments is a classic (cf. e.g. Zysset et al., 2006, p. 1380), such that it even received its own term in Todd and Benbasat (1991, p. 99): the "apartment selection task".

[514] And surely there have been people that made pros and cons lists before the 18th century.

[515] According to Marewski and Link (2014, p. 10), most research in the tradition of the adaptive-decision-maker framework as famously established by Payne et al. (1993) focused on preferential choice, whereas Gigerenzer and colleagues in their fast-and-frugal-heuristics framework (Gigerenzer et al., 1999) rather investigated probabilistic inference.

p. 272) for the most commonly researched ones. Cf. Marewski and Link (2014, p. 7) for an overview of approaches to rule selection.

In the upcoming experiment the multi-attribute decision making paradigm was employed, because it represents a decision type that is very common in everyday life, because it is a classic, much researched research paradigm, and because it is such an intelligible and somewhat natural way of comparing options (as argued above).

Based on this important paradigm this experiment is the second in line to investigate the influence of decision strategy on satisfaction.

10.2.1 Method

10.2.1.1 Design and Hypotheses

The experiment included 1 between-subjects factor with three conditions (*Decision Strategy*: "decide by reasons" vs. "decide by principle" vs. "decide by self-chosen strategy"/control), and 8 multi-attribute decision situation vignettes, all of which providing four or five attributes on two options (within). After each vignette, participants were asked to document their decision strategy, choose one of the two options, and rate their satisfaction with respect to: the decision situation in total (DV1), the option they chose (DV2), and the decision strategy they were asked to employ (DV3). Last, they were asked to indicate how emotional the respective decision situation would be for them (DV4).

The following hypotheses were put forward:

(H0.1) There is no difference between strategies on DV1, *Situation satisfaction*.

The rationale behind this hypothesis is that the satisfaction with the nature of the situation, i.e. the satisfaction or content with the context should not be influenced by the procedure participants were told to follow to decide (i.e. the decision strategy they were told to employ).

(H1.1) On DV2, *Option satisfaction*, there is a difference between strategies.

Since the decision strategy manipulation (cf. section A.b on page 410) instructed participants to follow a specific procedure and then choose an option according to this procedure's result, it seems sensible to assume that participants' satisfaction with the option chosen would be influenced by the strategy used.

(H1.2) On DV3, *Strategy satisfaction*, there is a difference between strategies.

This is the hypothesis of main interest: differing decision strategies result in differing satisfaction with said strategies.

(H1.3) The more emotional the decision situation (DV4), the *more* satisfied are participants with the decision strategy (DV3) in the conditions "decide by reasons" and "decide by principle" and the *less* satisfied are participants in the condition "decide by self-chosen strategy"/control.

The rationale behind this last hypothesis is that for a decision situation to be "emotional" usually is not a good thing: at the very least, it makes the deciding more stressful. Therefore, following a prescribed strategy as opposed to following a self-chosen strategy should give participants an enhanced feeling of confidence and safety and thus make them more satisfied with their strategy.

10.2.1.2 Procedure

The study was conducted online, the link was circulated via student mailing lists and private channels. After the welcome page, participants were asked to answer five demographic questions (*Age*, *Gender*, *Education*, *Occupation*, and *University*, cf. Table 7.3 on page 166), as well as the items *Device* and *Code*, cf. Table 7.2 on page 165, both from section 7.2.1, chapter *General Method* (chap. 7). Participants were then randomized into the three conditions of *Decision Strategy*. In all conditions participants next viewed a short introduction explicating the procedure, and in the conditions "decide by reasons" and "decide by principle" participants additionally received an explanation as to the concept of reasons or principles respectively. Thereafter, they were presented with the eight decision situation vignettes in tabular format. On the same page with the vignette the decision strategy manipulation led participants to either decide by reasons, by principle or by a strategy freely chosen that they were asked to quickly describe in an open text field. On the same page still, participants then had to decide between the two options given by the scenario. On the following page participants were required to answer the dependent measures *Situation satisfaction*, *Option satisfaction*, and *Strategy satisfaction*, they could comment on their satisfaction in an open text field, and last they had to indicate the extent of *Emotionality* associated with the respective decision situation. In total, each of the eight decisions used up two web pages: the first page for the vignette, the manipulation and the choice, and the second page for the dependent measures. After the eight vignettes, in the conditions "decide by reasons" and "decide by principle" participants were then asked, if they had to decide by reasons or by principle a whole week long, which would they choose? In the control group participants were asked without reference to reasons or principles which strategy they would choose if they had to commit to one for a week. Next, participants were confronted with a 10-item questionnaire measuring the dimension "rational/vigilant" of the Decision Style Questionnaire (DSQ, for its items cf. Table 9.12 on page 245 within section 9.2.2.1 from chapter *Questionnaires*, chap. 9), and on the subsequent page they were given the 14-item 14BiPole-Value Questionnaire (for an introduction to the theory behind the questionnaire, cf. section E on page 254 within section 9.3.1.2, chap. 9 as above). On the last page of the study, participants received the items *Diligence*, *Comments*, *Course credit* (cf. Table 7.2 on page 165 as above), and were asked to indicate whether they had had technical problems, whether they had an idea what the study was about, and how many studies of a similar topic they had already participated in.

10.2.1.3 Materials

A Independent Variables

A.a Decision Situation Vignettes The decision situation vignettes were modeled after classic multi-attribute decision making materials, thus presented in tabular format as an attribute matrix (cf. e.g. Jungermann et al., 2005, p.43, p.133). In terms of content, they referred to typical decision situations a student might encounter. These "typical" decision situations had been gathered empirically in a previous study, namely the questionnaire study on *Decision Categorization Scales*, section 9.3 on page 250 within chapter *Questionnaires* (chap. 9).[516]

Cf. Figure 10.10 for an example of one of the eight decision situation vignettes (Vignette 1). The contents of the eight vignettes were as follows: V1: choose apartment, V2: whom to celebrate Christmas with, V3: choose examination date, V4: do postgraduate studies, V5: hold job while being a student, V6: drop out of university, V7: use holiday for education, V8: choose university location. All vignettes can be found in the Appendix *Original Materials*, section I.2 on page 710 within F.2.3.

Wohnungssuche

Sie suchen eine neue Wohnungsmöglichkeit und müssen sich zwischen den folgenden beiden Optionen entscheiden.

Attribute	Optionen	
	Wohngelegenheit A	**Wohngelegenheit B**
Entfernung zur Uni	nah	fern
Preis	420€	550€
Viertel und Umgebung	laut, Partymeile, ungepflegt	ruhig, Wohngegend
Größe der Wohnung	WG-Zimmer mit 28m²	2-Zimmer-Wohnung mit 40m²

Figure 10.10 One of the eight multi-attribute decision situation vignettes with collegiate content.
Note. English translation: House hunting. You are looking for a new place to live and have to choose between the following two options. Attributes: Distance to university; price; neighborhood and surrounding area; size of apartment. Options: Apartment A - near; 420 EUR; noisy, party area, unkempt; shared flat with 28 square meters; Apartment B - far; 550 EUR; quiet, residential area; 2-room apartment with 40 square meters.

A.b Decision Strategy Manipulation The decision strategy manipulation for the conditions "decide by reasons" and "decide by principle" was basically identical to the respective manipulation in the Pilot Study (cf. section A.b on page 178 within 8.3.1.3

[516] In this previous study, student participants had been asked to report examples of "medium-sized" decision situations they had personally encountered. These reports were then coded into 21 typical collegiate decision situations. Cf. section 9.3.2.1 on page 282 for information on the coding procedure as well as the 21 collegiate decision situations and their frequencies; cf. section 9.3.1.1 on page 250 for the according study's procedure.

from chapter *Pilot Study*, chap. 8).[517] Cf. the upcoming Figures 10.11, 10.12, and 10.13 for a depiction of all three conditions of *Decision Strategy* in this study including their English translations. The third condition "decide by self-chosen strategy"/control had no equivalent in the Pilot Study.

The content of the conceptual explanations as to what are reasons and principles respectively, however, was identical in both studies – please refer to section A.b on page 178 within 8.3.1.3 from chapter *Pilot Study* (chap. 8) for the complete quotation (translated to English). A complete visual impression is to be found in the Appendix *Original Materials*, section I.2 on page 710 within F.2.3.

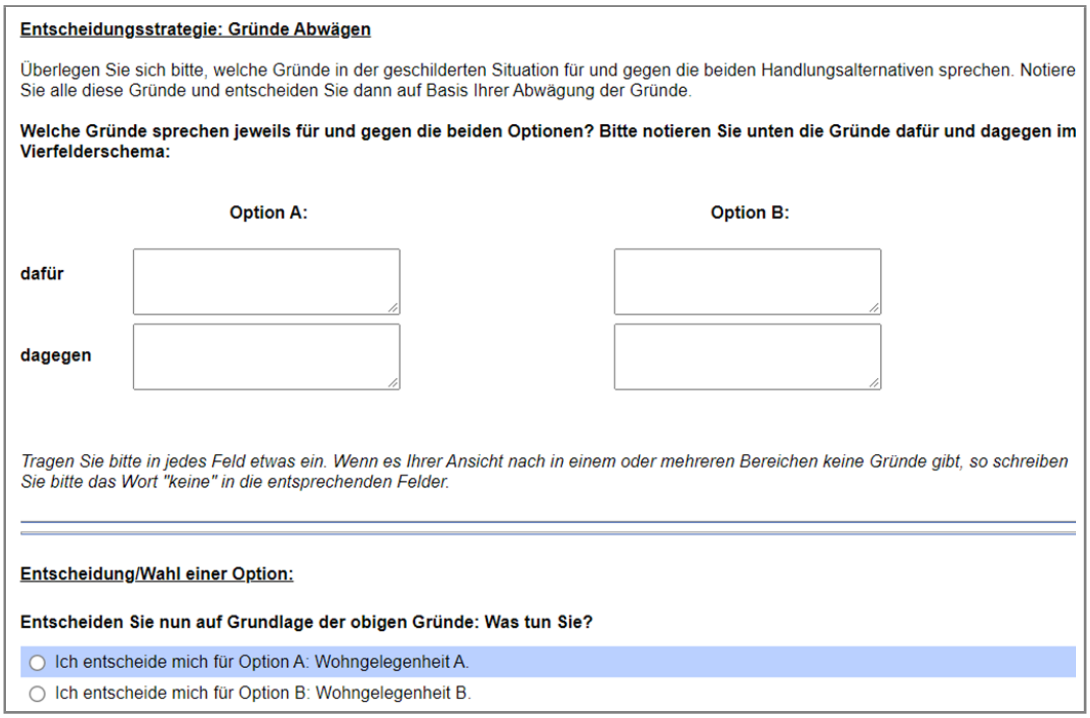


Figure 10.11 Decision strategy manipulation of condition "decide by reasons" within the multi-attribute decision making paradigm.

Note. English translation: Decision strategy: Please consider which reasons speak for and against the two alternative courses of action in the situation described. Write down all these reasons and then decide on the basis of your consideration of the reasons. [theoretical explanation] What are the reasons for and against each of the two options? Please write down the reasons for and against below: [four-field matrix] Please enter something in each field. If you think there are no reasons in one or more areas, please write the word "none" in the corresponding fields. Decision/choice of an option: Now decide based on the reasons above: What do you do?

[517] The only difference was that in the present study the explanation of the concept of reasons and principles respectively was not given before each rating above the free text fields where reasons and principles were to be entered, but only once and before the first vignette was displayed. This is because the Pilot Study in its experimental part included only one vignette, the present study however included eight vignettes such that displaying the conceptual explanation above each entry would have been too long and repetitive.

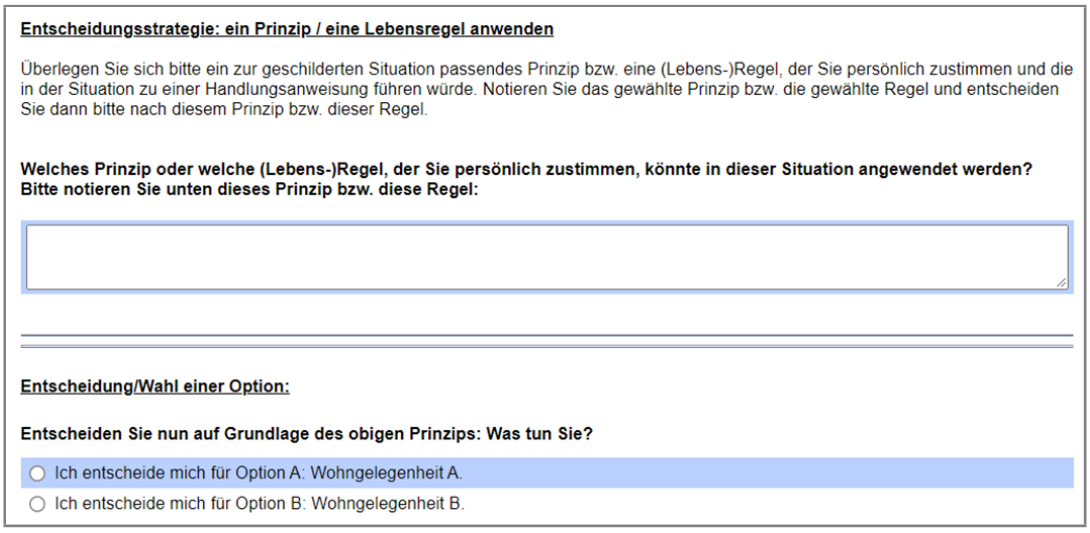


Figure 10.12 Decision strategy manipulation of condition "decide by principle" within the multi-attribute decision making paradigm.

Note. English translation: Decision strategy: Please think of a principle or a (life) rule that fits the situation described, which you personally agree with and which would lead to a clear instruction for action in the situation. Write down the chosen principle or rule and then decide according to this principle or rule. [theoretical explanation] What principle or (life) rule that you personally agree with could be applied in this situation? Please write down this principle or rule below: [open text field] Decision/choice of an option: Now decide based on the above principle/rule: What do you do?

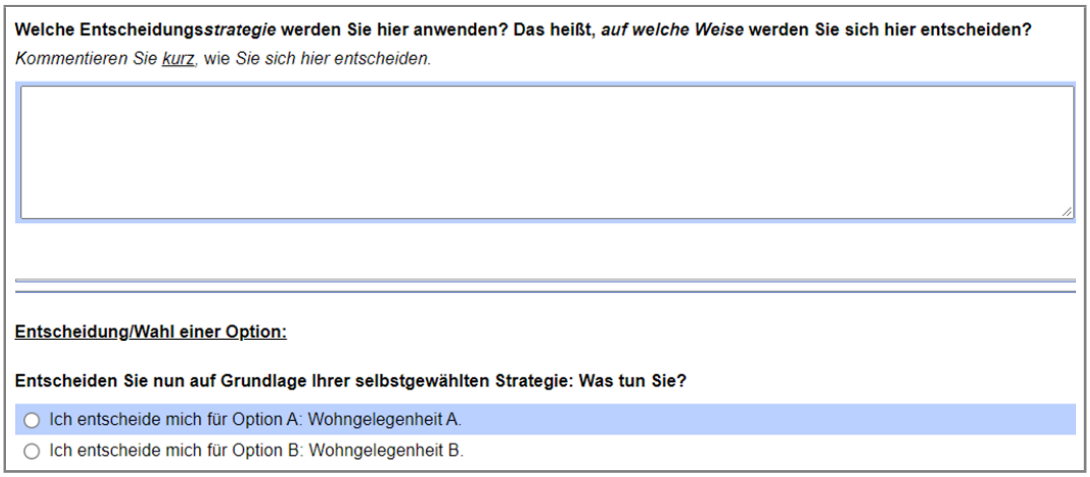


Figure 10.13 Decision strategy manipulation of condition "decide by self-chosen strategy"/control within the multi-attribute decision making paradigm.

Note. English translation: Which decision strategy are you going to employ here? That is, in which way are you going to decide here? Comment shortly on how you will decide here. [open text field] Decision/Choice of an option: Now decide based on your self-chosen strategy: What do you do?

B Dependent Measures Cf. Table 10.12 for the dependent variables.

Table 10.12 List of dependent variables, wording in German and English, and scale information.

DV#	Dependent Variable Name	Wording in German + English translation	Type of Scale and Anchorage in German + [English]
	[Intro]	Zufriedenheit: Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein. Satisfaction: Please now answer these questions to your satisfaction. Adjust the sliders accordingly.	
DV1	Situation satisfaction	Ich bin zufrieden mit... ...der Entscheidungssituation insgesamt. I am satisfied with... ...the decision-making situation overall.	Visual Analogue Scale (VAS), end points labeled *gar nicht zufrieden* [not at all satisfied] (1) and *absolut zufrieden* [absolutely satisfied] (101). No values displayed to participants.
DV2	Option satisfaction	Ich bin zufrieden mit... ...der Entscheidungsoption, die ich gewählt habe. I am satisfied with... ...the decision option I have chosen.	VAS as above.
DV3	Strategy satisfaction	Ich bin zufrieden mit... ...der Entscheidungsstrategie, die ich verwendet habe [(= Gründe abwägen) / (= ein Prinzip anwenden) / %]. I am satisfied with... ...the decision strategy I used [(= weigh reasons) / (= apply a principle) / %].	VAS as above.
[C]	Comment	Haben Sie eine Anmerkung zu Ihrer Zufriedenheit? Do you have any comment about your satisfaction?	Open field answer, optional entry.
DV4	Emotionality	Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie? How emotional, i.e. afflicted with emotion, would this decision-making situation be for you?	Visual Analogue Scale (VAS), end points labeled *gar nicht emotional* [not at all emotional] (1) and *absolut emotional* [absolutely emotional] (101). No values displayed to participants.

10.2.1.4 Participants

Participants were recruited via mailing list from FOM University of Applied Sciences Hamburg, Leuphana University Lüneburg, as well as through private channels. The complete data set included $N = 244$ entries. Recruitment took place in Mai and June 2017 (first data entry 23/05/2017, last data entry 30/06/2017).

After filtering for self-rated diligence,[518] $N = 164$ participants of originally $N = 244$ entries remained for analysis. However, only $n = 10$ participants failed the filter criterion, whereas the rest of excluded data sets belonged to participants who did not reach the last page of the questionnaire.

Regarding their occupation, $n = 129$ of participants (79%) were students and $n = 22$ of participants (13%) were employees; all other categories received negligible numbers. Accordingly, with respect to their formal education, the vast majority of participants $n = 124/67\%$ was equipped with a university entrance diploma ("Abitur"), some participants ($n = 16/10\%$) held a restricted entrance diploma ("Fachabitur"), and $n = 14/9\%$ held a graduate degree.

Of the $N = 164$ participants $n = 21$ did not enter a home university; $n = 85$ participants (59%) (had) studied at Lüneburg University, $n = 40$ participants (28%) (had) studied at FOM University, and $n = 18$ participants (16%) were affiliated with various other universities. With respect to their major at university, $n = 35$ of participants did not enter one. Of those who did, $n = 95/74\%$ were psychology students and $n = 34/26\%$ studied various other subjects.

Age ranged from 18-55 years, with a mean of $M_{\text{age}} = 23$ years ($Mdn_{\text{age}} = 22$ years, $SD_{\text{age}} = 5$ years). 74% ($n = 122$) of participants were female and 26% ($n = 42$) were male.

On average, participants took $M_{time} = 19$ min to complete the questionnaire ($SD_{time} = 6.5$ min, $Mdn_{time} = 20$ min).[519]

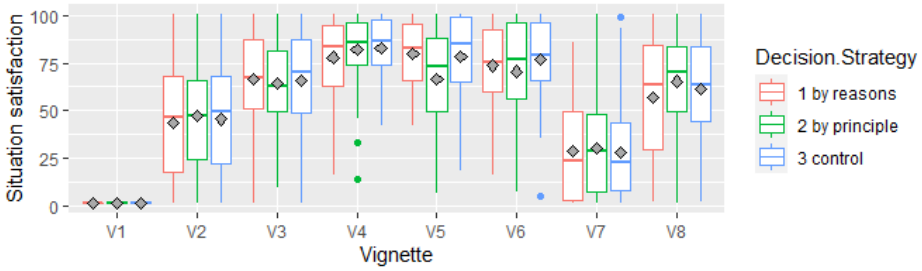
10.2.2 Results

10.2.2.1 General Results

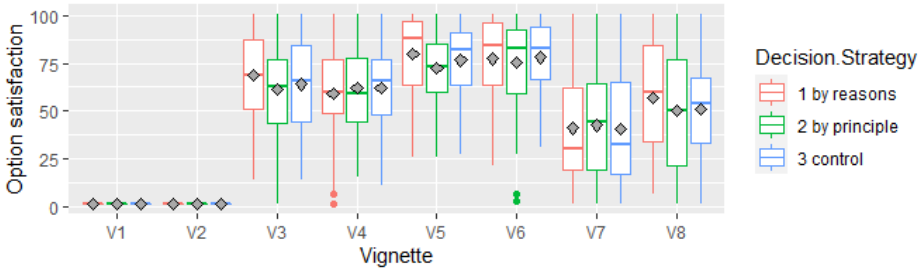
A Visual Inspection of Vignette Differences per Dependent Measure Each of the eight vignettes, of course, differed in terms of content. Already from the Pilot Study we know that vignette/scenario content has a stronger impact on participant ratings than would be desirable from the perspective of a study's design where scenario content is unavoidable, but not of theoretical interest. Therefore cf. Figure 10.14 for a visual display of the average ratings per vignette for the dependent measures *Situation satisfaction*, *Option satisfaction*, *Strategy satisfaction*, and *Emotionality*.

[518] Based on the 6-point scale of the variable *Diligence*, where 6 denoted the highest value of diligence, participants reporting a value <4 were excluded from further analysis. For further information on the variable *Diligence*, cf. Table 7.2 on page 165 from section 7.2.1.

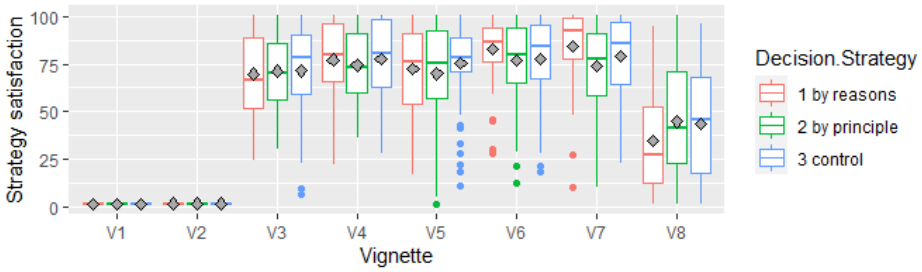
[519] The relatively large standard deviation is due to the fact that the manipulation in the control group was much less time consuming.



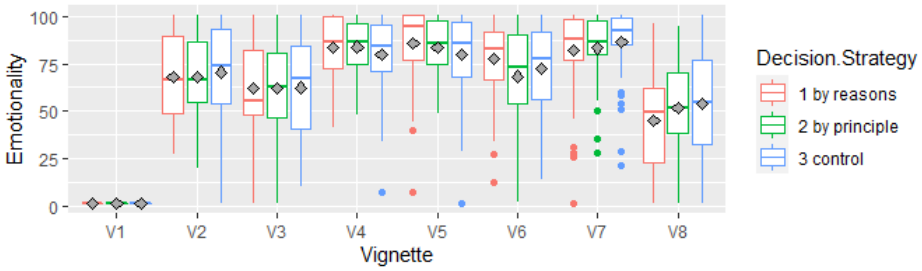
(a) *Situation satisfaction* by *Vignette* and *Decision Strategy*.



(b) *Option satisfaction* by *Vignette* and *Decision Strategy*.



(c) *Strategy satisfaction* by *Vignette* and *Decision Strategy*.



(d) *Emotionality* by *Vignette* and *Decision Strategy*.

Figure 10.14 Boxplots including mean values per dependent variable by *Vignette* and *Decision Strategy*.

While the variability between Vignettes V3 to V8 seems adequate, V1 and partially V2 show a bottom effect that cannot be explained by content. Further inspection of the respective ratings showed that participants here only rated "1" or "2" as if the variable had been dichotomous. Inspecting the programming of the online questionnaire no such technical mistake could be found. Still, a technical problem – maybe while recording the respective variables – is the only reasonable explanation. At any rate, Vignettes V1 and V2 must thus be excluded from analysis.

B Correlations Between Dependent Measures Some of the dependent measures (e.g. *Emotionality*) were solely meant to be covariates. The three satisfaction variables (*Situation satisfaction*, *Option satisfaction*, *Strategy satisfaction*) are also supposed to function as covariates to each other in order to make the DV of interest even more specific – so to speak: freeing it from the other aspects of satisfaction. However, it is reasonable to assume that especially the satisfaction variables correlate highly. A correlation matrix split by *Decision Strategy* can be viewed in Table 10.14, a correlation matrix glossing over both *Decision Strategy* and *Vignette* is displayed in Table 10.13.[520] [521]

Table 10.13 Correlations (r) between the dependent variables not grouped by condition.

	Option satisfaction	Strategy satisfaction	Emotionality
Situation satisfaction	0.41	0.08*	0.18
Option Satisfaction		0.22	0.21
Strategy satisfaction			0.42

Note. All correlations (but one) were significant with $p \leq 0.001$. This one correlation being insignificant with $p > 0.05$ is denoted with *.

[520] Splitting additionally by *Vignette* would have been interesting, especially regarding the variable *Emotionality*. However, a correlation matrix of the resulting massive extension would not have been informative.

[521] Correlations were calculated using the function rmcorr{rmcorr} which is specifically designed for correlation analyses in repeated measures data. Yet, using the standard correlations calculation by cor_mat{rstatix} did result in relatively similar results. However, calculating correlations on the same data in wide format – with the repeated measures dependent variables averaged over vignettes – did yield strikingly different results. A tabular version comparing the results of these three analyses can be found in the Appendix, cf. section D.2.1.1 on page 640.

Table 10.14 Correlations between the dependent variables split by *Decision Strategy*.

	Option satisfaction			Strategy satisfaction			Emotionality		
	R	P	C	R	P	C	R	P	C
Situation satisfaction	0.42	0.39	0.41	0.14*	0.02†	0.08†	0.31	0.11**	0.12**
Option Satisfaction				0.09†	0.28	0.28	0.16**	0.30	0.17**
Strategy satisfaction							0.48	0.43	0.37

Note. R = "by reasons", P = "by principle", C = "control". All correlations without asterisk (*) were significant with $p \leq 0.001$. Otherwise: † non-sign., * $p \leq 0.05$, ** $p \leq 0.01$.

There was one hypothesis regarding these correlations, namely (H1.3), cf. section 10.2.1.1.[522] Here, we will first have a descriptive look at the pattern of correlations:

1. Looking at the overall correlations (glossing over *Decision Strategy*, Table 10.13), two points seem noteworthy:
   a) The correlation between *Situation satisfaction* and *Option satisfaction* is much higher than the correlations of each of these two with *Strategy satisfaction*. Among the latter, the correlation of *Option satisfaction* with *Strategy satisfaction* is not the same as and higher than the correlation of *Situation satisfaction* with *Strategy satisfaction*. Altogether, this is good news, because it means:
      (i) Participants were able to distinguish their satisfaction with the strategy used from other aspects of the decision vignette that could influence their satisfaction.
      (ii) *Strategy satisfaction* was perceived to differ from both the satisfaction with the options as well as from the satisfaction with the decision situation as the wider context, thus receiving a special status.
      (iii) *Strategy satisfaction* was more related to satisfaction with the options than it was related to satisfaction with the decision situation as a whole, which again conceptually is a satisfying result since decision strategy – as implemented in the present study – is indeed more related to the options (since it leads to choosing one of them) than to the situation as a whole.
   b) All correlations between the three satisfaction measures and *Emotionality* were positive. This is surprising, because in general it means that it was *not* the case that the more emotional the situation the more unsatisfied participants were with that situation. Even regarding *Situation satisfaction* there was a positive relation.[523] Yet again, the correlation of *Strategy satisfaction*

[522] This hypothesis will be analyzed in section D.
[523] Reminder: the variable *Emotionality* asks how emotional the *decision situation* would be for participants (cf. Table 10.12 on page 413).

with *Emotionality* was about double as high as the correlations of the two other satisfaction measures, again giving a special status to *Strategy satisfaction*: here, it holds all the more that the more emotional the situation, the more satisfied were participants with their strategy used.

2. Looking at the correlations split by *Decision Strategy* in sum, there are almost no differences between conditions regarding the correlations of *Situation satisfaction* and *Option satisfaction* as well as regarding the correlations of *Strategy satisfaction* and *Emotionality*. There were differences between conditions as regards (i) *Strategy satisfaction* and *Situation satisfaction*, (ii) *Strategy satisfaction* and *Option satisfaction*, (iii) *Emotionality* and *Situation satisfaction*, and (iv) *Emotionality* and *Option satisfaction*. Yet, the global descriptive interpretation regarding the overall correlations not split by condition is still valid and not disproved by the more refined picture.

C Analytical Strategy In the present section 10.2.2.1, general results will be presented for each dependent variable. After displaying summary statistics, results from a mixed ANOVA[524] will grant a quick first impression. Thereafter, by means of multilevel modeling using the R function lmer{lmerTest}[525] model fit – including covariates – will be determined.[526] Pairwise comparisons will be reported as post-hoc tests. Assumptions will not be tested.[527]

C.a Multilevel Modeling Strategy A multilevel modeling approach was used to compare linear mixed effect models including covariates. The starting point always was the null model including only the random effect of participants (random intercept) and *excluding* the independent variable of interest, *Decision Strategy* (between).

$$m0.lmer <- lmer(DV \sim 1 + (1|CASE), data = df)$$

Next, the between-subjects fixed effect was added:

$$m1.lmer <- lmer(DV \sim Decision.Strategy + (1|CASE), data = df)$$

Then, even if the grouping variable *Decision Strategy* did not improve model fit, it was nevertheless kept, since it is the variable of main interest and the variable that my hypotheses refer to. – In the next step, a random effect of *Vignette* (random intercept) was added:

$$m2.lmer <- lmer(DV \sim Decision.Strategy + (1|CASE) + (1|Vignette), data = df)$$

[524] The ANOVA was conducted using the R function anova_test{rstatix}.
[525] lmerTest is based on lme4.
[526] It is not advisable to conduct a classic ANCOVA on repeated measures data, therefore the repeated measures ANCOVAs were implemented as multilevel models.
[527] Assumptions were tested for other studies.

After these three initial steps,[528] covariates were successively included. Thereby, the order of inclusion was determined on theoretical grounds, being: *Emotionality*, *Situation satisfaction*, *Option satisfaction*, *Strategy satisfaction*, *Gender*, *Age*. For example:

$$m3.lmer <- lmer(DV \sim Decision.Strategy + Emotion + (1|CASE) + (1|Vignette), data = df)$$

Interactions were not of interest and were not tested.[529]

D DV1 – *Situation satisfaction*

D.a Summary Statistics Table 10.15 displays the descriptives for DV1 *Situation satisfaction* separately for *Decision Strategy* and *Vignette*.

[528] It would have been cool to think to include a random slope for *Vignette* like $(1 + Vignette|CASE)$, allowing participants to have an individual slope over vignettes. However, (1.) the succession of vignettes is meaningless: the within variable *Vignette* is categorical not ordinal or interval scaled. That is, as opposed to a true time variable with measurements taken, say, on day 1, 3, 5, and 10 (here: rank ordered/ordinal), where a slope over time could be meaningfully interpreted as an effect of time, there is no such "effect over vignettes" to be expected in terms of vignette content, since there was no ordered aspect to the contents and succession of vignettes. There is no overall trend to be expected. (2.) Making *Vignette* a numeric variable (instead of a factor, which it really is in R terminology), allows lmer to calculate a random slope for *Vignette*. However, in order to do that, *Vignette* must be categorized as a fixed effect – which it is not. It clearly is a random effect, since I want to generalize to all kinds of similar situations/vignettes, while the ones used in the experiment are just a "random" sample.
Therefore: there cannot be a random slope for *Vignette*, and a random intercept model with *Vignette* and participants (a.k.a. *CASE*) as random effects and *Decision Strategy* as fixed effect is the correct model specification.

[529] Also, covariates are not supposed to interact.

Table 10.15 Descriptives for DV1 *Situation satisfaction*.

(a) Means and standard deviations by *Decision Strategy*.

IV	*M*	*SD*	*n*
Decision Strategy (between)			
1 - by reasons	63.94	29.48	312
2 - by principle	63.11	28.89	336
3 - control	65.56	29.77	336

Note. The high n is an artifact of the long format of the data table. The correct number is $n = 164$ participants, and the displayed n accounts for the number of data points. This has no influence on the means and standard deviations.

(b) Means and standard deviations by *Vignette*.

IV	*M*	*SD*	*n*
Vignette (within)			
Vignette 3 (V3)	65.45	24.22	164
Vignette 4 (V4)	81.02	18.53	164
Vignette 5 (V5)	74.78	23.23	164
Vignette 6 (V6)	73.65	23.69	164
Vignette 7 (V7)	28.99	24.53	164
Vignette 8 (V8)	61.37	28.73	164

D.b Mixed ANOVA Results There was no effect of *Decision Strategy* ($F(2, 161) = 0.64, p = 0.528$), a significant main effect of *Vignette* ($F(4, 649) = 108.14, p < 0.001$), and a marginally significant interaction ($F(8, 649) = 1.68, p = 0.099$).

D.c Multilevel Modeling Results As described in section C.a on page 418, successive models were built and compared by the respective anova function. The variables *Vignette* (as random effect, model M2) and (as covariates) *Emotionality* (M3), *Option satisfaction* (M4), and *Strategy satisfaction* (M5) all significantly improved model fit as indicated by significant chi-squared test statistics, as well as smaller values for AIC and BIC. *Gender* (M6) and *Age* (M7) did not make a significant difference. [530][531]

The overall effect of *Decision Strategy* remained insignificant in the final model M5 with $F(2, 973) = 0.80, p = 0.448$. In the final model M5 the variance accounted for by the fixed effects[532] was 25% as compared to 0.11% in model M2 without the covariates (cf. section C.a on page 418). This, of course, is an artifact of the covariates that correlate in part highly with the DV (cf. section B on page 416). The variance accounted for by

[530] There was a marginally significant improvement by *Age* in M7, however, while AIC decreased by 0.3 compared to M5, BIC *increased* by 9.5 points. Therefore the more simple model M5 is to prefer.

[531] The final model M5 was thus specified such: $m5.lmer <- lmer(SitSat \sim Decision.Strategy + Emotion + OptSat + StratSat + (1|CASE) + (1|Vignette), data = df)$. The exact statistics for the three significant covariates (*Emotionality*, *Option satisfaction*, and *Strategy satisfaction*) as well as AIC and BIC for the seven models will not be reported since these details are not of importance here.

[532] "r2.marginal" from get_gof{modelsummary}.

the fixed and random effects combined[533] could only be calculated for M2, the simple model, and amounted to 42%, thus confirming once more that the random effects were the decisive components of the model.

Pairwise comparisons on M5[534] [535]yielded no significant differences between the three conditions of *Decision Strategy*: (1) "by reasons" vs. "by principle", $t(161) = -0.11, p = 0.916$, (2) "by reasons" vs. "control", $t(160) = -1.14, p = 0.258$, (3) "by principle" vs. "control", $t(160) = -1.05, p = 0.296$.

Thus, even when accounting for covariates, there are no differences between strategies on *Situation satisfaction*.

E DV2 – *Option satisfaction*

E.a Summary Statistics Table 10.16 displays the descriptives for DV2 *Option satisfaction* separately for *Decision Strategy* and *Vignette*.

[533] "r2.conditional" from get_gof{modelsummary}.

[534] Pairwise comparisons were calculated by lsmeans{lsmeans}. The p-value adjustment was disabled. The reason for this decision is (a) I am not testing a hypothesis here, (b) even if making these three pairwise comparisons were equivalent to the disjunctive hypothesis $(M_1 - M_2 \neq 0) \vee (M_1 - M_3 \neq 0) \vee (M_2 - M_3 \neq 0)$, thus making α cumulate, the kind reader may make her own Bonferroni adjustment by simply multiplying each p-value by 3 (i.e. the number of comparisons), (c) this one and various other p-value adjustment methods can be easily realized using the function p.adjust{stats}, (d) I find it difficult to adjust p-values when α cumulates in cases of disjunctive (H1) hypotheses, but not react to the cumulation of β/increased type II error in cases of conjunctive (H1) hypotheses. Please refer to footnote 500 on page 391 on that point. Last, (e), a perhaps less common, but completely Bonferroni-equivalent (and much more transparent) way of adjustment would be to divide the global α of 0.05 by the number of comparisons (here: 3), which will result in a new critical α-Level per comparison (here: $0.01\overline{6}$). That is, each calculated comparison could be declared as statistically significant only in case $p \leq 0.01\overline{6}$.

[535] Use of the R function p.adjust{stats}: first save a vector of un-adjusted p-values, e.g. pvalues <–$c(0.9159, 0.2580, 0.2960)$, then have adjusted p-values calculated: p.adjust (pvalues, method = "bonferroni"). It is recommendable to read the R documentation for p.adjust, where the various adjustment methods are described.

Table 10.16 Descriptives for DV2 *Option satisfaction*.

(a) Means and standard deviations by *Decision Strategy*.

IV	*M*	*SD*	*n*
Decision Strategy (between)			
1 - by reasons	63.86	28.03	312
2 - by principle	60.65	27.61	336
3 - control	62.10	27.46	336

Note. The high n is an artifact of the long format of the data table. The correct number is $n = 164$ participants, and the displayed n accounts for the number of data points. This has no influence on the means and standard deviations.

(b) Means and standard deviations by *Vignette*.

IV	*M*	*SD*	*n*
Vignette (within)			
Vignette 3 (V3)	64.55	24.26	164
Vignette 4 (V4)	61.23	23.69	164
Vignette 5 (V5)	76.29	19.59	164
Vignette 6 (V6)	76.88	21.97	164
Vignette 7 (V7)	41.35	28.59	164
Vignette 8 (V8)	52.67	28.99	164

E.b Mixed ANOVA Results There was no effect of *Decision Strategy* ($F(2, 161) = 0.91, p = 0.406$), a significant main effect of *Vignette* ($F(4, 615) = 56.04, p < 0.001$), and no interaction ($F(8, 615) = 0.60, p = 0.772$).

E.c Multilevel Modeling Results The multilevel results for DV2 *Option satisfaction* were basically identical to those from DV1 *Situation satisfaction*: The variables *Vignette* (as random effect, model M2) and (as covariates) *Emotionality* (M3), *Situation satisfaction* (M4), and *Strategy satisfaction* (M5) all significantly improved model fit. As opposed to DV1, here, also *Gender* (M6) improved model fit, while *Age* (M7), again, did not.

The overall effect of *Decision Strategy* remained insignificant in the final model M6 with $F(2, 157) = 1.05, p = 0.353$. In the final model M6 the variance accounted for by the fixed effects was 19% as compared to 0.21% in model M2 without the covariates. The variance accounted for by the fixed and random effects combined amounted to 35% in M6, 31% in M2, 4% in M1 – i.e., the model including *Decision Strategy* but not *Vignette* (cf. section C.a on page 418 for the model specifications) – and equally 4% in M0. Again, the random effects were the decisive components of the model.

Pairwise comparisons on M6[536] yielded no significant differences between the three conditions of *Decision Strategy*: (1) "by reasons" vs. "by principle", $t(159) = 1.43, p = 0.156$, (2) "by reasons" vs. "control", $t(159) = 0.95, p = 0.343$, (3) "by principle" vs. "control", $t(160) = -0.48, p = 0.632$.

[536] P-values were not adjusted, cf. footnote 534 on the preceding page.

Thus, even when accounting for covariates, there are no differences between strategies on *Option satisfaction*.

F DV3 – *Strategy satisfaction*

F.a Summary Statistics Table 10.17 displays the descriptives for DV3 *Strategy satisfaction* separately for *Decision Strategy* and *Vignette*.

Table 10.17 Descriptives for DV2 *Strategy satisfaction*.

(a) Means and standard deviations by *Decision Strategy*.

IV	*M*	*SD*	*n*
Decision Strategy (between)			
1 - by reasons	70.16	27.27	312
2 - by principle	68.47	25.22	336
3 - control	70.75	26.13	336

Note. The high n is an artifact of the long format of the data table. The correct number is $n = 164$ participants, and the displayed n accounts for the number of data points. This has no influence on the means and standard deviations.

(b) Means and standard deviations by *Vignette*.

IV	*M*	*SD*	*n*
Vignette (within)			
Vignette 3 (V3)	70.85	21.38	164
Vignette 4 (V4)	76.46	19.73	164
Vignette 5 (V5)	72.46	24.07	164
Vignette 6 (V6)	78.84	21.17	164
Vignette 7 (V7)	79.01	21.56	164
Vignette 8 (V8)	41.07	27.31	164

F.b Mixed ANOVA Results There was no effect of *Decision Strategy* ($F(2, 161) = 0.51, p = 0.600$), a significant main effect of *Vignette* ($F(4, 659) = 80.48, p < 0.001$), and a marginally significant interaction ($F(8, 659) = 1.79, p = 0.075$).

F.c Multilevel Modeling Results The multilevel results for DV3 *Strategy satisfaction* were again basically identical to those from DV1 as well as DV2: The variables *Vignette* (as random effect, model M2) and (as covariates) *Emotionality* (M3), *Situation satisfaction* (M4), and *Option satisfaction* (M5) all significantly improved model fit. Just as with DV1, here, too, *Gender* (M6) as well as *Age* (M7) did not improve model fit.

The overall effect of *Decision Strategy* remained insignificant in the final model M5 with $F(2, 136) = 0.49, p = 0.612$. In the final model M5 the variance accounted for by the fixed effects was 17% as compared to 0.13% in model M2 without the covariates. The variance accounted for by the fixed and random effects combined amounted to 39% in M5, 40% in M2, 7% in M1 – i.e., the model including *Decision Strategy* but

not *Vignette* – and equally 7% in M0. And again the random effects were the decisive components of the model.

Pairwise comparisons on M5[537] yielded no significant differences between the three conditions of *Decision Strategy*: (1) "by reasons" vs. "by principle", $t(161) = 0.56, p = 0.574$, (2) "by reasons" vs. "control", $t(161) = -0.41, p = 0.685$, (3) "by principle" vs. "control", $t(160) = -0.99, p = 0.324$.

Thus, even when accounting for covariates, there are no differences between strategies on *Strategy satisfaction*.

G DV4 – *Emotionality*

G.a Summary Statistics Table 10.18 displays the descriptives for DV4 *Emotionality* separately for *Decision Strategy* and *Vignette*.

Table 10.18 Descriptives for DV2 *Emotionality*.

(a) Means and standard deviations by *Decision Strategy*.

IV	*M*	*SD*	*n*
Decision Strategy (between)			
1 - by reasons	72.75	26.28	312
2 - by principle	72.10	24.84	336
3 - control	72.54	25.94	336

Note. The high n is an artifact of the long format of the data table. The correct number is $n = 164$ participants, and the displayed n accounts for the number of data points. This has no influence on the means and standard deviations.

(b) Means and standard deviations by *Vignette*.

IV	*M*	*SD*	*n*
Vignette (within)			
Vignette 3 (V3)	62.27	25.22	164
Vignette 4 (V4)	82.54	16.93	164
Vignette 5 (V5)	82.88	19.40	164
Vignette 6 (V6)	72.68	25.02	164
Vignette 7 (V7)	84.05	19.46	164
Vignette 8 (V8)	50.32	26.84	164

G.b Mixed ANOVA Results There was no effect of *Decision Strategy* ($F(2, 161) = 0.04, p = 0.956$), a significant main effect of *Vignette* ($F(4, 643) = 69.46, p < 0.001$), and no interaction ($F(8, 643) = 1.56, p = 0.133$).

G.c Multilevel Modeling Results The multilevel results for DV4 *Emotionality* were again basically identical to those from DV1, DV2, and DV3: The variables *Vignette* (as random effect, model M2) and (as covariates) *Situation satisfaction* (M3), *Option satisfaction* (M4), and *Strategy satisfaction* (M5) all significantly improved model fit.

[537] P-values were not adjusted, cf. footnote 534 on page 421.

Analogously to DV1 and DV3, here, too, *Gender* (M6) as well as *Age* (M7) did not improve model fit.

The overall effect of *Decision Strategy* remained insignificant in the final model M5 with $F(2, 972) = 0.20, p = 0.818$. In the final model M5 the variance accounted for by the fixed effects was 32% as compared to 0.01% in model M2 without the covariates. The variance accounted for by the fixed and random effects combined was unavailable for M5, and amounted to 35% in M2, 4% in M1 – i.e., the model including *Decision Strategy* but not *Vignette* – and equally 4% in M0. Looking at M2, again the random effects were the decisive components of the model. Only in M5 – including all the covariates – explained variance was at a reasonable level.

Pairwise comparisons on M5[538] yielded no significant differences between the three conditions of *Decision Strategy*: (1) "by reasons" vs. "by principle", $t(161) = -0.32, p = 0.747$, (2) "by reasons" vs. "control", $t(161) = 0.30, p = 0.766$, (3) "by principle" vs. "control", $t(160) = 0.63, p = 0.528$.

H Summary There were no differences between decision strategies on any of the dependent measures – neither with nor without covariates, neither overall (ANOVA) nor specifically (post hoc pairwise comparisons). Accordingly, when comparing multilevel models, the inclusion of *Decision Strategy*, the main independent variable of this study, did not improve model fit. On the other hand, including (the random effect of) *Vignette* was an important predictor explaining a lot of variance.

10.2.2.2 Hypothesis Testing

A H0.1 (H0.1) There is no difference between strategies on DV1, *Situation satisfaction*.

This hypothesis is visibly a null hypothesis. Therefore, it seems important to think about β/type II error – i.e. the probability to wrongly maintain a null hypothesis while the alternative hypothesis is true.[539] Post hoc power analysis comes to mind, but does not make very much sense (cf. e.g. Dziak et al., 2020; Hoenig & Heisey, 2001), and most importantly is not very informative: given non-significant results and a small (empirical) effect size, of course, so called "observed power" will be low. Instead, I would like to know, given sample size and an expected small effect (a) plus given the conventional alpha of $\alpha = 0.05$, what is my beta, and (b) making a trade-off between alpha and beta, what would be my critical alpha/p-value. The tool G*Power (Faul et al., 2007) offers a specific type of power analysis for the latter case.

Setting a small effect size ($f = 0.1$), $N = 164$, number of groups = 3, number of measurements = 6, correlation among repeated measures = 0.09,[540] and $\alpha = 0.05$ resulted in: $\beta = 0.37$. That is, the probability to wrongly maintain the H0 would be 37% – which

[538] P-values were not adjusted, cf. footnote 534 on page 421.

[539] The reader may have already noted my interest in power calculations, β/type II error and transparent adjustment (cf. footnotes 534 on page 421 and 500 on page 391).

[540] The parameter "correlation among repeated measures" which needs to be entered in the case of a repeated measures ANOVA was empirically determined by means of using the wide format version of the dataset to obtain a correlation matrix of the DV over vignettes.

in this case is unacceptable. Using the same parameters, setting $\beta = 0.05$ and requesting alpha, returned $\alpha = 0.46$ – which, even in this case, would be too unconventional. The "compromise" type of power analysis where a "β/α ratio" can be chosen[541] was thus used. Maintaining the conventional ratio of 4, returned $\alpha = 0.08$ and $\beta = 0.30$. Since the hypothesis in question is a null hypothesis and thus the (type II) risk of wrongly maintaining this hypothesis is somewhat equivalent to the ordinary type I error in cases of alternative hypotheses, the β/α ratio was set to 1. The result was $\alpha = \beta = 0.17$. Thus, the probability to wrongly maintain the H0 or to wrongly accept the H1 would both be 17%. The critical alpha of $\alpha = 0.17$ would be the value that the empirical p-value would need to fall below in order to accept the H1.

Having determined our critical alpha of $\alpha_{crit} = 0.17$, we can go back to the mixed ANOVA results on *Situation satisfaction* from section D.b on page 420 from 10.2.2.1: with $p = 0.528$, $p > \alpha_{crit}$, and thus we can maintain H0.1.[542] – The hypothesis that there is no difference between strategies on *Situation satisfaction* can be maintained.

B H1.1 (H1.1) On DV2, *Option satisfaction*, there is a difference between strategies.

The answer to this hypothesis can be found in the mixed ANOVA results for *Option satisfaction* from section E.b on page 422 from 10.2.2.1: there was no significant main effect of *Decision Strategy* on *Option satisfaction*. Even entering significant covariates in the multilevel model, *Decision Strategy* remained insignificant, cf. section E.c on page 422. Looking at pairwise comparisons including these covariates, there were no significant pairs.[543] Thus, H1.1 clearly could not be confirmed.

C H1.2 (H1.2) On DV3, *Strategy satisfaction*, there is a difference between strategies.

This, of course, is the main hypothesis: decision strategy makes a difference to satisfaction regarding the strategy used. Again, the answer can be found in the mixed ANOVA results for *Strategy satisfaction* from section F.b on page 423 from 10.2.2.1: there was no significant main effect of *Decision Strategy* on *Strategy satisfaction*. Even entering significant covariates in the multilevel model, *Decision Strategy* remained insignificant, cf. section F.c on page 423. Looking at pairwise comparisons including these covariates, there were no significant pairs.[544] Thus, H1.2, too, could not be confirmed.

D H1.3 (H1.3) The more emotional the decision situation (DV4), the *more* satisfied are participants with the decision strategy (DV3) in the conditions "decide by reasons" and "decide by principle" and the *less* satisfied are participants in the condition "decide by self-chosen strategy" (=control).

[541] Note that the conventional version of $\alpha = 0.05$ and $1 - \beta = 0.80/\beta = 0.20$ results in a β/α ratio of 4. A higher number makes alpha smaller at the cost of beta, a lower number reversely so. A ratio of 1 gives α and β equal importance, thus an equal number.

[542] Note that even if we had chosen to set $\beta = 0.05$ and $\alpha = 0.46$ as depicted above, the empirical p-value would still have been greater than the critical alpha, and the H0 would still have been maintained.

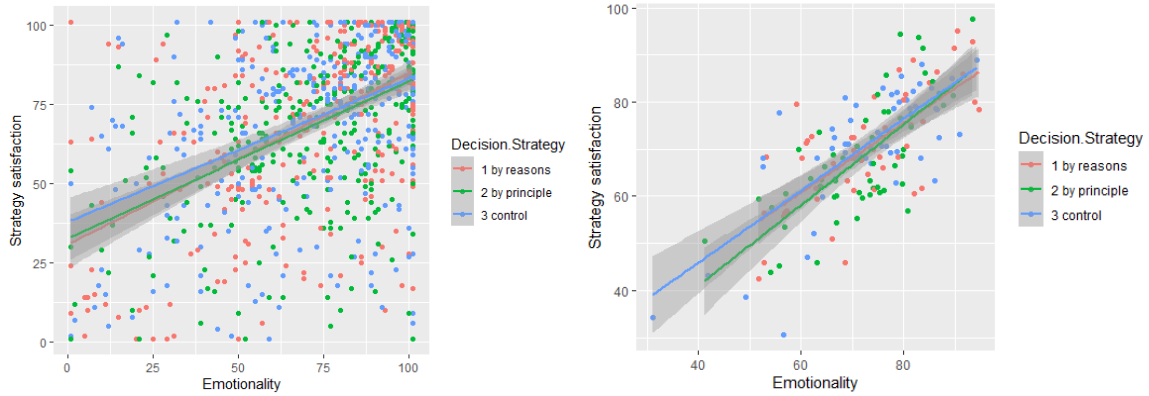
[543] And mind here footnote 534 on page 421, point (e), which explains that for each comparison $\alpha_{crit} = 0.01\overline{6}$.

[544] Cf. footnote 543.

A look at the correlations per group (cf. Table 10.14 on page 417) already shows that there are no negative correlations regarding *Emotionality*, such that the second part of the hypothesis cannot be true. The first part of the hypothesis descriptively is the case, but looking at (H1.3) like this, splitting it in its two parts, is not true to its idea. The idea is: The two manipulated strategies are different from the control group – in that there, the correlation between *Strategy satisfaction* and *Emotionality* is higher than in the control group. Therefore, to give this idea a chance, let's change the hypothesis such:

$$(r_{reas} > r_{contr}) \wedge (r_{prin} > r_{contr})$$

Here is a graphical depiction calculated both on the long format data (cf. Figure 10.15a) and the wide format data averaged over vignettes (cf. Figure 10.15b). Figure 10.16 on the next page displays the same correlations additionally split by *Vignette*.



(a) Correlations on long format data.

(b) Correlations on wide format data.

Figure 10.15 Correlation of *Emotionality* and *Strategy satisfaction* grouped by *Decision Strategy*.

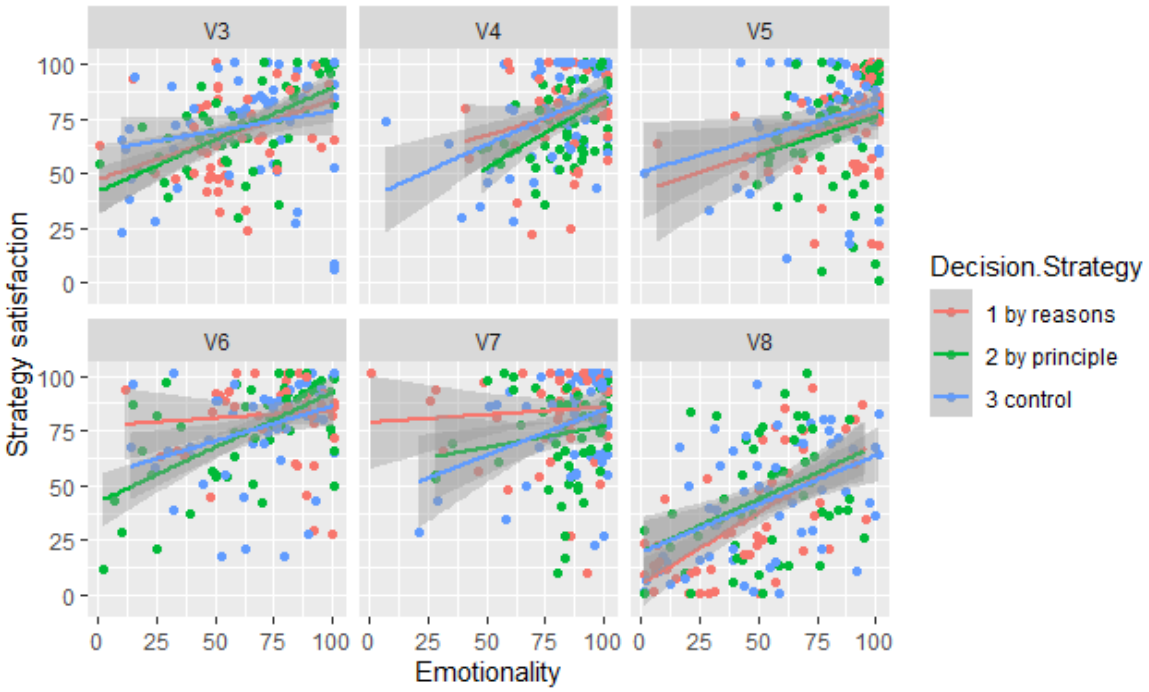


Figure 10.16 Correlation of *Emotionality* and *Strategy satisfaction* grouped by *Decision Strategy* and *Vignette*.

Visibly, the correlations between vignettes were quite different. A non-formatted table with the according correlation coefficients can be found in the Appendix (cf. Table D.3 on page 641).

The modified hypothesis above is a conjunctive alternative hypothesis, that is: beta cumulates. Specifications can be found in the below footnote 545.[545]

The z-test to compare two correlations from independent samples (Lenhard & Lenhard, 2014) yielded for the first difference ($r_{reas} > r_{contr}$): $z_{Diff1} = 0.69$, $p_{Diff1} = 0.247$, and for the second difference ($r_{prin} > r_{contr}$): $z_{Diff2} = 0.39$, $p_{Diff2} = 0.349$. While according to conventional decision rules both differences would count as clearly non-significant,

[545] The following parameters were entered into G*Power in order to establish the status quo power for the first part of the conjunctive hypothesis: tails = one, effect size = medium, $\alpha = 0.05$, sample sizes: $n = 52$ and $n = 56$. This returned: $\beta = 0.54$ and an according power of $1 - \beta = 0.46$ – which is an unspeakably bad result. Therefore, the β/α ratio was set to 1 (having been 10 at the above specifications), which resulted in $\alpha = \beta = 0.22$. That is, upon these specifications the difference between the correlations (r_{reas} and r_{contr}) would be declared significant once $p < 0.22$. However, these are the specifications for the first part of the conjunctive hypothesis. Let's assume the specifications for the second part were the same (they will only slightly differ due to 4 more participants). Then, the global beta for the complete hypothesis would be $2*0.22 = 0.44$, while alpha remains $alpha = 0.22$. Let's integrate this knowledge and set the β/α ratio to 0.5. This results in $\beta_{test} = 0.15$ and respectively in $\beta_{global} = 0.31$; alpha does not cumulate with $\alpha_{Test} = \alpha_{global} = 0.31$. According to these calculations we'd have to declare each oft the two pairs of correlations to be significantly different at $p < 0.31$ – fully knowing that the probability of both the type I and the type II error in this case would be 31%.

according to the considerations in footnote 545, Diff1 would be significant while Diff2 would not.

At any rate, the hypothesis in total cannot be confirmed. There is no significant difference regarding the relation of *Strategy satisfaction* and *Emotionality* between the instructed decision strategies and the control group.

E Summary Four hypotheses were tested, one of which an H0.

None of the three alternative hypotheses could be confirmed, and the one null hypothesis was maintained. That is, in other words, there were no significant differences whatsoever.

- There were no differences between strategies on *Situation satisfaction* (H0.1).
- There were no differences between strategies on *Option satisfaction* (H1.1).
- There were no differences between strategies on *Strategy satisfaction* (H1.2).
- There was no moderating effect of *Emotionality* regarding the deliberational decision strategies versus self-chosen strategy/control on *Strategy satisfaction* (H1.3).

10.2.2.3 Additional Variables

A *Commit* The variable *Commit* asked participants from the two experimental conditions which strategy they could commit to for a week (cf. section 10.2.1.2 on page 409). The results can be found in Table 10.19.

Table 10.19 Count data on *Commit* by group.

	DV Commit to decision strategy for a week			
	by reasons	by principle	other	n
IV Decision Strategy (between)				
1 - by reasons	**44**	**7**	**1**	52
2 - by principle	**40**	**12**	**4**	56
n	84	19	5	N=108

One might have thought that participants would choose the strategy they had had to use during the experiment – but this is not what happened. The vast majority of participants chose to decide "by reasons" if they had to commit for a week. Post hoc this is easily explained with the fact that (a) in everyday life we are used to operate with reasons – think about reasons, give reasons, request reasons – but not so regarding principles, and that (b) the format of the decision situation vignettes was basically a pros and cons list – which is what we do with reasons, but not with principles.

Calculating Fisher's exact test to determine whether there was a significant association between *Decision Strategy* and *Commit*[546] yielded a non-significant result (two-

[546] Fisher's exact test is used once there would be expected values < 5 in the calculation of the chi-squared test – or one or more of the cell counts in the cross table is < 5.

tailed, $p = 0.201$).[547] That is, *Decision Strategy* is unrelated to participants' preference for one or the other strategy in case they had to commit.

Collapsing the two conditions of *Decision Strategy* and leaving out the category "other" from the DV *Commit*, a Binomial Test was calculated to confirm that the total proportions of $n = 84$ participants committing to reasons and $n = 19$ participants committing to principles are not equal. As plainly visible, these proportions significantly differ from equal distribution, $\chi^2(1) = 39.77, p < 0.001$.

In sum, participants in this study, no matter which decision strategy they were subjected to in the experimental manipulation, on average preferred to decide by reasons rather than by principle.

B Rational/Vigilant Decision Style From the DSQ At the end of the study participants answered 10 items from the rational/vigilant subscale of the Decision Style Questionnaire (DSQ, cf. section 9.2 on page 231 for the development of the DSQ, and Table 9.12 on page 245 for the final version of the DSQ).[548] The respective 5 items from the final DSQ (cf. footnote 548) were aggregated to constitute a one-variable indicator of each participant's proneness to a rational/vigilant decision style: *DSQ rational*.[549]

B.a Summary Statistics Cf. Table 10.20 for summary statistics split by group. A one-way ANOVA confirmed that there were no differences between groups, $F(2, 161) = 0.57, p = 0.569$.

Table 10.20 Summary statistics for *DSQ rational*.

IV	*M*	*SD*	*n*
Decision Strategy (between)			
1 - by reasons	4.17	0.58	52
2 - by principle	4.06	0.66	56
3 - control	4.16	0.58	56

B.b *DSQ rational* as Covariate in Multilevel Modeling Does controlling for the variance in participants' decision style make visible differences in *Strategy satisfaction* due to *Decision Strategy*? Asked differently: what happens to *Strategy satisfaction* using *DSQ rational* as an additional predictor?

[547] Fisher's exact test has no test statistic to report.

[548] NB: At the time of the conduction of the present study, the final version of the DSQ was not yet established. In the final version, the subscale "rational/vigilant" includes only 5 items, whereas originally 10 items were distilled from the literature and entered into analysis (cf. Table 9.7 on page 233 from *Decision Style Questionnaire*, section 9.2 on page 231, within chapter *Questionnaires*, chap. 9). All of these original 10 items were given to participants in the present study. However, since the final rational/vigilant subscale of the DSQ is established now, only its 5 items (items #3, #4, #5, #8, and #10) will be used here for further analysis.

[549] *DSQ rational* is based on a 5-point Likert scale from 1 "stimme gar nicht zu" [do not agree at all] to 5 "stimme absolut zu" [do absolutely agree], cf. section B on page 232 for the according scale information in *Decision Style Questionnaire*, section 9.2 on page 231.

The short answer is: it does not change anything. In the model comparison, *DSQ rational* does not significantly improve model fit, $\chi^2(1) = 0.45, p = 0.504$. There is no main effect of *Decision Strategy* ($F(2, 160) = 0.46, p = 0.635$), nor is there a main effect of *DSQ rational* ($F(1, 160) = 0.44, p = 0.509$).

C Personal Values From the 14BiPole-Value Questionnaire The 14 data points from the 14BiPole-Value Questionnaire (Strack, 2001, 2004; Strack et al., 2008) are used to generate the two dimensions "Universality" and "Tradition".[550] Participants' individual values on the two variables mark their position in the Schwartz Value Circle (Schwartz, 1992). A visual depiction is displayed in Figure 10.17. The graph on the right hand side shows that in this sample mainly consisting of university students participants uniformly did not score high on the dimension "Tradition" (with values such as: control, order, and authority).

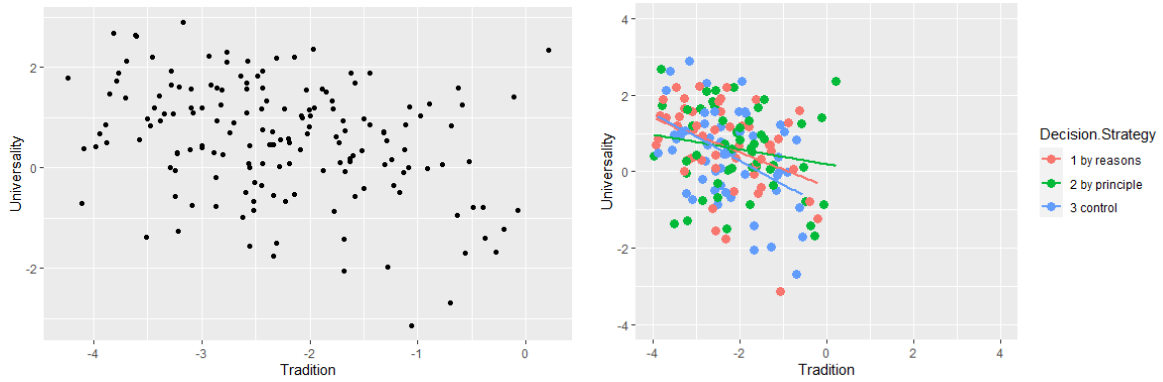


Figure 10.17 Scatterplots of participants' personal values in the dimensions *Universality* and *Tradition*.

Note. On the right hand side (i) personal values are displayed split by *Decision Strategy* including regression lines, and (ii) the scaling of both axes was set to {-4,4}.

C.a Correlations by Group The regression lines by group in Figure 10.17 (right hand side) point to differing correlations of *Universality* and *Tradition* depending on *Decision Strategy*. These correlations are: $r_{reas} = -0.39$, $r_{prin} = -0.12$, and $r_{contr} = -0.48$. A z-test to determine whether they significantly differ revealed for "reasons" vs. "principle" a marginally significant difference ($z = -1.50, p = 0.067$), a non-significant difference for "reasons" vs. "control" ($z = 0.56, p = 0.287$), and a significant difference for "principle" vs. "control" ($z = 2.10, p = 0.018$). Thus, regarding their location in the Value Circle due to their personal values participants having had to decide by principle on average significantly differ from participants having decided according to their own strategy ("control") and descriptively also from those having had to decide by reasons. To facilitate visual inspection, a so-called convex hull was calculated, cf. Figure 10.18.

[550] The formula necessary to calculate these two dimensions from the raw data was kindly given to me by Micha Strack in 2016.

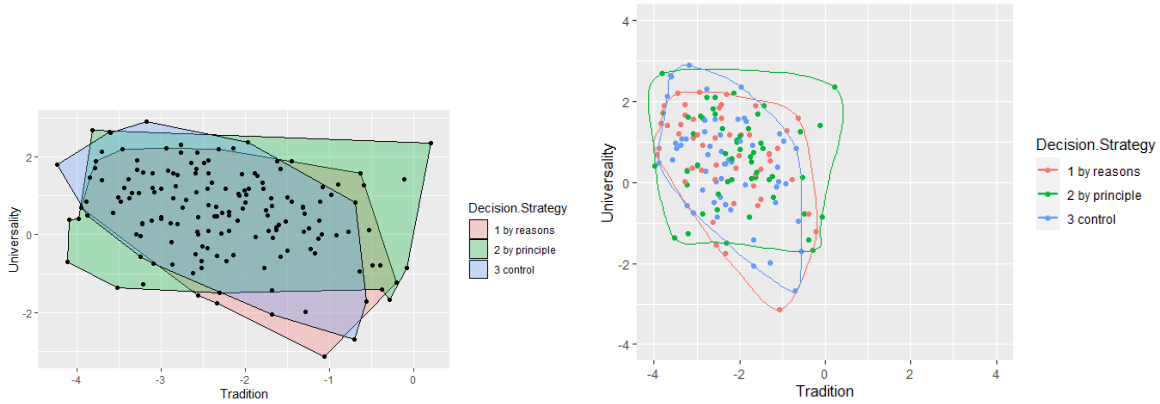


Figure 10.18 Scatterplots of personal values with points grouped by *Decision Strategy*.
Note. On the right hand side the scaling of both axes was set to {-4,4}.

Figure 10.18 confirms visually that (i) while the scatter pattern is not identical between groups, still the vast majority of points overlap, and (ii) the lack in overlap is caused by only a few data points. Thus, there is no reason to think that the three groups of *Decision Strategy* – in spite of participants' random allocation – really stem from different populations by chance.

The other explanation for the one significant difference between groups ("principle" vs. "control") besides a pre-existing chance difference, or – descriptively speaking – the visibly differing correlation coefficients would be to consider an influence of the decision strategy manipulation on participants' personal values. However, this is not likely since personal values are conceptualized to be quite stable, similar to attitudes.

C.b Summary Statistics Summary statistics are presented in Table 10.21 and Figure 10.19. A MANOVA confirmed that there were no differences between groups, $F(4, 322) = 0.65, p = 0.628$.

Table 10.21 Summary statistics for *Tradition* and *Universality*.

	n	Tradition		Universality	
IV		*M*	*SD*	*M*	*SD*
Decision Strategy (between)					
1 - by reasons	52	-2.35	0.97	0.65	1.11
2 - by principle	56	-2.12	1.06	0.56	1.08
3 - control	56	-2.33	0.94	0.49	1.21

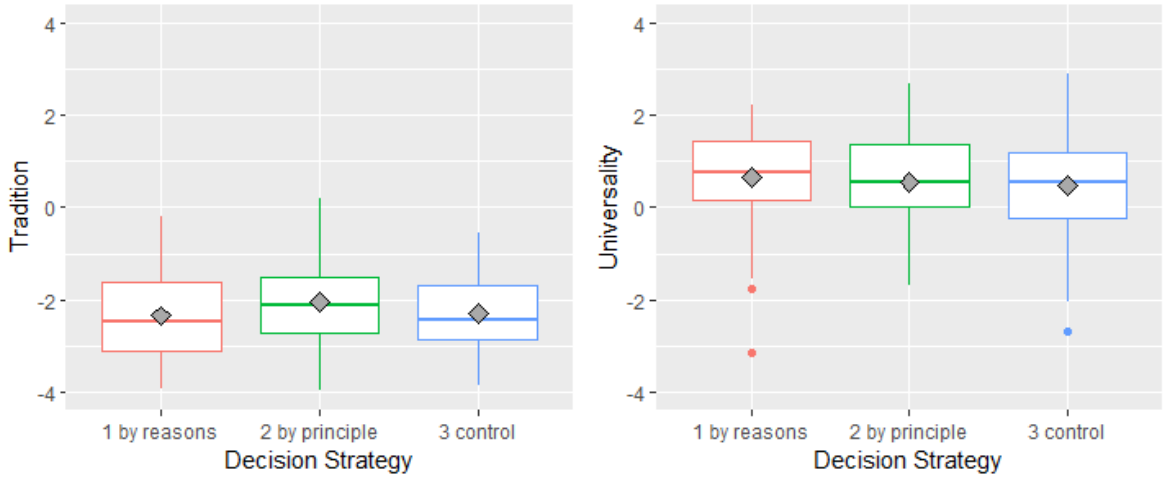


Figure 10.19 Boxplots of *Tradition* and *Universality* by *Decision Strategy*.
Note. Mean values are signified by the grey diamond shape.

C.c *Tradition* and *Universality* as Covariates in Multilevel Modeling In the model comparison, neither *Universality* (M3: $\chi^2(1) = 0.04, p = 0.848$) nor *Tradition* (M4: $\chi^2(1) = 0.31, p = 0.579$) improved model fit. There was no main effect of *Decision Strategy* ($F(2, 159) = 0.56, p = 0.572$), nor was there a main effect of either *Universality* ($F(1, 159) = 0.00, p = 0.999$) or *Tradition* ($F(1, 159) = 0.30, p = 0.584$).

D Summary Three further measures were scrutinized: the variable *Commit*, the composite measure *DSQ rational*, and the 14BiPole-Value Questionnaire:

The two experimental groups (not the control group) were asked which decision strategy, deciding by reasons or deciding by principle, they could commit to for a week, and the result was that independent of *Decision Strategy* participants significantly preferred to commit to using reasons as a decision strategy for a week.

Controlling for rational/vigilant decision style from the DSQ did not change the null effect of *Decision Strategy* on *Strategy satisfaction* and did not improve model fit.

Regarding the two dimensions of the value circle, participants overall scored low on *Tradition* and medium to high on *Universality*, as is to be expected for a student sample. *Universality* and *Tradition* did not improve model fit in Multilevel Modeling.

10.2.2.4 Summary

Overall, the results of this study are dire: none of the hypothesized effects of decision strategy on satisfaction materialized and none of the covariates could change that.

10.2.3 Discussion

10.2.3.1 Reminder of all Results

There basically were no significant results. For a summary of the results from hypothesis testing, cf. section E on page 429, and for a summary of the results from the additional variables, cf. section D on the preceding page.

10.2.3.2 Purpose Evaluation

The purpose of this study was to test the main research question of this thesis – the hypothesized differential effect of 'deciding by reasons' versus 'deciding by principle' on satisfaction – within an often-used research paradigm, namely MADM displayed in matrix format.

The independent measure *Decision Strategy* was split into three conditions: the two deliberational strategies above and a control condition where participants were free to use any decision strategy they wanted, but were asked to make a note on *how* they were going to decide in an open text field.

The dependent measure satisfaction was split into *Situation satisfaction* ("I am satisfied with...the decision making situation overall"), *Option satisfaction* ("I am satisfied with...the decision option I have chosen"), and *Strategy satisfaction* ("I am satisfied with...the decision strategy I used [(= weigh reasons) / (= apply a principle) / %]"), cf. Table 10.12 on page 413 within 10.2.1.3 for the dependent variables.

Differences due to *Decision Strategy* were hypothesized for *Option satisfaction* and *Strategy satisfaction*, but not for *Situation satisfaction* (cf. section 10.2.1.1 on page 408 for the rationale). Yet, there were no differences between strategies (overall or pairwise) on any dependent variable even when integrating covariates into the model that even had improved model fit.

The most pervasive effect also explaining the most variance was the effect of *Vignette* – that is: once more a content effect.

The study was analyzed using multilevel modeling in order to apply the most appropriate method of analysis.

In some sense, this study absolutely fulfilled its purpose: it suggests very strongly that there just is no effect of 'deciding by reasons' versus 'deciding by principle' on (strategy) satisfaction.

10.2.3.3 Possible Limitations, Solutions, and Interpretations

Sample Characteristics The analyzed sample included $N = 164$ participants which is not a lot, but sufficient considering the design (1 between subjects factor with 3 conditions) and the method of analysis (multilevel modeling). Most participants were students (79%), and most of these were psychology majors (74%). The majority of participants was female (74%).

Measures Splitting satisfaction into three distinct measures was meant to afford a more specific look at strategy satisfaction. Indeed, participants were able to distinguish the three referents of satisfaction, as correlation results suggest (cf. section B on page 416).

Design and Operationalizations The design was simple with only one between subjects factor.

Vignettes The 'themes' of the vignettes were based on the collegiate decision situations that had been distilled while studying the Decision Categorization Scales (cf. section 9.3 on page 250). The format was based on a standard matrix visualization of the MADM paradigm. The specific contents of the vignettes were devised by students (and quality approved by me), such that good fit with the student sample was ensured. Yet, the differences between vignettes created a lot of variance, once more confirming the impact of content.

However, the specific reasons for participants' differing reactions to vignette content are not easy to understand. Comparing the means of the three dependent satisfaction measures and *Emotionality* per vignette as reported in sections D on page 419, E on page 421, F on page 423, and G on page 424, shows that there is not one pattern, but several.

For example, the highest and lowest ratings per DV were these (rounded):

Situation satisfaction: $M_{max} = M_{V4} = 81$, $M_{min} = M_{V7} = 29$

Option satisfaction: $M_{max} = M_{V6} = 77$, $M_{min} = M_{V7} = 41$

Strategy satisfaction: $M_{max} = M_{V7} = 79$, $M_{min} = M_{V8} = 41$

Emotionality: $M_{max} = M_{V7} = 84$, $M_{min} = M_{V8} = 50$

All vignettes can be found in the Appendix, section I.2 on page 710.

V4 is 'exam option' with the attributes: timing (soon, later), difficulty (hard, easy), further parallel exams (one, none), and content (known, unknown). V7 is 'termination of studies' to take a job with the attributes: finances (good, bad), CV (bad, good), education (bad, good), exam stress (no, yes), current career (good, bad). V6 is 'job during studies' with the attributes: free time (little, much), finances (better, worse), CV (good, bad), consequences for studying (less time, sufficient time), consequences for graduation (later, in time). V8 is vacation destination with the attributes: group (strangers, friends), language school (yes, no), recreation (stressful, relaxed), new contacts (yes, no).

For example, within the three satisfaction measures, V7 was rated highest once and lowest twice: V7 produced both the lowest *Situation satisfaction* and *Option satisfaction*, but the highest *Strategy satisfaction*.

The only visible pattern (on this level of analysis) is that *Strategy satisfaction* and *Emotionality* show the same pattern: maximum values for V7, minimum values for V8.

A bold hypothesis just based on the second point is this: among the six remaining vignettes, V7, 'termination of studies', might be one of the more uncomfortable decisions, which is why emotionality is rated high, and strategy (no matter which) is appreciated. However, this interpretation does not entirely hold up with the patterns of the second and third highest ratings among the other vignettes.

Furthermore, the first point seems to corroborate the perceived difficulty of V7: the decision situation on the whole is unsatisfying and the satisfaction with the chosen option is low, because the non-chosen option has attractive aspects, too. However, the second lowest ratings for situation and option satisfaction were for V8, 'vacation destination', but vacation destination *also* has the lowest strategy satisfaction rating. But 'vacation destination' is very different to 'termination of studies' in terms of scope of consequences and thus arguably in terms of importance.

Going with that, it seems that situation and option satisfaction may be low for both important (V7) as well as unimportant (V8) decisions, but only if the decision is important, strategy (no matter which) is appreciated, whereas unimportant decisions are better left to self-chosen/spontaneous decision making.

But all of this amounts to poking in the dark. The contents of the vignettes have not been rated on any promising dimensions such as 'significance'. It would have been interesting to use the Characteristics of Decision Situations Scale (cf. section A.e on page 294 within 9.3.2.3) from the Decision Characterization Scales (section 9.3) with its dimensions *Difficulty*, *Duration*, *Predictability*, *Control*, *Clarity*, and *Significance*. However, that scale has 14 items such that it would have been much to ask from participants to rate each of the eight vignettes furthermore on these items. Alternatively, the vignettes could have been rated within a pre-study to at least get an idea regarding the differing values on these dimensions and/or create a 'balanced' set of vignettes. Yet, having the actual study participants also rate the vignettes would have been much more valuable as the individually perceived qualities of the vignettes could have been used as covariates.

At any rate, the effects of content are huge, but remain somewhat mysterious at this point.

Decision Strategy Once more, three decision strategy conditions were used. The two deliberational strategies, deciding by reasons and deciding by principle, were manipulated in the same way as in the Pilot Study. The third condition, control, did not simply encourage intuitive decision making, but allowed for a 'self-chosen strategy' that had to be reported. In doing so, the gap between control and the deliberational strategies – discussed at length regarding the Trolley Experiment, cf. section 10.1.3.3 on page 403 – was meant to be ameliorated. One aspect of that gap was 'guidance' which was provided by the deliberational strategies, but not by a purely intuitive control condition (without any instructions). Another aspect was deliberation: following the manipulation of 'decide by reasons' and 'decide by principle' participants had to deliberate, which was not the case in a purely intuitive control condition. Yet, the interest of this research project never was for a distinction between deliberation vs. no

deliberation (or: System 1, System 2), but between two deliberational strategies. Accordingly, in this experiment, the control condition entailed instructions to note down a self-chosen strategy and decide accordingly. In doing so, (i) the control condition provided guidance (note down a strategy and use it) just as the experimental conditions, yet not the specific guidance of deciding by reasons and deciding by principle, and (ii) the control condition also required deliberation, but again not the specific deliberation of looking for reasons and principles. A formal difference is that in the control condition the deliberation had to be about which strategy to employ and verbalize it, whereas in the experimental conditions the strategy was set and the deliberation was about which reasons or principles to use.

At any rate, taking it seriously that two formal differences – guidance and deliberation – between experimental conditions and control had probably been eliminated, it is all the more telling that there were no significant differences between experimental conditions and control as there had been in the Trolley Experiment where the control condition had not involved guidance and deliberation (cf. section 10.1.2.2 on page 390).

A bold interpretation of the results of both experiments would thus be that while there is no differential effect on satisfaction of specific kinds of guidance and deliberation as provided by 'deciding by reasons' versus 'deciding by principle' *or* unspecific guidance and deliberation as induced by the control condition in the present MADM Experiment – *there is* an effect of guidance and deliberation as became obvious in the Trolley Experiment where the contrast was with a purely intuitive control condition.

Thus, what may have been corroborated is the differential effect on satisfaction of guidance/deliberation versus 'intuition' as (aspects of) decision strategies which has been shown before (cf. section 5.4 on page 153).

Further Analyses One interesting aspect of the analysis of further variables was the fact that participants were much more prone to choose 'deciding by reasons' as a week-long decision strategy than 'deciding by principle'. However that may be explained by the characteristics of the sample being young and educated, potentially progressive, and possibly associating 'principles' with authoritarianism and political conservatism.

One major gap in analysis is that I did not analyze the string variables (due to time constraints). All conditions of *Decision Strategy* provided string variables: participants wrote down their principles, their reasons, and their self-chosen strategies (control). The entries for self-chosen strategies in the control group should have been quite interesting in that one could have tried to classify them into different strategies. Furthermore, I would have liked to investigate whether the MADM paradigm – which due to the matrix format essentially is a descriptive pros and cons list – made participants more prone to use reasons in their decision making than anything else. However, based on the present experiment with all participants being confronted with the MADM matrices, the latter question could not have been answered.

Summary There were no significant results in this experiments, while the sample size, the measures, operationalizations, and manipulations all seemed reasonable and

functional. It stands to reason that 'deciding by reasons' versus 'deciding by principle' just does not differentially affect any satisfaction measure.

10.2.3.4 Conclusion

The two most important findings of this experiment are these: (1) Once again, vignette content proved to be important to all dependent measures, but difficult to analyze, (2) the *presence* of guidance/deliberation seems to have a chance at making a difference to satisfaction measures, whereas the *quality* of the guidance/deliberation seems not to.

At any rate, again 'deciding by reasons' versus 'deciding by principle' did not make a difference to satisfaction.

10.3 Reasons vs. Principles in a Field Experiment

The following two pages are the handout to a poster presented at the SPUDM Conference in 2017. Unfortunately, I do not have the time to re-analyze and report this experiment at length (which would take about two months of concentrated work and result in 30+ further pages).

Accordingly, what I will do is to set the contents of the below handout into LaTeX for ease of legibility (without changes) starting with section 10.3.1 on page 442, discuss the results at more length than in the handout in section 10.3.5 on page 446, and include the results of this experiment in the general discussion in part *Concluding* (Part III).

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WHICH DECISION STRATEGY LEADS TO GREATER SATISFACTION?

A FIELD EXPERIMENT DISENTANGLING GENDER EFFECTS

INTRODUCTION

We make decisions all the time. Life is made up of decisions, big and small. Since every controlled, non-automatic process involves a decision. The decision of what to order in a restaurant, whom to marry or even just whether to have a cigarette, watch another episode, or eat an apple. Sometimes we wonder how to decide best, that is: what strategy to use.

One should hope to find some guidance in either normative philosophical ethics or decision sciences. One of the highest-level distinctions in the latter is the one between compensatory strategies (like WADD) and non-compensatory strategies (like LEX). A similar distinction is mirrored in moral psychology's dimension of consequentialism (weighing consequences) versus deontology (following singular rules), e.g. Cushman, 2013.

The distinction I revert to here is similar to the preceding two in some ways, and different in others, but structurally it is set at a yet lower level of explanation. It is the distinction (popularized by the emergence of moral particularism; Dancy, 2004) between *deciding by principle* and *deciding by reasons* (particularistically). Both are conceptualized as deliberate decision strategies. They are not confined to the moral realm. While deciding by principle is deciding according to a general rule holding for all situations of a kind, deciding by reasons means to decide casuistically in accordance with each specific situation. Reasons are not confined to consequences, but all facts can be reasons (e.g. Dancy, 2013).

PREVIOUS RESEARCH

While there is ample literature on decision strategies,

> "[t]he question of *how* [my italics] people arrive at satisfying decisions has not been given much attention in psychology or economics" and
>
> "previous research examining satisfaction with choice has largely been focused on satisfaction with outcomes [...]. In reality, however, one could report being satisfied with an entire decision-making process and yet be disappointed by an outcome. In such a case, one may evaluate decision quality as low, not because the decision was bad, but rather because of chance or bad luck affecting the outcome"

(Crossley & Highhouse, 2005, p. 256, p. 258).

Apart from studies on decision-making *style*, there is only little and scattered research as to the influence of strategy on satisfaction.

A FIELD EXPERIMENT

This study's aim is to investigate whether these two strategies and a third, deciding by intuition, make a difference to people's satisfaction when used in their everyday lives. Therefore, a field experiment was conducted in which participants had to successively make personal decisions by means of one of the three strategies. The results of this study could give real indications as to what strategy to adhere to when making everyday personal decisions.

Methods

Design & Hypotheses. Participants had to document 10 personal decisions. The experimental factor (between) was *decision strategy* with the levels "by principle" (P), "by reasons" (R), "by intuition" (I). The main dependent variable was *immediate satisfaction* after each decision (repeated measures). In a final questionnaire administered after the field phase participants were asked to give several overall evaluations on satisfaction and other aspects (e.g. strategy similarity). I hypothesized differences on all satisfaction DVs, while taking into account gender as well as additional descriptors of the decisions.

Materials & procedure. The field experiment was conducted online. Participants were asked to document two decisions of their choice per day on five succeeding days on their mobile phones. They were instructed to start with the questionnaire as soon as they wanted to decide something (e.g. whether to go to the gym or stay home). The questionnaire led them through the decision process according to the decision strategy they had been allocated to. Participants of all experimental groups had to describe the current decision on 11 items (e.g. importance, difficulty, number of people affected etc.) and rate *immediate satisfaction* (scaled from 1-101, 'not at all satisfied' to 'absolutely satisfied'). Demographics and a short Big Five questionnaire were recorded before the field phase and general retrospective evaluations (e.g. *global satisfaction*, *strategy satisfaction* and *outcome satisfaction*) after. University student participants received course credit for participation, privately recruited participants were not rewarded.

Participants. Participants were recruited from two German universities and through private acquisition. Filtering for diligence N=169/124 participants (of originally N=223) were retained, producing 1604 documented decisions, 6-10 decisions per person. Age ranged from 18-63 years with a mean of M=26 years (Mdn=23, SD=9.93). There were 77% females and 23% males. 75% of participants were university/college students.

Results

A multilevel approach was used to look at the repeated measures DV *satisfaction* (R package 'lmerTest'). With gender of participants included, ANOVA results showed a significant main effect of strategy ($F(2,163.27)=3.31$, $p=.039$) and a significant interaction with gender ($F(2,163.27)=3.57$, $p=.030$). Planned contrasts revealed a marginally significant difference between the two strategies *by principle* versus *by reasons* ($t(164.67)=-1.80$, $p=.073$) and a significant difference comparing these two to the strategy *by intuition* ($t(162.01)=-2.20$, $p=.030$. Satisfaction was higher when using the strategy *by principle* ($M_{(P)}=77.36$) than *by reasons* ($M_{(R)}=72.21$); lowest satisfaction ratings were obtained when using the strategy *by intuition* ($M_{(I)}=69.80$). However, these results are driven by the interaction with gender. There was a marginally significant interaction of the first contrast with gender ($t(164.67)=-1.86$, $p=.064$) and a significant interaction of the second one with gender ($t(162.01)=-2.29$, $p=.024$). While female participants showed virtually no difference in satisfaction between all three strategies ($M_{(Pf)}=71.80$, $M_{(Rf)}=71.97$, $M_{(If)}=72.08$), strategy use had an effect on male participants: highest satisfaction was reached when deciding *by principle* ($M_{(Pm)}=82.92$), lowest when deciding *by intuition* ($M_{(Im)}=67.51$), and their satisfaction when deciding *by reasons* was at the same level as that of the females ($M_{(Rm)}=72.44$). → See Figure 1 and Table 1.

As to the overall retrospective evaluations of satisfaction, no differences of strategy or gender were found regarding *outcome satisfaction*. The same initially held for *global satisfaction* with all decisions, yet when adding the covariate "similarity" where participants indicated how similar the imposed strategy was to their usual decision-making, a significant difference between the strategies *by principle* and *by reasons* emerged, $t(162)=-2.44$, $p=.016$, and no interaction with gender, showing that, when controlling for *similarity*, participants of both genders retrospectively were more satisfied with their decisions having had to decide *by principle* ($M_{(P)}=84.03$) than *by reasons* ($M_{(R)}=76.25$). → See Figure 2 and Table 2.

Strong differences were found on the variable *strategy satisfaction*, with a main effect of strategy ($F(2,163)=12.97$, $p<.001$) and an interaction thereof with gender ($F(2,163)=3.97$, $p=.021$). Overall, there was significantly more satisfaction with the strategy *by reasons* ($M_{(R)}=72.11$) than *by principle* ($M_{(P)}=57.66$), $t(163)=2.66$, $p=.009$. A significant interaction contrast ($t(163)=-2.03$, $p=.044$) revealed that while males saw little difference between the two strategies ($M_{(Pm)}=66.31$, $M_{(Rm)}=69.73$), females were much more satisfied with the strategy *by reasons* ($M_{(Rf)}=74.49$) than *by principle* ($M_{(Pf)}=49.02$). → See Figure 3 and Table 3.

Discussion

This study was partially exploratory in nature. An effect of gender was expected, but no specific pattern had been hypothesized. Yet, the differences due to gender were the most remarkable results. Why does strategy use not make a difference to *immediate satisfaction* (measured right after each decision) for women, but for men it does? The high satisfaction ratings in males under the strategy *by principle* reminds a little of Kohlberg's theory of moral development (e.g. Kohlberg, 1981) and its criticism by Gilligan (e.g. Gilligan, 1977): Is there a gender specific preference for or against the use of principles that maps onto satisfaction? Another surprising result is the discrepancy between the above *immediate satisfaction* (repeated measures) ratings and the global evaluation of *strategy satisfaction* after the field phase where both male and female participants seem to contradict themselves: Regarding global *strategy satisfaction* women now see a difference between *by reasons* and *by principle*, but men cease to do so.

REFERENCES – See handout!

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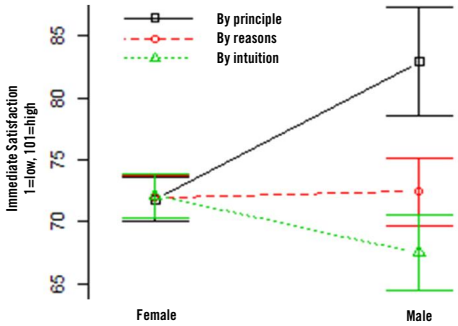


Figure 1. *Immediate satisfaction* by condition and sex.

Table 1. Adjusted means and standard errors for *immediate satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	71.80 (1.75)	82.92 (4.37)
By reasons	71.97 (1.72)	72.44 (2.73)
By intuition	72.09 (1.76)	67.51 (3.06)

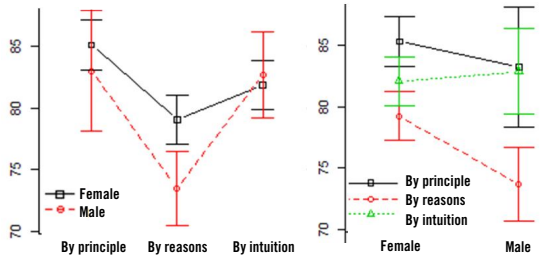


Figure 2. Adjusted means for *global satisfaction*, controlled for *similarity* of strategy used.

Table 2. Adjusted means and standard errors for *global satisfaction*, controlled for *similarity*.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	85.08 (1.99)	82.98 (4.86)
By reasons	79.03 (1.96)	73.48 (3.00)
By intuition	81.87 (1.96)	82.65 (3.46)

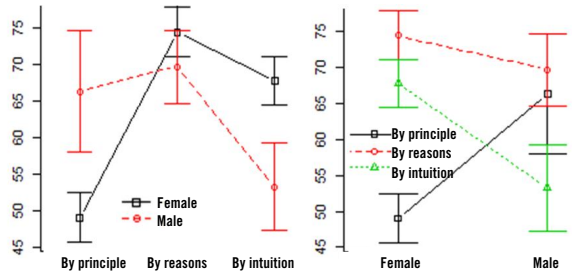


Figure 3. *Strategy satisfaction* by condition and sex.

Table 3. Adjusted means and standard errors for *strategy satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	49.02 (3.41)	66.31 (8.32)
By reasons	74.49 (3.37)	69.73 (5.05)
By intuition	67.79 (3.39)	53.25 (5.97)

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10.3.1 Introduction

We make decisions all the time. Life is made up of decisions, big and small. Since every controlled, non-automatic process involves a decision. The decision of what to order in a restaurant, whom to marry or even just whether to have a cigarette, watch another episode, or eat an apple. Sometimes we wonder how to decide best, that is: what strategy to use. One should hope to find some guidance in either normative philosophical ethics or decision sciences. One of the highest-level distinctions in the latter is the one between compensatory strategies (like WADD) and non-compensatory strategies (like LEX). A similar distinction is mirrored in moral psychology's dimension of consequentialism (weighing consequences) versus deontology (following singular rules), e.g. Cushman (2013).

The distinction I revert to here is similar to the preceding two in some ways, and different in others, but structurally it is set at a yet lower level of explanation. It is the distinction (popularized by the emergence of moral particularism; Dancy, 2004) between *deciding by principle* and *deciding by reasons* (particularistically). Both are conceptualized as deliberate decision strategies. They are not confined to the moral realm. While deciding by principle is deciding according to a general rule holding for all situations of a kind, deciding by reasons means to decide casuistically in accordance with each specific situation. Reasons are not confined to consequences, but all facts can be reasons (e.g. Dancy, 2013).

10.3.1.1 Previous Research

While there is ample literature on decision strategies,

> [T]he question of *how* [my italics] people arrive at satisfying decisions has not been given much attention in psychology or economics.

and

> [P]revious research examining satisfaction with choice has largely been focused on satisfaction with outcomes [...]. In reality, however, one could report being satisfied with an entire decision-making process and yet be disappointed by an outcome. In such a case, one may evaluate decision quality as low, not because the decision was bad, but rather because of chance or bad luck affecting the outcome.
>
> (Crossley & Highhouse, 2005, p. 256, p. 258)

Apart from studies on decision-making style, there is only little and scattered research as to the influence of strategy on satisfaction.

10.3.1.2 This Study

This study's aim is to investigate whether these two strategies and a third, deciding by intuition, make a difference to people's satisfaction when used in their everyday lives. Therefore, a field experiment was conducted in which participants had to successively make personal decisions by means of one of the three strategies. The results of this

study could give real indications as to what strategy to adhere to when making everyday personal decisions.

10.3.2 Method

10.3.2.1 Design and Hypotheses

Participants had to document 10 personal decisions. The experimental factor (between) was *decision strategy* with the levels "by principle" (P), "by reasons" (R), "by intuition" (I). The main dependent variable was *immediate satisfaction* after each decision (repeated measures). In a final questionnaire administered after the field phase participants were asked to give several overall evaluations on satisfaction and other aspects (e.g. strategy similarity). I hypothesized differences on all satisfaction DVs, while taking into account gender as well as additional descriptors of the decisions.

10.3.2.2 Materials and Procedure

The field experiment was conducted online. Participants were asked to document two decisions of their choice per day on five succeeding days on their mobile phones. They were instructed to start with the questionnaire as soon as they wanted to decide something (e.g. whether to go to the gym or stay home). The questionnaire led them through the decision process according to the decision strategy they had been allocated to. Participants of all experimental groups had to describe the current decision on 11 items (e.g. importance, difficulty, number of people affected etc.) and rate *immediate satisfaction* (scaled from 1-101, 'not at all satisfied' to 'absolutely satisfied'). Demographics and a short Big Five questionnaire were recorded before the field phase and general retrospective evaluations (e.g. *global satisfaction*, *strategy satisfaction* and *outcome satisfaction*) after. University student participants received course credit for participation, privately recruited participants were not rewarded.

10.3.2.3 Participants

Participants were recruited from two German universities and through private acquisition. Filtering for diligence $N = 169/124$ participants (of originally $N = 223$) were retained, producing 1604 documented decisions, 6-10 decisions per person. Age ranged from 18-63 years with a mean of $M = 26$ years ($Mdn = 23$, $SD = 9.93$). There were 77% females and 23% males. 75% of participants were university/college students.

10.3.3 Results

A multilevel approach was used to look at the repeated measures DV *satisfaction* (R package 'lmerTest'). With gender of participants included, ANOVA results showed a significant main effect of strategy ($F(2, 163.27) = 3.31$, $p = .039$) and a significant interaction with gender ($F(2, 163.27) = 3.57$, $p = .030$). Planned contrasts revealed a marginally significant difference between the two strategies *by principle* versus *by reasons* ($t(164.67) = -1.80$, $p = .073$) and a significant difference comparing these two to

the strategy *by intuition* ($t(162.01) = -2.20, p = .030$). Satisfaction was higher when using the strategy *by principle* ($M_{(P)} = 77.36$) than *by reasons* ($M_{(R)} = 72.21$); lowest satisfaction ratings were obtained when using the strategy *by intuition* ($M_{(I)} = 69.80$).

However, these results are driven by the interaction with gender. There was a marginally significant interaction of the first contrast with gender ($t(164.67) = -1.86$, $p = .064$) and a significant interaction of the second one with gender ($t(162.01) = -2.29, p = .024$). While female participants showed virtually no difference in satisfaction between all three strategies ($M_{(P_f)} = 71.80$, $M_{(R_f)} = 71.97$, $M_{(I_f)} = 72.08$), strategy

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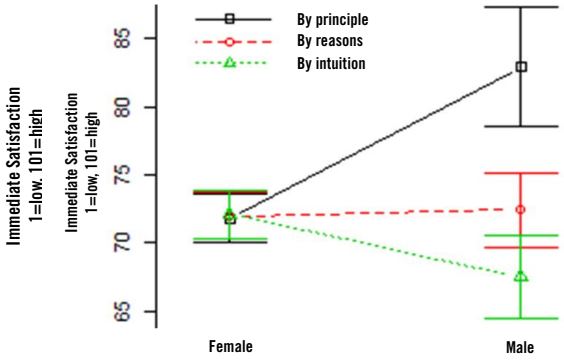


Figure 1. *Immediate satisfaction* by condition and sex.

Table 1. Adjusted means and standard errors for *immediate satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	71.80 (1.75)	82.92 (4.37)
By reasons	71.97 (1.72)	72.44 (2.73)
By intuition	72.09 (1.76)	67.51 (3.06)

Figure 10.20 *Immediate satisfaction* by condition and sex. And Table 1: Adjusted means and standard errors for *Immediate satisfaction* given condition and sex.

As to the overall retrospective evaluations of satisfaction, no differences of strategy or gender were found regarding *outcome satisfaction*. The same initially held for *global satisfaction* with all decisions, yet when adding the covariate "similarity" where participants indicated how similar the imposed strategy was to their usual decision-making, a significant difference between the strategies *by principle* and *by reasons* emerged, $t(162) = 2.44$, $p = .016$, and no interaction with gender, showing that, when controlling for *similarity*, participants of both genders retrospectively were more satisfied with their decisions having had to decide *by principle* ($M_{(P)} = 84.03$) than *by reasons* ($M_{(R)} = 76.25$). See Figure 10.21 and Table 2.

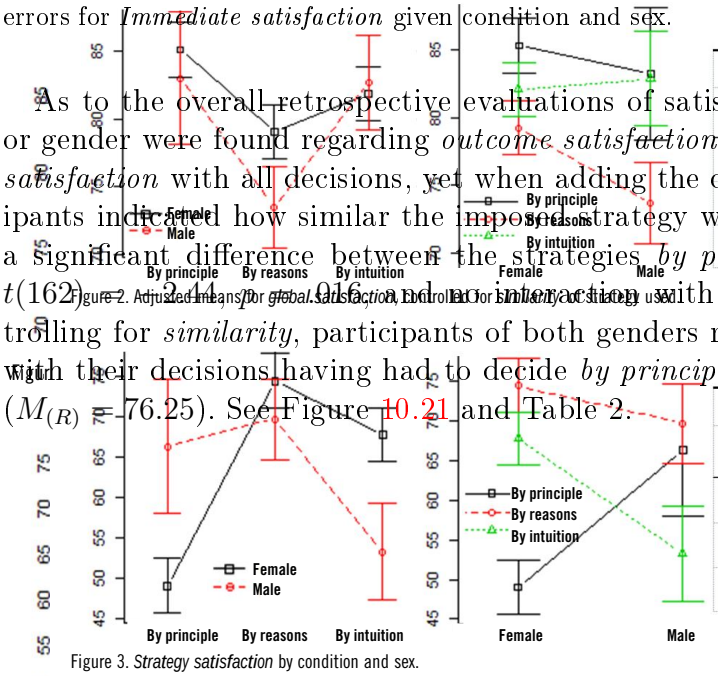


Figure 3. *Strategy satisfaction* by condition and sex.

Table 2. Adjusted means and standard errors for *global satisfaction*, controlled for *similarity*.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	85.08 (1.99)	82.58 (4.86)
By reasons	79.03 (1.98)	73.46 (4.86)
By intuition	81.87 (2.01)	82.65 (4.91)

Table 3. Adjusted means and standard errors for *strategy satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	49.02 (3.41)	66.31 (8.32)
By reasons	74.49 (3.37)	69.73 (5.05)
By intuition	67.79 (3.39)	53.25 (5.97)

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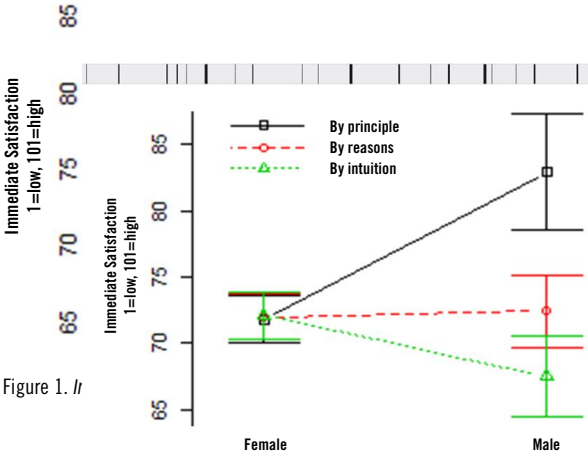


Figure 1. *Immediate satisfaction* by condition and sex.

Table 1. Adjusted means and standard errors for *immediate satisfaction* given condition and sex.

	Sex	
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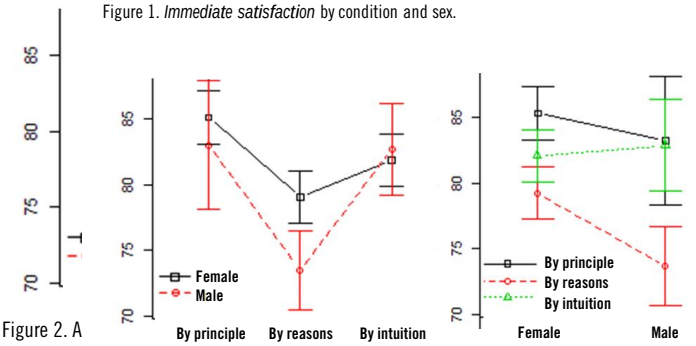


Figure 2. Adjusted means for *global satisfaction*, controlled for *similarity* of strategy used.

Table 2. Adjusted means and standard errors for *global satisfaction*, controlled for *similarity*.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	85.08 (1.99)	82.98 (4.86)
By reasons	79.03 (1.96)	73.48 (3.00)
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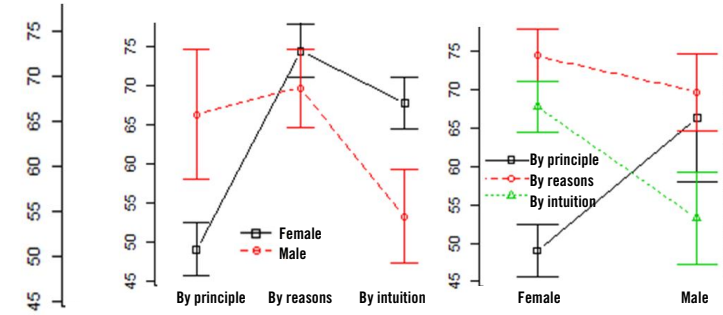


Figure 3. *Strategy satisfaction* by condition and sex.

Table 3. Adjusted means and standard errors for *strategy satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	49.02 (3.41)	66.31 (8.32)
By reasons	74.49 (3.37)	69.73 (5.05)
By intuition	67.79 (3.39)	53.25 (5.97)

Figure 10.22 *Strategy satisfaction* by condition and sex. And Table 3: Adjusted means and standard errors for *Strategy satisfaction* given condition and sex.

10.3.4 Discussion

This study was partially exploratory in nature. An effect of gender was expected, but no specific pattern had been hypothesized. Yet, the differences due to gender were the most remarkable results.

Why does strategy use not make a difference to *immediate satisfaction* (measured right after each decision) for women, but for men it does? The high satisfaction ratings in males under the strategy *by principle* reminds a little of Kohlberg's theory of moral development (e.g. Kohlberg, 1981) and its criticism by Gilligan (e.g. Gilligan, 1982): Is there a gender specific preference for or against the use of principles that maps onto satisfaction?

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Another surprising result is the discrepancy between the above *immediate satisfaction* (repeated measures) ratings and the global evaluation of *strategy satisfaction* after the field phase where both male and female participants seem to contradict themselves: Regarding global *strategy satisfaction* women now see a difference between *by reasons* and *by principle*, but men cease to do so.

10.3.5 Additional Discussion

10.3.5.1 Reminder of all Results

- Regarding *Immediate satisfaction*, for males, there was a significant difference between the two deliberational decision strategies versus intuition, with deciding by intuition receiving the lowest ratings. Furthermore, for males there was a significant difference between the two deliberational decision strategies with deciding by principle leading to more immediate satisfaction than deciding by reasons. For females however, *Immediate satisfaction* was the same for all three decision strategies.
- There were no differences of decision strategy on retrospective overall *Outcome satisfaction*, and no differences by gender.
- Regarding retrospect *Global satisfaction*, once controlling for *Similarity* participants of both genders were significantly more satisfied if they had to decide by principle rather than by reasons.
- Regarding *Strategy satisfaction*, for females, there was a significant difference between the two deliberational decision strategies with deciding by reasons leading to more strategy satisfaction than deciding by principle. For males however, *Strategy satisfaction* was the same for the two deliberational decision strategies.

Interpretation Only *Global satisfaction* did not show a gender effect. Yet, there was only a significant difference between deliberational decision strategies once the similarity to how participants usually made decisions (self-rated) was controlled for. This makes the result difficult to interpret without further analyses.

An effect of gender had not been hypothesized. Yet, only when taking gender into account differences were found between strategies. Furthermore, the distinction between immediate ratings of satisfaction and retrospect global ratings proved useful. In sum, it then seemed that decision strategy made a difference to males on immediate satisfaction, whereas it made a difference to females on global strategy satisfaction. On *Immediate satisfaction* males preferred principles to reasons, and on global *Strategy Satisfaction*, females preferred reasons to principles. (And on *Global satisfaction* controlling for *Similarity*, everyone preferred principles to reasons.)

As already noted, the last result is difficult to interpret (without at least means for similarity by decision strategy and gender), but it shows that the similarity to someone's usual decision making is important. It might also mean that people do indeed have habitual ways of decision making and do not like or especially like to be forced to

decide differently.

Leaving out *Global satisfaction*, there is still the contrast that decision strategy mattered to males on *Immediate satisfaction* (but not on global *Strategy satisfaction*), whereas reversely decision strategy mattered to females on global *Strategy satisfaction* (but not on *Immediate satisfaction*).

While differences between immediate and retrospect satisfaction measures can easily be explained with reference to Kahneman's 'two selves' (cf. sections 3.3.2.3 on page 83 and 5.4 on page 153), the gender difference cannot be explained presently.

10.3.5.2 Purpose Evaluation

After the dire results of the online experiments where decision strategy proved to be quite ineffective under the conditions these experiments could provide, a change in methodology was the last resort. What are the most pervasive differences between the online experiments and the present field experiment?

(i) In the previous online experiments (Pilot Study, Trolley Experiment, MADM Experiment), participants were presented with a series of fictional scenarios which constituted the basis of their decisions.

(ii) Each of these decisions came with two preconceived options participants could choose between.

(iii) All satisfaction measures had to be rated immediately after each fictional decision.

All of these circumstances were deemed less than ideal. Accordingly, the field experiment was meant to amend them: in the field experiment, (i) participants decided on real personal decision situations, not fictional scenarios, (ii) the options they could choose between were determined by participants themselves, and (iii) immediate satisfaction was measured, but in the end of the field experiment further retrospective and global satisfaction measures were applied and could be compared.

The main purpose of the field experiment was to determine whether in real life, decision strategy makes a difference to satisfaction. And apparently it does, but in quite intricate, non-straightforward ways.

10.3.5.3 Possible Limitations, Solutions, and Interpretations

Analyses Well, the gravest limitation is, of course, that this study would deserve more thorough analyses:

– Each decision was rated on several items (number of options, difficulty, importance, implementation status, time at disposal, stressfulness, number of people affected, possibility of postponement). Descriptive analyses (frequencies) should be looked at. Furthermore, since there were strong gender effects, frequencies grouped by gender as well as inferential statistics should be analyzed: Did decisions reported my males and females differ significantly in their characteristics? Moreover, these characteristics could be used as covariates/random effects.

- The contents of decisions had to be entered as string variables. These could be coded according to content domains.
- After the field phase, several further variables had to be rated by participants, among these: similarity of strategy used to usual decision making, trust in strategy used, and general satisfaction with own decisions. These variables should be looked at as predictors of the three retrospect satisfaction measures (*Global satisfaction*, *Strategy satisfaction*, and *Outcome satisfaction*).
- A personality measure (Big Five) was included in the study. Its five dimensions should be analyzed regarding gender effects as well as used as covariates to the satisfaction measures.
- The study included further variables to assess data quality. These should be thoroughly analyzed and used for additional filtering.

Personality Looking at personality for satisfaction with the imposed decision strategies seems especially interesting to look at. However, previous studies included measures of decision style which did not prove to be illuminating. Since decision style is conceived of as a habit, accordingly a trait variable, which also is especially related to decision making, it seems unlikely that a more general personality measure such as the Big Five would show effects, if decision style does not.

Sample Once more, the sample included mostly students (75%) and women (77%).

Data Points More than 1600 decisions were retained for analysis, which is a lot of data. Accordingly, it would be important to look at effect sizes and explained variance. In fact, looking at the means and remembering the rating scale going from 1 to 101, the difference on immediate satisfaction for males is very small ($M_1 - M_2 = 11$), as is the differences for both genders on global satisfaction ($diff = 16$). Only the difference on strategy satisfaction for females is a little more satisfactory ($M_1 - M_2 = 25$). Thus, if there is an effect of decision strategy on some satisfaction measure, it is a very small effect.

Measures While *Immediate satisfaction* ratings will likely not be distorted due to memory or reference problems, the same cannot be said for the retrospect ratings. Memory is one thing, but I believe reference might be the bigger issue: Effectively participants were asked to rate their satisfaction regarding only those decisions they had documented for the field experiment during the past week. However, we make myriads of decisions each week, and there is no way to be sure that participants' retrospect global satisfaction ratings latched onto those 6-10 decisions they were supposed to think of (if they could even remember). Accordingly, the global satisfaction ratings might partially be fused with an evaluation of all of one's decisions of the week.

Design One might wonder whether there is a general problem of the design of the study in that the documented decisions could be entirely inconsequential. Participants were asked to document a decision they were about to make, use the decision strategy

they were assigned to to make it, and subsequently rate their immediate satisfaction ("How satisfied are you with the decision now directly after it was made?").

Let's say, I choose to document the decision to take a break from writing now or finish the section, I fill out the reasons for and against it, and I end up deciding to only take a break after having finished the present section. Then I rate my satisfaction.

That is, I rate my satisfaction after I 'made the decision' in the sense that I know which action to take. But I have not taken the action. I might end up doing something else.

But is that a problem? I don't think so. In fact, it is an advantage, because the interest is with the evaluation of the decision not the chosen option. If you now think of a decision you want to make and then cognitively settle on what you want to do – I think that indeed is the perfect point in time to rate your satisfaction with just that: the decision. Not the action, not the outcome, not the wider consequences – just the 'settling on an option'.

10.3.5.4 Conclusion

This field experiment seemed promising since it was the first to produce some significant results and the surprising gender effects are interesting. The gender effects, however, cannot be easily explained and most of the significant differences really are very small in size. Yet, there seems to be something in the data, but it is not that easy to capture. There are differences in gender, but are they due to personality, habitual decision strategy use ('similarity'), or systematic differences in the characteristics of decisions documented in this study? Furthermore, there are differences between immediate and global retrospective ratings of satisfaction, which is consistent with previous research and theory.

Now, does 'deciding by reasons' versus 'deciding by principle' make a difference to some measure of satisfaction? Well, the most reliable of the present results is that it makes a difference to women when they rate strategy satisfaction retrospectively.

That is, if you are a woman and want to increase the probability that you are satisfied with your decision strategy when you look back at a set of decisions you made over the last week, and ask yourself how satisfied you were with the strategy used – then you should rather have decided by reasons than by principles.

Consolidation: The Results

I already made very clear that this research is largely exploratory and that its exploratory nature in part dictated the overall procedure (cf. section 6.1 on page 158) – that is: the succession of studies as well as the variety of measures.

This chapter will show the progression of thought within the empirical part and tie together the results.

A reminder of content: The empirical part includes four experiments: the Pilot Study, the Trolley Experiment, the MADM Experiment, and the Field Experiment. Furthermore, it includes three questionnaires/questionnaire studies: the Strategy Satisfaction Questionnaire, the Decision Style Questionnaire, and the Decision Categorization Scales.

The Pilot Study started out with several purposes and generated several insights which determined most of the successive research:

The Decision Strategy Manipulation First of all, the Pilot Study was meant to test the decision strategy manipulation, that is: to make participants either decide by reasons or decide by principle. The decision strategy manipulation is depicted in section A.b on page 178 within 8.3.1.3 and remained basically the same over the course of all studies. The description of the two deliberational decision strategies always remained exactly the same. The 'decide by reasons' condition also always remained the same in that it included a four-field matrix to enter reasons for and against each option. The 'decide by principle' condition which originally required to enter only one principle was varied to include an 'opposing principle' in the Trolley Experiment (cf. section B on page 372 within 10.1.1.3).

The Pilot Study had provided initial evidence that the decision strategy manipulation had worked, which was further scrutinized by the Trolley Experiment. The Trolley Experiment – besides finding evidence for the main research question – had two further purposes that were achieved by analyzing the string variables participants provided by documenting their reasons and principles: On the one hand, these string variables were analyzed regarding the question whether participants did indeed provide reasons and principles respectively, that is: whether they generally understood the manipulation. On the other hand, the reasons and principles were analyzed in terms of their consequentialist or deontological content in order to show that the distinction between deciding by reasons and deciding by principle is different to the consequentialist/deontological

distinction. Both of these aims were achieved.

A further variation within the decision strategy manipulation was the addition and character of a third condition as control group. In the Pilot Study there was no third condition, in the Trolley Experiment the third condition was termed 'by intuition' and involved no instructions and no documentation, in the MADM Experiment the third condition was termed 'decide by self-chosen strategy' and involved the documentation of how participants planned to decide, and in the Field Experiment the third condition involved instructions as to what it means to decide intuitively, but no documentation.

This variation of the third strategy afforded the discussion of whether the aspect of 'guidance' can be split from the aspect of 'deliberation' (cf. section 10.1.3.3 on page 403), and the insight that as soon as there is minimal guidance and deliberation as when participants had to note their 'self-chosen strategy' in the MADM Experiment, the difference between deliberational strategies and intuition as found in the Trolley Experiment – disappeared (cf. section 10.2.3.3 on page 434). Yet, it is important to note that the difference between the deliberational strategies and intuition in the Trolley Experiment was weak (cf. section 10.1.2.2 on page 390), such that not too much weight should be put on the disappearance of that effect.

The Measurement of Satisfaction The second purpose of the Pilot was to test measures of satisfaction. Based on the Pilot Study I concluded on the one hand that single-item measures worked and on the other hand that participants were able to distinguish different kinds of satisfaction. In the Pilot, I measured option satisfaction and strategy satisfaction; in the Trolley Experiment, I only measured general decision satisfaction; in the MADM Experiment, I measured situation satisfaction, option satisfaction and strategy satisfaction; and in the Field Experiment, I measured immediate satisfaction (repeated measures) and global satisfaction, strategy satisfaction, and outcome satisfaction (retrospect overall ratings).

That is, I measured a variety of aspects of satisfaction with the decision. The main interest, of course, was with satisfaction *due to decision strategy*, but which aspect exactly would be affected was of secondary interest.

However, the reason to ask for different aspects of satisfaction within one experiment was, as explained before, to be able to be more specific as to what the evaluation of being satisfied with a decision would actually refer to. The reason is that when thinking of evaluating a decision in terms of satisfaction, there are so many aspects that likely have an influence: you might be happy or mad that the decision situation came up at all (e.g. a marriage proposal), you might be satisfied or unsatisfied with your range of options (e.g. the universities you were accepted to), you might be contented or discontented with the outcome from a decision (e.g. the taste of the vegetarian dish you chose) – but what is less likely is that you think about how satisfied or unsatisfied you are with your decision making in itself, that is: the process of your decision making or the strategy you

applied (e.g. reading the whole menu and asking the waiter a bunch of questions). Since satisfaction with the strategy used seems to be rather rarely considered when evaluating one's decisions, it seemed to be all the more important to distinguish different objects of satisfaction.

The Strategy Satisfaction Questionnaire (SSQ) Another spin-off regarding the theme of measuring satisfaction is the Strategy Satisfaction Questionnaire (SSQ) focusing on strategy (cf. section 9.1 on page 220). This questionnaire is based on previous research. The final version includes 10 items, three of which specifically address 'deciding by reasons' versus 'deciding by principle' as decision strategies. Cumulative variance explained for the 10-item final version with three factors is 61% (cf. section D.a on page 226 within 9.1.2.1).

Two derivative questionnaires were devised: the SSQ-S (a single scale version) and the SSQ-G (a general version without reference to reasons/principles).

The SSQ-S includes the first factor of the SSQ with 5 items ($\alpha = 0.84$, variance explained: 52%). Two of these items specifically refer to the use of reasons/a principle for deliberation and choice, and the remaining three items are about: being contented to use the same strategy in everyday life, trusting the strategy to generally lead to good decisions, and judging the strategy to fit with one's values and opinions.[551]

The SSQ-G entails 5 items on two factors (cumulative variance explained: 61%). The first factor, labeled 'Personal Evaluation of Strategy Satisfaction' includes the three general items of the SSQ-S explicated above ($\alpha = 0.78$). The second factor 'Overall Evaluation of Strategy Satisfaction' includes two items, the first simply stating to be satisfied with the instructed strategy, and the second stating to be confident to not regret the strategy ($\alpha = 0.70$).

The Strategy Satisfaction Questionnaire (SSQ) and its derivatives have good psychometric properties and they are short enough to be applicable. Nevertheless, I did not further use them in scenario/vignette studies, because my interest was not only with strategy satisfaction, but with other aspects of satisfaction, too, as explained above. Also, to have participants rate a set of even only five items for each of several fictional decision situations to only get at strategy satisfaction seemed out of proportion. Furthermore, to be well balanced, other aspects of satisfaction (situation/general, option, outcome) would have needed a short questionnaire, too, which I had not devised, and which in combination would have been even more out of proportion.

However, the SSQ-G should and could have been used in the Field Experiment, which I failed to do (it would have had to be the general version because of the third intuitive condition).

Overall, the Strategy Satisfaction Questionnaire was thus rather a side-project. Yet, the SSQ-G seems to be a useful addition to existing research.

[551] The importance of *fit* corresponds to the effect of the variable *Similarity* within the Field Experiment.

Overall Results on Reasons vs. Principles The overall results regarding the effect of decision strategy on any satisfaction measure were not good in any of the four experiments. The main research interest, a difference in satisfaction due to 'deciding by reasons' versus 'deciding by principle' was not found.

In the Pilot Study, once accounting for the option participants chose, there were effects of decision strategy on strategy satisfaction, but the direction depended on the option chosen (cf. section F on page 187 within 8.3.2.2). In the Trolley Experiment, there was a difference between the two deliberational strategies and the intuitive control condition (yet driven by only one comparison), but no difference between 'deciding by reasons' and 'deciding by principle' (cf. section E.a on page 383 within 10.1.2.1). The MADM Experiment where the control condition was made to involve deliberation, too, did not provide any effects of decision strategy on any satisfaction measure (cf. section E on page 429 within 10.2.2.2). Last, the Field Experiment unveiled differences between strategies, even between the two deliberational strategies, but only when accounting for gender: there were effects on both immediate satisfaction as well as on global retrospective strategy satisfaction – but only for one gender each (cf. section 10.3.5.1 on page 446).

All effects, if even existent, were small in magnitude. The overall conclusion from this research hypothesizing that 'deciding by reasons' versus 'deciding by principle' makes a difference to satisfaction must be that this is not the case – on a global level. There are a few effects, but they are small, unsystematic, and difficult to interpret.

The results from the Field Experiment surely are the most promising venue, but the gender effects are not understood. Most importantly, in all of the experiments the effects of decision strategy were negligible compared to the effects of content. Basically, in the Pilot Study the option chosen determined satisfaction, in the Trolley Experiment it was scenario type, and in the MADM Experiment it was vignette. For the Field Experiment content characteristics of the decision situations were not analyzed.

The Effect of Content – the Decision Categorization Scales (DCSs) The third main result from the Pilot Study was the pervasiveness of the effect of content – which is a finding that really stuck out in all of the experiments, as noted above.

This finding thus inspired the desire for categorization: How could content – specifically the content of decision situations – be characterized?

The questionnaire study on the Decision Categorization Scales (DCSs) is the result of said attempt at categorization (cf. section 9.3 on page 250). I included all questionnaires and distinctions between domains I could find that provided dimensions potentially useful for the characterization of situations in general and decision situations specifically. Distinctions between domains that were not questionnaires or not of a fitting format, I converted into 'mini-scales', other scales could be used as-is, and one questionnaire I constructed based on distinctions used in the literature (cf. section B on page 251 within 9.3.1.2).

This resulted in eight questionnaires/scales (cf. section 9.3.3.2 on page 345 for the overview): four domain scales (the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale), one content model (the 14BiPole-Value Questionnaire), one evaluation rating (the Semantic Differential *Evaluation* Scale), and two scales concerned with the nature of decisions specifically (the Characteristics of Decision Situations Scale, and the Dimensions of Decisions Scale).

These scales were scrutinized in every way possible and were shown to be able to pick up differences between decision situation (as explicated within section 9.3.3.2 on page 350).

In future research, these scales could be used both for pre-testing material involving fictional decision situations (i.e.: scenario/vignette studies) as well as within these studies themselves for the provision of covariates to control for (perceived) content.[552]

However, these scales amount to a considerable amount of items: whereas the three 'mini-scales' are short with on average 6 items, as is the Situational Eight DIAMONDS Scale S8-II with 8 items, and the Semantic Differential *Evaluation* Scale with 3 items, there are 14 items each for the 14BiPole-Value Questionnaire and the Characteristics of Decision Situations Scale – which sums up to 57 items. Yet, the Dimensions of Decisions Scale (Franz & Kramer, 2010) with 84 items is longer than all of the other scales together.

However, rating so many items for just one decision situation could only be requested from (unpaid) participants for one or maximum two decision situations per study. Of course, not all of the eight scales would have to be used, yet all of these scales add unique information (as I showed within section 9.3.3.2 on page 350).

In sum, the study on the Decision Categorization Scales (DCSs) was the reaction to the huge effects of content that haunted all of the scenario/vignette studies. It is up to future research to make use of these categorizations.

Person Characteristics – the Decision Style Questionnaire (DSQ) Surely when considering satisfaction as due to decision strategy, person characteristics should be taken into account. I have not done that enough in terms of personality: the Field Experiment included a measure of the Big Five, but I did never get around to include them in the analyses (and there is, of course, always the problem of sufficient participant numbers when using further predictors).

Yet, a measure of person characteristics that was included already in the Pilot Study was decision style. Decision style is supposed to be a trait variable, referring to habits in decision making of some stability.

[552] Note however that some of the scales need further validation, or even changes in item formulation and response scale format. This has been explicated in the respective sections evaluating the scales; a summary of these evaluations is to be found in section 9.3.3.1 on page 342.

Development of the Decision Style Questionnaire (DSQ) There were three distinct decision style questionnaires in the literature (cf. section 9.2.1.2 on page 231) with large overlaps. I put together the items of all three previous questionnaires, eliminated identical doubles, and translated the remaining 60 items into German. After a thorough psychometric validation including factor analyses and scale-length optimization the final Decision Style Questionnaire included 24 items on 6 factors with internal consistencies ranging from $\alpha = 0.82$ to $\alpha = 0.92$ and total variance explained at 63% (cf. the summary in section 9.2.3 on page 247). The Decision Style Questionnaire includes most of the information of all three previous questionnaires, because several dimensions could be merged (e.g. rational/vigilant). Cumulative variance explained was the highest on par with one of the previous studies, but most of the previous studies had better (larger and more divers) samples.

Still, the new Decision Style Questionnaire is a major improvement to the three previous ones in that it consolidates all of their input and has good psychometric properties. Also, at the time it was the first to be used on a German sample (and thus the first German translation). Yet, as elaborated in the evaluation of the questionnaire, to be fully respectable, item formulations should be reconsidered and the questionnaire would have to be re-validated with a proper sample.

Results Using the Decision Style Questionnaire (DSQ) The 6 factors of the Decision Style Questionnaire were used as covariates to the experiment of the Pilot Study (cf. section 8.4.2 on page 202). In the Pilot Study, satisfaction as due to 'deciding by reasons' versus 'deciding by principle' was measured pre and post outcome information.

Pre outcome information, none of the six factors changed the effects of decision strategy and choice on strategy satisfaction. Then in the repeated measures analysis, DSQ's factor 4, 'rational/vigilant' decision style, stuck out (cf. section 8.4.2.2 on page 203). Interestingly, when looking at the second measurement point only as a follow-up, none of the main independent variables (decision strategy, choice, and outcome) still produced a main effect or interaction on strategy satisfaction: the only significant effect was a main effect of rational/vigilant decision style. That is, at the second measurement point after outcome information in the Pilot Study, none of the experimental factors was effective, but rational/vigilant decision style singularly explained strategy satisfaction.

There is no straight-forward explanation for the result that there was no effect of rational/vigilant decision style on strategy satisfaction at the first measurement point, but rational/vigilant decision style single-handedly explained strategy satisfaction at the second measurement point. However, in the Pilot Study I used different measures of strategy satisfaction at the first and second measurement points, which may contribute to this finding, but I don't think it can explain its magnitude.

Since the whole DSQ has 24 items but only rational/vigilant decision style proved partially effective in the Pilot Study, this subscale was used in a further study, the MADM Experiment.

Unfortunately, however, to no avail (cf. section B on page 430 within 10.2.2.3): using rational/vigilant decision style as an additional predictor in the multilevel model predicting strategy satisfaction did not improve model fit, and there was no main effect of

rational/vigilant decision style (I termed the subscale *DSQ rational*).

In sum, it rather seems that decision style does not (help to) explain strategy satisfaction – although this question certainly has not been scrutinized sufficiently. Yet, taking the above results at face value, it stands to reason that if decision style – a set of personality variables very close to decision making – has no effect on (strategy) satisfaction, then the Big Five – a set of very general personality variables not related to decision making – likely will not have an effect either.

On the other hand, both in the Pilot Study and the MADM Experiment the effect of rational/vigilant decision style was only tested on *strategy* satisfaction. Other aspects of satisfaction might react differently to personality variables, especially global retrospect ratings. But this is for future research to find out.

Characteristics of the Scenario/Vignette Studies

Certainty or Uncertainty The decision situation in the Pilot Study was the only one in this thesis that included *uncertainty* and an *outcome* of the decision made.

A middle ground regarding certainty/uncertainty is filled by the Field Experiment: Some of the decisions made in the Field Experiment likely included uncertainty, although some of them surely did not, since the common consumer decision (shampoo A or shampoo B) is classically understood to not include uncertainty in the relevant sense (namely the sense in which there would only be a probability that the shampoo smelled like lemon not the certainty of that attribute). I have no data on the frequency of decisions involving certainty/uncertainty in the Field Experiment, although analyzing the string variables giving decision content could give an indication.

The remaining two experiments, the Trolley Experiment and the MADM Experiment did not involve uncertainty: flipping the switch would certainly kill the designated person in the Trolley case, and choosing an option would certainly get you the object, action, or condition you bargained for in the MADM case.

The reasons I reverted to certainty only are these: (i) The Pilot Study did give no indication that it would be worthwhile to include uncertainty and outcome information, in fact there were no systematic effects of outcome (cf. section 8.4.1 on page 201 and section B on page 601 in the Appendix). (ii) In the Pilot Study I had hypothesized an interaction of decision strategy and outcome on strategy satisfaction which did not occur. If there is an effect of decision strategy on some measure of satisfaction, it *should be* independent of outcome but likely *is not*, was the reasoning. Yet, a main effect of outcome (if binary: good, bad) is not interesting, but an interaction did not show. (iii) Studies involving outcome information, obviously, are longer and much more time intensive to program and analyze. (iv) Even without giving outcome information, scenarios/vignettes involving uncertainty would be more difficult to construct and come with an additional source of variance (the perceived uncertainty and its consequences). Also, within preferential choice I do not know of any classic set of scenarios/vignettes

involving uncertainty that I could have adopted for my purpose. (v) Decisions under certainty are less uncommon in real life than might be thought!

Most importantly, there was no reason for me to be specifically interested in uncertainty. If decision strategy had shown a strong effect on (strategy) satisfaction over several studies, an extension to uncertainty would have been desirable, but the general idea was not dependent on a distinction between certainty and uncertainty.

Preference or Inference The Pilot Study and the MADM Experiment clearly involved preferential choice (cf. section 8.3.1.3 on page 176 for the Pilot vignette and section I.2.2 on page 714 in the Appendix for all MADM vignettes).

The Field Experiment, again, might cover a middle ground, but I do rather find it unlikely that participants reported (many) inferential choices. I believe, inferential judgment is not commonly understood as a 'decision' or a 'choice' in everyday life. This could be further investigated by analyzing the decision contents reported by participants.

The Trolley Experiment classically is viewed to be a case of *moral judgment*. Is that a third category: inference, preference, and morality? According to the classic four domains of value (cf. section 4.2.1.1 on page 98) it is: moral, prudential, aesthetic, and epistemic.

The Trolley Experiment (besides the general research question) had the important purpose to show the (psychological) independence of 'deciding by reasons' and 'deciding by principle' from consequentialist/deontological deciding, which was successful. Otherwise, the research question whether the two deliberational decision strategies make a difference to (strategy) satisfaction does not come with a specific interest in moral decision making. Its home base certainly is preferential choice.

Content The Pilot Study only used one scenario, the two options of which – meet your friends in Paris or write on an important proposal – were rated to be about 'sociality' versus 'duty' respectively on the Situational Eight DIAMONDS Scale S8-II each to the same degree (cf. section B on page 195 within 8.3.2.4).

The Trolley Experiment used the material from Waldmann and Dieterich (2007) which involved five different Trolley scenarios: a bus on train tracks (classic trolley), a spreading virus infection, a rogue torpedo, a bomb in a restaurant, and a shooting rampage at a university (cf. section I.1.2 on page 691 in the Appendix for the originals).

The MADM Experiment gave participants multi-attribute decisions in matrix format. The general themes of these vignettes were the result of the collegiate decision situations distilled from the Decision Categorization Scales Study (cf. section 9.3.2.1 on page 282) and involved: Moving for the place of study, Apartment hunting, Celebrate Christmas with father/mother, Exam option, Take up master's studies, Job during studies, Termination of studies, and Vacation destination (cf. section I.2.2 on page 714 in the Appendix for the originals). The specific contents were created by a group of students from one of the classes I taught at the time.

In the Field Experiment, of course, participants themselves determined the decision situations they documented.

In the Pilot Study and the MADM Experiment contents were chosen to be such that they would fit with the decisional circumstances of university students, who were the main respondents, and usually made up more than 70% of the sample. Obviously, the Field Experiment provided the most naturalistic context.

Statistical Methods Used Some of the more sophisticated statistical methods I did not use everywhere I could have or should have. So this section will state where I used the more sophisticated methods.

Whereas I only used various types of ANOVA in the experimental part of Pilot Study and in the Trolley Experiment, I used multi-level modeling for the MADM Experiment and the Field Experiment; which is documented in section C on page 418 within 10.2.2.1.

I did the most thorough factor analysis and scale construction on the Decision Style Questionnaire, the procedure of which is documented in section A on page 236 within 9.2.2.1. Validity is discussed in section 9.3.2.4 on page 301 for the Decision Categorization Scales.

The most thorough descriptive analyses including extensive plotting were performed on the Decision Categorization Scales in section 9.3.2.5 on page 308.

Topics such as p-value adjustment, disjunctive and conjunctive hypotheses, type II error, power analysis, and (the nonsense of) post-hoc power analysis came up several times and were partially discussed and resolved in footnotes such as: footnotes 431 on page 339, 500 on page 391, 506 on page 403, 534 on page 421, and 545 on page 428.

Effect sizes were calculated and reported whenever possible, e.g. in the Pilot Study (as commented on e.g. in footnotes 293 on page 188 and 298 on page 193, as well as most of the footnotes referenced above).

Further methods used: coding of string variables, cluster analysis, extensive plotting.

Conclusion Was there success in the empirical part of this thesis?

Well, the Strategy Satisfaction Questionnaire (SSQ), the Decision Style Questionnaire (DSQ), and the Characteristics of Decision Situations Scale (section I on page 264 within 9.3.1.2) from the Decision Categorization Scales are newly constructed questionnaires each with satisfying psychometric properties.

The Strategy Satisfaction Questionnaire (SSQ) was based on the only three articles concerned with decision strategy satisfaction at the time (Crossley & Highhouse, 2005; Schlegel et al., 2013; Zhang & Fitzsimons, 1999), and the Decision Style Questionnaire (DSQ) was a based on the three previous questionnaires measuring decision style (Leykin & DeRubeis, 2010; Mann et al., 1998; Scott & Bruce, 1995). The Characteristics of Decision Situations Scale was based on the characteristics of decisions or decision situations as described in the textbook by Jungermann et al. (2005); Pfister et al. (2017).

In spite of showing good psychometric properties, all of these questionnaires need re-evaluation and re-validation, especially using larger and more diverse samples. Otherwise, they seem to be of lasting usefulness.

The main research question, however, the hypothesis that 'deciding by reasons' versus 'deciding by principle' makes a difference to (some measure of) decision-related satisfaction, was elusive. The results from the Pilot Study and the analysis of the string variables in the Trolley Experiment gave me enough hope and conviction that 'there was something there'. And in the Field Experiment, at last, there were significant differences between the two deliberational decision strategies.

Yet, overall, the hypothesis clearly failed. Effects were weak, unsystematic, and conditioned upon other variables such as gender, 'similarity', and choice content. Yet, I am not quite ready to conclude that 'deciding by reasons' versus 'deciding by principle' does not make a difference – nowhere, ever. Maybe the difference it makes is not on 'satisfaction', and/or the conditions under which the difference emerges are very specific. But it has become very clear that there is no strong, context independent, general psychological differential effect of 'deciding by reasons' versus 'deciding by principle' on satisfaction.

What can be concluded so far?

Well, first one might draw the negative conclusion that different 'modes of deliberation' and/or strategies of deliberational decision making do not make much of a difference to satisfaction, but what rather makes a difference is whether there is deliberation at all or not. This is the well-known distinction between intuitive and deliberate decision making (or System 1 and System 2/Type 1, Type 2) which has already gotten exorbitant attention. – This might yield the practical conclusion that *how* you deliberate does not matter, but it matters *whether* you do.

Second, there is the question how reasons/principles specifically connect to satisfaction: studies on reasons/reasoning and choice are inconclusive (cf. section 5.4 on page 154), studies on rules and choice find that rules advantage the so-called 'remembering self' (cf. section 5.4 on page 154). – On the one hand, there are still many open questions regarding deliberation and satisfaction in decision making. On the other hand, based on the above, a vague practical conclusion is that (i) the wise person should try to find out when to decide intuitively and when to deliberate, and (ii) the wise person should make up their mind about whether to put more importance on the 'experiencing self' or the 'remembering self' and adjust accordingly (cf section C on page 87 within 3.3.2.3 for a discussion of that point).

Third, it may be the case that reasons are psychologically primary (over rules/principles), just as Dancy argued conceptually (cf. section A on page 131 within 4.3.7.2). According to Dancy (e.g. Dancy, 2004, p. 31), a principle just latches onto a reason and declares it to be invariant. In other words: there is a reason in every rule. If you do not choose your favorite ice cream due to the rule 'seek variety', you might just as well – if you are conscious of the rule – understand 'seek variety' as a reason. Understanding 'seek variety' as a reason allows you to weigh it against other reasons, for example the reason 'lemon ice cream is my favorite'. – The practical conclusion here is for research: if reasons are primary, then reasons and rules/principles are not on the same level: reasons are the building blocks and rules require an extra step. It should be inter-

esting to investigate what this extra step exactly is: commitment, inhibition, conviction?

In sum, the questionnaire construction worked out, but the main research question failed – as set up here. Some reasons will be discussed in the upcoming part *Concluding* (Part III).

III Concluding

Overview

The discussion chapter should involve a critical review of the results: how can the specific results and potential discrepancies to hypotheses be explained, what further literature can speak to these specifics, what are limitations of the studies presented and what are tasks for future research?

List of Discussion Sections

Most of these questions have already been tackled and extensively scrutinized in the discussion sections of the individual studies and experiments:

Pilot Study:	*General Discussion* on page 207
Strategy Satisfaction Questionnaire:	*Summary* on page 229
Decision Style Questionnaire:	*Summary* on page 247
Decision Categorization Scales:	*Summary and Discussion* on page 342
Trolley Experiment:	*Discussion* on page 402
MADM Experiment:	*Discussion* on page 434
Field Experiment:	*Additional Discussion* on page 446

Consolidation Chapters

Furthermore, a summary of all results and insights from the empirical part is provided in chapter *Consolidation: The Results* on page 450.

Regarding the theoretical part, the full argument is summed up in chapter *Consolidation: The Argument* on page 141.

This Chapter

Updated Literature Review

There is one point, however, which I delayed for this chapter: updating the literature. This is especially important since the chapter on *Previous Research* on page 145 only includes literature up to the year 2014/15 which is when I did the main literature search that the conceptualization of my own project is based on.

A part of this chapter will therefore be dedicated to an updated contextualization of the present research. Due to the fact that the present research combines several novel perspectives (as spelled out in chapter *This Research* on page 158), I expect to not find much fitting literature. However, to make such a claim – that is: the claim that something is not there – like an H0, has specific problems attached to it: I might just have failed to conduct a high quality literature search and review.

Accordingly, it seems wise to document my search process. Especially within health sciences (cf. e.g. Riegelman & Kocher, 2018) systematic literature reviews have become the preferred type of literature review (cf. e.g. M. J. Grant & Booth, 2009, for a typology) and the trend has partially spilled over to (other) psychological disciplines.

Conducting a state of the art systematic review is way beyond the scope of this chapter. Yet, some aspects regarding the documentation of the search may very well be adopted. Thus, the search process, criteria, and results will be thoroughly documented.

Structure of this Chapter

This chapter will be structured according to the two main story lines of this research: On the one hand, there is the primary plot: the effect of *Reasons vs. Principles* as deliberative decision strategies on measures of well-being/satisfaction. On the other hand, I devoted quite some attention to three *Questionnaires*: the Strategy Satisfaction Questionnaire (SSQ), the Decision Style Questionnaire (DSQ), and the Decision Categorization Scales (DCSs). Each of these four themes requires a separate updated literature review and according discussion.

Yet, an extended discussion is of differing importance to these two 'story lines': For the subject matter of *Reasons vs. Principles* it is essential to look for alternative explanations of results and non-results based on related literature, such that the findings from the experiments may be better understood.

Regarding the *Questionnaires*, however, there is no such need for explanations: The questionnaire items and response scales were based on previous literature and the process of psychometric validation was based on state of the art recommendations (as explicated in section 9.2.2.1 on page 236). Furthermore, the limitations of my questionnaire construction have been made transparent and are mostly due to small and unbalanced samples as well as the lack of confirmatory replications. Accordingly, the function of the general discussion of the questionnaires is rather that of comparison than that of explanation.

There will be no literature search and extended discussion for the Decision Categorization Scales (DCSs) – on the one hand, because they have been extensively discussed in their own chapter (cf. section 9.3.3 on page 342) and on the other hand, because the taxonomization of decision situations is less related to the overarching theme of decision strategy and satisfaction. An interesting and important topic nonetheless, but for the sake of time and space I will leave it out here.

Literature Search and Documentation

Three separate literature searches were performed, starting with *Reasons vs. Principles*, then going on to *Strategy Satisfaction* and *Decision Style*. The searches were conducted on PsycInfo and Google Scholar for the first, and on PsycInfo only for the latter two subject matters.

The results for *Decision Style* and *Strategy Satisfaction* will be reported first, the purpose being the delineation of the research status quo regarding these measures. The discussion of *Reasons vs. Principles* as decision strategies and their effect on satisfaction will be the centerpiece of this chapter.

General Search Procedure and Terminology

'Literature search' is the overall umbrella term referring to the whole process regarding one topic. There will be four literature searches in total (one each for *Decision Style* and *Strategy Satisfaction*, and two for *Reasons vs. Principles*).

Per literature search, from search terms a search string will be generated. I will use the term 'search string' in a loose sense: any variation in the combination and use of the designated search terms (e.g. combining two terms with 'AND' vs. 'OR', or searching 'all fields' vs. 'abstract', or using synonyms and/or truncation) is deemed one and the same search string, and said variations will be termed 'variations of the search string'. That is, each separate literature search entails one search string, but several variations of that search string.

First, several variations of a search strings will be tested in order to gain an understanding of what influences the number of search hits, and which degree of specificity is appropriate. Second, among these variations one or several specific searches will be chosen for further processing. All sampled variations of a search string are given within the Appendix, the finally chosen specific search or searches is/are given in the main text.

Third, there will be two screenings: Screening 1 is dichotomous and sorts into 'possibly relevant' and 'not relevant'. Screening 2 sorts into three categories: 'good fit' (green), 'medium fit' (yellow), and 'no fit' (red). For each literature search, Screening 2 of the literature from the PsycInfo database is fully documented within the Appendix. All publications deemed having a 'good fit' are given in the main text, and the discussion will focus on them.

11 Questionnaires for Decision Style and Strategy Satisfaction

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11.1 Decision Style

11.1.1 Introduction

My Decision Style Questionnaire (DSQ) was based on three previous publications with largely overlapping content (as depicted in section A on page 231, cf. also Table 9.6 on page 232):

(i) Scott and Bruce (1995)
24 items, 5 factors: rational, intuitive, spontaneous, dependent, avoidant

(ii) Mann et al. (1998)
22 items, 4 factors: vigilance, buck-passing, procrastination, hypervigilance

(iii) Leykin and DeRubeis (2010)
43 items, 9 factors: vigilant, intuitive, spontaneous, dependent, avoidant, anxious, confident, respected, brooding

The final version of my Decision Style Questionnaire (DSQ) entails 6 factors with 24 items total, measuring habitual decision making behavior on the dimensions (1) anxious/confident, (2) avoidant/procrastinating, (3) intuitive/spontaneous, (4) rational/vigilant, (5) dependent, and (6) buck-passing.

From the altogether 13 dimensions reported in the literature (cf. Table 9.6 on page 232), 10 dimensions are included in the final DSQ where four of the six factors include items from two previous dimensions each, which is also evident from the respective factor labels (such as 'rational/vigilant').

The final Decision Style Questionnaire (DSQ) is depicted in Table 9.12 on page 245 within section 9.2.2.1.

Table 9.14 on page 248 within the summary section 9.2.3 on page 247 displays a comparison of the DSQ with the previous three questionnaires including total variance explained, Cronbach's α ranges, and information on the samples. Regarding total variance and α, as well as economy in terms of the relation between total number of items to dimensions covered, the DSQ shows very good properties and trumps previous questionnaires. However, it cannot compete in terms of sample characteristics.

In the Pilot Study only the subscale 'rational/vigilant' produced results (cf. section 8.4.2 on page 202), such that in the MADM Experiment only that subscale was used, where however no significant results were found (cf. section B on page 430, within 10.2.2.3).

11.1.2 Updated Literature Search

The updated literature search was conducted using PsycInfo. The tested variations of the search string are documented within the Appendix (cf. Table E.1 on page 645). The search finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 11.1 below. An additional systematic snow ball search was not conducted since the overview provided by the $N = 54/n = 27$ articles was sufficient for present purposes. Of course, relevant references given by the sampled articles were examined.

Table 11.1 Chosen Search, Initial Hits, and First Screening for the *Decision Style Questionnaire (DSQ)*.

#	Explanation String	String	PsycInfo # of Hits	Screening 1
6	All fields, "decision style" and synonyms for "scale", plus "style" three words adjacent to "scale" and its synonyms	("decision style" and ((questionnaire or scale or item* or measure) adj3 style)).af.	54	27

Screening 2 is fully documented in Table E.2 on page 646 within the Appendix. Table 11.2 on the next page below displays the $n = 3$ publications with 'good fit'.

Table 11.2 Publications Remaining After the Second Screening for the *Decision Style Questionnaire (DSQ)*.

	Reference	Year	Fit	About / Scales	Dual Process / Info	Based On
4	Dewberry, C., Juanchich, M., & Narendran, S. (2013a). Decision-making competence in everyday life: The roles of general cognitive styles, decision-making styles and personality. *Personality and Individual Differences*, *55* (7), 783–788. https://doi.org/10.1016/j.paid.2013.06.012	2013		decision compentence: cognitive style, decision style, big five personality		Leykin & DeRubeis
5	Dewberry, C., Juanchich, M., & Narendran, S. (2013b). The latent structure of decision styles. *Personality and Individual Differences*, *54* (5), 566–571. https://doi.org/10.1016/j.paid.2012.11.002	2013		latent structure: decision style, maximization, regret, Sys1-Sys2	yes	Leykin & DeRubeis
13	Hamilton, K., Shih, S.-I., & Mohammed, S. (2016). The development and validation of the Rational and Intuitive Decision Styles Scale. *Journal of Personality Assessment*, *98* (5), 523–535. https://doi.org/10.1080/00223891.2015.1132426	2016		development and validation of the Decision Styles Scale (DSS), focus on rational and intuitive styles	yes [new instrument]	Scott & Bruce (1995); Mann (1998); Leykin & DeRubeis (2010)

11.1.3 Discussion

11.1.3.1 Decision Style and Cognitive Style

There is a divide in the literature: On the one hand there is what I have understood to be 'decision styles', namely habitual ways of decision making of relative inter-individual stability (M. J. Driver, 1979), to be distinguished on several qualitatively different dimensions – such as the 6 dimensions I identified as (1) anxious/confident, (2) avoidant/procrastinating, (3) intuitive/spontaneous, (4) rational/vigilant, (5) dependent, and (6) buck-passing. And on the other hand there is the literature on so-called 'cognitive styles' that basically relies on a dichotomy of a rational versus an intuitive style, the Cognitive Style Index (Allinson & Hayes, 1996) being a major precursor in terms of measurement.

In their scale development article, which also includes the most thorough and critical review of decision style and related measures that I have come across, Hamilton, Shih, and Mohammed (2016) describe the relationship of 'decision styles' and 'cognitive styles' such:

> Whereas decision styles more narrowly focus on capturing decision-making processes, cognitive styles more broadly capture general information processing and problem solving.
>
> Some authors treat cognitive and decision styles interchangeably (e.g., Andersen, 2000), and others consider cognitive styles a subset of decision styles (e.g., Thunholm, 2004). The more recent perspective is to view decision styles as a subset of cognitive styles (e.g., Dalal & Brooks, 2013; Kozhevnikov, 2007).[553] (p. 524)

11.1.3.2 Measures

According to Hamilton et al. (2016) "Scott and Bruce's (1995) General Decision Making Style (GDMS) instrument is the most popular decision styles measure" (p. 526) – an assessment which is corroborated by the fact that out of 13 relevant articles from my PsycInfo search, 10 articles cite Scott and Bruce (1995) as the (partial) origin of their decision style items or research (cf. Table E.2 on page 646 within the Appendix,

[553] Interestingly, in their newly developed Decision Styles Scale (DSS) Hamilton et al. (2016) choose to focus on a rational and intuitive style only (p. 526), yet are clearly concerned with decision style, not cognitive style. Accordingly, it is important to note that the distinction between decision style and cognitive style is conceptual, not in terms of number of dimensions. Yet, my interest is with conceptualizations and studies that are *not* restricted to or focused on a rational-intuitive distinction.

last column). Next in line are Leykin and DeRubeis (2010) with 5 mentions, Mann et al. (1998) with 3 mentions, and one study from 2020 (Cheek & Goebel, 2020) references Hamilton et al. (2016).[554] There are no further references to questionnaires/scales that do *not* focus on the rational-intuitive distinction within the $n = 27$ publications I subjected to Screening 2. Accordingly, it seems that the three publications I based my questionnaire on are still the most prominent decision style questionnaires that go beyond the rational-intuitive dichotomy.[555] [556] Further isolated 'decision styles' – that is: ones not integrated into a framework of several dimensions – within the sample of literature I screened are: maximizing style, indecisiveness, regret style, compensatory style, and need for closure. Domains are besides general decision making vocational/career decision making, clinical decision making, stress, and team decision style.

These general patterns and contents are corroborated by the list of decision style measures and studies using them provided by Hamilton et al. (2016) (p. 525): From 17 measures in total, 9 are focused on a rational-intuitive distinction (of which 3 are based on the Myers-Briggs-Type Indicator), 3 are impractical for usage due to being copyrighted or qualitative, 2 are concerned with what I called isolated styles (indecisiveness, compensatory style), and the remaining 3 are the questionnaires devised by Leykin and DeRubeis (2010); Mann et al. (1998); Scott and Bruce (1995) – which I based my questionnaire on. These three were the dominant decision style scales in 2014, and still are today.

11.1.3.3 My Study and Future Research

Surprisingly, there is no study that had the same goal as I pursued, namely to combine and amend the three dominant decision style scales. Maybe the trend is towards a dichotomous model of rationality versus intuition (but see Dewberry, Juanchich, & Narendran, 2013b who convincingly propose a two-component model where 'rationality' and 'intuition' are aspects of one component, whereas 'decision anxiety' defines the second component). A more probable reason is that besides the fact that research on decision styles is not a big research area, proper validation studies are not easy to conduct due to the need for several appropriately large and diverse samples – a quality necessity I failed, too.

Fittingly, Hamilton et al. (2016) bemoan:

[554] Multiple mentions were counted as such, such that $10 + 5 + 3 \neq 13$.

[555] Publications focusing on said dichotomy are 12 from 27 which are marked in Table E.2 on page 646 within the Appendix, fore-last column.

[556] I will continue to refer to the 'rational-intuitive' (or: 'intuitive-rational') dichotomy or distinction throughout the remainder of this manuscript. What is meant is the distinction that in the present sample of literature most often is termed "System 1/System 2" (after e.g. Kahneman, 2003, 2011, cf. also section 1.2.5 on page 23), but really has been identified and discussed by several teams of researchers (e.g. Evans & Stanovich, 2013; Sloman, 1996; Stanovich & West, 2000) and thus also has gotten several names (cf. e.g. Alós-Ferrer & Strack, 2014; Evans, 2008 for a review). I do not think that dubbing the distinction 'the rational-intuitive dichotomy' is the best way to put it; in fact I think it is the worst way, because the use of the term 'rational' is utterly confusing and under-determined. I will use it nevertheless because it is handy, and because I like the sarcasm.

> In addition to content validity concerns, construct validity evidence is conspicuously absent for most decision style measures [...]. Especially rare are confirmatory factor analyses and convergent, discriminant, and predictive validity. (p. 524-526)

Accordingly, I believe a proper validation study using the same approach I did, namely combining the best of existing measures, is still a worthwhile enterprise for future research to tackle. Furthermore, I think an exclusive concentration on the rational-intuitive distinction leads to an impoverishment of the concept of decision style which conceptually warrants further dimensions – the proof of an existence of which as valid(ated) psychological constructs is an empirical task.

11.1.3.4 Relevant Findings

There are no findings that are straightforwardly relevant to the fact that the 'rational/vigilant' subscale of my Decision Style Questionnaire (DSQ) did not prove useful to this research. Yet, some relationships might be speculated about.

Dewberry, Juanchich, and Narendran (2013a) investigated the explanatory potency of cognitive style, decision style, and big five personality traits regarding 'decision competence'. More precisely, they tested the hypothesis that given decision style, cognitive style would not have any additional explanatory potential towards decision competence, but big five personality would. On the whole, the authors could confirm these hypotheses.

Wood and Highhouse (2014) with the dependent measure 'decision quality' made the reverse test and investigated whether given personality, decision style would make an additional contribution to the explanation of self-rated 'decision quality'. Decision quality was rated on 4 items stating that the decisions made 'are quality ones', 'are good ones', 'end up working out well', 'are regretted later'; an item pertaining to happiness had to be dropped due to a weak factor loading (p. 226). These authors, too, could generally confirm their hypothesis, yet the only decision styles significantly predicting self-rated decision quality with respectable effect sizes were the styles 'rational' and 'intuitive'.

The first finding is relevant to my own research, since I did not use a personality measure in most experiments (only in the Field Experiment, where I did not analyze it, cf. section 10.3.5.3 on page 447), partially due to the assumption that if decision style played no role within my setup of decision strategy and satisfaction, then likely personality would not either. Now, in Dewberry et al. (2013a) personality did indeed make an independent contribution – however explaining decision *competence* not *satisfaction*. Accordingly, this finding cannot simply be adopted, but it does speak in favor of using both measures of decision style and personality. The point of using both measures is further strengthened by the second finding of Wood and Highhouse (2014) showing the independent contribution of decision style in explaining decision quality. Self-rated decision quality as conceptualized here is arguably conceptually closer to 'decision sat-

isfaction' than decision competence – although the one item referring to happiness had to be dropped. It is also noteworthy that only the 'rational' and 'intuitive' decision styles were effective.

Thus, the take-home message is that (i) when it comes to decision competence and self-rated decision quality, decision styles and personality based on a big five measure do not occupy the same explanatory space: it is illuminative to use both measures, and (ii) the 'rational' and 'intuitive' decision styles do play a special role.

Dewberry et al. (2013b) used structural equation modeling to investigate the latent structure of decision style as based on the Leykin and DeRubeis (2010) questionnaire.[557] Their argument is that while three of the seven Leykin and DeRubeis (2010) dimensions (namely: vigilance, intuition, and spontaneity) might explicate the rational-intuitive (System-1-System-2) distinction and thus form one cluster, the remaining four dimensions (namely: dependent, avoidant, brooding, and anxious) are "conceptually distinct" (p. 567). Further basing their proposal on research on anxiety and fear, the authors propose a two-component model of decision styles with decision anxiety on the one hand (leading to avoidance, brooding, and dependence) sustaining no significant paths to vigilance, intuition, and spontaneity. This structure could be confirmed. The authors suggest the interpretation that some decision styles are concerned with information processing (the rational-intuitive distinction, System 1 and System 2), whereas others are concerned with "the regulation of decision-making" (p. 569). This corroborates the special role of the rational-intuitive distinction (or the according styles) while at the same time demonstrating that there is more to decision style than these two.

This research speaks in favor of my point made above that reducing decision styles to a dichotomy of rational versus intuitive does not do justice to the phenomenology.

11.1.3.5 Summary

While there is no straightforward explanation of the lack of results of decision style in my research (which I also did not specifically search for), the main conclusion to draw from the updated literature review is that my attempt to unify and refine existing measures of decision style is still a research desideratum. The three questionnaires I used are also still the most prominent questionnaires/scales measuring decision style on several dimensions.

As spelled out by Hamilton et al. (2016, p. 524-526), even the most prominent scales by Scott and Bruce (1995) and Leykin and DeRubeis (2010) partially come with poor validation and/or psychometric properties as well as inconsistent results regarding factor inter-correlations in subsequent studies. Accordingly, an enhanced attempt at unification and improvement using several larger and more divers samples as well as confirmatory factor analysis in the last step is still a worthwhile task for future research.

[557] In their Study II they used the Scott and Bruce (1995) questionnaire for replication.

11.2 Strategy Satisfaction

11.2.1 Introduction

Based on three previous publications (Crossley & Highhouse, 2005; Schlegel et al., 2013; Zhang & Fitzsimons, 1999), I constructed my Strategy Satisfaction Questionnaire (SSQ) (cf. section 9.1.1.2 on page 220). Only Crossley and Highhouse (2005) confirmed that their 4 items loaded on one factor, both Schlegel et al. (2013); Zhang and Fitzsimons (1999) just averaged across their items to form a composite measure without confirming uni-dimensionality.

The final version of my Strategy Satisfaction Questionnaire (SSQ) entails 3 factors with 10 items total, measuring the dimensions (1) Decision Strategy Satisfaction ($\alpha = 0.84$), (2) Choice Option Satisfaction ($\alpha = 0.76$), and (3) Affective Process Satisfaction ($\alpha = 0.70$). Cumulative variance explained was 61%, total scale reliability was $\alpha = 0.87$. The final Strategy Satisfaction Questionnaire (SSQ) is depicted in Table 9.3 on page 227 within section 9.1.2.1.

Furthermore, a single-scale version of the Strategy Satisfaction Questionnaire was constructed, the SSQ-S with 5 items, $\alpha = 0.84$, and total variance explained at 52%.

Since no less than two items from both the SSQ and the SSQ-S specifically referred to 'deciding by reasons' and 'deciding by principle', furthermore a general version was constructed omitting any reference to reasons or principles: the SSQ-G. This general version entails 2 factors with 5 items in total, measuring the dimensions (i) Personal evaluation of strategy satisfaction ($\alpha = 0.78$) and (ii) Overall evaluation of strategy satisfaction ($\alpha = 0.70$). Cumulative variance explained was 61% like the basic SSQ, total scale reliability was $\alpha = 0.80$. The final SSQ-G is depicted in Table 9.5 on page 229 within section 9.1.2.1.

Two of the three previous studies did not perform a factor analysis and the one that did, did not report total variance explained. Accordingly, this is an aspect where my study prevails. However, the Cronbach's alphas reported in the previous studies ranged from 0.79 to 0.88 and were thus consistently higher than mine (ranging from 0.70 to 0.84/0.87).

My Strategy Satisfaction Questionnaire was only used within the Pilot Study (cf. section 8.4.1 on page 201), and dropped for the sake of one-item measures in subsequent experiments due to the repeated-measures nature of these experiments and the need to reduce the item-load for participants.

11.2.2 Updated Literature Search

The updated literature search was conducted using PsycInfo. The tested variations of the search string are documented within the Appendix (cf. Table E.3 on page 647). The

searches finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 11.3 below. An additional systematic snow ball search was not conducted since the overview provided by the $N = 175/n = 50$ articles was sufficient for present purposes. Of course, relevant references given by the sampled articles were examined.

Table 11.3 Chosen Searches, Initial Hits, and First Screening for the *Strategy Satisfaction Questionnaire (SSQ)*.

#	Explanation String	String	PsycInfo # of Hits	Screening 1
11	Title without "questionnaire"	(decision and strategy and satisfaction).ti.	4	4
13	Abstract, synonyms for "questionnaire"	(decision and strategy and satisfaction and (questionnaire or scale or measure or dependent or item*)).ab.	58	6
14	Abstract, synonyms for "questionnaire" combined with satisfaction, synonym for "strategy"	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process)).ab.	28	18
16	Abstract, strategy/process three words adjacent to satisfaction	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process) and ((strategy adj3 satisfaction) or (process adj3 satisfaction))).ab.	1	1
17	All fields, as above	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process) and ((strategy adj3 satisfaction) or (process adj3 satisfaction))).af.	84	21

Note. After Screening 1 the total number of remaining publications was $n = 50$ (last column).

Screening 2 is fully documented in Table E.4 on page 648 within the Appendix. Table 11.4 below displays the $n = 2$ publications with 'good fit'.

Table 11.4 Publications Remaining After the Second Screening for the *Strategy Satisfaction Questionnaire (SSQ)*.

Reference	Year	Fit	Measure/s	Domain	Details
Fitzsimons, G. J. (2000). Consumer response to stockouts. *Journal of Consumer Research*, *27* (2), 249–266. https://doi.org/10.1086/314323 11	2000		"Satisfaction was measured with two six-item scales, one to measure decision satisfaction and a second to measure consumption satisfaction" (p. 254).	consumer satisfaction	DECISION SATISFACTION ITEMS (p. 265) [All items have endpoints 1 p strongly agree, 10 p strongly disagree, unless otherwise noted.] D1. I found the process of deciding which product to buy frustrating. D2. Several good options were available for me to choose between. D3. How satisfied or dissatisfied are you with your experience of deciding which product option to choose? (endpoints 1 = extremely satisfied, 10 = extremely dissatisfied) D4. I thought the choice selection was good. D5. I would be happy to choose from the same set of product options on my next purchase occasion. D6. I found the process of deciding which product to buy interesting.
Lu, J., Chen, Y., & Fang, Q. (2022). Promoting decision satisfaction: The effect of the decision target and strategy on process satisfaction. *Journal of Business Research*, *139*, 1231–1239. https://doi.org/10.1016/j.jbusres.2021.10.056 23	2022		decision satisfaction	strategy, self vs. other decision making	STILL CITING (Zhang & Fitzsimons, 1999) FOR PROCESS SATISFACTION "After making each decision, the participants rated the process ('I find the decision process interesting.' 'I find the decision process frustrating.' (reverse-scored) 'I was satisfied with the decision process.') and outcome ('I like the decisionoutcome.' 'My decision is wise.' 'I am satisfied with my decision outcome.') satisfaction on a nine-point scale (1 = totally disagree to 9 = totally agree). These items have been widely used on decision satisfaction (Fitzsimons, 2000; Heitmann et al., 2007; Zhang & Fitzsimons, 1999)." (p. 1235)

11.2.3 Discussion

11.2.3.1 Measures

Strategy satisfaction scales/questionnaires are generally not as carefully devised and subjected to factor analytic methods as are measures of decision style. Most authors use makeshift scales quickly created and averaged, many use one-item face-valid variables.

The most prominent, widely cited and widely used scale of strategy satisfaction is one devised by Fitzsimons and colleagues in the domain of consumer satisfaction in 1997, originating in an unpublished manuscript (Fitzsimons, Greenleaf, & Lehmann, 1997), and subsequently used e.g. in Fitzsimons (2000); Zhang and Fitzsimons (1999). I also partially based my Strategy Satisfaction Questionnaire (SSQ) on this scale, and the original items of the Fitzsimons scale are reported in section 9.1.1.2 on page 220.

Fitzsimons and colleagues did not factor-analytically validate their 6-item scale, but Heitmann, Lehmann, and Herrmann (2007) did a decade later and further research relied and still currently relies on their refined scale (e.g. Flavián, Gurrea, & Orús, 2016; Hu & Krishen, 2019; Lu, Chen, & Fang, 2022). Heitmann et al.'s (2007) "scale purification process" (p. 248) led to the exclusion of half of the items from the original Fitzsimons scale.

The following items remained:

(H1) I found the process of deciding which product to buy frustrating. (R)
(H5) I found the process of deciding which product to buy interesting.
(H6) I was satisfied with my experience of deciding which product option to choose.[558]

The following items were removed:

(H2) Several good options were available for me to choose between.
(H3) I thought the choice selection was good.
(H4) I would be happy to choose from the same set of product options on my next purchase occasion.

Heitmann et al. (2007) describe their process such:

> In the case of decision satisfaction, Fitzsimons's (2000) original scale includes three items each on the perception of the assortment and on the experience of deliberation. The sets of items share little variance. When we included all six items in the measurement model, we obtained indicator reliabilities of .06 (Indicator 2), .21 (Indicator 3), and .18 (Indicator 4) for the three items that measured assortment perceptions. However, a measurement model consisting of only the three items related to the experience of decision making resulted in reliabilities of .67 (Indicator 1), .57 (Indicator 5), and .38 (Indicator 6). Therefore, for both empirical and substantive reasons, we focused on the more narrow deliberation aspect of decision satisfaction. (Heitmann et al., 2007, p. 238)[559]

[558] The original item by Fitzsimons et al. (1997) had a changed structure and response scale, reading: 'How satisfied or dissatisfied are you with your experience of deciding which product option to choose?', to be answered on a 10-point scale ranging from 'extremely satisfied' [1] to 'extremely dissatisfied' [10]. All remaining items were adopted identically by Heitmann et al. (2007). However, they used a 9-point scale (p. 242).

[559] Note that in SEM terms, 'indicator' means 'item'. The reliability of an 'indicator' in SEM is "commonly represented by the squared multiple correlation coefficient, which ranges from 0 to 1" (Raines-Eudy, 2000, p. 128). The squared multiple correlation coefficent (R^2) values are the squared factor loadings of a CFA model (standardized) and a common rule of thumb is the requirement that $R^2 > .50$ (e.g. Bean, 2021, chap. 4.2; cf. also Cheung et al., 2023).

It is obvious that the reliability values (R^2) of the retained items are not great but acceptable (cf. footnote 559 on the previous page) for all but one: item #6 ('I was satisfied with my experience of deciding which product option to choose.') with $R^2 = 0.38$.

Furthermore, Heitmann et al.'s (2007) analysis confirms what can be gauged from the semantics of the six original items: three items (H2, H3, H4) evaluate the *options* available (this is what Heitmann and colleagues call 'assortment perceptions'), two items (H1, H5) are clearly about the decision *process* (which is what Heitmann et al. call the 'deliberation aspect'), and one item (H6) is about both ('I was satisfied with my experience of deciding which product option to choose') and thus unsurprisingly comes with the lowest R^2-reliability.

In sum, only two of the six items originally proposed by Fitzsimons and colleagues clearly pertain to process or strategy satisfaction. Apart from the work of Fitzsimons and colleagues and subsequently by Heitmann and colleagues, there were no further decision process or strategy satisfaction scales/questionnaires to be found – in the domain of general decision making including consumer satisfaction.

11.2.3.2 The Medical Domain

Satisfaction scales (both pertaining to process/strategy as well as outcome) are dominated by domain.

The largest domain is medical decision making where many validated questionnaires are to be found, the vast majority being concerned with aspects of patient satisfaction (e.g. regarding treatment, information, medication, doctors, nursing, therapy, or general satisfaction), and quite a few validated questionnaires deal with job satisfaction of nurses (cf. Table E.4 on page 648 within the Appendix for details).

From the $n = 47$[560] publications remaining after Screening 1, $n = 17$ were from the medical domain (as indicated in the fore-last column in Table E.4 on page 648), of which three were concerned with satisfaction with the decision making *process*. One study did not report their items (Budden, Hayes, & Buettner, 2014), another one used a one-item measure ("I am satisfied with the overall informed consent taking process", Basukala et al., 2023), and the third study (Skyring, Mansfield, & Mullan, 2021) used a modification of the Treatment Decision Making Satisfaction Scale (TDM-SAT, Victorson et al., 2016). While the authors of the scale were not specifically concerned with decision *process*, Skyring et al. (2021) cast the (almost identical) items in the light of process satisfaction.

These are the items from Skyring et al. (2021):[561]

[560] The discrepancy between $n = 47$ publications in Table E.4 on page 648 and the report of $n = 50$ publication as the sum of all variations of the search string in Table 11.3 on page 472 is simply due to one article coming up thrice ($= -2$) and another one twice ($= -1$), thus: 50-3=47.

[561] The items from Victorson et al. (2016), the authors of the scale are these: "The items comprising the scale were 1) my treatment decision making options were clear to me, 2) it was easy for me to

(TDM-1) My treatment decision making options were clear to me.

(TDM-2) It was easy for me to decide on the treatment I chose.

(TDM-3) I am satisfied with the level of communication I had with my physician about treatment options.

(TDM-4) Overall, I am satisfied with my treatment decision making experience.

(TDM-5) Overall, I am satisfied with the treatment I chose.

The original values for internal consistency (0.96) and item-total correlations (0.85 to 0.91) as reported by Victorson et al. (2016) are very high; in spite of their changes to the scale, Skyring et al. (2021) do not seem to have re-evaluated these numbers. Furthermore, Victorson et al. (2016) do not report a full factor analysis, but only note that "Factor analyses showed that 84% of the variance was explained by a single factor" (p. 1424) which indicates that the items indeed loaded onto more than one factor.

The TDM-SAT items are clearly quite specific to the patient/treatment decision making context. One could transform some of these items to fit a more general purpose:

(TDM-1_{gen}) My options were clear to me.

(TDM-2_{gen}) It was easy for me to settle on the option I chose.

(TDM-3_{gen}) ?

(TDM-4_{gen}) Overall, I am satisfied with my decision making experience.

(TDM-5_{gen}) Overall, I am satisfied with the option I chose.

The transformation to item (TDM-3_{gen}) needs further interpretation: What is the analogue of the function of 'communication with the physician' in a non-medical context? Is it 'information', 'authority', 'participation', 'security', or 'consultation with a trusted individual', 'decision support', 'shared decision making'?

At any rate, transforming these items to be more general makes it even more obvious that they are quite diverse; there is: 'clarity of the options' (TDM-1), 'ease/difficulty of the decision' (TDM-2), 'affective component of the 'experience" (TDM-4), 'option satisfaction' (TDM-5), and, say, 'degree of shared decision making' (TDM-3).

Based on this diversity in terms of aspects of the decision situation, the very high internal consistency reported by Victorson et al. (2016) would be inexplicable – if it were not for the focus of subject matter on 'treatment'. Accordingly, it stands to reason that in spite of the diversity as regards decision making aspects, participants were mentally quite focused on a range of situations and interactions pertaining to their treatment choice.

decide on the treatment that I chose, 3) I am satisfied with the level of communication that I had with my physician about my treatment, 4) overall, I am satisfied with my treatment decision making experience, 5) overall, I am satisfied with the treatment that I chose and 6) next year at this time I believe that I will continue to be satisfied with the treatment that I chose." (p. 1424). Accordingly, there was one further item, but otherwise the changes in Skyring et al. (2021) were minor.

Conceptually, I would still want to argue that what these apparently high intercorrelations show is that e.g. the clarity of the options, the fitting amount of communication with doctors, and the evaluation of the overall 'experience' are all independent aspects of a medical decision situation that simply correlate highly – rather than that they are components of one entity named 'treatment decision making satisfaction'.

In sum, in the large domain of medical decision making, too, research on satisfaction with the decision strategy/process is underrepresented. Furthermore, the example of the (partially) validated Treatment Decision Making Satisfaction Scale (TDM-SAT) – which according to Skyring et al. (2021) measures satisfaction with the decision making *process* – shows that due to domain-consistency (in this case: the treatment decision situation) high internal consistencies may be achieved *without a consistent construct of 'decision process'*. That is, while the TDM-SAT may be completely adequate within its specific domain, this research cannot speak to the measurement of strategy/process satisfaction in other domains – least of all a domain of 'general decision making' – because its items refer to aspects of a decision problem/situation as diverse as the decision options, the decision difficulty, or the decision 'experience'.

This analysis of the advantages of domain specificity is not exclusive to the medical domain (and subdomains such as treatment decision), but applies to other domains just as well. It is an interesting parallel to what I called *the effect of content* regarding scenario/vignette content in the discussion of the experiments. It seems that in general domain/content is something that human minds latch onto more easily than they latch onto mere structure.

11.2.3.3 My Study and Future Research

Both in the domain of general decision making including consumer satisfaction as well as in the well-researched domain of medical decision making no convincing scale/questionnaire of decision strategy/process satisfaction was found. In the former case, Heitmann et al. (2007) performed confirmatory factor analysis on the 6 items from Fitzsimons et al. (1997) only to end up with only three items, one of which came with a quite unconvincing loading. In the latter case I argued that the good psychometric properties of the TDM-SAT (Victorson et al., 2016) are due to domain consistency whereas the items as regards aspects of decision making are too diverse to form a uniform construct of decision process satisfaction.

From these two possibilities, the Heitmann et al. (2007) scale is the better one. General versions of the three retained Heitmann et al. (2007) items would sound like this:

($H1_{gen}$) I found the process of deciding frustrating. (R)

($H5_{gen}$) I found the process of deciding interesting.

($H6_{gen}$) I was satisfied with my experience of deciding which option to choose.

For comparison, these are the items from my SSQ-G, the best general version of my Strategy Satisfaction Questionnaire (SSQ) without reference to reasons or principles, with 5 items on 2 factors (cf. Table 9.5 on page 229 for the final factoring solution). Factor 1 (F1) was labeled 'Overall Evaluation' and Factor 2 (F2) was labeled 'Personal Evaluation'.[562]

(SSQ-G02) In everyday life I would use the same decision strategy. (F1)

(SSQ-G10) I am confident that the decision strategy I was instructed to use generally leads to good decisions. (F1)

(SSQ-G11) The decision strategy I was instructed to use fits my values and opinions. (F1)

(SSQ-G01) I am satisfied with the decision strategy I was instructed to use. (F2)

(SSQ-G12) I am confident that I would not regret this decision strategy. (F2)

It is obvious that the SSQ-G does not include any of the old Fitzsimons items, but is rather made up of the items from Crossley and Highhouse (2005) (SSQ-G1, SSQ-G2) and Schlegel et al. (2013) (SSQ-G12, SSQ-G10, SSQ-G11), although all items were heavily adapted (cf. section 9.1.1.2 on page 220 for all original items). My SSQ-G is thus an entirely different scale than the Fitzsimons/Heitmann scale. It also *sounds* very different: whereas the Heitmann scale sounds very flat (frustrating, interesting, satisfied), the SSQ-G has a more rounded character (would use the same strategy, leads to good decisions, fits values and opinions, satisfied, confident to not regret).

Could the SSQ-G be easily used for future research? My Strategy Satisfaction Questionnaire was formulated to fit an experiment that manipulated 'decision strategy' as the independent variable ("the strategy I was instructed to use"), but this could be easily changed to e.g. 'the strategy I used'. However, the SSQ-G items *could not* be easily changed to include the word 'process' instead of 'strategy'. For example, a version of item SSQ-G10 using the term 'process' would read: "I am confident that the decision *process* I used generally leads to good decisions". However, this sentence only makes sense if 'process' is understood metaphorically (like the artist stating "I follow a certain process in order to..."). A process – unless understood in that metaphoric sense – is not 'used' or 'employed', but one goes through it; it has a passive connotation with parts of it not being conscious or controlled. The term 'strategy' on the other hand has an active connotation; a strategy is consciously chosen and executed.

If the questionnaire were predetermined to the use of the term 'strategy' this would be a grave limitation, since it is rarely the case that we identify a naturalistic act of decision making as following a specific *strategy*. Even a person who makes a pros and cons list (which is a strategy) will likely additionally promote their decision making by further means, like talking to a friends. Did this person then use two strategies, or was their one strategy to first make a list and to secondly talk to a friend? – At any rate, the term 'strategy' in a naturalistic context might be rather confusing to participants

[562] The item numbering was kept identical to the numbering in Table 9.5 on page 229.

and should not be used. But it could certainly be paraphrased.

An adapted version of the SSQ-G could sound something like this:

(SSQ-G02$_{new}$) In everyday life I would go about making a decision just the same.

(SSQ-G10$_{new}$) I am confident that the way in which I arrived at this decision/choice generally leads to good decisions/choices.

(SSQ-G11$_{new}$) The way in which I made this decision fits my values and beliefs.

(SSQ-G01$_{new}$) I am satisfied with the way I arrived at my choice/decision.

(SSQ-G12$_{new}$) I am confident that I will not regret the way in which I made this decision.

Of course, this is just a first upshot. For example, as indicated by the slash in 'decision/choice' or 'choice/decision', conceptual thinking as well as pre-testing would need to show which term seems more fitting to participants. The same goes for the paraphrasing of 'decision strategy' (or process) as 'the way of arriving at a decision' (or choice).

A different question is, in which kind of experimental or survey context such a questionnaire could be employed. Using five items to evaluate 'the way of having arrived at a decision' makes quite a big deal of said decision. Accordingly, it would seem unproportionate to use this questionnaire if participants had to make many or very inconsequential choices. Furthermore, as the SSQ-G$_{new}$ items are phrased now, they presuppose that the respondent understands that there are different ways to make decisions (i.e.: different strategies), that they have cognitive access to the way they made the decision, that it was a consequential decision they made (otherwise the regret item would make little sense), and that the decision situation to be evaluated does not elicit very special or artificial decision strategies (otherwise the comparison to everyday life does not make sense). Accordingly, the area of application is probably not very large.

In sum, I believe a scale/questionnaire measuring satisfaction with the decision strategy/process more rounded and with better psychometric properties than the Heitmann et al. (2007) items can be constructed. Such a questionnaire, to my knowledge, does still not exist, but my Strategy Satisfaction Questionnaire (SSQ and its variants) does not fit the bill either, because presently it could only be used in a context where a specific decision strategy was instructed to participants. An adapted version seems entirely possible, but its area of application would have to be chosen with care.

11.2.3.4 Relevant Findings

The research program conducted by Fitzsimons and colleagues (Fitzsimons, 2000; Fitzsimons et al., 1997; Zhang & Fitzsimons, 1999) distinguishes three types of satisfaction in consumer decision making: overall satisfaction, consumption satisfaction, and process satisfaction (which they call 'decision satisfaction'): "[D]ecision satisfaction is a significant contributor to consumers' overall satisfaction judgments and is conceptually distinct from satisfaction with the consumption of a good" (Fitzsimons, 2000, p. 252).

Fitzsimons (2000) uses the six items from Fitzsimons et al. (1997) for 'decision satisfaction' and six further items for 'consumption satisfaction', centering around the question "How satisfied were you with the product you chose?" (p. 265). 'Consumption satisfaction' is accordingly akin to what I call 'outcome satisfaction'.[563] The two scales were subjected to factor analysis together and "the six consumption items load[ed] highly on one factor, while the six decision items loaded highly on a second factor" (p. 254). Since the factor analysis is not reported in more detail, it is unclear whether the pattern and loadings can be deemed satisfactory. Reliability for the six decision satisfaction items is reported with $\alpha = 0.83$, and for consumption satisfaction with $\alpha = 0.89$. The correlation between 'decision satisfaction' and 'consumption satisfaction' is reported with $r = 0.36$.

Heitmann et al. (2007) use structural equation modeling to understand the connections between antecedent factors (individual and choice set characteristics; first level), choice goals (justifiability, confidence, evaluation costs, anticipated regret, final negative affect; second level), decision and consumption satisfaction (third level) and consumer consequences (e.g. loyalty; last level). They use three of the six Fitzsimons items for 'decision satisfaction' (i.e.: process satisfaction) and an entirely different measure than Fitzsimons (2000) for consumption satisfaction (i.e.: outcome satisfaction), which included 10 items (Study 1) and 8 items (Study 2); Cronbach's alphas were not specifically reported. The correlation between decision satisfaction and consumption satisfaction is reported with $r = 0.46$.

Amongst further details, they find that (i) the five 'choice goals' differentially affect decision vs. consumption satisfaction (p. 240), (ii) decision satisfaction leads to consumption satisfaction (p. 242), and (iii) the choice goal 'evaluation costs' increases consumption satisfaction, but decreases decision satisfaction (p. 245).

Hu and Krishen (2019) use structural equation modeling to investigate the relationships between information overload, decision difficulty, and decision satisfaction (amongst further variables). For 'decision satisfaction' (i.e.: process satisfaction) the authors use the three Heitmann et al. (2007) items, for which they report a reliability of $\alpha = 0.69$. Hu and Krishen (2019) find that decision difficulty fully mediates the effect of information overload on decision difficulty (p. 34) and they conclude that: "Our findings suggest that while the quantity and quality of online reviews lead to information overload, they do not exhibit a direct effect on decision satisfaction. Instead, when a decision is perceived to be difficult, information overload affects decision satisfaction. Further, the strength of the indirect effect depends on personal characteristics (i.e., a consumer's product knowledge)" (p. 34-35).

[563] The full set of items is this: C1. My choice turned out better than I had expected; C2. Given the identical set of alternatives to choose from, I would make the same choice again; C3. How satisfied were you with the product you chose? (endpoints 1 = extremely satisfied, 10 = extremely dissatisfied); C4. I am very displeased with the product I purchased; C5. I am very happy with the product I purchased; C6. Thinking of an ideal example of the product I purchased, my choice was very close to the ideal example (Fitzsimons, 2000, p. 265).

Lu et al. (2022) investigate the effect of choosing versus rejecting options ('decision strategy') and making a decision for oneself versus another ('decision target') on process satisfaction and outcome satisfaction.[564] For process satisfaction they use a simplified version of the three Heitmann et al. (2007) items ('I find the decision process interesting', 'I find the decision process frustrating', 'I was satisfied with the decision process', Lu et al., 2022, p. 1235), and further three items for outcome satisfaction ('I like the decision outcome', 'My decision is wise', 'I am satisfied with my decision outcome', p. 1235) whose origin is wrongly attributed by the authors and remains unclear. Lu et al. (2022) report a reliability of $\alpha = 0.65$ for the three process satisfaction items and $\alpha = 0.95$ for outcome satisfaction; simple correlations are not reported. Furthermore, over the course of three studies the authors consistently report different effects of the independent variables on process versus outcome satisfaction and conclude: "Although the choices our participants made did not differ across different experimental conditions, their process satisfaction differed, showing that process satisfaction is independent of decision outcomes" (p. 1238-9).

Skyring et al. (2021) in the domain of medical decision making investigate "the links between involvement in the decision making process, satisfaction with that decision making process and subsequent regret in the same patient population" (p. 2). The measure they used for process satisfaction, the TDM-SAT, has already been described above. To measure decision regret, they used the Decision Regret Scale (Brehaut et al., 2003) with the items: 'It was the right decision', 'I regret the choice that was made', 'I would go for the same choice if I had to do it over again', 'The choice did me a lot of harm', 'The decision was a wise one'. The results were as expected that "increased involvement in the decision making process correlates with increased satisfaction with that process and that increased satisfaction with the decision making process then correlates with lower decision regret" (p. 6). The correlation found between process satisfaction and regret was $r = 0.56$ (p. 5).

Szrek (2017) investigates the effect of number of options (here: health plans) and perceived variety on both outcome and process satisfaction (among other variables). She uses one item-scales for both measures (outcome: 'How much do you like the plan you decided to pick?'; process: 'How much did you enjoy making the choice?'; p. 46), whose correlation is given with $r = 0.56$ (p. 46). The main findings are that "once perceived variety is included in the model, the number of options [...] has no effect on [...] choice outcome satisfaction [...] and [...] decreases choice process satisfaction" (p. 42).

In sum, the reviewed findings most importantly corroborate the distinction between process satisfaction and outcome/consumption satisfaction – a distinction that holds up both in correlational as well as in experimental studies. While the two constructs

[564] Note that this research will be more thoroughly reviewed in the section on *Reasons vs. Principles*, whereas in this section only results pertaining to the Strategy Satisfaction Questionnaire (SSQ) will be depicted. The same holds for a related study conducted by Wang and Liu (2014).

correlate with medium strength (>.3, <.5), they are consistently affected differentially by upstream predictors.

A further inspiring (although unsurprising) finding is the large negative correlation with regret. One of my Strategy Satisfaction Questionnaire items (item #12, also included in SSQ-G) refers to regret (based on the scale by Schlegel et al., 2013) and thus inadvertently makes the claim that (non-)regret is on the same dimension as satisfaction. Does the relationship between the two types of satisfaction (process and outcome) with regret warrant further investigation? It may simply be the case that just as satisfaction can have different objects (such as the process as well as the outcome of a decision), so does regret – and in both cases participants may be well able to distinguish these differing referents.

However, broadening the focus to include regret opens up another line of research within decision sciences which may be quite worthwhile given the small amount of literature concerned with decision process satisfaction.

11.2.3.5 Summary

Several studies, both correlational and experimental, substantiate the distinction between decision strategy/process satisfaction and decision outcome satisfaction. Although both constructs correlate, they are affected by different predictors. Furthermore, it has been suggested that process satisfaction influences outcome satisfaction such that e.g. in a medical context attending to the decision process is additionally beneficial.

These findings speak in favor of the usefulness of a psychometrically sound questionnaire measuring decision process satisfaction. Such a questionnaire does not exist yet. Some suggestions were put forward as to how such a questionnaire might look like.

12 Reasons versus Principles as Decision Strategies

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12.1 Introduction

12.1.1 Experimental Results

The core interest of this research endeavor was the effect of 'deciding by reasons' versus 'deciding by principle' as two deliberative decision strategies adopted from philosophy

on measures of well-being/satisfaction.

In total, I devised six experiments to investigate this subject matter, three of which have been reported here. Each scenario-based experiment was situated within a specific and already known research paradigm due to the pervasive effects of content as found in the Pilot Study. As there exists no taxonomy of decision situations or readily available scenarios/vignettes along the lines of a general taxonomy of (decision) situations, and extensive pre-testing to devise such a set of scenarios was not possible, the next best thing was to test the subject matter within existing paradigms and to use existing material if possible.

This is the list of all six experiments investigating the effects on satisfaction when using reasons versus a principle as decision strategy. The first three of them are reported in chapter *Reasons vs. Principles* (chap. 10). The latter three are not reported within this manuscript. A list of all studies I conducted for the present research endeavor is to be found in Table Ad.1 on page 769 within the Appendix.

Trolley Paradigm	Original materials from Waldmann and Dieterich (2007), section 10.1 on page 367.
MADM Paradigm	Classic matrix format, self-constructed contents based on the *Collegiate Decision Situations* (9.3.1.2 on page 250), section 10.2 on page 407.
Field Experiment	Field experiment of type diary study thus not scenario-based, no materials required, section 10.3 on page 439.
Value Circle	Original materials from Strack et al. (2008), not reported, cf. Table Ad.1 on page 769.
Moral vs. Prudential	Original materials from Young, Nichols, and Saxe (2010), not reported, cf. Table Ad.1 on page 769.
Haidt Paradigm	Original materials from various sources based on Haidt (2001), not reported, cf. Table Ad.1 on page 769.

All of these experiments, including the ones not reported, did lack convincing results as to the main hypothesis – namely that using one or the other deliberative decision strategy would lead to differing satisfaction ratings. Even adding a control condition where participants were not given a specific decision strategy or they were instructed to 'decide intuitively' did not result in a consistent pattern of results.

Glossing over the many details that were found due to thorough analysis and reported in the respective experimental sections, the overall verdict is that 'deciding by reasons' versus 'deciding by principle' cannot be said to make participants more or less satisfied – with the strategy, the outcome, or overall. There is no difference between the two deliberative strategies on satisfaction.

Accordingly, the task of this section is to find some potential reasons for this (non-)finding and relate it to similar research. The next section 12.1.2 on the next page will detail the search procedure and its results and the according literature will be discussed in section 12.5 on page 488.

12.1.2 Literature Search Procedure

The research documented as *Previous Research* (chap. 5 on page 145) within the theoretical part of this work went from more general to more specific. It entailed three sections:

(i) *Decision Making and Satisfaction* (5.2 on page 146)
(ii) *Decision Making Strategy and Satisfaction* (5.3 on page 151)
(iii) *Reasons & Principles as Decision Strategy and Satisfaction* (5.4 on page 153)

In this section I wish to discuss literature *most specific* to my main research question: the quest to show the differential effect of 'deciding by reasons' and 'deciding by principle' as two deliberative decision strategies on well-being/satisfaction – which equals the third of the three categories from above.

However, in order to get more results, I split this category in two: 'reasons and principles as decision strategy', and 'reasons and principles as decision strategy' *plus* satisfaction. Accordingly, I will conduct two separate literature searches, only the second of which will include satisfaction (and synonyms). Furthermore, I will conduct both literature searches both on PsycInfo and Google Scholar.[565]

Thus, there will be two search strings: There is "Search String 1" which *does not* include any search terms referring to some measure of well-being as the dependent measure, and there is "Search String 2" which *does* include satisfaction/happiness/well-being.

The results from PsycInfo and Google Scholar will be reported separately, but discussed together.

12.2 Search Strings 1 and 2

Table 12.1 on the next page displays the chosen terms and search strings.

[565] Google Scholar has limited search functions as compared to an academic database, it is usually recommended to not solely rely on it (cf. e.g. Gusenbauer & Haddaway, 2020), and yet the internet is full of university and college libraries offering some guidelines on how to use it (e.g. Archer Library, 2023; John S. Bailey Library, 2023; McKee Library, 2023). Google Scholar was included due to the provision of suitable results over and above PsycInfo.

Table 12.1 Search Terms and two Search Strings for "Reasons versus Principles".

Search String #	Term 1	Term 2	Term 3	Term 4	Term 5
	reasons	principles	decision strategy	experiment	satisfaction
	--	rules	decision process	--	happiness
	--	maxims	--	--	well-being
	reason-based	rule-based	--	--	--
Search String 1	(reason* OR reason*-based)	(principle* OR rule* OR maxim* OR rule-based)	("decision strategy" OR "decision process")	experiment	--
Search String 2	(reason* OR reason*-based)	(principle* OR rule* OR maxim* OR rule-based)	("decision strategy" OR "decision process")	experiment	(satisfaction OR happiness OR well-being)

Note. The asterisk (*) marks truncation, the quotation marks ("") join terms together. Both search strings are conjunctive: there is an 'AND' between each group of synonyms. Only Search String 2 includes satisfaction/happiness/well-being.

12.3 Search String 1: Reasons, Rules, Decision Strategy

12.3.1 Updated Literature Search

12.3.1.1 PsycInfo

The tested variations of Search String 1 are documented within the Appendix (cf. Table F.1 on page 650). The search finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 12.2 below.

Table 12.2 Chosen Search, Initial Hits, and First Screening for Search String 1 on PsycInfo.

#	Explanation String	String	PsycInfo # of Hits	Screening 1
2	All fields, truncated	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment).af.	251	41 (27)

Note. Screening 1 (last column) indicated $N = 68$ publications for further processing, of which $n = 41$ were available with full text, and $n = 27$ (mostly book chapters) were not available with full text.

Screening 2 is fully documented in Table F.2 on page 652 within the Appendix. Table 12.3 below displays the $n = 1$ publication with 'good fit'.

Table 12.3 Publications Remaining After the Second Screening for Search String 1 on PsycInfo.

	Reference	Year	Fit	Domain / Content	(Mis-)Fit Bc /About
13	Giblin, C. E., Morewedge, C. K., & Norton, M. I. (2013). Unexpected benefits of deciding by mind wandering. *Frontiers in Psychology*, *4*, Article 598. https://doi.org/10.3389/fpsyg.2013.00598	2013		compare post-choice satisfaction from choices made by mind wandering to reason-based choices and randomly assigned outcomes	poster study, satisfaction

12.3.1.2 Google Scholar

The tested variations of Search String 1 are documented within the Appendix (cf. Table F.3 on page 654). The searches finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 12.4 below.

Table 12.4 Chosen Searches, Initial Hits, and First Screening for Search String 1 on Google Scholar.

#	Explanation String	String	Google Scholar # of Hits	Screening 1
2	All fields, truncation suppressed	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND "experiment"	18.200	100 articles: 34
3	All fields, truncation suppressed; years limited to 2014-24	+ years 2014-2024	17.900	150 articles: 48
9	Simplified, 'intext' and 'intitle'	(intext:reason) AND (intext:rule) AND (intitle:"decision strategy")	71	18

Note. From the about $N = 20.000$ hits of Search #2 and #3 $n = 100$ and $n = 150$ hits respectively were subjected to Screening 1. For Search #9 all $N = 71$ initial hits were screened.

Table 12.5 below displays the $n = 3$ publication with 'good fit'.

Table 12.5 Publications Remaining After the Second Screening for Search String 1 on Google Scholar.

Reference	Year	Fit	About / Interesting Bc	Domain
Bechwati, N. N., & Xia, L. (2003). Do computers sweat? The impact of perceived effort of online decision aids on consumers' satisfaction with the decision process. *Journal of Consumer Psychology* , *13* (1–2), 139–148.	2003		satisfaction with the search process	consumer satisfaction
Chang, H. H., & Hung, I. W. (2018). Mirror, mirror on the retail wall: Self-focused attention promotes reliance on feelings in consumer decisions. *Journal of Marketing Research* , *55* (4), 586–599. https://doi.org/10.1509/jmr.15.0080	2018		manipulation of decision strategy	consumer decisions
Dhar, R. (1996). The effect of decision strategy on deciding to defer choice. *Journal of Behavioral Decision Making* , *9* (4), 265–281. https://doi.org/10.1002/(SICI)1099-0771(199612)9:4<265::AID-BDM231>3.0.CO;2-4	1996		manipulation of decision strategy	choice deferral

12.3.2 Summary

In total, the one search on PsycInfo and the three searches on Google Scholar yielded four articles with 'good fit'. One result was provided by PsycInfo (Giblin et al., 2013), and three results were provided by Search #2 in Google Scholar (Bechwati & Xia, 2003; H. H. Chang & Hung, 2018; Dhar, 1996). There were no doubles between searches for the 'good fit' articles. Two of the four articles were already known to me and have been cited in previous chapters (Dhar, 1996; Giblin et al., 2013).

All publications from both PsycInfo and Google Scholar rated with 'medium fit' based on Search String 1 are displayed in Table F.4 on page 655 within the Appendix.

12.4 Search String 2: Reasons, Rules, Decision Strategy, and Satisfaction

12.4.1 Updated Literature Search

12.4.1.1 PsycInfo

The tested variations of Search String 2 are documented within the Appendix (cf. Table F.5 on page 656). The search finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 12.6 below.

Table 12.6 Chosen Search, Initial Hits, and First Screening for Search String 2 on PsycInfo.

#	Explanation String	String	PsycInfo # of Hits	Screening 1
4	All fields: "reason", "rule", "strategy" and synonyms Abstract: "satisfaction" and synonyms	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process")).af. and (satisfaction or happiness or well-being).ab.	48	23

Screening 2 is fully documented in Table F.6 on page 657 within the Appendix. Table 12.7 below displays the $n = 2$ publications with 'good fit'.

Table 12.7 Publications Remaining After the Second Screening for Search String 2 on PsycInfo.

	Reference	Year	Fit	Double	About
4	DePaoli, A. M. (2017). *Reason-product (in)compatibility: Implications of consumer reasoning for post-choice satisfaction* [Doctoral dissertation, Stanford University]. http://purl.stanford.edu/kf481qy0875	2017		Search String 2 (Google)	distinguishes 'cognition-based' and 'affect based' reasons; effect on satisfaction dependent on 'reason-product compatibility'
7	Giblin, C. E., Morewedge, C. K., & Norton, M. I. (2013). Unexpected benefits of deciding by mind wandering. *Frontiers in Psychology* , *4* , Article 598. https://doi.org/10.3389/fpsyg.2013.00598	2013		Search String 1 (PsycInfo), Search String 2 (Google)	cf. Search String 1 (PsycInfo)

12.4.1.2 Google Scholar

The tested variations of Search String 2 are documented within the Appendix (cf. Table F.7 on page 658). The searches finally chosen as well the number of initial hits and the number of fitting publications after Screening 1 are displayed in Table 12.8 below.

Table 12.8 Chosen Searches, Initial Hits, and First Screening for Search String 2 on Google Scholar.

#	Explanation String	String	Google Scholar # of Hits	Screening 1
1	Basic Search	(reason OR reason-based) AND (principle OR rule OR maxim OR rule-based) AND ("decision strategy" OR "decision process") AND (satisfaction OR happiness OR well-being) AND experiment	18.000	160 articles: 65
6	In title for every group, without "experiment"	(intitle:(reason OR reason-based)) AND (intitle:(principle OR rule OR maxim OR rule-based)) AND (intitle:("decision strategy" OR "decision process")) AND (intitle:(satisfaction OR happiness OR well-being))	444	120 articles: 41

Note. From Search #1 $n = 160$ publications and from Search #6 $n = 120$ publications were subjected to Screening 1.

Table 12.9 below displays the $n = 5$ publication with 'good fit'.

Table 12.9 Publications Remaining After the Second Screening for Search String 2 on Google Scholar.

Reference	Year	Fit	Double	About
Bechwati, N. N., & Xia, L. (2003). Do Computers Sweat? The Impact of Perceived Effort of Online Decision Aids on Consumers' Satisfaction With the Decision Process. *Journal of Consumer Psychology* , *13* (1–2), 139–148.	2003		Search String 1 (Google)	cf. Search String 1 (Google)
Betsch, C., & Kunz, J. J. (2008). Individual strategy preferences and decisional fit. *Journal of Behavioral Decision Making* , *21* (5), 532–555. https://doi.org/10.1002/bdm.600	2008			decisional fit (the individually preferred decision strategy fits the actually applied strategy)
Depaoli, A. M. (2017). *Reason-Product (In)compatibility: Implications of Consumer Reasoning for Post-Choice Satisfaction* [Doctoral dissertation, Stanford University]. http://purl.stanford.edu/kf481qy0875	2017		Search String 2 (PsycInfo)	cf. Search String 2 (PsycInfo)
Fitzsimons, G. J. (2000). Consumer Response to Stockouts. *Journal of Consumer Research* , *27* (2), 249–266. https://doi.org/10.1086/314323	2000			consumer satisfaction with the decision process
Savioni, L., Triberti, S., Durosini, I., & Pravettoni, G. (2023). How to make big decisions: A cross-sectional study on the decision making process in life choices. *Current Psychology* , *42* (18), 15223–15236. https://doi.org/10.1007/s12144-022-02792-x	2023			personality traits and System 1 or 2 utilization may predict final satisfaction in life choices

12.4.2 Summary

The searches based on Search String 2 in both PsycInfo and Google Scholar yielded a total of six publications, some of which are doubles to previous searches.

The searches on PsycInfo yielded one completely new result (DePaoli, 2017), and the searches on Google Scholar resulted in three further completely new publications (Betsch & Kunz, 2008; Fitzsimons, 2000; Savioni, Triberti, Durosini, & Pravettoni, 2023). DePaoli (2017) was also found in Google Scholar. The remaining two hits (Bechwati & Xia, 2003; Giblin et al., 2013) had already been found based on Search String 1.

All publications from both PsycInfo and Google Scholar rated with 'medium fit' based on Search String 2 are displayed in Table F.8 on page 659 within the Appendix.

12.5 Discussion

Table 12.10 on the following page gives an overview of relevant research. Publications included are all those with 'good fit' (upper part of the table) and further ones from among those rated with 'medium fit', as well as two articles from the literature search for the Strategy Satisfaction Questionnaire (SSQ).

The first four categories are sorted as to relevance of ascending order: the included research entails (a) process/strategy satisfaction as a DV, (b) the manipulation of decision strategy as an IV, (c) decision strategy *and* satisfaction, (d) using reasons *or* principles/rules as a strategy *and* satisfaction. Furthermore, not within this ascending order, category (e) refers to research focusing on organismic variables. The categories are (obviously) not exclusive.

Those publications allocated exclusively to category (a) will not be further considered. The most interesting studies are those allocated to categories (d) and (e), which is the case for four of the eight articles with 'good fit' (upper part of the table) and none of the articles with 'medium fit' – which corroborates the consistency of Screening 2.

I will review this literature based on the categories introduced with Table 12.10 on the next page.

Table 12.10 Categorization and Contents of Relevant Literature Regarding *Reasons vs. Principles*.

Reference	(a) Process/ Strategy Satisfaction	(b) Manipulation of Decision Strategy	(c) Decision Strategy and Satisfaction	(d) Reasons or Principles as Decision Strategy and Satisfaction	(e) Person Variables	Content
Bechwati & Xia, 2003	2 Studies					IV: effort saving; DV: satisfaction with the search process
Betsch & Kunz, 2008				(X)	Experiments 1, 3, 5: preferred cognitive style (intuition vs. deliberation)	IV: cognitive style, decision strategy; DV: monetary value
Chang & Hung, 2018		Experiment 1: feeling vs. reason-based				IV: self-focus + decision strategy; DV: willingness to pay
DePaoli, 2017				Dissertation, Exp. 2, 3, 4, 5: cognition-based vs. affect-based reasons		IV: product category + reason type; DV: satisfaction
Dhar, 1996		Experiment 2: 4 classic decision strategies				IV: decision strategy; DV: choice deference
Fitzsimons, 2000	4 Studies					IV: various; DV: satisfaction
Giblin et al., 2013				Experiment 2: mind-wandering vs. reason-based		IV: decision strategy; DV: 'satisfaction'
Savioni et al., 2023					1 Study: Cognitive style, attachment, anxiety, Big Five	IV: personality traits, cognitive style; DV: satisfaction
Botti & McGill, 2011	Study 2					IV: hedonic vs. utilitarian option; DV: satisfaction
Connolly & Reb, 2012		Experiment 1: select vs. reject	(X)			IV: regret salience + decision strategy; DV: justifiability
Gallo et al., 2017		Experiments 4 & 5: intuition vs. deliberation				IV: intuitive/ deliberative processing; DV: experiential/ material choice
Hong & Chang, 2015		Pretest & Experiment 3: feeling vs. reason-based			(X)	IV: self-construal + decision strategy; DV: outcome valuation (WTP)
Lu et al., 2022			3 Experiments: choosing vs. rejecting			IV: decision target + decision strategy (+ seek/ avoid); DV: satisfaction
Ma & Roese, 2014			Experiment 2: maximizing vs. satisficing			IV: maximizing/ satisficing mindset; DV: regret, satisfaction
Machin, 2016			Experiments 2 & 3: select vs. reject			IV: decision strategy + valence/ salience; DV: 'satisfaction'
Wang & Liu, 2014			Experiment 2: alternative vs. attribute			IV: processing strategy + decision target; DV: satisfaction

Note. The upper part of the table comprises all articles rated with 'good fit' (green) from both search strings and both databases. The lower part of the table entails further relevant articles from among those rated with 'medium fit', as well as two articles (Lu et al., 2022; Wang & Liu, 2014) from the literature search for the Strategy Satisfaction Questionnaire (SSQ). The categories (a) - (e) are not exclusive. "(X)" denotes an additional partial fit for a category.

12.5.1 Manipulation of Decision Strategy

Four studies manipulated decision strategy and registered the effect on various dependent measures other than satisfaction.[566] The detailed results on these measures are not of interest here, but rather which decision strategies were manipulated and how it was done. Three of the studies used some version of the intuitive-rational distinction at the base of their conception of decision strategies.

Dhar (1996) was interested in the effect of decision strategy on choice deferral. He used four of the classic decision strategies: 'additive difference', 'linear additive'/additive compensatory, 'lexicographic'/elimination by aspects, and conjunctive (cf. also Table 1.2 on page 25). Participants received "a detailed description of the rule to which they were assigned" (p. 274), were guided through an example and provided with clarification if necessary. The choice problem was a classic MADM choice with four scenarios: apartment, bookshelf speaker, color television, and laptop computer (p. 275). Dhar (1996) included a manipulation check by self-report including the question "whether the participants followed the prescribed rule" (p. 275).

Gallo, Sood, Mann, and Gilovich (2017) investigate the fit between product category (experiential purchase vs. material purchase) and choice based on intuition vs. deliberation (= decision strategy). The authors base their distinction between intuitive and analytic processing on the many dual-process models to that effect (e.g. System 1, System 2; p. 754), and term the two modes variably 'strategy' (p. 754), 'mindset' (p. 756), and 'processing style' (p. 762). In two studies they instruct participants to either choose intuitively or based on deliberation. The dependent measures were the number of hypothetical material vs. experiential purchases chosen and willingness to pay. As hypothesized both studies confirmed the connection between intuitive decision style and experiential product type as well as deliberative decision style and material product type.

Hong and Chang (2015) and H. H. Chang and Hung (2018) distinguish between a 'feeling-based' and a 'reason-based' decision strategy, and their dependent measure of interest is 'willingness to pay' measuring outcome valuation.

Hong and Chang (2015) are interested in an independent vs. interdependent self-construal and manipulate both self-construal as well as decision strategy as the independent variables. Decision strategy was manipulated by instruction: in the feeling-based condition participants were told to "make their decisions based on 'how [they] feel about each of the options' and 'focus on [their] emotions and feelings toward each of the options"' whereas in the reason-based condition they were told to "make their decisions 'based on [their] reasoning' and 'focus on the logical reasoning of the pros and cons of each of the options"' (p. 1401). Willingness to pay was then recorded for a hypothetical choice between two apartments. The main effect of decision strategy was

[566] The sixth study, Connolly & Reb, 2012, will be reviewed within category (c) *Decision Strategy and Satisfaction*.

non-significant. The hypothesized connection between independent self-construal and feeling-based strategy as well as interdependent self-construal and reason-based strategy could be confirmed (p. 1402).

H. H. Chang and Hung (2018) were interested in high vs. low self-focused attention and manipulated both self-focused attention as well as decision strategy as the independent variables. Both the decision strategy manipulation as well as the choice task was taken from Hong and Chang (2015). Again, the main effect of decision strategy on willingness to pay was non-significant, and the interaction was significant. From their results the authors conclude that "reliance on feelings in decision making is more compatible with heightened self-focused attention" (p. 591).

12.5.1.1 Summary

In sum, apart from Dhar (1996), the more recent research has singularly focused on the intuitive-rational dichotomy. All three of these studies are in some way concerned with *fit* – Gallo et al. (2017) investigated the fit between decision strategy and product type, Hong and Chang (2015) were interested in the fit between decision strategy and self-construal, and H. H. Chang and Hung (2018) in the fit between decision strategy and self-focused attention. The fit examined was also always concerned with *the self* – which is conceptually so in case of the latter two, and Gallo et al. (2017) specifically points out that: "Thus, it may be that people find the evaluation of experiences more intuitive and spontaneous than the evaluation of material possessions in part because experiences are seen as closer to the self" (p. 765).

The sum of these findings is thus that intuitive decision making fits better with (a) experiential product types (taking a vacation rather than buying a new stereo), (b) independent self-construal, and (c) heightened self-focused attention. Intuition is closer to the self than deliberation.

Interestingly, however, both Hong and Chang (2015) and H. H. Chang and Hung (2018) did not find a significant main effect of decision strategy, but rather the hypothesized interactions: a certain decision strategy *plus* a certain self-construct (Hong & Chang, 2015) or self-focus (H. H. Chang & Hung, 2018) leads to higher outcome valuation (in terms of willingness to pay). That is: two things that fit well together lead to a more positive valuation. And the significant main effect found by Gallo et al. (2017), too, was based on fit (between mindset and product type).

I will come back to this point later.

12.5.2 Decision Strategy and Satisfaction

Ma and Roese (2014) rather speak of 'mindset' than 'decision strategy', which they define as "a way of thinking that carries over across different judgment domains" (p. 71). In one of their studies they contrast the 'maximizing mindset' with the 'satisficing mindset'. The authors induced these mindsets by priming. For example, in the maximizing condition, participants had to "write down their best choices in 13 life domains" which was supposed to make salient "the goal to get the best" as well as to activate "comparative thinking" (p. 74). Participants could pick among one of five products and

were informed about all five products' market prices after they had made their choice in order to induce regret. The dependent variables were regret and satisfaction regarding the choice, measured with one item each (p. 77). Confirming hypotheses, regret was higher and satisfaction lower upon the maximizing mindset.

Wang and Liu (2014) study the effect of processing strategy (alternative- vs. attribute-based) and decision target (self vs. other) on satisfaction. Processing strategy was induced by presentation format: "we used a brand format, in which one brand per page was described, to represent alternative-based processing; we used a table format, which encourages comparison across all attributes, to represent attribute-based processing" (p. 427); postdecision satisfaction was to be rated on a one-item scale (p. 428). There was no main effect of processing strategy, but a significant interaction as predicted: "when making decisions for themselves, participants who engaged in alternative-based processing were more satisfied with their choice than were those who engaged in attribute-based processing" (p. 429) and vice versa for decisions made for others. The authors explain this result with Regulatory Focus Theory (Higgins, 1997) where previous research indicated that there is a prevention focus (as opposed to a promotion focus) when making decisions for oneself (p. 431).

Further three studies (Connolly & Reb, 2012; Lu et al., 2022; Machin, 2016) are concerned with *choosing versus rejecting* as decision strategy.

Connolly and Reb (2012) are interested in reducing the so-called 'select/reject effect' (Shafir, 1993) by making regret salient. Previous research had shown that presenting subjects with an option with both very positive and very negative attributes ('enriched option') and an option with mediocre values throughout ('impoverished option'), the enriched option was chosen more often both when the task was to select the most preferred as well as when the task was to reject the least preferred option. These results had been explained with the greater ease of justification provided by the enriched option. Connolly and Reb (2012) furthermore reason that regret priming should reduce the justificatory power of the enriched option and thus eliminate the select/reject effect. Accordingly, participants had to select or reject one of two jobs (enriched, impoverished) and as a secondary dependent measure "rate how justifiable they would judge having chosen the job if it later turned out to be unsatisfactory" (p. 41); for regret salience half of participants were told that due to the job market they might be stuck with the job even if they did not like it and "you will have a lot of time to regret your decision" (p. 42). As predicted, "[i]n the regret-salient condition [...] the choice task (select or reject) did not significantly affect preferences" and neither did it affect justifiability ratings, whereas both was the case in the control condition. The authors conclude that "making regret salient can lead to more vigilant decision processing" (p. 43).

Machin (2016) in two studies manipulated selection versus rejection in a decision task in an altogether different way: participants were either asked to "take the bowl of jelly beans you want to taste from" or to "give back the bowl you do not want to taste from" (p. 13), such that by bodily movement (arm flexion or extension) they had

to pull towards (selection) or push away (rejection). The dependent measure 'satisfaction' included a "pictorial face scale" (p. 14) and two items asking how disgusting and how delicious participants found the jelly bean in the first study, and furthermore taste pleasure, satisfaction, happiness, and disappointment in the second study. In the first study, participants were either given a favorable or unfavorable taste experience, whereas in the second study all participants were given a negative experience and the second independent variable was 'salience of the foregone alternative'. In the first study, only when the taste experience was unpleasant, rejectors were more satisfied than selectors, but there was no difference when the experience was pleasant. In the second study there was a main effect of strategy (rejectors more satisfied), and the significant interaction revealed that rejectors were more satisfied than selectors when the foregone alternative was salient, whereas there was no difference when it was not salient. Having recorded participants thoughts during the decision process, the author concludes that the selecting/rejecting decision strategy "leads to a differential information focus during the choice process" (p. 23).

Lu et al. (2022) investigate the effect of decision target (self vs. other) and decision strategy (selection vs. rejection) on process satisfaction. In three scenario-based studies participants were to choose – for themselves or a friend, by selection or rejection – between options within a MADM paradigm, e.g. a travel destination. There were three to four consecutive choices to be made, each choice was between 4 options, and each option came with eight attributes presented in matrix format. Participants always had to choose two of the four options either by selection or rejection; decision strategy was instructed to participants by description. As dependent measures both process satisfaction as well as outcome satisfaction had to be rated on three items each (for a description of the items cf. section 11.2.3.4 on page 478). Interestingly, within the two studies that included outcome satisfaction, there were no significant main effects or interactions on that variable. Furthermore, in all three studies there were no significant main effects on process satisfaction – only the interaction of decision target and strategy was significant. In the first experiment, including exclusively attractive options, selectors were more satisfied than rejectors when deciding for someone else, but there was no difference for those who decided for themselves (p. 1236). In the second experiment, including less attractive options, rejectors were more satisfied when deciding for themselves, whereas there was no difference for those who decided for someone else (p. 1237). That is, the general pattern remained the same, but significance switched between decision target (self vs. other) based on the attractiveness of the options to choose from. However, the significant effects were super-small ($\eta_p^2 = 0.02$ in both experiments) and barely significant in the first case ($p = 0.50$). In the third study the authors additionally manipulated 'decision goal' as a third factor in that "participants were told that their goal was to seek desirable outcomes or avoid undesirable outcomes" (p. 1237). The result was that "the manipulation of the decision goals eliminated the effect of the decision target and strategy on process satisfaction, indicating that the mechanism of decision goals underlies this effect" (p. 1238). The only significant effect in that factorial experiment was the interaction between decision strategy and goal. However, only when the goal was

'seek desirable outcome', selectors were more satisfied than rejectors, whereas upon the avoidance goal there was no difference in satisfaction between strategies.

The authors point to results from Regulatory Fit Theory where "a fit between the decision strategy and goal promotes process satisfaction" (p. 1232, Higgins, 2002). Yet, the results are rather thin, as indicated above.

12.5.2.1 Summary

In sum, this sample of research is dominated by selection versus rejection as decision strategies. Table 12.11 provides a summary of findings.

Table 12.11 Summary of Findings in Studies on Decision Strategy and Satisfaction.

Reference		Given	Results on Satisfaction Regarding Decision Strategy
Ma & Roese, 2014	Exp. 2	///	regret (maximizing mindset > satisficing mindset) satisfaction (maximizing mindset < satisficing mindset)
Wang & Liu, 2014	Exp. 2	target: choose for another target: choose for self	satisfaction (alternative-based < attribute-based) satisfaction (alternative-based > attribute-based)
Connolly & Reb, 2012	Exp. 1	regret salient regret not salient	choice + justifiability (selectors = rejectors) choice + justifiability ('select/reject effect')
Machin, 2016	Exp. 2	unpleasant taste pleasant taste	satisfaction (selectors < rejectors) satisfaction (selectors = rejectors)
	Exp. 3	foregone option salient foregone option not salient	satisfaction (selectors < rejectors) satisfaction (selectors = rejectors)
Lu et al., 2022	Exp. 1: options attractive	target: choose for another target: choose for self	process satisfaction (selectors > rejectors) process satisfaction (selectors = rejectors)
	Exp. 2: options unattractive	target: choose for another target: choose for self	process satisfaction (selectors = rejectors) process satisfaction (selectors < rejectors)
	Exp. 3: plus goal	goal: seek desirable outcome goal: avoid undesirable outcome	process satisfaction (selectors > rejectors) process satisfaction (selectors = rejectors)

Connolly and Reb (2012) least fit with the compilation, since their dependent measure is not satisfaction; however, one of their justifiability items is 'I regret my decision', and regret plays a major role, which is why their research was included. They claim to have found that regret salience makes participants choose more carefully such that in a situation where selection/rejection strategy paired with a choice between enriched/impoverished options usually would make a heuristics-and-biases type 'irrational' difference – regret salience makes this effect disappear.

From the five articles, two do not deal with selection/rejection: Ma and Roese (2014) find that maximizing mindset leads to less satisfaction and more regret, and Wang and Liu (2014) distinguish an alternative-based versus an attribute-based decision strategy and find that satisfaction with either strategy depends on whether the decision is made for oneself or another person.

Machin (2016) and Lu et al. (2022), focusing on the interaction of selection/rejection with a further experimental factor, find mixed (and relatively weak) results. Not too

surprisingly, the rejection strategy is more in line with the negative (unpleasant tastes and foregone options in Machin, 2016 and unattractive options in Exp. 2 from Lu et al., 2022), and once that fit is there, satisfaction is higher than for the selection strategy. The results from Lu et al. (2022) regarding decision target (choosing for oneself versus another) are difficult to interpret, because they are so weak, but the boldest interpretation is that 'seeking desirable outcomes' is more in line with choosing for someone else versus 'avoiding undesirable outcomes' is the priority when choosing for oneself: it is accordingly a matter of risk aversion or prevention focus.

Since risk aversion/prevention focus varies inter-individually, maybe part of the weakness of results is due to not having accounted for these.

On the whole, all three 'strategies' – maximizing/satisficing mindset, attribute-/alternative-based processing, and selection/rejection strategy – may make a difference to satisfaction and regret. Yet, to find effects, most of these studies needed a second experimental factor to find significant interactions. In fact, the lack of main effects of strategy is rather striking. The only main effects of strategy found in this total of eight experiments was for rejectors being generally more satisfied (in Exp. 3 from Machin, 2016), and the main effect of mindset (maximizers less satisfied in Ma & Roese, 2014). This resonates well with the lack of an effect of strategy in my research.

Accordingly, while in the previous section 12.5.1 on page 490 studies focused on the intuitive-rational dichotomy as a distinction of decision strategies (e.g. 'feeling-based' versus 'reason-based'), found reliable effects on their respective dependent measures, and referred to *fit* as an explanation of these results, all the studies in this section testing selection versus rejection as decision strategies did virtually find no main effect of strategy on satisfaction, and no reliable pattern of results in general.

12.5.3 Reasons or Principles as Decision Strategy and Satisfaction

12.5.3.1 Three Poster Studies

Giblin et al. (2013) replicated the Wilson et al. (1993) poster study with one important difference (cf. also section 5.4 on page 154). The original study had involved a 'reasons condition' and a control condition: "In the reasons condition, the questionnaire instructed subjects to describe why they liked or disliked each of the five posters, in order to organize their thoughts. They were told that they would not be asked to hand in their answers and were given half a page to describe their reasons for liking each poster" (p. 333); in the control condition participants received an unrelated writing task.

Differently, Giblin et al. (2013) contrast a 'deliberate choice condition' – which they also term 'reason-based choice' – with a 'mind wandering condition', and furthermore add a control condition where a poster was simply assigned to participants such that they could not choose at all.

In the 'deliberate choice condition' the instruction read: "Think carefully about the posters until you identify the poster you most prefer", whereas in the 'mind wandering condition' it read: "Let your mind wander until the poster you feel most drawn to randomly comes to mind" (p. 3); in the control condition a poster was randomly assigned.

After participants were given their poster, 'post choice satisfaction' was measured by 'monetary valuation' of the poster as well as with two items measuring "the extent to which they liked their poster and preferred it to the other four posters in the experiment on 7-point scales with endpoints, *Extremely Dislike* (1) and *Extremely Like* (7), and *Much prefer the other posters* (1) and *Much prefer your poster* (7)" (p. 3, original italics), which were later collapsed to the variable 'linking' due to a correlation of $r = 0.64$.

Regarding the dependent measure 'monetary valuation', there was a significant main effect of strategy where participants in the two experimental conditions assigned a higher monetary value to their posters than control participants. There was no significant difference between the deliberate choice and mind wandering conditions. The very same pattern held for the composite dependent measure 'linking': the was a significant difference between the control and the experimental conditions, but no difference between 'deliberate choice' and 'choice by mind wandering'.

The authors frame the results such: "post-choice satisfaction with posters chosen using mind wandering as a choice strategy was as high as with posters chosen by an optimal deliberate strategy" (p. 4).

Another poster study (already briefly mentioned in section 5.4 on page 154) was conducted by Dijksterhuis and van Olden (2006), theoretically based on their Unconscious Thought Theory (Dijksterhuis & Nordgren, 2006). Dijksterhuis and van Olden (2006) used three conditions 'immediate decision', 'conscious thought' and 'unconscious thought'. In the 'conscious thought' conditions participants were specifically instructed to "list reasons for why they liked or disliked each poster and to carefully analyze their preferences" (p. 629) on paper. In the 'immediate decision' condition participants did exactly that: decide immediately after having been shown the posters, and in the 'unconscious thought' condition participants were shown the posters and then told that they were supposed to make a decision after another task they had to complete first. Accordingly, in my terminology these latter two conditions involved an intuitive choice immediately versus after some delay; that is: I would classify both the 'immediate decision' and the 'unconscious thought' conditions as versions of intuitive decision making.

Dijksterhuis and van Olden (2006) like Wilson et al. (1993) gathered the ratings on their main dependent measures not immediately, but some weeks later. Their dependent measures involved asking for satisfaction with the poster and regret after the choice on one item each, as well as the amount participants would be willing to sell the poster for (p. 629).

On the satisfaction and the money measures participants from the unconscious thought condition scored significantly higher than both participants from the conscious though and immediate decision conditions.

A Summary and Evaluation

The Use of Reasons Wilson et al. (1993) explicitly refer to reasons regarding the instruction given to participants, yet the description of the instruction reported does not even seem to entail the word 'reasons' – or at least it is unclear whether it does, since the exact wording is not given. It is also unclear whether participants were asked to make a list.

Giblin et al. (2013) on the other hand clearly do not refer to reasons in their instruction ('Think carefully about the posters until you identify the poster you most prefer'), which is why they term it the 'deliberate strategy' (they only term it 'reason-based' once, namely in the abstract). They also make this point themselves: "Notably, we did not ask participants in the deliberation condition of our study to introspect or list reasons for their preferences [...]. As a result, our deliberation instructions likely represent an intermediate level of thought" (p. 4).

Accordingly, it may be that neither of these two studies was specifically about reasons, but rather about a more unspecific deliberative strategy. Only the Dijksterhuis and van Olden (2006) study specifically instructed to use reasons and list them.

The Dichotomy Even though Giblin et al. (2013) give a fancy new name to their second condition, 'mind wandering', it clearly represents an instance of intuitive decision making. Accordingly, what we have here is another study contrasting intuitive with deliberative decision making: thus once more the basis is the intuitive-rational dichotomy.

Interestingly, though, whereas the studies reviewed in section 12.5.1 on page 490 using that dichotomy were all able to report significant differences, Giblin et al. (2013) found no differences between the two strategies. Surely, the dependent measures are not the same – although 'willingness to pay' (as used in H. H. Chang & Hung, 2018; Hong & Chang, 2015) seems relevantly similar to 'satisfaction'. The crucial difference, however, is that both Hong and Chang (2015) as well as H. H. Chang and Hung (2018) rely on a hypothesized interaction between decision strategy *and* another factor for significance, and successfully so (which I already pointed out in section 12.5.1.1 on page 491). That is, what creates the significant results is that one decision strategy fits better with one level of the second factor and the other decision strategy fits better with the second level of the second factor.

But Giblin et al. (2013) do not use a setup based on fit: there are only the two strategies, the choices based on these strategies, and the resulting satisfaction with the chosen object. A setup very similar to mine, although they use the intuitive-rational

dichotomy. Still, they cannot find a difference.

Dijksterhuis and van Olden (2006), however, did find a difference between unconscious and conscious thought and subsequent satisfaction. The difference between their unconscious thought intuitive strategy as compared to Giblin et al.'s (2013) mind wandering intuitive strategy is that in the former case participants were distracted from consciously thinking (or mind wandering) due to the distractor task they had to complete.

The Satisfaction Measure The first major difference is that Giblin et al. (2013) had participants rate the satisfaction measures *immediately* whereas Wilson et al. (1993) asked for participants' ratings *at the end of the semester* (p. 334). Since neither of the two studies included both – an immediate and a delayed measurement of satisfaction – they cannot be said to contradict each other. In fact, Wilson et al. (1993) specifically argued that it was due to the time lag that an initial more accurate appraisal – which had been repressed in the reasons condition – could instantiate itself again.

Second, the measures themselves were very different: Wilson et al. (1993) asked "three behavioral-type questions (whether people still had the poster, whether they had hung it, and whether they planned to keep it) and [...] two subjective questions (how much people said they liked their poster and their 'asking price' if someone wanted to buy it [...])" (p. 334).
Giblin et al. (2013), as reported, recorded 'monetary valuation' (if the poster could be sold back to the experimenter, which is the highest value at which participants would keep the poster), liking, and preference over the other posters.

Both teams of researchers call their measures 'post choice satisfaction', and surely their specific measures can be understood as an operationalization of satisfaction. Yet, they are not 'close' operationalizations – while they could have been: they could have just asked how satisfied participants were with their poster. The liking question both use comes closest to a simple understanding of satisfaction.

Dijksterhuis and van Olden (2006) directly asked for satisfaction with the poster on a one-item measure. Also, they gathered the satisfaction ratings "three to five weeks later" (p. 629) just as Wilson et al. (1993) had gathered them "[a]t the end of the semester" (p. 334).

Conclusion Regarding two of the three aspects discussed – the use of reasons, the dichotomy, and the satisfaction measure – my research presented in this manuscript differs from the poster studies: (i) only in Dijksterhuis and van Olden (2006) participants were explicitly told to list reasons, but still my definition, instruction, and way of listing reasons was more specific, and (ii) the contrast I draw is between two deliberative decision strategies, whereas all three studies contrast a deliberative with some intuitive strategy (control, mind wandering, and unconscious though). Regarding (iii), however,

Dijksterhuis and van Olden (2006), too, use a simple measure of satisfaction as I do.

What to make of the results? Well, first of all the intuitive-rational distinction is not of major interest to my research, but it seems that intuitive strategies are not all the same: the unconscious thought version sticks out. However, further exploring intuitive decision making and/or different conceptions of intuition and the involvement of automatic or unconscious processes is far beyond the scope of this work.

12.5.3.2 Another Poster Study: Two Different Types of Reasons

In his dissertation, DePaoli (2017), too, is concerned with Wilson et al.'s (1993) poster study and the according finding that deliberation/reasoning leads to reduced satisfaction – and sets out to refine the picture.

At the basis of his research is in the one hand the distinction between so-called 'utilitarian' versus 'hedonic' product types, which is a common distinction in consumer research: "Utilitarian products are those intended to be useful, functional, or to meet an affect-poor goal such as fulfilling a need, whereas hedonic products are those intended to be fun, enjoyable, or to meet an affect-rich goal such as fulfilling a desire" (p. 11).

On the other hand, DePaoli (2017) distinguishes between two types of reasons, 'affect-based' and 'cognition-based' reasons. The first are 'grounded in emotion' and the latter are 'grounded in cognitive evaluation' (p. 7), yet both are meant to be understood as 'deliberative reasoning', since "both cognition- and affect-based reasoning entail analyzing and explaining choices via careful consideration" (p. 7-8) – these two types of reasons merely have different content. The distinction is basically adopted from "the introspection literature" (p. 10).

Equipped with these distinctions, DePaoli (2017) first replicated the poster study in two experiments – with two differences: the choice set and the two types of reasons. His choice set of four posters based on a pretest included two more utilitarian and two more hedonic posters. His manipulation of reason type sounded like this: "In the cognition-based condition, participants were prompted to 'think carefully about this product, and list your thoughts', while in the affect-based condition, they were prompted to 'list your feelings about this product'. The use of words related to 'thinking' versus 'feeling' as prompts for cognition- and affect-based attitudes is borrowed from Mayer and Tormala (2010)" (p. 20); participants in the control group were told to "'examine all products carefully' (p. 21).

After a filler task, 'post choice satisfaction' was measured on five items: participants "rated their regret with the choice (reverse coded), their happiness with the choice, their satisfaction with the product, their satisfaction with their choice process, and the correctness of their choice" (p. 21), aggregated with $\alpha = 0.90$ (p. 24).

The study produced several interesting results as hypothesized. The author analyzed the three conditions based on two contrasts: the first contrasting affect-based reasoning

with the control condition (where no difference was expected) and the second contrasting cognition-based reasoning with the former two (where differences were expected).

Regarding the choice of more utilitarian or more hedonic options, as hypothesized there was no difference between affect-based reasoning and control, but a significant difference of cognition-based reasoning to the former two, with cognitive reasoners choosing more utilitarian options.

Regarding satisfaction, the same pattern emerged: there was no difference between the affect-based reasoning condition and control, but participants in the cognition-based reasoning condition reported significantly lower satisfaction than the former two. However, looking at the mean values (p. 25), the differences on a scale from 0-100 were very slim with $M_{aff} = 71$, $M_{contr} = 73$, and $M_{cog} = 69$.

Furthermore, DePaoli (2017) calculated a mediation analysis based on the same contrasts and found that there was a significant mediation of cognition-based reasoning on satisfaction through choice, which was not the case for affect-based reasoning. That is, as compared to affect-based and control, cognition-based reasoning changed choice and choice impacts satisfaction.

Identical results were obtained in a second replication experiment including further products besides posters.

In two further experiments, DePaoli (2017) used two independent variables, reason type (as before) and product framing (hedonic vs. utilitarian). In the resulting 3*2 between-subjects design, participants had to choose between two either hedonic versus utilitarian products based on one of the three reason type conditions. As predicted, the result was a significant interaction of the two factors on satisfaction where "satisfaction was higher under compatibility than incompatibility" (p. 48). However, again looking at the means, the differences on the 0-100 scale were not strong with $M_{aff-ut} = 78$ vs. $M_{aff-hed} = 86$ in the affective reasoning case and $M_{cog-ut} = 83$ vs. $M_{cog-hed} = 80$, which holds especially in the affective reasoning conditions which was marginally significant.

A second study where participants also consumed their chosen product (a youtube video) produced similar results.

A Summary and Evaluation No doubt, the research program presented in the DePaoli (2017) dissertation is strong and consistent.

It falls in line with my so far preferred interpretation of results pertaining to *fit* – in fact, DePaoli (2017) adheres to the very same interpretation terming it 'compatibility'.

The novelty of DePaoli's (2017) research is his conception of affect-based reasons, or more generally the distinction between affect-based and cognition-based reasons or reasoning.

The point that 'reasons' need not singularly pertain to affect-free contents is not new – in fact, it follows needlessly from Dancy's (2004) definition of reasons as facts: surely, 'my gut feeling tells me to go home', 'I feel elevated when looking at poster #2', and 'I dislike chocolate-flavored smoothies' are, if indeed true, just as ordinary facts as 'the sun is shining' – or 'she is in trouble and needs help' (cf. section 4.3.4 on page 120).

In fact, I believe the assimilation of 'reasons' with 'reason', 'reasoning', and 'rationality' is an ill-advised confusion in concepts. Yes, reasons are supposed to explain and/or justify, to make a case for a belief or an action, but by no means they come with a guarantee to 'rationality' (whatever that is taken to be).

That reasons can be about emotions or basic affect and taste has always been my understanding of the concept of a reason, yet I will admit that in the definition of reasons I gave to participants in my research (cf. section B on page 133) this point is not strongly made (as it is not excluded either).

Is affect-based reasoning versus cognition-based reasoning not just another instantiation of the intuitive-rational dichotomy? DePaoli (2017) makes his case against that suspicion based on equal response times and equal length of written responses (p. 27), claiming that both are cases of deliberation. My own understanding of reasons as explicated above is in agreement: surely you can use thoughts about emotions/feelings/affect as reasons within your reasoning and deliberation.

Still, I will venture to say that the contrast in itself, 'affect versus cognition', is – of course! – an instantiation of the intuitive-rational dichotomy. Just in this case, it is within deliberation itself.

This is also a difference to my two deliberative strategies: neither of them has more or less claim to affect or cognition: you may have sentimental reasons as well as sentimental principles.

Does the instruction 'list your thoughts' and 'list your feelings' do justice to 'reasons'? Under my conception it would not, but since the resulting string variables were analyzed and the manipulation was based on previous research, it seems to have worked out okay.

However, this again reminds of the lurking lack of conceptual clarity.

Yet, taking the conceptions used at face value, DePaoli's (2017) research makes a strong case for (i) the existence of fit between reason type and product type, and (ii) the positive effect of fit on satisfaction.

The specific fit between product type (hedonic/utilitarian) and reason type (affective/cognitive) is very similar to the results presented by Gallo et al. (2017) who investigated the fit between product type (experiential/material) and processing strategy (intuitive/rational). However, Gallo et al. (2017) instructed to participants to "go with [their] immediate gut feelings" (p. 760) versus "take [their] time and analyze the reasons" (p. 761) which clearly is a difference to DePaoli's (2017) understanding of two types of deliberative reasoning.

In sum, DePaoli's (2017) research is probably as close as it gets to my own setup. The difference however is that his deliberative strategies involved affect versus cognition while mine could both involve affect as well as cognition, but differed in scope of application (i.e.: structure, not content): reasons are to be applied casuistically (case by case) whereas principles hold in all situations of a kind.

Moreover, the DePaoli (2017) dissertation is a further case of a capitalization on fit – as is Gallo et al. (2017) with similarities regarding strategy as well as 'product type' (but without satisfaction as the dependent measure), Hong and Chang (2015) and H. H. Chang and Hung (2018) both using the intuitive-rational dichotomy, a fitting second factor (self-construal, self-focus) and willingness to pay as the dependent measure, Wang and Liu (2014) and Lu et al. (2022) both using a fit between decision strategy and decision target and satisfaction as the dependent measure, and Machin (2016) using a fit between decision strategy and valence as well as salience, again with satisfaction as the dependent measure.

Capitalizing on fit is thus a very common strategy.

12.5.4 Person Variables

Fit really is the new black. In this case, Betsch and Kunz (2008) are interested in the fit between 'individually preferred decision strategy' and 'actually applied decision strategy' – which they term *decisional fit*.

Once more, the authors use the intuitive-rational distinction to distinguish two decision strategies: intuitive versus deliberative. In order to measure 'preferred decision strategy', they use their own scale, the Preference for Intuition and Deliberation Scale (PID, Betsch, 2004): "PID conceptualizes intuition as a basic decision mode that uses affect as a decision criterion. [...] Deliberation is defined as a decision mode following explicit evaluation, beliefs, and reasons" (Betsch & Kunz, 2008, p. 536).

The two experiments reviewed here are ones where decision strategy is manipulated as the independent variable. Furthermore, in all studies where that is the case, the authors used the PID Scale to have participants assigned to two groups, such that a factorial 2*2 design resulted.

I the first experiment, the authors assessed preferred decision style and induced decision strategy as the independent variable. Participants had to choose between two pots and as the dependent variable indicate its 'estimated monetary value'. The instructions for the use of decision strategy were such (p. 538): "Please indicate spontaneously which of the two pots you prefer" ('spontaneous choice condition') and "Please have a close look at the pots and list pros and cons for each pot in the respective rows. You may take your time" ('reflection condition'). As hypothesized "when the preferred strategy fit the manipulated strategy, the estimated price was significantly higher" (p. 538). This result speaks in favor of the so-called 'enhancement effect' where experienced fit leads to a higher appraisal.

In their third experiment, the authors used the same design with two changes: participants immediately received a negative outcome of their choice (not getting a desired information), and the dependent measure was willingness to pay in order to receive that information. Again, participants had to either decide spontaneously or by deliberation. As hypothesized, participants with decisional fit were willing to pay significantly more than participants without fit.

In sum, the decisional fit hypothesis was clearly confirmed.

Savioni et al. (2023) report a study from a naturalistic context. They were interested in real life decisions from two domains, the use of System 1/System 2 decision making, personality variables, and several further evaluations of the decision such as satisfaction.

Participants were first asked to recall one 'sentimental' and one work decision; the exact instruction was to think about "'an event or a specific experience of your life in which you had to make an important decision"'. The description pertaining to sentimental vs. work decisions were: "'In particular, think of an event experienced in your life regarding the affective sphere (e.g., Should I get married? Now or later? Should I leave my partner? Should we go to live together?)"' and "'In particular, think of an event experienced in your life concerning the professional area (e.g., Should I study or work? Should I move for work? Which job/university should I choose?)"'. Thereafter, participants answered in total five one-item evaluative questions regarding the clarity and pleasantness of the episode, the difficulty of and satisfaction with the choice, and the days spent deciding (p. 15228).

The use of System 1 or System 2 processing had then to be rated on two items each: System 1: "'To decide, I relied on intuition, inspiration' and 'To decide, I let my emotions guide me"', and System 2: "'To decide, I relied on reasoning' and 'To decide, I documented on all the possible options"' (p. 15228).

Furthermore, participants completed five validated questionnaires regarding anxiety, self esteem, personality (Big Five), social support, and attachment style.

As hypothesized, there was an interaction of decision style and decision domain: "System 1 is significantly more involved in the sentimental area [...] than in the work area [...], while System 2 is significantly more involved in the work area [...] than in the sentimental area [...]."

The five evaluative questions (clarity, pleasantness, difficulty, satisfaction, decision days) were looked at regarding decision domain (sentimental vs. work). Only 'pleasantness' showed a difference with the decision process in the case of sentimental choices being rated as less pleasant than work choices.

Furthermore, the authors conducted a regression analysis per decision domain, regressing 'satisfaction' on System 1/System 2 use, and the five personality trait questionnaires (anxiety, self esteem, personality, social support, attachment). Interestingly, satisfaction regarding sentimental versus work decisions had entirely different predictors: Sentimental choices were only predicted by two out of four attachment dimensions (positive: secure attachment, negative: ambivalent attachment), and not by System 1/ System 2 or any other trait variable. Work choices, on the other hand, were predicted by System 1 (positive), System 2 (positive), and anxiety (negative). Big Five did not predict satisfaction in either domain.

12.5.4.1 Summary

Both studies are well in line with the bulk of research: they rely on the intuitive-rational distinction and are about fit. Betsch and Kunz (2008) demonstrate positive effects on satisfaction when the preferred decision strategy and the executed decision strategy match, and Savioni et al. (2023) show that choices made in an affective domain

('sentimental' choices) versus a more 'rational' domain (work choices) differentially fit with System 1/System 2 use.

Furthermore, Savioni et al. (2023) find that the satisfaction with a decision from a sentimental versus work domain has different predictors and that only in the work domain System 1 and System 2 use are predictors of satisfaction. Moreover, both System 1 and System 2 use *positively* predicted satisfaction in the work domain – which speaks in favor of the understanding that naturally in naturalistic contexts people of course use a mixture of processing strategies and both may be important to a satisfying decision.

The two out of four attachments styles being the only predictors of satisfaction in the so-called 'sentimental' domain might partially be an artifact of the instruction to think of marriage and break-up as examples. It would have been interesting to have participants write down the two recalled decisions to be able to code for content (as I did with the Collegiate Decision Situations, cf. section 9.3.2.1 on page 282).

12.6 Conclusion

The discussion of the literature pertaining to *Reasons vs. Principles* was structured according to four categories that had also been used in Table 12.10 on page 489:

1 The manipulation of decision strategy,
2 Decision strategy and satisfaction,
3 Reasons or principles as decision strategy and satisfaction, and
4 Person variables.

In sum, as regards decision strategy, the bulk of research uses the intuitive-rational dichotomy at the base of their distinction of decision or processing strategies. The second largest group distinguishes selection versus rejection as decision strategies. Several studies are interested in satisfaction as the dependent measure (which also was a major search criterion).

The Importance of Fit The most interesting finding, I think, is the importance of fit. My own experimental research was plagued from a lack of results: 'deciding by reasons' versus 'deciding by principle' just would not want to make a (robust and interpretable) difference to satisfaction. In the MADM experiment, there was not even a difference between the experimental strategies and the control group, i.e.: no effect of decision strategy on satisfaction whatsoever.

However, the research reviewed here also almost never could report a significant main effect of decision strategy on satisfaction and related measures such as willingness to pay and regret – not when using the intuitive-rational dichotomy, and not when using selection versus rejection. This is quite interesting in itself since it might mean that *decision strategy in general just does not affect (immediate) satisfaction* – in a laboratory context using hypothetical and inconsequential decisions etc. Surely, the lab context and the way this research generally is conducted is an important caveat to the interpretation of results. Still, both distinguishing an intuitive from a deliberative strategy

as well as distinguishing choice by selection from choice by rejection are theoretically well-founded distinctions *and* conceptually as well as phenomenologically very different decision strategies. That is: their difference as to what they are is much larger than the – by comparison rather subtle – difference between my two deliberative decision strategies, 'deciding by reasons' and 'deciding by principle'.

My point is: if even decision making by intuition vs. deliberation or by selection vs. rejection does not make a difference to satisfaction (on its own), why would there be a difference in satisfaction as due to two deliberative strategies that are much more similar to each other than the former two distinctions?

It is thus a striking and smart feature of most of the reviewed studies to throw in something else into the equation and hypothesize an interaction (instead of a main effect): two decision strategies plus another dichotomy (decision target, self-construal, product type, decision domain, preferred processing...) whose levels produce a fit or misfit with decision strategy – and thus the dependent measure 'satisfaction' may record a difference. Certainly, there is theory claiming that fit is conducive to satisfaction and well-being (e.g. regulatory fit, Higgins, 1997) – but this point also is a matter of common sense: of course 'fit' – in any area of life – is simply more comfortable.

Making Use of the Importance of Fit Having realized 'the importance of fit', how could I make use of this idea? What is it that may or may not fit with 'deciding by reasons' and 'deciding by principle'? This question will be brushed in the upcoming chapter 13 on page 508.

The Timing of Satisfaction Ratings The three conventional poster studies differed in whether they measured immediate satisfaction (Giblin et al., 2013) or delayed satisfaction (Wilson et al., 1993 as well as Dijksterhuis & van Olden, 2006). Wilson et al. (1993) found that delayed satisfaction was greater in the intuitive control group than in the reasons group, Dijksterhuis and van Olden (2006) found that delayed satisfaction was greater in the unconscious thought (= delayed intuitive) group than in the reasons group, but there was no difference between the reasons group and the immediate choice group (the equivalent to Wilson et al.'s 1993 control group). Giblin et al. (2013) found no difference on immediate satisfaction between the reasons group and mind wandering; 'mind wandering' conceptually seems to be in between 'immediate intuitive' (Wilson et al.'s 1993 control) and 'delayed intuitive' (Dijksterhuis and van Olden's 2006 unconscious).

Putting aside the differences in the intuitive conditions (Wilson's control, Giblin's mind wandering, and Dijksterhuis' unconscious thought), there was only an effect on *delayed* satisfaction. However, grouping the intuitive conditions differently (Wilson's control, Giblin's mind wandering, and Dijksterhuis' *immediate choice*), only Wilson et al. (1993) found an effect at all.

Yet, there was one particularly odd part in Wilson et al.'s 1993 study: after participant in the reasons group had written down their reasons for liking/disliking each of the posters, the experimenter threw these notes into a bin(!): "If subjects were in the

reasons condition, the experimenter picked up the reasons questionnaire when she returned, mentioned that they would not be needing it anymore, and placed it in a trash can" (p. 333). Even reading this feels rude and it is hard to see that it would not have an effect. Surely an effect on satisfaction with the poster at the end of the semester is unlikely, unless participants were very resentful, but this episode in the experimental procedure still calls the results into question.

Nevertheless, it seems reasonable to take the timing of the satisfaction ratings seriously. The potential difference it makes is analogous to Kahneman's (Kahneman, 2011; Kahneman et al., 1997) claims regarding the experiencing and the remembering self (cf. section 3.3.2.3 on page 83). Applying his terminology, 'immediate satisfaction' would be rated by the experiencing self, and 'delayed satisfaction' by the remembering self. Unless one claims that in both cases it is the experiencing self that looks at the poster and rates its satisfaction, just at differing points in time. Which self has been rating the posters in the poster studies and whether satisfaction with a product even is susceptible to the difference in perspective and under which circumstances – cannot be determined without further research. But what can certainly be learned from the distinction and the inconclusive results is that the timing of satisfaction ratings might make a difference.

Making Use of the Timing of Satisfaction Ratings My Field Experiment (cf. section 10.3 on page 439) included satisfaction ratings after each decision and a global satisfaction rating looking back at the whole week of having used one or the other decision strategy for about 10 real life decisions. And indeed, the results on the two variables were very different. This will be brushed once more in the upcoming chapter 13 on page 508.

Person Variables Person variables are certainly something for future research – but I find the results are rather mixed: On the one hand, there are person-related variables that rather belong to the category "fit". Most certainly, Betsch and Kunz's (2008) explicit theory of 'decisional fit' belongs there: there is preferred processing style and preferred strategy, both along the lines of the intuitive-rational dichotomy – of course they would fit. Second in line, self-construal could be a person variable (although it was manipulated not measured in Hong & Chang, 2015), but here, too, fit really is the key.

The difference between person variables that are majorly about fit and those that are not becomes clear when looking at the results from Savioni et al. (2023): In their study, the authors measure general person characteristics that could potentially and reasonably be relevant to real life decision making (in the two chosen domains of relationships and work): anxiety, self esteem, personality, social support, attachment. And it tuned out that for example the Big Five *did not* explain satisfaction ratings in neither domain. This is a result that cannot be found when fit is almost predetermined – due to the variables researched being conceptually very close (as is the case in the fit type studies).

The fit type studies are like asking me for my favorite color and then predicting that I will have some object of that color in my possession. That is not very interesting. It

is much more interesting to boldly hypothesize (at best based on a good theory) that, for example, an extroverted person possesses more colorful clothes than an introverted one. The gap between the variables is bigger – as is the likelihood of a null finding. But at least – if confirmed or rejected – I learned something that I could not just have predicted out of common sense.

In conclusion: decision strategy seems to not easily affect immediate satisfaction, immediate satisfaction might differ from delayed satisfaction, and person variables need further research.

13 General Discussion and Conclusion

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13.1 Overview

13.1.1 Theory

After having conceptually analyzed and clarified the main terms used in decision sciences and important to this endeavor (chap. 1 on page 7), the main argument was laid out. Decision quality in case of preferential choice was found to be bound to normative utility theory, expressed by utility maximization, with 'utility' indicating something valuable (chap. 2 on page 31). Accordingly, the next chapter asked what it is that is of value to a person (= prudential value) and found the answer in theories of well-being and utility: it is either pleasure (hedonism), preference satisfaction (satisfactionism), or eudaimonia (objective list theories/capabilities framework) (chap. 3 on page 55). Thus, well-being – in some form or another – is the goal of preferential choice.

A second strand of theory introduced moral particularism and moral generalism as decision strategies and established them as the independent variable. The dependent variable, well-being, was found to be appropriately captured by domain satisfaction (chap. 4 on page 94).

The full argument is summed up in chapter *Consolidation: The Argument* on page 141.

Previous research was reviewed and found to be thin as to the present research endeavor (chap. 5 on page 145). The present research was characterized as combining

several novel or rarely researched aspects: manipulating decision strategy as the independent variable, using 'deciding by reasons' and 'deciding by principle' as decision strategies, and measuring satisfaction with the strategy as the dependent measure (chap. 6 on page 158).

13.1.2 Empirical Findings

In its general orientation the present research was largely exploratory – and proceeded accordingly. All correlational studies and experiments were conducted online using the same online survey tool (chap. 7 on page 163). The Pilot Study (chap. 8 on page 168) was run to establish the feasibility of investigating the effect of 'deciding by reasons' versus 'deciding by principle' on satisfaction, and at the same time included the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ). Initial results showed effects of decision strategy on satisfaction which were, however, heavily dependent on choice content.

Accordingly, there were two spin-offs from the Pilot Study: A chapter on questionnaires (chap. 9 on page 216), validating the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ), as well as scrutinizing eight Decision Categorization Scales (DCSs) as a reaction to the strong effect of content; and a chapter examining the original interest in the effects of the two deliberative decision strategies on satisfaction (chap. 10 on page 363).

The yield of chapter *Questionnaires* (chap. 9 on page 216) were viable questionnaire versions of the SSQ and the DSQ, as well as a thorough attempt at decision situation classification based on the eight DCSs. From the Decision Categorization Scales (DCSs) the 'Characteristics of Decision Situations Scale', a newly constructed scale based on decision situation characteristics as explicated in Pfister et al. (2017), is probably the most psychologically interesting one with its six factors Difficulty, Duration, Predictability, Control, Clarity, and Significance (cf. section A.b on page 289 within 9.3.2.3).
In sum, all three questionnaires need revision and most importantly re-validation, but as is, they provide a good base.

The yield of chapter *Reasons vs. Principles* (chap. 10 on page 363), too, was threefold: First, I was able to show that the distinction between 'deciding by reasons' and 'deciding by principle' not only conceptually, but also psychologically is not the same as the common distinction in moral psychology between consequentialist and deontological decision making (section 10.1 on page 367). Second, in all three experiments reported (as well as in the further three experiments not reported, cf. Table Ad.1 on page 769), the two deliberative decision strategies did not have a differential effect on measures of satisfaction – on their own. The MADM experiment was the most explicit example of this null-effect (section 10.2 on page 407). However, the Field Experiment where participants were to use one of the two decision strategies over the course of a week in real life decisions, did result in differential effects on immediate versus global

retrospective satisfaction – which interestingly were dependent on gender (section 10.3 on page 439).

Yet, in sum, as based on the findings from the present research program, 'deciding by reasons' and 'deciding by principle' as decision strategies without further qualification do not differentially affect measures of satisfaction.

A more detailed summary of all results and insights is provided in chapter *Consolidation: The Results* on page 450.

13.1.3 Discussion

A thorough and documented updated systematic literature search for 'decision style', 'strategy satisfaction' (chap. 11 on page 465) and 'reasons versus principles' (chap. 12 on page 482) confirmed, as expected, that the research presented in this manuscript is still novel or hardly researched.

Regarding decision style (section 11.1 on page 465), my effort at a unification of the existing scales is still the only attempt to date, while at the same time the need for further research is articulated (e.g. Hamilton et al., 2016).

Regarding strategy/process satisfaction (section 11.2 on page 471), too, the most common scale by Fitzsimons and colleagues is flawed and its validated descendant is rather 'flat' in terms of semantics. I propose revisions of my original scale which may serve as a start for future research.

The updated literature search on reasons and principles (chap. 12 on page 482) revealed six points: First, if decision strategy is manipulated as the independent variable, this is most of the time simply done by instruction. Second, the most researched decision strategies are intuition versus deliberation and selection versus rejection. Third, main effects of decision strategy on satisfaction were rare to non-existent. Forth, the effects of strategy might be different for immediate satisfaction and delayed/retrospective satisfaction. Fifth, most results accrued by this research are due to a fit between decision strategy and some other factor, such that satisfaction was differentially affected by the interaction. Sixth, person variables outside the workings of fit need further research.

In the upcoming section these points will be further discussed.

13.2 Evaluation of the Present Research

13.2.1 Questionnaires

Questionnaire construction is a straight-forward process. The most solid one within this work is the Decision Style Questionnaire (DSQ): it is based on respected predecessors, combines their strength and amends their weaknesses, and comes with respectable psychometric properties. This questionnaire mostly only needs re-validation including CFA

with good samples, but going over the items could not hurt. At the very least, the DSQ showed that a unification of existing scales is possible and worthwhile.

The Strategy Satisfaction Questionnaire (SSQ) in order to be useful for a broader range of research needs more substantial revision, because it originally was very specifically tied to the present research concerning reasons, principles, and strategy. A proposal adjusting this questionnaire to be concerned more broadly with 'process' instead of 'strategy' was made in section 11.2.3.3 on page 476.

The Decision Categorization Scales (DCSs) have not been discussed within the present part *Concluding*, partly due to practical limitations, partly because they had already been extensively discussed within their specific discussion section (section 9.3.3 on page 342).

Certainly, a taxonomization of decision situations could be useful in a number of ways – using the resulting dimensions as covariates, additional factors, or for scenario construction – but this research is in its infancy. The DCSs also do not provide a unified taxonomization, but rather a potpourri of scales measuring potentially relevant aspects. However, in section 9.3.3.2 on page 345 (specifically section 9.3.3.2 on page 350) I demonstrated that each of the eight scales was able to distinguish two intuitively dissimilar decision situations – in an overall non-redundant way.

Furthermore, the 'Characteristics of Decision Situations Scale' (section I on page 264) from the DCSs deserves special mention, because due to its truly exploratory construction process (cf. section A.f on page 296), the resulting dimensions of *difficulty, duration, predictability, control, clarity, and significance* (plus the seventh factor *magnitude*, cf. section A.f on page 618 within the Appendix) might be psychologically most relevant. Further research should be devoted to take up this line of inquiry.

In sum, I believe chapter *Questionnaires* did produce some useful research contributions.

13.2.2 Reasons vs. Principles

This section will be structured according to the points listed in section 13.1.3 on the previous page.

The Manipulation of Decision Strategy Most studies simply instructed decision strategy, and several of them used a manipulation check by self-report where participants were asked whether they had adhered to the instructed strategy. My own manipulation of decision strategy was stronger than that, because I not only instructed the strategy to use, but participants also had to note down their reasons and principles respectively. The resulting string variables could be used for further manipulation checks which was done in the Trolley Experiment.

Most Researched Decision Strategies The most researched decision strategies in the sample of literature reviewed here contrast intuition versus deliberation and selection versus rejection. Both of these pairs entail a rather strong contrast, whereas my decision strategies might be more similar to each other. Using reasons versus a principle for making a decision both involve deliberation.

What are differences between the two strategies, and is it a qualitative or a quantitative difference? For example, one might reasonably argue that using a principle in the lab setup is no different to using just one reason. After all, a principle is meant to hold always, not just for one decision. Accordingly, the aspect of committing to a principle long-term could not be studied within the present setup.

Investigating the distinction between 'deciding by reasons' and 'deciding by principle' was new. In retrospect, it seems like it would be valuable to take a step back and conduct more 'groundwork' type of research to better understand underlying processes and relata of each strategy – by using verbal protocols or even qualitative methods.

Main Effects of Decision Strategy on Satisfaction The fact that most of the research reviewed here did not find a main effect of decision strategy on satisfaction and neither expected such, relativizes the null effects my research suffered from: it may be the case that 'satisfaction' is just not the kind of dependent measure that would register differences due to decision strategy, but other dependent measures might. Put more clearly: decision strategy in itself just does not make a difference to (immediate) satisfaction – and this is not only the case for reasons versus principles, but also for intuition versus deliberation, and selection versus rejection.

Immediate and Delayed Satisfaction A comparison of the poster studies (cf. section 12.6 on page 505) revealed that immediate satisfaction might not be the same as delayed or retrospect satisfaction. The same was the case in my Field Experiment where the effects of strategy (qualified by gender) were almost reversed for immediate versus global/retrospect satisfaction (cf. section 10.3.5 on page 446). Integrating time delay in a study is, of course, less convenient than the conventional one-time lab or online study, but this aspect certainly deserves further attention. Furthermore, the insights from Kahneman (2011); Kahneman et al. (1997) regarding the experiencing and the remembering self should be taken into account. Moreover, if satisfaction were measured at different points in time it should be measured multi-dimensionally with various referents, e.g. 'remembering the process...', 'looking back at the outcome...' etc. in order to be as clear as possible as regards the specific mental representation that is evaluated.

A Matter of Fit Studies manipulating decision strategy as the independent variable found effects on (immediate) satisfaction as soon as another factor was involved – and the effects were interaction effects due to fit. It thus stands to reason that such factors might exist for 'deciding by reasons' and 'deciding by principle', too. Surely, person variables is a possibility (see next paragraph), but what else? In order to find such potentially interacting factors, the properties of using reasons or a principle for decision making needs further scrutiny: what is involved when people weigh reasons,

what is involved when they adhere to a principle? Besides the long-term commitment (mentioned earlier) an effective principle requires, it seems that principles are in their use distinct from reasons in that they are usually not come up with in the very same situation they are used for: If someone decides by principle they usually decide by a principle they already have. Furthermore, the conscious(!) principles/maxims someone adheres to will likely pertain to rather specific situations, such as 'never order fish at a work dinner' or 'try to catch at least some sleep before an exam for brain consolidation'. Reasons, on the other hand, are absolutely flexible and we are used to using them in any situation. Accordingly, looking for factors going well with reasons versus principles, especially the use of principles requires more research.

Person Variables In this research, the 'rational/vigilant' subscale of the Decision Style Questionnaire (DSQ) was predictive once in the Pilot Study, but not in the MADM experiment. In the Pilot Study none of the other DSQ dimensions had shown any effects on satisfaction. These are certainly not conclusive results, but the impression is that decision style is not a relevant factor in the setup used here. Big Five personality was measured within the Field Experiment, but not analyzed, which is an unfortunate limitation.

Yet, the research reviewed cannot be said to be conclusive either: Savioni et al. (2023) in their naturalistic setting did not find satisfaction to be predicted by any of the Big Five dimensions in either of their two life domains (relationships, work). Betsch and Kunz (2008), on the other hand, is a paradigm case of the fit literature with 'preferred strategy' and 'used strategy' so closely related that the effect of their fit on satisfaction is hardly a surprise.

As regards 'deciding by reasons' and 'deciding by principle', the matter is even more intricate: Since both strategies are deliberative, their difference is subtle. Or is it? Committing to a principle and making a decision based on that is very different to weighing reasons pro and con. While weighing reasons may be the symbol for indecisiveness, using a principle is a clear-cut thing: no weighing, no second thoughts. So which person variables might correspond? This is still an open question.

Conclusion So, what did I find? I found that questionnaires may be constructed and experiments may be devised, but any attempt at depicting relationships between constructs will only be able to look at a tiny segment of real world factors. Thus, all answers found are local, not global. No less 'true', but if applied, subject to uncountably many further interacting, enhancing, and diminishing influences – such that only the strongest of researched effects have a chance to practically matter. Decision strategy's effect on satisfaction is not one of them.

13.3 Coda

The example decision situation from the very beginning of this enterprise read:

> Imagine, old friends of yours from the US traveling through Europe ask you to meet up in Paris for a weekend. Unfortunately, you also have a deadline approaching and money is tight right now. But it is a rare opportunity to see them which will not happen soon again. On the other hand, the deadline is tied to a project you really want and you need the time to produce a proposal of good quality.

If you wondered which decision strategy to use, if you wondered whether to *decide by reasons* or *decide by principle*, what does this research tell you?

Well, first it tells you that the goal of decision making is your well-being, and that you may decide whether 'well-being' for you is pleasure, preference satisfaction, or eudaimonia.

Second, it tells you that if you decided to measure your well-being by satisfaction, there is no reason to think that either deliberative strategy – using reasons or a principle – would make a difference to it – on its own. Neither though would deciding by intuition versus deliberation or by selection versus rejection – again, on its own.

Third, decision strategy might make a difference to your satisfaction if there is another factor present which would produce some kind of fit – between the strategy and a level of that second factor. To identify such a second factor you might ask yourself 'what is my preferred way of making decisions' (among the strategies at your disposal, say: reasons, principles, and intuition) or 'what is the domain of life the decision is about' (e.g. relationships/work, consumption etc.). In order to be rather satisfied than not with an instance of decision making, looking out for *fit* is your best bet.

What to do now with the impending visit of your US friends? Well, the student sample from the Pilot Study voted in favor of meeting your friends. While you should not infer from sample statistics to yourself, for the (non-existent) person representing the mean this would be the way to go. For everyone else decision making is more complicated.

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– Appendices –

Theoretical Appendix

A Decision Strategy

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A.1 The Domain of the Moral

A.1.1 Deontology versus Teleology

The distinction between deontology and teleology (i.e.: a wider term including consequentialism) is infamous (cf. e.g. J. Driver, 2005), and all major theories in normative ethics have been categorized as one or the other. Surely the distinction picks up on an important difference, but: what is this difference? I think that in psychologists' use[567] the difference is understood such that the moral quality of an act either depends on its consequences (consequentialism) or on some intrinsic features of the act itself (deontology). But this is not the major point – and furthermore, 'deontology' here is understood based on only one (of several) formulations of Kant's categorical imperative, namely the so-called 'humanity formulation' which "holds that one must always act so as to treat humanity, whether in one's own person or that of another, always as an end and never merely as a means" (Ridge & McKeever, 2023, §1). The point about the deontology/ teleology distinction, however, really is this:

> Normative ethical theories have traditionally been divided into teleological or deontological categories. Teleological theories are thought to be those that define moral quality in terms of the achievement of some good or avoidance of some

[567] For example, when empirically treating the Trolley Problem (Foot, 1967; Thomson, 1976); cf. also my trolley experiment (section 10.1 on page 367) in the empirical part and further literature referenced there.

> bad. Thus, for these accounts, a theory of value is extremely important because it will provide substance to what the theory recommends. Deontological accounts are those that specify moral quality – not in terms of goodness achieved, but rather as a function of something else, such as a duty that binds, no matter the consequences, or the adherence to principles that are agreed upon by rational agents. This is not to say that an account of value is not important to deontological approaches – it is. But these approaches do not define the right in terms of the good, so to speak.[fn.2] A teleological theory does. (J. Driver, 2005, p. 31-32)

That is, the point of distinction is whether the evaluative (the good) is prior to the deontic (e.g. the right) or whether the deontic is prior to the evaluative (cf. also e.g. M. Schroeder, 2021, §3). This is a very theoretical point, even a meta-ethical one, not to be reduced to 'consequences versus intrinsic features'.[568]

Yet, whether there really is a misunderstanding between the philosophical categories and psychologists' use of them is not why I think that it should be interesting for psychological research in decision making – both research concerned with morality as well as prudence – to (also) consider another distinction, namely said distinction between particularism and generalism.

The reason why this second distinction is interesting and important, is, because *both*, consequentialism/utilitarianism *and* deontology/Kantianism have one very pervasive similarity: *they are both principled ethical theories*. That is, they are both generalist theories – which is why the contrast to a non-generalist theory (most prominently: particularism) should be investigated.

A.1.2 Excursus: Can normative ethical theories be of help in the absence of a conceptual definition of morality?

Let's assume the following premises:

(1) The occasional immoral act is not irrational. Rationality is singularly about prudence: to do what is in my self-interest is rational. (Corollary: Theories about well-being which are theories about prudence apply. That is, it is rational for me to either hedonistically care about my pleasure and pain, see to the satisfaction

[568] Also note that virtue ethics always seems to fall a little square to the teleology versus deontology distinction. For example, it is debated whether Aristotelian virtue ethics is teleological or not (cf. e.g. Santas, 1996). According to e.g. Trianosky (1990), there are versions of virtue ethics of either kind, teleological and non-teleological (cf. Trianosky, 1990, p. 338 f., also for a very informative description of the distinction). Contrarily, e.g. Louden (1996) stresses how virtue ethics is distinct from both teleological and deontological theories and includes "a critical program that presents a critique of the prevailing assumptions, methods, and aspirations of normative teleological and deontological moral theories" (p. 687). Alexander and Moore (2021), too, assign a special place to virtue ethics: "[D]eontology falls within the domain of moral theories that guide and assess our choices of what we ought to do (deontic theories), in contrast to those that guide and assess what kind of person we are and should be (aretaic [virtue] theories). And within the domain of moral theories that assess our choices, deontologists – those who subscribe to deontological theories of morality – stand in opposition to *consequentialists*" (§0, original italics).

of my preferences, or work on my virtues and on the realization of an objective list.)

(2) In absence of a strict formal/conceptual definition of morality, adhering to one of the "three methods of ethics" (that is: Kantian ethics/deontology, consequentialism/utilitarianism, and virtue ethics) seems to be a safe bet to do the moral thing in an according decision situation. This is so, because these normative ethical theories have been crafted and debated by great minds over long periods of time and none of them has been ultimately refuted. Accordingly, correctly applying one of these theories should guarantee that I choose the morally good, right, permitted, required, or virtuous option – even without having to establish beforehand whether this is even a *moral* decision situation.

(3) There is no meta theory that requires me to always be a deontologist, a consequentialist, or a virtue ethicist. Consistency in this sense is not required; I may freely switch between these normative ethical theories.

Now let's look at a famous moral dilemma, the Trolley example (Foot, 1967; Thomson, 1976; for a thorough introduction cf. my trolley experiment, section 10.1 on page 367, in the empirical part). A very short version goes like this: There are 5 people on train tracks and a runaway trolley heads towards them and will for sure kill them. You can throw a switch that will divert the trolley to another track where there is one person that will be surely killed. The (thought) experiment has been extensively used to pin deontological versus consequentialist intuitions against each other.

Let's see in turn what each theory would suggest:

Deontology	It is assumed that 'deontology'[569] would prohibit to throw the switch, either because it implies using a human as a means or because it involves involving an innocent. I don't think that it is all that clear that 'deontology' would issue this verdict, but for the sake of argument, let's assume, it does: it is morally wrong to throw the switch.
Act-utilitarianism	For the greatest good of the greatest number (or: most pleasure, least pain over all involved) you should throw the switch, since the ratio of lives over deaths would be 5:1. Accordingly: it is morally right to throw the switch.
Virtue ethics	Virtue ethics does not give action guidance for singular acts. You could ask the *phronimos* (the wise person) what they would do. Otherwise, if you have trained yourself well and are wise enough, you will know what to do.

For the sake of simplicity, let's further assume that (a) of the two options (throw the switch, not throw the switch) if according to a theory one option is right, then

[569] The quotation marks indicate that specifications would be in order – whose deontology? which version, what characteristics? – which I will skip.

the other option is automatically wrong (which is not necessarily the case: the negated option could be indifferent or not right/wrong with the same force etc.), and (b) it is equally bad to do the wrong thing as not to do the right thing (no theoretical omission bias).

Accordingly, we are at an impasse here: Theory [D] says to do x is wrong whereas theory [U] says to do x is right. So if I do the right thing according to [U] I at the same time do the wrong thing according to [D], and if I do the right thing according to [D] I at the same time do the wrong thing according to [U]. So whatever I do, it will be morally right and wrong at the same time.

Referring back to my three premises above, I said, I should not be held to a consistency criterion, but I could be a deontologist here and a consequentialist there, and I would still always have a mighty normative theory to back me up.

In these deontology-versus-consequentialism dilemmas where each option is *also* wrong, I might opt to look at the bright side which is that each option *is also right*. So whatever I do, I am justified. I did the right thing.

The point of this little excursus is this: If I want to be moral (for whatever reason), but struggle with the question what morality is, how the domain of the moral can be delimited, or how I can be sure that some judgment is a moral judgment, let alone a correct one – then I could just opt to flexibly lean on the established normative ethical theories that there are and follow their guidance.[570]

Yet, there is one caveat: In real life it is rather unlikely to encounter a situation that (1) is an exclusively *moral* dilemma situation where me and my self-interest do not really play a role (as e.g. in the Trolley case from above), and (2) does not allow for me to create 'third options' to e.g. find a middle ground. A short comment on the first point:

As opposed to a (dilemma) situation where I am not part of those affected, it is much more often the case that I will have to weigh my self-interest against the interests of others that I care about (like: 'I am really hurt by this friend and don't want to talk to them, but I know they are remorseful and wait for me to reply') or even yet discern whether self-interest is involved and drives my actions (like: 'Do I not want to tell her the truth because it would hurt her, or is it rather that it is unpleasant and exhausting for me to put up with her hurt?').

But these situations involving self-interest versus concern for others' interests are actually quite tricky, because both deontology as well as consequentialism would require

[570] How to apply the utilitarian calculus is already spelled out by Bentham (1907 [1789], chap. IV) himself (but remember that he rather thought of it as a normative ideal too complex for quick application, cf. section B on page 79 within 3.3.2.1), and step-by-step instructions on how to apply Kant's categorical imperative can be found e.g. in Johnson and Cureton (2022, §5).

me to be *impartial*,[571] which, in real life, might be quite hard to do, since I do have a special concern for myself that, I think, I cannot be quite sure to successfully reason away and overcome. In fact, it seems that for truly practical purposes (i.e. real life decisions) deontology and consequentialism are not prepared all too well to factor in my (natural) concern for myself as a practical hindrance to my moral deliberations.[572]

Accordingly, if you want to be moral (for whatever reason), there is guidance to be found in normative ethical theories – and especially virtue ethics, which seemed to not be very helpful in any singular situation, may be indeed very helpful as to leading 'the good life' more broadly, both morally and prudentially – but the application to real life will likely remain tricky.

A.1.3 Is morality unified?[573]

In their article *The Disunity of Morality and Why it Matters to Philosophy* Sinnott-Armstrong and Wheatley (2012) make the claim that morality/moral judgment[574] is not unified in that "all judgments that are intended to be about morality as opposed to law, economics, aesthetics, and so on are unified by any common and peculiar feature that enables important universal generalizations about their distinctive properties" (p. 357). In order to be able to tackle the question whether 'moral judgments are unified', Sinnott-Armstrong and Wheatley (2012) need a preliminary understanding of 'moral judgment'. Accordingly, they define by stipulation moral judgment "to include all judgments that are intended to resemble paradigm moral judgments. The judger's intention is what makes the judgment moral" (p. 356).[575]

This approach is very informative in that it covers a large field and in that it argues for the negation of the unity claim. I am not convinced by most of the examples (functioning as arguments by counterexample) which is why I will discuss this article more closely.

A.1.3.1 Content

Citing B. Gert (2005), the authors aim to rebut "that moral judgments are about harm to others" (p. 358). The first example they give is the failure to give a celebratory gift to a colleague,[576] which according to the authors is an instance of (non-executed) 'moral niceness', but is not related to harm to others (since the colleague is not disappointed, is happy enough etc.).

However, this example is unconvincing on three grounds: First, it arguably is a case marginal to moral judgment, if it is that at all. It could just as well be a case of

[571] Cf. e.g. Sinnott-Armstrong (2023b, p. 107): "many (though not all) philosophers see impartiality of some kind as essential to morality (Jollimore, 2023)". (Jollimore, 2023, is wrongly cited by his first name in Sinnott-Armstrong, 2023b.)

[572] This point, of course, hints at debates both in philosophy and empirical psychology (e.g. Haidt, 2001) that criticize all too rational accounts of moral reasoning.

[573] Only the first paragraph is the same as in the main text in section 4.2.4 on page 108.

[574] They seem to use the two terms synonymously. I will stick with 'moral judgment'.

[575] Dahl (2023), who criticizes this definition, apparently does not understand how this move is necessary to proceed with the question at hand.

[576] This example was already mentioned in the last paragraph of footnote 201 on page 99.

etiquette or social convention. Second, the example stipulates that there is no harm involved, e.g. no disappointment. But is that a realistic stipulation? If the target agent decides against a celebratory gift and even conceives of this as a moral decision (maybe based on a morally relevant emotion such as envy), he surely must be part of a societal environment where celebratory gifts are rather common – which again makes it unlikely that the target colleague, who arguably inhabits the same or a similar social environment, would not expect such, and thus not be disappointed. Last, that the target colleague really is not disappointed is something that only can be known for sure after the fact. Yet, the moral judgment/decision takes place before this can be known. Accordingly, the judgment/decision must be based on what is likely or even merely possible. I think it is reasonable to think that it is quite possible that the target colleague will be disappointed. Accordingly, there is harm involved.

Furthermore, Sinnott-Armstrong and Wheatley (2012) look at several domains and sub-domains of Moral Foundations Theory as put forward by Haidt and colleagues (e.g. Graham et al., 2013; Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011; Haidt & Graham, 2007; cf. also section B on page 101 within 4.2.2). According to them, some of these domains concern harm to others, but others don't:

> Spitting on your father's grave is disrespectful, so many would judge it immoral even when it harms nobody at all. Those who disagree see this judgment as a moral judgment that is mistaken rather than as some other kind of judgment. The same goes for purity. If one eats or has sex with a dead human body when nobody is looking, no disease is transferred, and the person died by accident, then cannibalism and necrophilia might cause no harm to others. (Sinnott-Armstrong & Wheatley, 2012, p. 360)

I'd like to venture that both examples may not be cases of moral judgment. Spitting on someone's grave may be disrespectful – but is disrespect a matter of morality? If you spit on a Jewish grave it is not the disrespect which is a moral problem, but the antisemitism. Similarly, if you spit on your father's grave, it may be your hatred for him, not the act of spitting, that is subject to moral judgment.

Now, as regards claiming certain sexual fetishes or preferences to be a matter of morality seems to me to be both odd and outdated – a relic of US-American prudery? – and even dangerous. Yes, I find necrophilia disgusting, but others find it disgusting if someone likes to wear a cat costume for sex, or the mild SM play as portrayed in *Fifty Shades of Grey* (E. L. James, 2012) – or homosexuals having intercourse. Now, where is the line to be drawn? How are some of these practices matters of taste and others matters of morality?

If anything, vignettes that illicit basic emotions such as disgust must be scrutinized with all the more caution. In fact, we specifically owe it to the referenced work by Haidt and colleagues (e.g. Haidt, 2001) that we are aware that it is strong emotional reactions like that, especially disgust, that sway people's moral judgments – or, to be

more precise, make them believe they make a moral (as opposed to some other kind of) judgment.[577]

A The Definition's Immunity Yet, my points may not affect Sinnott-Armstrong and Wheatley's (2012) argument, because their stipulation was that:

(1) moral judgments = "all judgments that are intended to resemble paradigm moral judgments" (p. 356) and

(2) moral judgments = all judgments that the judging person intends to be a moral judgment (p. 356).

Now these two definitions are not the same thing and will likely not have the same extension. The first definition hinges on what a 'paradigm moral judgment' is – and it stands to reason that paradigm moral judgments are indeed about 'harm to others'.

The second definition is truly empirical. Two comments:
First, it amounts to the fact that the racist claiming that having a so-called 'inter-racial' relationship is morally wrong, the spiritual leader insisting that not obeying his cult's practices is morally wrong, and the Nazi misogynist declaring that any women who does not put all her efforts into child-bearing is morally wrong – all have a say in the matter. All such racist, sexist, and ideological/sectarian opinions then have a claim to be part of morality. Yet, surely, even if classified as (legitimately) moral judgments they could still be wrong.

That is, e.g. the claim 'having an inter-racial relationship is morally wrong' (for short: 'ϕ-ing is morally wrong') is wrong. But what does it mean? It is wrong (i.e.: not true) that ϕ-ing is morally wrong. What does that make ϕ-ing? Is ϕ-ing then morally right? But it seems odd to say that 'having an inter-racial relationship is morally right' – it really does not seem to be a matter of morality. But if it is 'morally indifferent', then it is not within the realm of morality and therefore not a moral judgment.[578]

Second, how is this empiricism to be applied? By means of majority, or by means of 'statistical significance', or even by existential quantifier? What I mean by this is the following:

The formulation of definition (2) that 'all judgments that the judging person intends to be a moral judgment' is quite clear: all of these so intended moral judgments are elements of the set labeled 'moral judgments'.

But what about rare sentences such as "Do not commit incest or necrophilia" and "Do not commit cannibalism" (Sinnott-Armstrong & Wheatley, 2012, p. 360)? Are we simply to trust that someone in world history will have uttered them *and* intended them to be a moral judgment? And: is that one potential someone sufficient?

[577] Cf. e.g. Kelly (2014) for a very similar argument.

[578] One could try to make a case with the deontic terms 'prohibited', 'required', and 'permitted'. The ϕ-ing in this case is clearly not morally prohibited nor required. But saying 'having an inter-racial relationship is morally *permitted*' really rather seems like an insult.

Usually quantitative empirical approaches are about numbers (and Haidt and colleagues do quantitative research). Accordingly, it stands to reason that an according approach should be to give a number of participants an according sentence such as "Do not commit cannibalism" and have them judge whether this is a moral judgment.

Yet, how will you go about it? One could ask (a) Is this a moral judgment? Yes/no; (b) Is this one or more of the following: a moral judgment, a social judgment, a judicial judgment, a prudential judgment, an economic judgment, an aesthetic (i.e. pertaining to gustatory taste) judgment,...; (c) What kind of a judgment is this? [open text field].

On the one hand: clearly regarding [a], [b], and [c] one would get a bunch of different answers as well as differing percentages of answers. But that set aside, say, we take [a], the least fair of the response scales, and we get percentages for 'yes' and 'no'. Let's say it's 60:40 in percentages that yes, 'Do not commit cannibalism', is a moral judgment. Is that majority sufficient to make this sentence an element of the set? What about 51:49?

But even so, the formulation was 'all judgments that the judging person intends to be a moral judgment'. But do participants *intend* for that sentence to be a moral judgment? Are they even stating the judgment "Do not commit cannibalism"? I don't think so: in fact, they do neither. What they do is judge whether the presented sentence is to be classified as a moral judgment. That is, they classify. They do not judge that cannibalism is morally wrong nor do they intend that the judgment that cannibalism is wrong is a moral judgment.

In sum, the definition as it is supposedly meant, namely that any utterance that anyone ever intended to be a moral judgment goes into the set of moral judgments, is, of course, immune to me claiming (in section A.1.3.1 on page 580 above) that neither spitting on a grave (in itself) nor performing some sexual practice are matters of morality.

But clearly that definition was just a crutch to get the investigation started: in order to scrutinize 'the unity of morality' a reference class (or set) was needed. But no one can seriously want a technical term (as 'moral judgment' is to both philosophy and psychology, as well as any other discipline concerned with moral questions) to be delimited by not even mainstream usage, but by anyone just one person claiming that some entity is part of the set. Just right now I can claim that my bed is a desk, because I'm working there right now. But this does not make my bed or even all beds elements of the set "desks".

In conclusion, the set of 'all judgments that anyone ever intended to be a moral judgment' is a rich and interesting set to work with. But the work must still be conceptual.

A.1.3.2 Further Features

For reasons of length I will not discuss each of the further chapters in Sinnott-Armstrong and Wheatley (2012) – namely phenomenology, force, form, function, and brain mecha-

nisms – in detail. However, I will quickly state the content of each chapter, and thereafter discuss one further point.[579]

Phenomenology: There is no common *feel* to all moral judgments.

Force: Not all moral judgments are *authority-independent.*

Form: Contrary to Hare (1981): Not all moral judgments are *prescriptive* and *overriding.*

Function: Contrary to G. J. Warnock (1971): It is not the case that "the goal of moral judgments is to reduce liability to harm that arises from limited sympathy: We care about ourselves and our friends and family much more than we care about other people. This limited sympathy leads us to choose acts that harm others, so we are all in danger when lots of other people have such limited sympathy" (p. 365).

Brain mechanism: "[D]ifferent moral judgments rely on different neural systems" (p. 366).

A Two Comments on Strategy

A.a One First, due to this very short, almost keyword-based 'summary' I gave above, Sinnott-Armstrong and Wheatley's (2012) argumentative strategy becomes all too clear:

(i) Every statement anyone ever intended to be a moral judgment, *is* a moral judgment;

(ii) At least one of the elements within this large and diverse package is not a, b, or c;

(→) Moral judgments are not unified regarding a, b, or c, they are diverse.

Disproving a universal proposition (all x are y) by counterexample (where one suffices: there is one x that is not y), is already a simple strategy.[580] However, using such a large and diverse set (all statements anyone ever intended to be a moral judgment) as the basis for a universal proposition (all elements of that set have that feature) is borderline unfair. Why not at least have the set be 'all statements any professional philosopher ever signed off as being a moral judgment'? Surely, these would be empirically more difficult if not impossible to gather, but the authors also did not gather all the moral-judgments-by-intention in world history, but just assumed that almost any normative statement surely must have been intended to be a moral judgment by someone sometime.

In fact, in doing so the authors likely overshot their target, since the set of 'all statements anyone ever intended to be a moral judgment' will likely be co-extensive with all normative judgments whatsoever – because as laypeople in everyday life we are really not that precise! If philosophers have a hard time to define morality, how should normal people be able to? Accordingly, the envisioned set might likely be useless to a definition of morality. In fact, its diversity would rather suggest to give up the category of morality altogether.

[579] The list is also in the main text.

[580] The correct formalization is: $\forall x\,(F(x) \rightarrow G(x))$, but $\exists x\,(F(x) \wedge \neg G(x))$, therefore $\neg\forall x\,(F(x) \rightarrow G(x))$.

A.b Two Second, while B. Gert and Gert (2020) make such a big point of distinguishing a descriptive and a normative sense of 'morality' (cf. also section 4.2.3 on page 103 within 4.2.2),[581] Sinnott-Armstrong and Wheatley (2012) are rather laid-back regarding this matter. Which kind of morality are they aiming to scrutinize regarding its unity?

Since the set their analysis is based on is an empirical set ('all statements anyone ever intended to be a moral judgment'), it seems that they must clearly be looking to investigate the unity of moral judgment in a *descriptive* sense. Yet, right in the beginning they say this:

> What can moral psychology and neuroscience contribute to moral philosophy? Descriptive sciences cannot directly entail normative conclusions, as Hume and Moore taught. Nonetheless, science still might play an important role in a larger argument (such as an inductive inference to the best explanation) with a normative conclusion. In addition, when philosophical moral theories depend on empirical presuppositions and premises, psychology and neuroscience can test those assumptions. This latter use of moral psychology and neuroscience is what we will try to exemplify here. (Sinnott-Armstrong & Wheatley, 2012, p. 355)

Accordingly, it seems, they are not interested in a descriptive sense only, but also in 'normative conclusions' (whatever, in this case, they actually mean by that). This may be the wrong interpretation, but from the way they authors write and go about it, I believe they are investigating the *concept* of morality (but certainly in a 'descriptive-elucidatory' way, cf. section 4.2.3.2 on page 107 within 4.2.3.2).

Due to the authors' known interest and expertise in empirical research, they might have opted to substitute the use of philosophical intuition – which has been heavily criticized during the past two decades by empirically-minded philosophers and empirical researchers, cf. e.g. Pust (2019) – with the use *everybody's intention* (which seems a little stricter than 'everybody's intuition').

In fact, this move is not unheard of (and therefore not necessarily connected to a descriptive interest in morality only): Hooker (2017), who most certainly is on a conceptual mission not a descriptive one, in his article *What Makes a Judgement a Moral Judgement* in order to remain sufficiently neutral regarding different moral views and theories (p. 111), claims that: "We should not here delineate moral thought, action, and theory in a way that excludes any thoughts, action, or theories that we can recognize as trying to be moral thoughts, actions, and theories, even if we think they are highly implausible" (p. 104).

This is not completely the same, but it is close. Accordingly, I have treated Sinnott-Armstrong and Wheatley (2012, 2014) as if they provide a conceptual investigation of morality – which they might actually be doing.

[581] They also claim that: "Which of these two senses of 'morality' a moral philosopher is using plays a crucial, although sometimes unacknowledged, role in the development of an ethical theory" (§0).

A.1.3.3 Summary and Discussion

In sum, while Sinnott-Armstrong and Wheatley (2012) certainly is a very interesting read and deserves more discussion on the details (which for reasons of reasonable space I sadly cannot provide here) my conclusion is disagreement on most points. That is, while I find it easy to agree that there likely is no common phenomenology and certainly no common brain mechanism to all moral judgments, the further two categories, form and function, as well as the one category I discussed at length, content, seem to me to be more difficult to dismiss: Regarding these three categories I disagree with the counterexamples the authors provide in order to disprove the claim to a common feature within the respective category (which is the strategy I pointed out in section A on page 584 and footnote 580 on page 584).

There are two possibilities of disagreement: First, I might disagree that the given counterexample indeed is a *moral* judgment (as I did in the case of sexual practices). In this case, the authors' argument is immune to my disagreement, since based on the stipulated definition of moral judgments, it suffices that just one person indeed finds the example in question to be a moral judgment (which is the immunity I pointed out in section A on page 582).

Second, I might disagree that the given counterexample does *not* have the feature in question (as I did in the case of the celebratory gift). That is, if the counterexample is supposed to show that there is a moral judgment that does not involve harming others, I might argue that it fails to do so and indeed harming others is involved. Yet, this will never be a conclusive argumentative strategy, since due to their definition of moral judgments ('all judgments that the judging person intends to be a moral judgment') the authors could provide an endless amount of examples which I would have to disprove. Accordingly, their definition does a lot of work for them (which I have already repeatedly criticized).

Although I cannot spell it out here (since that would be a whole new dissertation), I do think that 'harm to others' (which will include matters of justice/fairness), 'authority-independence', and 'overridingness' (as long as the latter is not tied to rationality) stand good chances to be common features of at least *paradigm* or *prototypical* moral judgments.[582] [583]

I believe, finding common features of paradigm or prototypical moral judgments might well suffice. Why should the concept of 'moral judgment' not have fuzzy edges? After all, we accept fuzzy edges for tables and cups (cf. my point on definitions in footnote

[582] What does 'authority-independence' even mean? That is does not depend on authority whether something is a moral matter or not? Or that authority cannot make something morally right or wrong? Sinnott-Armstrong and Wheatley (2012) mean the latter, and I find their counterexample (p. 362-363) especially unconvincing.

[583] The point of 'overridingness' is spelled out by Sinnott-Armstrong and Wheatley (2012, p. 363) like this: "moral judgments are [...] overriding in the sense of being more important than nonmoral considerations so that morality determines what we overall ought to do in any conflict between moral and nonmoral reasons". In fact, under this description, it seems that this feature is just built into the concept of 'moral judgment'...

4 on page 8 – featuring cups; cf. the mind-blowing chapter *Between Good and Yellow* by Kovesi (2004) – featuring tables) – and are still well able to work with them. To the contrary, Sinnott-Armstrong and Wheatley (2014, p. 454) claim that 'definitional looseness' is a problem to "scientific inquiry and understanding", and that therefore there exist no sciences about subjects that only come with such a 'loose definition'.[584]

I think, they are mistaken. First, one glimpse at the literature on definitions/concepts reveals that, on several levels and on several grounds, what we usually think a definition is, namely saying exactly what something is, might really not be possible – for any concept (cf. footnote 4 on page 8). Second, I doubt that even physics, which is something like *the* prototypical science, only deals with 'unified' concepts. Certainly, biology doesn't: for example biological sex refers to several characteristics (classically: chromosomes, gametes, hormones, and genitalia, cf. e.g. Rehmann-Sutter, Hiort, Krämer, Malich, & Spielmann, 2023; Smiley et al., 2024), but these do not always align. Still, biology and medicine can work with that. Third, the immense productivity of moral philosophy as well as empirical moral psychology seems to contradict the point about an 'antagonistic effect on scientific inquiry'.

Sinnott-Armstrong and Wheatley (2014) conclude with the "positive proposal that the field commit to a taxonomic approach" (p. 452), for example as according to them provided by Moral Foundations Theory by Haidt and colleagues (e.g. Graham et al., 2013; Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011; Haidt & Graham, 2007). Yet, they admit that "though it is not clear whether they [the taxonomists] agree with us that nothing unifies those kinds and makes them all moral judgments" (p. 470). Accordingly, Sinnott-Armstrong and Wheatley (2014) are willing to endorse a 'taxonomy' that does not even necessitate their main point (that morality is not unified).[585]

[584] The complete quote on the matter is this: "[T]his looseness is antagonistic to scientific inquiry and understanding. Because furniture has no defining features, scientists cannot discover generalizations that hold for all and only furniture. There is no science of furniture. The same goes for games, jade, memory, and, we will argue, moral judgments. Psychology and neuroscience seek to reveal components, mechanisms, and consequences of certain mental kinds. Categories that are not properly unified are counterproductive to this pursuit." (Sinnott-Armstrong & Wheatley, 2014, p. 454).

[585] Note that Sinnott-Armstrong and Wheatley (2014) is an amended, but very similar version of Sinnott-Armstrong and Wheatley (2012) (which I only came across after most of this section was written). Still, my points of criticism all remain valid, because all of the examples I discussed at length are also to be found in Sinnott-Armstrong and Wheatley (2014), and structure, strategy, and goals of both articles are the same. One thing that is notably missing in Sinnott-Armstrong and Wheatley (2014) is their 2012 remark about 'normative conclusions' I wrote about in section A on page 584, second comment. The 'positive proposal' about taxonomies is new, too, but the point is already anticipated in Sinnott-Armstrong and Wheatley (2012).

Empirical Appendix

B Pilot Study

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B.1 General Results Including SSQ and DSQ

[Jump back to main.]

B.1.1 *Repeated Measures Analysis of Satisfaction Pre and Post Outcome Information Using the SSQ* – Results in Detail⇑

B.1.1.1 Summary Statistics⇑

Summary statistics can be taken from Table B.1, a visualization is displayed in Figures B.1 and B.2.[586]

Table B.1 Summary statistics for pre and post outcome satisfaction with the decision strategy.

Cell #	Decision Strategy (Factor 1)	Choice	Outcome (Factor 2)	Time before vs. after outcome information	n	Satisfaction	
						M	SD
1	1 by reasons	1 friends	1 negative	1 before	16	3.02	0.90
2				2 after	16	3.32	0.90
3			2 positive	1 before	20	3.51	0.83
4				2 after	20	3.32	0.91
5		2 application	1 negative	1 before	11	3.38	1.08
6				2 after	11	3.73	0.89
7			2 positive	1 before	15	3.99	0.95
8				2 after	15	3.75	1.01
9	2 by principle	1 friends	1 negative	1 before	22	3.90	1.03
10				2 after	22	4.00	0.90
11			2 positive	1 before	14	3.68	1.25
12				2 after	14	3.80	1.10
13		2 application	1 negative	1 before	9	3.39	1.22
14				2 after	9	3.64	0.79
15			2 positive	1 before	11	2.98	1.28
16				2 after	11	3.76	0.82
					118	3.60	1.01

[586] The following analyses as well as their sequence was inspired by Kassambara (n.d.-c).

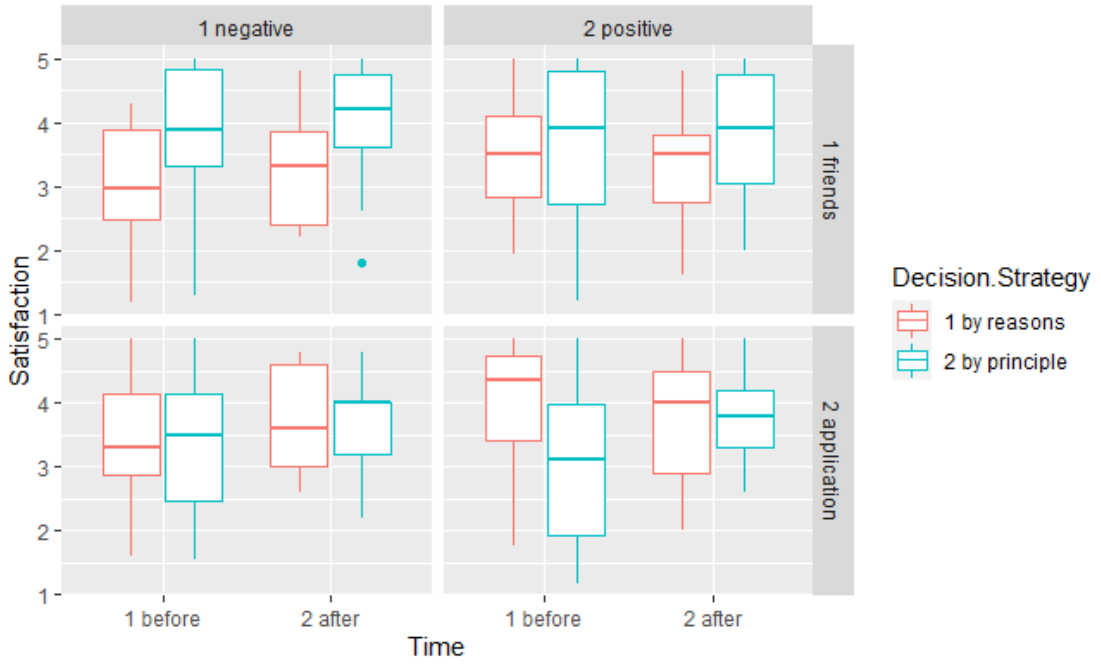


Figure B.1 Box plot visualization of satisfaction with the decision strategy pre and post outcome information by *Decision Strategy* * *Choice* * *Outcome*.

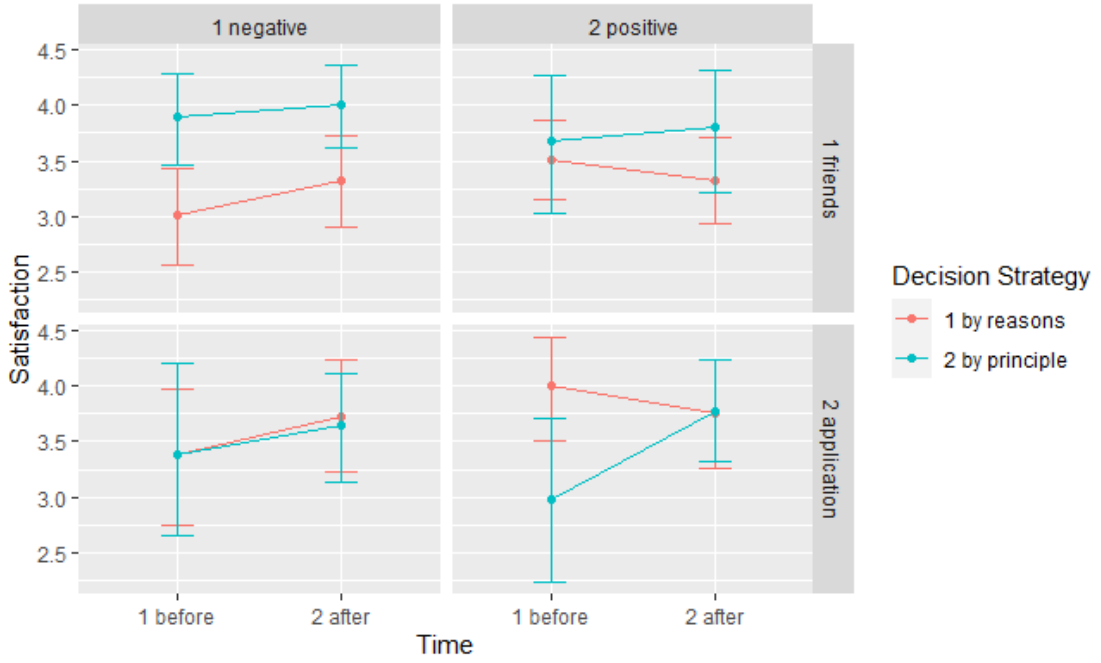


Figure B.2 Interaction visualization of satisfaction with the decision strategy pre and post outcome information by *Decision Strategy* * *Choice* * *Outcome*.

B.1.1.2 Tests of Assumptions for Repeated Measures ANOVA

A Extreme Outliers There was one outlier (ID 140, cell #10) with a value of $y_{Satisf} = 1.80$, but it was not an extreme outlier as determined by the R function identify_outliers {rstatix}.

B Normality *Satisfaction* was normally distributed ($p > 0.05$) for all cells but three, as assessed by Shapiro-Wilk's test of normality. Non-normal distribution was found in cell #9 ($W = 0.91, p = 0.037$), #10 ($W = 0.91, p = 0.045$), and #12 ($W = 0.87, p = 0.044$).[587] Visual inspection showed that for each cell all points fall approximately along the reference line, cf. Figure B.3. Normality of the data will thus be assumed.

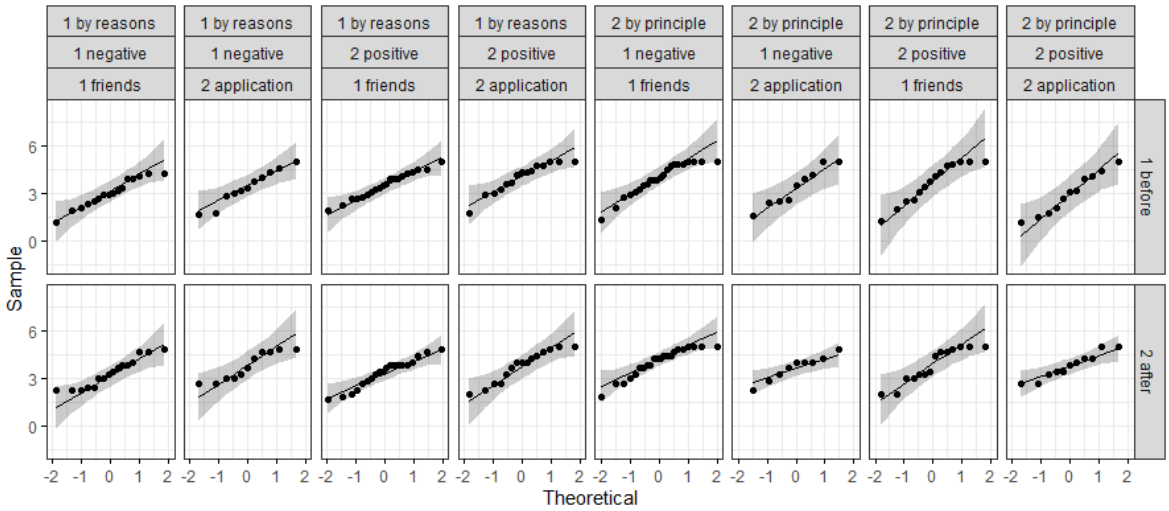


Figure B.3 QQ plot for each cell of the design.

C Homogneity of Variance There was homogeneity of variances, as assessed by Levene's test of homogeneity of variance ($p > 0.05$) with $F(7, 110) = 0.87$, $p = 0.535$ for the first measurement point and $F(7, 110) = 0.58$, $p = 0.769$ for the second measurement point.[588]

D Sphericity Sphericity necessarily holds for variables with only two levels.

B.1.1.3 Inferential Statistics I: Satisfaction by *Decision Strategy* * *Choice* * *Outcome* * *Time* (within)

There was a significant two-way interaction of *Decision Strategy* and *Choice*, $F(1, 110) = 6.12, p = 0.015$; a significant three-way interaction of *Decision Strategy*, *Outcome* and

[587] The R function employed was shapiro_test{rstatix}.
[588] The R function employed was levene_test{rstatix}.

Time, $F(1, 110) = 4.79, p = 0.031$; and a marginally significant main effect of *Time*, $F(1, 110) = 3.88, p = 0.051$. There were no further main effects or interactions.[589] [590]

A Follow-Up Analyses

A.a Simple two-way Interaction To follow up the three-way interaction of *Decision Strategy* * *Outcome* * *Time* the data was grouped by *Time* in order to scrutinize the remaining two-way interaction of *Decision Strategy* and *Outcome*. Thus grouped by time, at the first measurement point (= before outcome information), there was a significant interaction of *Decision Strategy* and *Outcome*, $F(1, 110) = 4.63, p = 0.034$, but not so at the second measurement point (= after outcome information), $F(1, 110) = 0.02, p = 0.894$.

Regarding the two-way interaction of *Decision Strategy* * *Choice*, it became obvious that it was driven by the first measurement point with a significant interaction there ($F(1, 110) = 6.50, p = 0.012$), whereas this interaction was only marginally significant at the second measurement point ($F(1, 110) = 2.94, p = 0.089$).

A.b Simple Main Effects There was no simple main effect of *Outcome* in any of the eight cells provided by *Decision Strategy* * *Choice* * *Time*. Neither was there a simple main effect of *Choice* in any of the eight cells of *Decision Strategy* * *Outcome* * *Time*.

However, there were three simple main effects of *Decision Strategy*:

First, cf. Table B.1, cell #1 vs. cell #9: at *Time* = "1 before", when participants had chosen to meet their friends (condition of *Choice* = "1 friends") and the condition of *Outcome* was "1 negative", there was a significant difference of *Decision Strategy*: those participants who had had to decide by reasons ($M = 3.02, SD = 0.90$) were significantly less satisfied with the decision strategy than those having had to decide by principle ($M = 3.90, SD = 1.03$), $F(1, 36) = 7.44, p = 0.010$.

Second, cf. Table B.1, cell #2 vs. cell #10: at *Time* = "1 after", when participants had chosen to meet their friends (condition of *Choice* = "1 friends") and the condition of *Outcome* was "1 negative", there was again a significant difference of *Decision Strategy*: those participants who had had to decide by reasons ($M = 3.32, SD = 0.90$) were again significantly less satisfied with the decision strategy than those having had to decide by principle ($M = 4.00, SD = 0.90$), $F(1, 36) = 5.20, p = 0.029$.

These two identical patterns of "choose friends" and "negative outcome" at both measurement time points are what underlies the reported marginally significant main effect of *Time*: When participants had chosen to meet their friends and the outcome then turned out to be negative, participants both before and after knowing the outcome

[589] A Type III ANOVA was calculated using the R function anova_test{rstatix}. Identical results were obtained using lmer{lme4}, specifying *lmer (Satisfaction_5 ~ Decision.Strategy * Choice * Outcome * Time_f + (1|CASE))*, as well as using ezANOVA{ez} (which again uses Anova{car}), and aov_car{afex} or aov_ez{afex}. The function aov{stats} returns Type I sums of squares without further specification.

[590] This paragraph is also cited in the main text.

were more satisfied with the decision strategy used when they had had to decide by principle rather than by reasons.

Third, cf. Table B.1, cell #7 vs. cell #15: at *Time* = "1 before", when participants had chosen to work on their application (condition of *Choice* = "2 application") and the condition of *Outcome* was "2 positive", there was a significant difference of *Decision Strategy*: those participants who had had to decide by reasons ($M = 3.99, SD = 0.95$) were significantly more satisfied with the decision strategy than those having had to decide by principle ($M = 2.98, SD = 1.28$), $F(1, 24) = 5.37, p = 0.029$.

The first and the third result here confirm two of the three significant differences found in section F of Part A of the Pilot Study.

A.c Further Visualizations The reported two-way interaction of *Decision Strategy* and *Choice* (cf. section B.1.1.3) can be retrieved in the above reported simple main effects: the first and the second simple effect had the same pattern at both time points, namely: when having chosen to meet their friends, participants were more satisfied when they had decided by principle. The third simple effect showed that the opposite was true when participants had chosen to work on their application: in this case, they were more satisfied when they had decided by reasons. – In this description I left out that all three simple effects were conditioned upon *Time* and *Outcome*, too. Nevertheless, cf. Figure B.4 for the significant interaction of *Decision Strategy* and *Choice* in disregard of *Time* and *Outcome*.

This interaction was also present looking at the first measurement point only in section F of Part A of the Pilot Study.

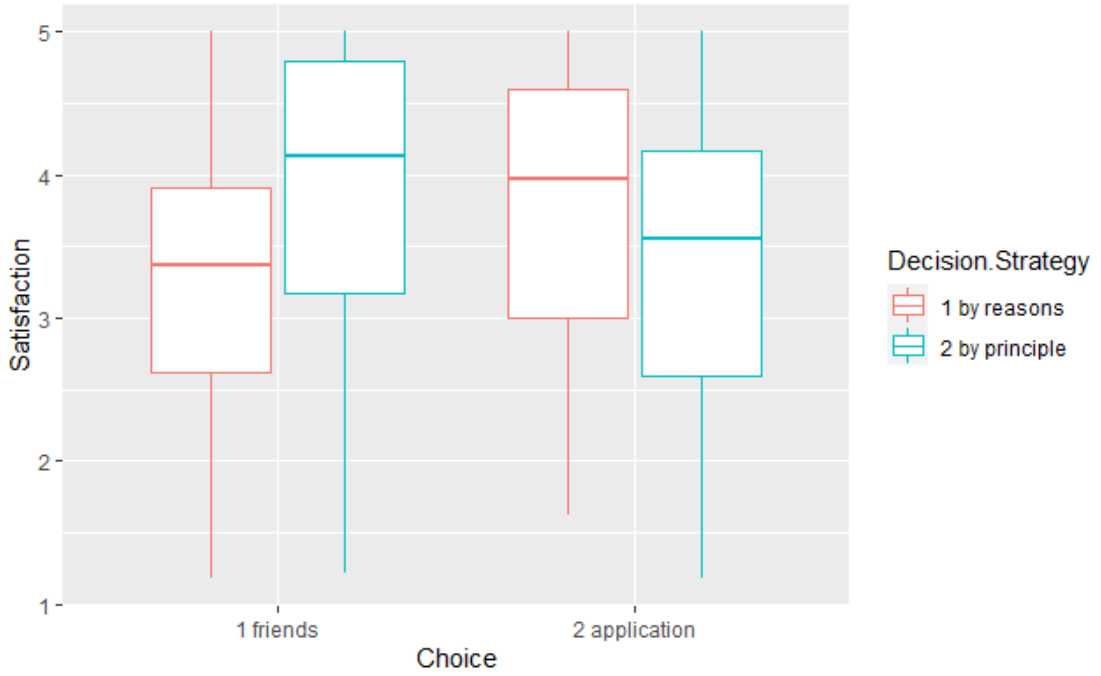


Figure B.4 Box plot visualization of the two-way interaction of *Decision Strategy* and *Choice*.

The three-way interaction of *Decision Strategy*, *Outcome* and *Time* (cf. B.1.1.3) with an underlying significant two-way interaction of *Decision Strategy* and *Outcome* at the first measurement point only (cf. A.a) is visualized in Figure B.5.

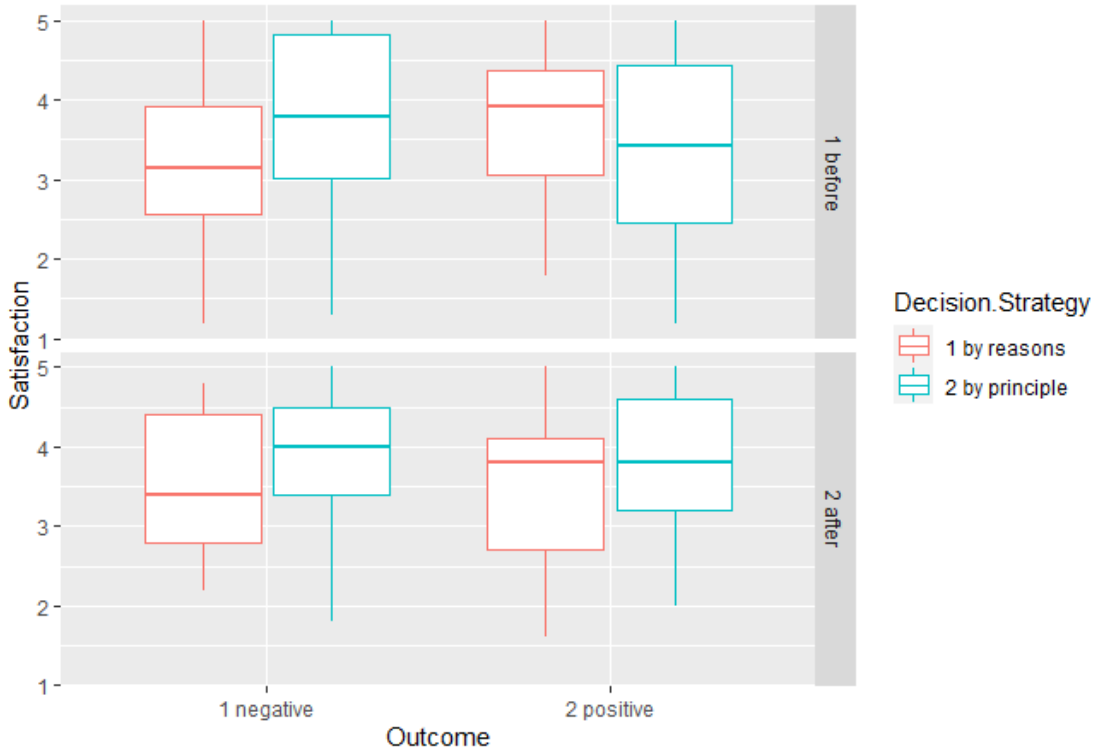


Figure B.5 Box plot visualization of the three-way interaction of *Decision Strategy*, *Outcome* and *Time*.

Last, cf. Figure B.6 for a display of all 16 cells of the design with *Decision Strategy* as the comparison variable. The reported simple effects (cf. section A.b) can be found in the following panels: Panel 1 (upper left) and Panel 5 (lower left) display the first and the second simple main effect, where participants having decided by principle were more satisfied; Panel 4 (upper right) displays the third simple main effect, where participants having decided by reasons were more satisfied.

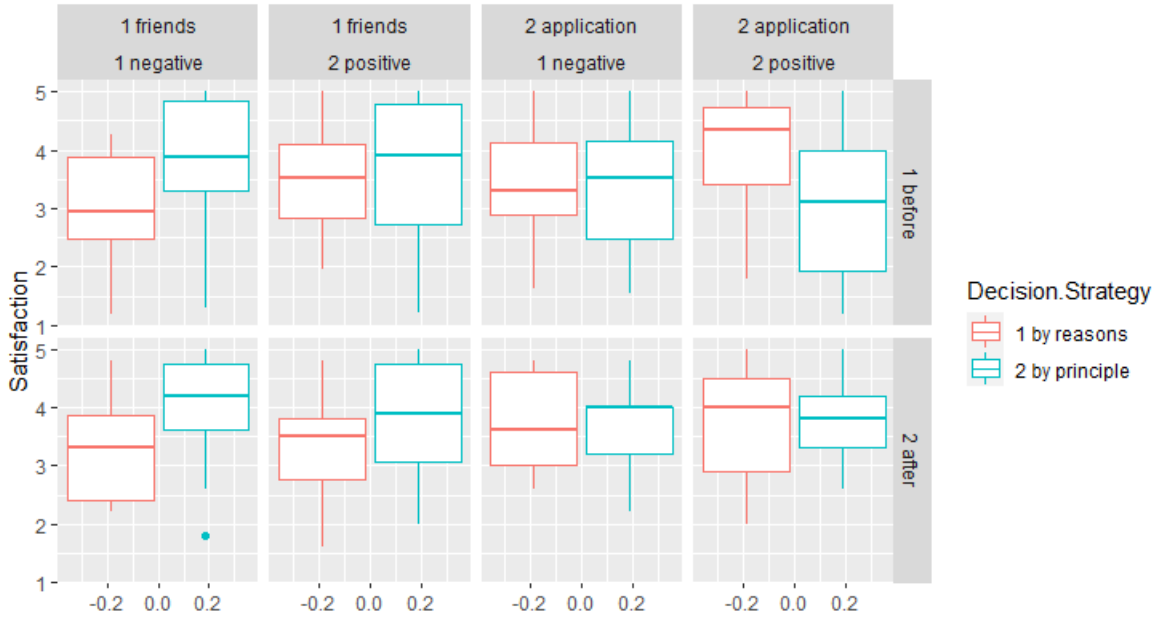


Figure B.6 Box plot visualization of all cells of the design with *Decision Strategy* as the comparison variable.

B.1.1.4 A Caution to Interpretation

A cautionary note: The variable *Time* distinguishes the first and the second measurement point. What is the difference between these two points? It it the outcome information that is given to participants between the first and the second measurement of their strategy satisfaction. That is, at the first measurement of their strategy satisfaction they had no outcome information yet. And therefore, the distinction between the conditions of negative versus positive *Outcome* within the first measurement point is obsolete – and misleading. For example, in Figure B.6 the distinction within the first row (i.e. the first measurement point) between Panel 1 and 2 and between Panel 3 and 4 is artificial: in fact Panel 1 + 2 and Panel 3 + 4 must be thought of as being only one panel. In that sense, *Time* does include part of the information of *Outcome*, namely whether outcome information was given. It does not include the specific information of *Outcome* regarding whether a positive or a negative outcome information was given. Therefore, I will include one further analysis before proceeding with the interpretation of results.

B.1.1.5 Inferential Statistics II: Satisfaction by *Decision Strategy* * *Choice* * *Time* (within) and Without *Outcome*

This analysis will answer the question whether outcome information (the difference between the first and second measurement point in the within-subjects variable *Time*) makes a difference to participants' strategy satisfaction – in disregard of whether they were given negative or positive outcome information before the second measurement point.

A visualization of the repeated-measures ANOVA without the variable *Outcome* is displayed in Figure B.7.

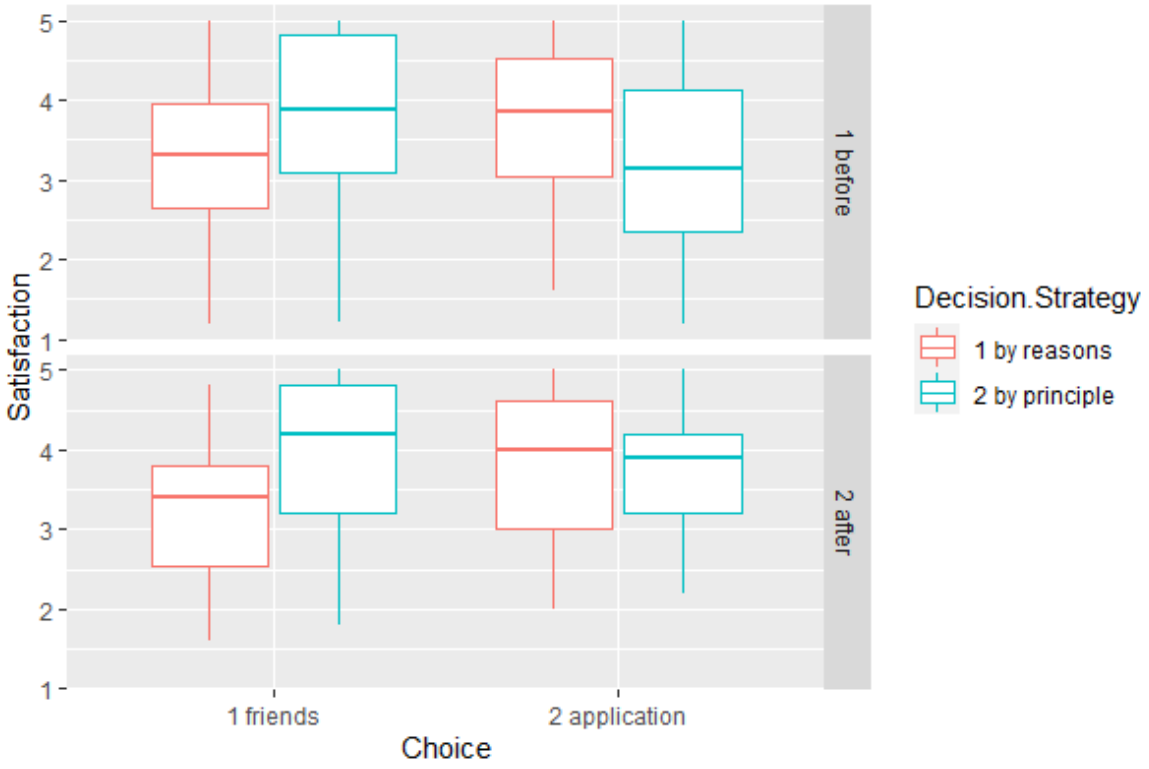


Figure B.7 Box plot visualization of satisfaction with the decision strategy pre and post outcome information in disregard of the outcome information content.

There was a marginally significant main effect of *Time*, $F(1, 114) = 3.39, p = 0.068$; a significant interaction of *Decision Strategy* and *Choice*, $F(1, 114) = 7.01, p = 0.009$; and a marginally significant interaction of *Decision Strategy* and *Time* $F(1, 114) = 2.79, p = 0.098$.

Scrutinizing the effects of *Decision Strategy* by simple main effects analysis revealed that there was a significant difference between strategies (i) before outcome information when participants had chosen to meet their friends (in Figure B.7, first row and first pair of box plots), $F(1, 70) = 4.82, p = 0.031$ and (ii) after outcome information again when participants had chosen to meet their friends (in Figure B.7, second row and first pair of box plots), $F(1, 70) = 7.44, p = 0.008$.

There was a marginally significant difference between strategies (iii) before outcome information when participants had chosen to work on their application (in Figure B.7, first row and second pair of box plots), $F(1, 44) = 2.88, p = 0.096$.

Between (i)/(ii) and (iii) satisfaction scores were reversed, with participants having decided by reasons being less satisfied in (i) and (ii) and more satisfied in (iii) as com-

pared to those having decided by principle.[591]

Scrutinizing the effects of *Choice* by simple main effects analysis revealed three marginally significant differences between choices (i) before outcome information when participants had decided by reasons (in Figure B.7, first row: both red box plots), (ii) before outcome information when participants had decided by principle (in Figure B.7, first row: both green box plots), and (iii) after outcome information when participants had decided by reasons (in Figure B.7, second row: both red box plots).[592]
Between (i) and (ii) satisfaction scores were reversed, with participants having decided to meet their friends being less satisfied in (i) and more satisfied in (ii) as compared to those having decided to work on their application.

Comparing these results to those in in section A.b, the effect of *Decision Strategy* completely corresponds (but is more easy to see), whereas the marginally significant effects of *Choice* did not come through in the above first simple effects analyses in section A.b.

The following visualization by box plots in Figure B.8 focuses on the effect of *Time*, and thus outcome information:

[591] Since these are additional analyses, I skip the descriptives on means and standard deviations.
[592] Since these effects are only marginally significant and the effects of *Choice* not of major importance, I skip further statistics.

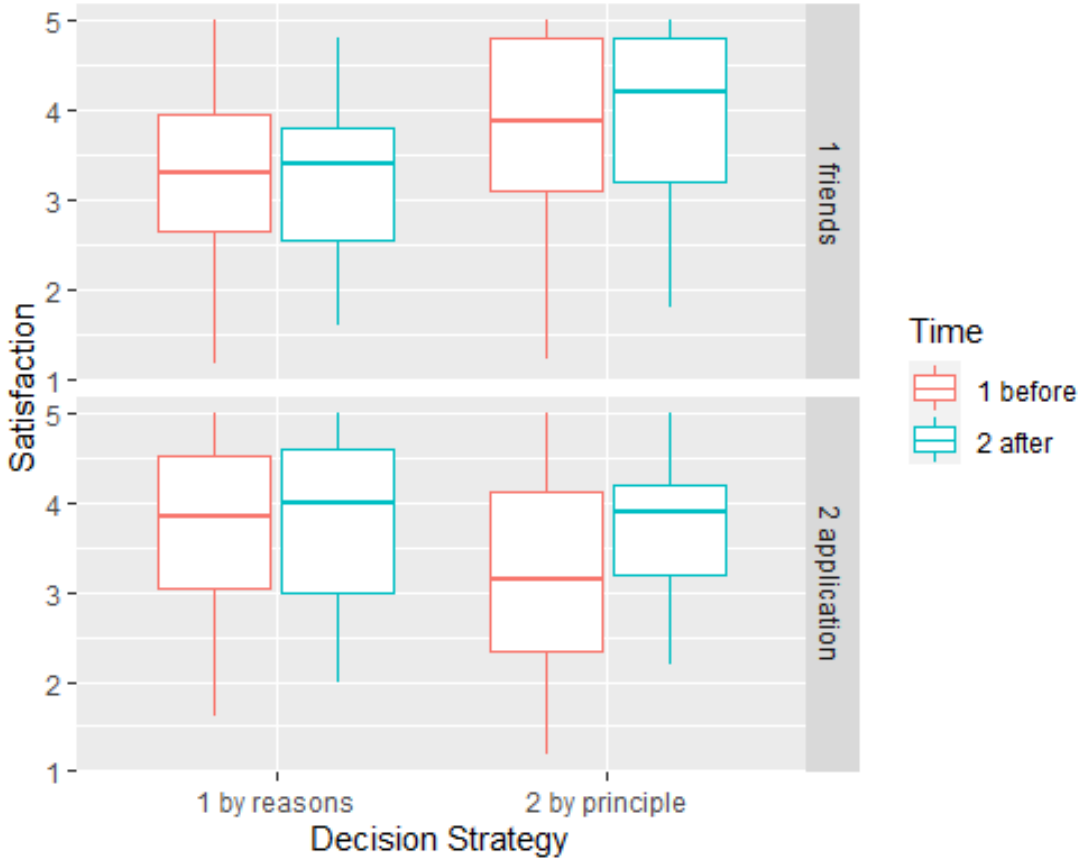


Figure B.8 Box plot visualization of satisfaction with the decision strategy pre and post outcome information in disregard of the outcome information content – focusing *Time*.

There was no significant simple main effect of *Time*. None of the conditions of *Decision Strategy* * *Choice* visualized in Figure B.8 was significant; even the condition "2 application" + "2 by principle" (last pair of box plots) only scratched marginal significance with $F(1, 38) = 2.73, p = 0.106$. However, descriptively in all conditions displayed satisfaction was slightly higher after outcome information than before outcome information. Thus, outcome information (in disregard of the information content being negative or positive) did not make a difference to participants' strategy satisfaction. This does again well correspond to section A.b, where there was no significant simple main effect of outcome. However, cf. Figure B.9 for a visualization of the marginally significant interaction of *Decision Strategy* and *Time*.

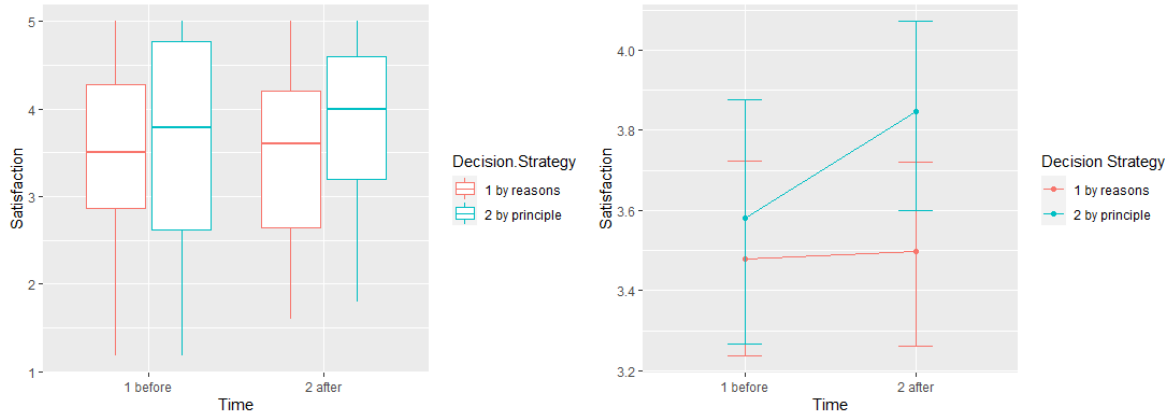


Figure B.9 Interaction of *Decision Strategy* and *Time*.

B.1.1.6 Interpretation and Discussion⇑

A Summary In the following summary I will list all found effects and refer to "Analysis I" and "Analysis II" to signify their origin. The former refers to section B.1.1.3 and the latter to section B.1.1.5 above.

The following effects were found:

(a) a marginally significant main effect of *Time* (Analysis I and Analysis II), cf. Figure B.8 (all green medians ("2 after") are slightly higher than the red ones ("1 before"))

(b) a two-way interaction of *Decision Strategy* and *Choice* (Analysis I and Analysis II), cf. Figure B.4 for a direct visualization or Figure B.6 for details (and collapse the two time points and the two outcomes in your mind)
   - *Choice*
     - no simple main effects of *Choice* (Analysis I)
     - three marginally significant simple main effects of *Choice* (Analysis II)
   - *Decision Strategy*
     - three simple main effects of *Decision Strategy* (Analysis I)
     - two significant and one marginally significant simple main effect of *Decision Strategy* (Analysis II)

(c) a three-way interaction of *Decision Strategy*, *Outcome* and *Time* with an underlying significant two-way interaction of *Decision Strategy* and *Outcome* at the first measurement point, but not the second (Analysis I), cf. Figure B.5 – corresponding to the marginally significant interaction of *Decision Strategy* and *Time* (Analysis II), where *Time* signifies outcome information (cf. section B.1.1.4), cf. Figure B.9
   - *Outcome* (Analysis I), respectively *Time* (Analysis II)

  - no simple main effects of *Outcome* (Analysis I)
  - no simple main effects of *Time* (Analysis II)
- *Decision Strategy*
  - see above

B Which effects are important and interpretable?

B.a (a) Main Effect of *Time* There was also an interaction including *Time*, but it seems legitimate to look at this main effect shortly (cf. Figure B.8): participants were more satisfied with the decision strategy they had to use after outcome information (no matter whether is was positive or negative, $M = 3.66, SD = 0.93$) than before outcome information, $M = 3.53, SD = 1.07$. However, this main effect was only marginally significant (cf. section B.1.1.3) and there is not much to feed an interpretation. Cf. Figure B.8.

B.b (b) Two-way Interaction of *Decision Strategy* and *Choice* In case participants had opted to meet their friends, their satisfaction with the decision strategy was higher when they had had to decide by principle ($n = 72, M = 3.87, SD = 1.03$) than by reasons ($n = 72, M = 3.31, SD = 0.88$). Conversely, in case participants had opted to work on their application, their satisfaction with the decision strategy was higher when they had had to decide by reasons ($n = 52, M = 3.74, SD = 0.98$) than by principle ($n = 40, M = 3.44, SD = 1.06$). Cf. Figure B.4.

Two of the three simple main effects from Analysis I of *Decision Strategy* (Panel 1 and Panel 4 in Figure B.6, cf. section A.c) are not interpretable since they are conditioned upon *Outcome* which did not play a role at the first measurement point yet (cf. section B.1.1.4). The third simple main effect (Panel 5 in Figure B.6) means that participants that had opted to meet their friends and received negative outcome information were more satisfied with the decision strategy in case they had decided by principle ($n = 22, M = 4.00, SD = 0.90$) than in case they had decided by reasons ($n = 16, M = 3.32, SD = 0.90$).

The two significant simple effects and the one marginally significant main effect from Analysis II of *Decision Strategy* (cf. section B.1.1.5) confirm the point made in section A.a, namely that the two-way interaction of *Decision Strategy* and *Choice* as reported in the beginning of this paragraph (b) is driven by the first measurement point. The difference between strategies at the first measurement point was significant (choice = "1 friends") and marginally significant (choice = "2 application") and at the second measurement point significant for choice = "1 friends" only. This latter significant difference was driven by the condition outcome = "negative", the third simple main effect from Analysis I above. Cf. Figure B.7. The three marginally significant simple main effects of *Choice* from Analysis II will not be further considered.

The significant two-way interaction of *Decision Strategy* and *Choice* at the first measurement point including the (marginally) significant differences by *Decision Strategy* for each of the two choice options seems to be the most interpretable result of all results.

B.c (c) Two-way Interaction of *Decision Strategy* and *Outcome* The two-way interaction of *Decision Strategy* and *Outcome* at the second measurement point was non-significant. However, the remaining two-way interaction of *Decision Strategy* and *Outcome* from Analysis I at the first measurement point is not interpretable, since there was no outcome information yet at that point. Thus collapsing the two conditions of *Outcome* and looking at *Time* instead as the variable distinguishing the absence or presence of outcome information as done with Analysis II, we only find a marginally significant interaction (cf. Figure B.9), where – descriptively – satisfaction remains about at the same level before and after outcome information in case participants decided by reasons, whereas there is a rise of satisfaction after outcome information (in disregard of the valence of that information) in case participants decided by principle. This latter difference is not significant, however, $F(1, 110) = 1.76, p = 0.187$. Cf. Figure B.9.

Given the fact that there were no further simple main effects of *Outcome* or *Time* respectively, it seems safe to conclude that there are no systematic effects of *Outcome* or outcome information nor such effects interacting with *Decision Strategy* on strategy satisfaction.

C Conclusion[593] The one persistent result is the interaction of *Decision Strategy* and *Choice* at the first measurement point – just as already found in section F on page 187 from 8.3.2.2.

Interestingly, *Outcome* – that is: outcome information – did not produce any systematic effect on satisfaction with the decision strategy. On the one hand, this is a very encouraging result, because it might mean that participants were able to distinguish their satisfaction with the outcome – which should reasonably vary with outcome valence – from their satisfaction with the strategy – which, from a rational point of view – should not be that dependent on bad or good outcomes. On the other hand, non-significant results are risky to interpret, since simply my manipulation might have failed. That is, participants might not have been too disturbed by the negative or positive outcome information they received. It should be possible, though, to find an answer to this question (were participants moved by the negative or positive outcome information) with a look at the *Mood* variables (cf. section A on page 191 from 8.3.2.4). And yes, there was a significant and strong main effect of *Outcome* on both *Mood valence* and *Mood potency*, cf. section A.a on page 193. Thus, it seems that indeed participants' strategy satisfaction was largely independent of outcome.

There was no main effect of the variable of interest, *Decision Strategy*, nor a persistent interaction of *Decision Strategy* and *Outcome* as hypothesized with H1.2 (cf. section 8.3.1.1). Thus, H1.2 could not be confirmed regarding the Strategy Satisfaction Questionnaire (SSQ) as one of the post-outcome measures of satisfaction. Since the hypothesized interaction was not found on the *Mood* items either, it is final that H1.2

[593] Please note that the present section *Conclusion* is also to be found in the main text, cf. section 8.4.1.1 on page 201.

could not be confirmed regarding either post-outcome satisfaction measure.[594]

It was only in combination with *Choice* that *Decision Strategy* made a difference to strategy satisfaction (section F on page 187 from 8.3.2.2). This effect was driven by the first measurement only. Now, *Choice* is a variable whose values in themselves are not of interest at all. The study was created such that participants were presented with a vignette describing a situation a student might encounter. The two options (meet friends/work on application) turned out to be relatively balanced as indicated by the results from the Situational Eight DIAMONDS Scale, cf. section B.a on page 198 from 8.3.2.4. Yet, there was no specific research interest tied to the question whether choosing a social option (meet friends) or an options linked to duty (work on application) would lead to more or less satisfaction with the decision strategy that led to choosing that option. However, this is exactly the result we got: in combination with *Decision Strategy* the option chosen makes a difference to strategy satisfaction: People who chose their friends were happier with the "by principle" strategy and people who chose their application were happier with the "by reasons" strategy (cf. Figure B.7 on page 597 within the Appendix, first measurement point).

Now, we might ask: is choosing sociality over duty or duty over sociality maybe a matter of personality or at least attitude – thus dependent on (relatively stable) personal characteristics? Is maybe preferring one or the other decision strategy a matter of personality, too? If both were the case, it might simply be such that the same people that like to be social also prefer to decide by principle and those that like to fulfill duties prefer to decide by reasons. If we suppose that respecting duty is correlated with anal character trades[595], which again include a nag for rational considerations, and if we suppose that deciding by reasons as instructed in this study (namely weighing pros and cons) has a more rational air to it than deciding by principle (just giving oneself a rule), then this idea – that the interaction we see is based on personality – is not so far off. Another point in favor of this idea is the fact that much fewer participants chose duty (namely only 36%, i.e. about one third of participants) than sociality (which was chosen by 64% of participants, cf. section A on page 183 from 8.3.2.2). This corresponds to the prejudice about students that most of them do not hold duty in the highest regard.[596]

This study does not enable us to find out whether personality, and which aspects of it, might have contributed to the given results. However, in the following section we will refine the results by means of the Decision Style Questionnaire (DSQ).

[Jump back to main: 8.4.1 on page 201.]

[594] Remember that there were two post-outcome measures of satisfaction, namely the *Mood* variables and the Strategy Satisfaction Questionnaire (SSQ) that H1.2 referred to.

[595] This concept is not at all outdated, cf. e.g. Haslam (2011)

[596] Last, it is also important to remember that participants' freedom to choose one or the other option (meet friends/work on application) led to much differing cell sizes. Where possible, it was accounted for that by choosing robust statistical procedures (e.g. Type III SSq in ANOVA). Yet, it is possible that more uniform cell sizes might have led to slightly differing significances. Therefore, it is reasonable to consider the descriptive patterns as well.

C Questionnaires

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Main Table of Contents

C.1 Strategy Satisfaction Questionnaire (SSQ)

[Jump back to main.]

C.1.1 Addenda to *Results*

C.1.1.1 Steps Towards the Final Factoring Solution of the SSQ⇑

A Factor Structure – Complete Data Set A maximum-likelihood factor analysis with *promax* rotation for three factors was run with the complete data set. This was up for some surprise: The *chi-squared test* that three factors are sufficient nearly rejected the three-factor solution with ($\chi^2(33) = 46.5$, $p = 0.059$); cumulative variance explained was only 44%. Furthermore, the resulting factors seemed difficult to interpret. Therefore, additionally a few other factoring solutions were tested. Here is an overview:

1 factor $\chi^2(54) = 129.4$, $p < 0.001$; cumulative variance explained: 37%

2 factors $\chi^2(43) = 69.9$, $p = 0.006$; cumulative variance explained: 48%

3 factors $\chi^2(33) = 46.5$, $p = 0.059$; cumulative variance explained: 44%(!)

4 factors $\chi^2(24) = 19.9$, $p = 0.702$; cumulative variance explained: 60%

5 factors $\chi^2(16) = 9.9$, $p = 0.870$; cumulative variance explained: 60%

The obvious choice is to use a four-factor solution. Still, the item to factor allocation as based on semantic criteria is not trivial here, too. Therefore, I will propose two versions as displayed in Table C.1. Before that, I will explain the rationale behind the item to factor allocations (cf. section A.a) which will then be presented in the following (cf. section A.b and Table C.1).

A.a Rationale for Item to Factor Allocations The decision to allocate items to factors was made based on (i) loadings, (ii) semantic criteria, (iii) reliability of item sets (factors) in terms of *Cronbach's alpha*. Some explanations regarding (iii): I started a back and forth process between item allocation and reliability analyses – with the aim to maximize *Cronbach's alpha* for all scales (factors), while having none of the scales fall below $\alpha < 0.7$. See section D.b for the detailed results from reliability analyses.

Table C.1 Two versions of item to factor allocation on the basis of four factors of the Strategy Satisfaction Questionnaire (SSQ) complete data set.

	Loadings to Factor Allocation Version 1				Loadings to Factor Allocation Version 2			
Item #	Factor 1 Decision Strategy Satisfaction	Factor 2 Cognitive Process Satisfaction	Factor 3 Choice Option Satisfaction	Factor 4 Affective Process Satisfaction	Factor 1 Decision Strategy Satisfaction I	Factor 2 Decision Strategy Satisfaction II	Factor 3 Choice Option Satisfaction	Factor 4 Affective Process Satisfaction
1		0.79		**1.00**		**0.79**		1.00
2	**0.87**				**0.87**			
3	**0.64**				**0.64**			
4	**0.65**				**0.65**			
5				**-0.45**				**-0.45**
6			**1.05**				**1.05**	
7	0.34	0.23	**0.32**		0.34	**0.23**	0.32	
8		0.50	**0.49**			0.50	**0.49**	
9		**0.58**				**0.58**		
10	**0.77**				**0.77**			
11	**0.53**	0.35			0.53	**0.35**		
12		0.27		**0.46**		**0.27**		0.46

Note. The cut-off for the display of loadings was set to 0.2; all loadings were rounded to two digits. Loadings in bold font signify their attribution to the respective factor. Grey background in the item number column signifies differences in item attribution between the two versions. Weak factors (in terms of number of attributed items) are set to normal font with grey background in the header (second row) of the table. Please note that the naming of factors may remain basically the same as for the two separate versions.

A.b Comparison of two Versions of Item to Factor Allocations

Version 1 Version 1 is the conventional version: items were allocated to factors in virtue of their highest loading – with only two minor exceptions, namely item #7 and item #8. However, the difference between the respective loadings was negligible with 0.01 (item 8) and 0.02 (item 7), and the chosen allocation made sense semantically. Version 1 yields three strong enough factors and one one-item factor (Factor 2) which will thus be dropped. For a decription of the allocation process, see below (section A.a).

Version 2 Version 2 is the attempt to strengthen Factor 2 which does gather six loadings > 0.2 that are well interpretable as a set of items. Unconventional allocation decisions were thus made in case of item #1, item #7, item #11, and item #12. Version 2, too, yields three strong enough factors and one one-item factor (Factor 4) which will be dropped respectively. (For a decription of the allocation process, see below (section A.a).)

A.c Revisited: What about a three-factor solution? In section D I argued against a three-factor solution based on a mediocre cumulative variance explained of 44% (as opposed to 60% with four factors), and a just-so non-significant *chi-squared test*. Yet, in the light of Table C.1, where both versions end up with only three factors due to having one factor each which comprises of only one item, the question arises: why not give it another try? Therefore, a quick look at the three-factor solution.

Table C.2 A three-factor solution (Version 3) for the Strategy Satisfaction Questionnaire (SSQ).

	Loadings to Factor Allocation Version 3		
Item #	Factor 1 Decision Strategy SatisfactionI	Factor 2 Decision Strategy SatisfactionII	Factor 3 Choice Option Satisfaction
1	0.49	**0.38**	
2	**0.53**	0.32	
3	0.52	**0.44**	
4	**0.67**		
5	**-0.45**		
6			**1.01**
7	0.26	**0.36**	0.29
8		0.51	**0.50**
9		**0.59**	
10	**0.52**	0.33	
11	0.40	**0.53**	
12	**0.43**		

Note. The cut-off for the display of loadings was set to 0.2; all loadings were rounded to two digits. Loadings in bold font signify their attribution to the respective factor. Please note that the naming of factors is exactly the same as in Version 2 in Table C.1.

The allocation of items in the above three-factor solution (Version 3), too, was based on the rationale pointed out in section A.a above. The naming of factors is identical to that of Version 2 above (cf. Table C.1). In fact, Version 2 and the three-factor solution (Version 3) are very similar: only two items, namely item #3 and item #12, are switched between Factor 2 and Factor 1.

Table C.3 Comparison of scales resulting from the Strategy Satisfaction Questionnaire (SSQ).

	Version 1 (4 factors)	Version 2 (4 factors)	Version 3 (3 factors)
		Factor 1	
Total number of items	5	4	4 (+ 1 item dropped)
Items #	#2, #3, #4, #10, #11	#2, #3, #4, #10	#2, #4, (#5), #10, #12
Dropped items	none	none	#5
Dropped factor (y/n)	n	n	n
Alpha	0.84	0.81	0.75
Alpha with dropped item	not applicable	not applicable	0.72
		Factor 2	
Total number of items	1	5	5
Items #	#9	#1, #7, #9, #11, #12	#1, #3, #7, #9, #11
Dropped items	none	none	none
Dropped factor (y/n)	y	n	n
Alpha	not applicable	0.76	0.79
Alpha with dropped item	not applicable	not applicable	not applicable
		Factor 3	
Total number of items	3	2	2
Items #	#6, #7, #8	#6, #8	#6, #8
Dropped items	none	none	none
Dropped factor (y/n)	n	n	n
Alpha	0.76	0.74	0.74
Alpha with dropped item	not applicable	not applicable	not applicable
		Factor 4	
Total number of items	2 (+ 1 item dropped)	1	not applicable
Items #	#1, (#5), #12	#5	not applicable
Dropped items	#5	none	not applicable
Dropped factor (y/n)	n	y	not applicable
Alpha	0.70	not applicable	not applicable
Alpha with dropped item	0.65	not applicable	not applicable
		Overall Statistics	
Total number of dropped items	1 (#5)	none	1 (#5)
Total number of dropped factors (with item #)	1 (with item #9)	1 (with item #5)	none
Number of items remaining	10	11	11
All Alphas	0.84, 0.76, 0.70	0.81, 0.76, 0.74	0.75, 0.79, 0.74
Mean Alpha	0.77	0.77	0.76
Alpha sum after decimal point	230	231	228

A.d Comparison of the Three Versions Cf. Table C.3 for a comparison of all three versions. Looking at the *Overall Statistics* in the lowest chunk of the table reveals that the three factoring solutions are very similar in terms of (i) number of factors (all retain three factors), (ii) mean alpha (0.76-0.77), (iii) troublesome items (item #5). The slightly superior version seems to be Version 2, since on the one hand Version 3

(right column) has a lower mean alpha and Version 1 (left column) leads to the loss of one additional item.

A.e Interim Summary The MSA for the complete data set suggested that the sample was factorable ($MSA = 0.85$), cf. section A. Parallel analysis suggested a three-factor solution (cf. section B) for the complete data set as well as the separate questionnaire versions (cf. section C), but based on the cumulative variance explained, a four-factor solution was chosen (with 60% variance explained, cf. section D). On the basis of re-iterating reliability analyses as the basis for item to factor allocation (cf. section A.a) only three factors remained (cf. section A.b), which were again compared to an *a priori* three-factor solution (cf. section A.c). Comparing all three versions, Version 2 showed a very slight advantage (cf. section A.d).

A.f Reanalysis Version 2 as well as Version 3 led to the exclusion of item #5; Version 1 additionally led to the exclusion of item #9. Therefore, the EFA (ML, promax) was re-run (i) without item #5 and (ii) without both items #5 and #9, specifying the extraction of three factors.

(i) Three factors are sufficient ($\chi^2(25) = 31.5$, $p = 0.174$), two factors would not have been ($\chi^2(34) = 49.8$, $p = 0.039$). Cumulative variance explained at three factors is 49%.

(ii) Three factors are sufficient ($\chi^2(18) = 20.4$, $p = 0.313$), two factors would just-so have been ($\chi^2(26) = 38.4$, $p = 0.056$). Cumulative variance explained is 61% at three factors and 53% at two factors.

Thus based on cumulative variance explained, number (ii) with three factors was chosen as the final factoring solution.[597]

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B Best Single Scale – SSQ-S⇑ In an exploratory manner I went looking for the best single scale questionnaire out of the SSQ items. Starting out with the complete 12-item questionnaire (combined data set), I used the statistic "reliability if an item is dropped" to successively reduce items, but maintain the highest possible reliability (internal consistency). The original 12-item version had an $\alpha = 0.86$, dropping item #5 yielded a yet higher internal consistency of $\alpha = 0.87$. Trying various orders in successively dropping items, the highest number of items that could be dropped with the internal consistency remaining at $\alpha = 0.87$ was four items (#9, #8, #6, and #12), yielding a 7-item scale. Additionally dropping item #7 yielded a 6-item scale with $\alpha = 0.86$.

A subsequent factor analysis (ML, promax) on the remaining 6 items allowed a one-factor solution ($\chi^2(9) = 15.2$, $p = 0.087$, proportion of variance explained: 52%) or a two-factor solution ($\chi^2(4) = 5.2$, $p = 0.267$, cumulative variance explained: 61%). Interestingly, the two-factor solution afforded only item #1 to the second factor. The

[597] This final solution (Version 4) turns out to be equivalent to Version 1 (cf. section A.b). Note that Versions 1-3 are only reported here in the Appendix, cf. section A.

other 5 items (with loadings between 0.55 and 0.91) yielded $\alpha = 0.84$ for the first factor and corrected item total correlations between $r = 0.63$ and $r = 0.67$. A re-run factor analysis (ML, promax) without item #1 confirmed the one-factor solution ($\chi^2(5) = 5.1$, $p = 0.399$), and the proportion of variance explained was 52%.

Therefore, the best single-scale version of the SSQ, thus named the SSQ-S, would consist of the following five items: (#2) "In everyday life, I would use the same decision strategy.", (#3) "I am satisfied that as a first step I thought about reasons for and against the options." / "I am satisfied that as a first step I thought about a principle or a (life) maxim.", (#4) "I am satisfied that I used the reasons for and against the options as the basis for the decision." / "I am satisfied that I used the principle / the (life) maxim as the basis for the decision.", (#10) "I am confident that the decision strategy I was instructed to use generally leads to good decisions.", and (#11) "The decision strategy I was instructed to use fits my values and opinions.".

These are exactly the same five items that make up Factor 1 of the final SSQ (cf. sections D.a, D.b, and Table 9.3).

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C Best Set of General Items for Future Research – SSQ-G⇑ Among the specific items there are on the one hand those three items (items #3, #4, and #5) that constitute the difference between the two questionnaire versions (cf. section 9.1.2.1 ff.) in that they very specifically refer to "deciding by reasons" or "deciding by principle". On the other hand, there are two more rather specific items, namely item #6 ("The two choice options in the scenario were sufficient to make a good decision."), and (less clearly so) item #7 ("I was satisfied with choosing an option according to a given procedure."). These five items in total were excluded from the following analyses in virtue of being hard to adapt to future research possibly dealing with different decision strategies or doing so differently. – Five of the remaining seven items refer unspecifically to *decision strategy* (items #1, #2, #10, #11, #12). Two items, item #8 ("I liked the options available.") and item #9 ("I found the decision-making process interesting."), refer unspecifically to other aspects.

First, a factor analysis (ML, promax) was initiated for all seven unspecific items. The MSA for these 7 unspecific items was $MSA = 0.81$. Parallel analysis suggested 1 factor. However, the *chi-squared test* that one factor is sufficient rejected the one-factor solution ($\chi^2(14) = 30.8$, $p = 0.006$), but a two-factor solution was sufficient ($\chi^2(8) = 8.0$, $p = 0.436$). Cumulative variance explained at the two-factor solution was 49%. Reliability (internal consistency) of the total scale was $\alpha = 0.80$. Cf. Table C.4a (left) for loadings to factor allocations, as well as reliability statistics. Here, item statistics confirm, as speculated above, that items #8 and #9 do differ viably from the other items. Therefore, another solution without items #8 and #9 was tested.

Table C.4 Two factoring solutions for a set of unspecific items of the Strategy Satisfaction Questionnaire (SSQ) suitable for future research.

(a) Factoring solution for the 7-item scale.

	Loadings to Factor Allocation	
Item #	Factor 1	Factor 2
1		1.06
2	0.86	
8		0.39
9	0.24	
10	0.75	
11	0.68	
12		0.50
Cronbach's α	0.73	0.67
Item Total Correlations	0.32-0.66	0.38-0.64
Higher α if an item dropped	0.78, item #9	0.70, item #8

(b) Factoring solution for the 5-item scale.

	Loadings to Factor Allocation	
Item #	Factor 1	Factor 2
1		1.04
2	0.88	
8	--	--
9	--	--
10	0.71	
11	0.61	
12		0.48
Cronbach's α	0.78	0.70
Item Total Correlations	0.61-0.64	0.54-0.54
Higher α if an item dropped	no	no

Note. The cut-off for the display of loadings was set to 0.2; all loadings were rounded to two digits.

The MSA for the reduced version with 5 items was $MSA = 0.78$. Parallel analysis for these 5 items suggested 1 factor. However, the *chi-squared test* that one factor is sufficient again rejected the one-factor solution ($\chi^2(5) = 19.1$, $p = 0.002$), but a two-factor solution was sufficient ($\chi^2(1) = 0.6$, $p = 0.442$). Cumulative variance explained at the two-factor solution was 61%. Reliability (internal consistency) of the total scale was $\alpha = 0.81$. Cf. Table C.4b (right) for loadings to factor allocations, as well as reliability statistics. As expected, this 5-item scale is the better solution.

Thus, the best set of general items for future research, named the SSQ-G, contains the five items #1, #2, #10, #11, #12. These items form a two-factor solution, where Factor 1 (items #2, #10, #11) refers to a more pragmatic aspect of personal decision making, whereas Factor 2 (items #1, #12) rather refers to an overall evaluation of the decision strategy. Thus, Factor 1 was labeled "Personal Evaluation (of Strategy Satisfaction)", and Factor 2 was labeled "Overall Evaluation (of Strategy Satisfaction)".

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C.2 Decision Categorization Scales (DCSs)

[Jump back to main.]

C.2.1 Addenda to *Materials*

C.2.1.1 The 14BiPole-Value Questionnaire: German Original⇑

Figure C.1 displays the original German 14BiPole-Value Questionnaire.

Persönliche Werte

Im Folgenden sind je 14 Werte einander gegenübergestellt. Die Paare bilden oft nicht wirklich Gegensätze, manchmal sind sie eher im übertragenen Sinne zu verstehen. Bitte setzen Sie pro Zeile je ein Kreuz auf eine Zahl in Richtung des Werts, der eher Ihrem persönlichen Ideal entspricht:
„*Ich will mich eher orientieren an.....*“

GLEICHHEIT (gleiche Chancen für alle)	2 - 1 - 0 - 1 - 2	AUTORITÄT (das Recht zu führen und zu bestimmen)
SOZIALE MACHT (Kontrolle über andere, Dominanz)	2 - 1 - 0 - 1 - 2	SOZIALE GERECHTIGKEIT (Ungerechtigkeiten beseitigen, sich um die Schwachen kümmern)
SOZIALE ORDNUNG (Stabilität der Gesellschaft)	2 - 1 - 0 - 1 - 2	EIN ANREGENDES LEBEN (anregende Erfahrungen)
REICHTUM (materieller Besitz, Geld)	2 - 1 - 0 - 1 - 2	EINHEIT MIT DER NATUR (Einpassung in die Natur)
HÖFLICHKEIT (gute Umgangsformen)	2 - 1 - 0 - 1 - 2	KREATIVITÄT (Originalität, Phantasie)
VERGNÜGEN (Erfüllung von Wünschen)	2 - 1 - 0 - 1 - 2	EINE WELT IN FRIEDEN (frei von Krieg und Konflikt)
TOLERANT (gegenüber verschiedenen Ideen und Überzeugungen)	2 - 1 - 0 - 1 - 2	IN DER ÖFFENTLICHKEIT ANSEHEN BEWAHREN (das Gesicht wahren)
DEMÜTIG (bescheiden, selbstlos)	2 - 1 - 0 - 1 - 2	EINFLUßREICH (Einfluß auf Menschen u. Ereignisse ausüben)
EHRLICH (echt, aufrichtig)	2 - 1 - 0 - 1 - 2	ERFOLGREICH (Ziele erreichen)
DAS LEBEN GENIEßEN (Freude an Essen, Erotik, Vergnügungen usw)	2 - 1 - 0 - 1 - 2	FROMM (religiöse Glaubensinhalte annehmen)
ACHTUNG VOR DER TRADITION (Erhaltung altehrwürdiger Sitten)	2 - 1 - 0 - 1 - 2	EIN ABWECHSLUNGSREICHES LEBEN (erfüllt mit Herausforder-ungen, Neuem u. Veränderungen)
WAGEMUTIG (Abenteuer und Risiko suchen)	2 - 1 - 0 - 1 - 2	GEHORSAM (Pflichten erfüllen)
EIGENE ZIELE WÄHLEN (eigene Absichten verfolgen)	2 - 1 - 0 - 1 - 2	EHRERBIETIG GEGENÜBER ELTERN UND ÄLTEREN MENSCHEN (respektvoll)
WELTOFFEN (kosmopolitische Orientierung, die Vielfalt lieben)	2 - 1 - 0 - 1 - 2	KONTROLLE ÜBER UNSICHERHEITEN (die Dinge in der Hand behalten)

Figure C.1 German original of the 14BiPole-Value Questionnaire.

C.2.2 Addenda to *Results*

C.2.2.1 Alternative Factor Analyses of the Characteristics of Decision Situations Scale⇑

A Further Factoring Solutions As described in footnote 381 from section A in 9.3.2.3 there were several attempts made to stick with the best practice criteria for factor analysis from section A in 9.2.2.1 – to the effect that the questionnaire (nearly) eradicated itself. However, the results of these attempts – especially when looked at in combination – are still interesting not only from a methodological point of view, but also as regards content. Thus the procedures followed and results obtained of these previous factoring attempts will be outlined here:

A.a First Attempt Criteria were applied as outlined in section A in 9.2.2.1. After each round of deletions, a new EFA was conducted, but items with loadings $<.3$ were only deleted in the very last round, which is a slight deviation from the procedure. The fifth and last (pre-final) factoring solution included 17 items on 4 factors (with {5, 5, 2, 5} items), cumulative variance explained was 46%. After scale-length optimization, 10 items remained. Below is a list of the four factors, their respective labels, and their properties:

Factor 1: *Difficulty*, 4 items, $\alpha = 0.79$, $r_{int-it} = 0.51 - 0.69$.[598]

- Weighing desired and undesired possible consequences of the decision was difficult. (CD-06)
- I felt that my uncertainty in making the decision was great. (CD-21)
- The decision was difficult. (CD-31)
- I experienced the decision situation as a conflict. (CD-32)

Factor 2: *Clarity*, 2 items, $\alpha = 0.73$, $r_{int-it} = 0.58$.

- When making the decision, my goals were clear to me. (CD-08)
- My goals were concrete (not abstract). (CD-10)

Factor 3: *Duration*, 2 items, $\alpha = 0.85$, $r_{int-it} = 0.75$.

- The decision-making process took a long time. (CD-28)
- The process of deliberation and decision-making was fast. (CD-36)

Factor 4: *Magnitude*, 2 items, $\alpha = 0.68$, $r_{int-it} = 0.51$.

- The decision had a variety of consequences. (CD-02)
- The consequences of the decision were of high importance. (CD-07)

[598] Remember: The index "int-it" denominates "item total correlations" in case of several items. In case of a factor with only two items the item total correlation of both items is identical to the inter-item correlation – which, of course, is identical to their simple correlation.

According to the criteria from section A in 9.2.2.1 factors with two items that correlate with $< .7$ shall be deleted – which would apply to Factor 2 (Clarity) and Factor 4 (Magnitude), but not Factor 3 (Duration). Nevertheless, an EFA on all four factors (10 items) completely confirmed factor structure, cumulative variance explained was 66%. An EFA on the two-factor solution comprising 6 items also completely confirmed factor structure, cumulative variance explained here was 57%.

A.b Second Attempt In the second attempt I followed the guidelines from section A in 9.2.2.1 even more closely in that I (i) strictly followed the sequence "delete factors with < 3 items", "delete items with loadings $<.32$", "delete crossloading items", (ii) performed a new EFA after each step (i.e.: the deletion process was conducted successively instead of simultaneously per EFA), and (iii) in the last step also deleted items with communalities $<.4$. The eleventh factoring solution after applying the communality criterion included 7 items on 3 factors ({3,2,2}), cumulative variance explained was 67%:

Factor 1: *Magnitude*, 3 items, $\alpha = 0.8$, $r_{int-it} = 0.60 - 0.69$.

- The decision had a variety of consequences. (CD-02)
- The consequences of the decision had a long-term impact. (CD-03)
- The consequences of the decision were of high importance. (CD-07)

Factor 2: *Difficulty*, 2 items, $\alpha = 0.74$, $r_{int-it} = 0.59$.

- Weighing desired and undesired possible consequences of the decision was difficult. (CD-06)
- The decision was difficult. (CD-31)

Factor 3: *Clarity*, 2 items, $\alpha = 0.73$, $r_{int-it} = 0.58$.

- When making the decision, my goals were clear to me. (CD-08)
- My goals were concrete (not abstract). (CD-10)

Again, according to the guidelines from section A in 9.2.2.1 Factor 2 (Difficulty) and Factor 3 (Clarity) should be deleted due to their items' correlations being $<.7$. Thus, only Factor 1 (Magnitude) with three items remains, reliability is as reported above, and the proportion of variance explained is 58%.

A.c Third Attempt In the third attempt, again, I strictly followed the guidelines from section A in 9.2.2.1, but this time I performed the deletion process simultaneously instead of successively, but communalities $<.4$ again were deleted only in the last step. After deleting the respective items, in the seventh data set 4 items remained and parallel analysis suggested 2 factors. However, stats::factanal refused to allocate 4 items to two factors ("Error [...]: 2 factors are too many for 4 variables"). Therefore, scale-length optimization was performed on the previous, sixth factoring solution which included 7 items on 2 factors, cumulative variance explained was 42%. The identical 4 items resulted:

Factor 1: *Clarity*, 2 items, $\alpha = 0.73$, $r_{int-it} = 0.58$.

- When making the decision, my goals were clear to me. (CD-08)
- My goals were concrete (not abstract). (CD-10)

Factor 2: *Difficulty*, 2 items, $\alpha = 0.74$, $r_{int-it} = 0.59$.

- Weighing desired and undesired possible consequences of the decision was difficult. (CD-06)
- The decision was difficult. (CD-31)

According to the guidelines from section A in 9.2.2.1 both factors should be deleted – leaving 0 items on 0 factors.

A.d Comparison of all Versions Cf. Table C.5 for a comparison of the three attempts with the main version.

Table C.5 Comparison of the main version of the Characteristics of Decision Situations Scale to the previous factoring attempts.

	# of Factors	# of Items	Cum. Variance Expl.	Names of Factors	Difference to Main Version (Items)
Main Version	6	14	65%	1 - Difficulty (21, 31, 32) 2 - Duration (28, 35, 36) 3 - Predictability (19, 20) 4 - Control (1, 23) 5 - Clarity (8, 10) 6 - Significance (26, 29)	--
Attempt 1 a	4	10	66%	- Difficulty (6, 21, 31, 32) - Duration (28, 36) - Clarity (8,10) - Magnitude (2, 7)	- plus redundant item #6 - minus non-redundant item #35 - identical items - altogether different factor
1 b	2	6	57%	- Difficulty, - Duration	--
Attempt 2 a	3	7	67%	- Difficulty (6, 31) - Clarity (8, 10) - Magnitude (2, 3, 7)	- plus item #6, minus items #21 and #32 → includes only the two redundant items - identical items - altogether different factor → compared to 1st Attempt: plus item #3
2 b	1	3	58%	- Magnitude	--
Attempt 3 a	2	4	n.a.	- Difficulty (6, 31) - Clarity (8, 10)	- factor identical to Attempt 2a - factor identical to Attempt 2a
3 b	0	0	--	--	--

Note. The numbered factors of the Main Version are listed in the order they were reported, the factors from the three attempts are listed according to that order and are therefore not numbered. For reasons of space, all items are referenced without prefix ("CD-"). The list of items can be found in Table 9.23 on page 269 from section 9.3.1.2. The b-version of each attempt is the version where after scale-length optimization factors with two items that correlated with $r < .7$ were deleted; the a-version includes these factors.

Attempts 1-3 strictly applied the criteria from section A in 9.2.2.1, the differences in their applications were reported above. The stricter the application of the criteria, the more items and factors got deleted – up to the deletion of the whole questionnaire in Attempt 3b.

There are notable similarities between the Main Version and the three attempts: The factors "Difficulty", "Duration" and "Clarity" repeatedly emerged with identical or similar item combinations. "Clarity" always comprised the same two items, and "Difficulty" and "Duration" tended to each shrink to two very redundant items. It is likely simply due to that redundancy that these factors repeatedly came out strong.

A new and interesting factor is the factor "Magnitude" that is not part of the Main Version, nor is any of its items. This factor could also have been labeled "Significance"

– as is the 6th factor of the Main Version – but its perspective is notably different: This factor is about a decision having a variety of consequences that have a long-term impact and are of high importance, whereas the factor "Significance" is about a decision that is unique and important. The word *consequences* is part of every item in "Magnitude" but of none in "Significance".

A.e What to do with these additional versions? While the cumulative variance explained by the a-versions is even a little higher than that of the Main Version, I would not recommend using these versions – simply because there is much more redundancy in their set of items, which is flagged in Table C.5. Yet, the new factor "Magnitude" is interesting, which is why I conducted another factor analysis based on the Main Version plus "Magnitude" (3 items) as a 7th factor. This factor analysis is reported in the following paragraph.

A.f Main Version plus "Magnitude" Parallel analysis suggested 5 factors, but the factor analysis was set to 7 factors. The resulting factoring solution confirmed the previous factor structure with only one exception: item #CD-08 ("When making the decision, my goals were clear to me.") now loaded more highly on Factor 6 (Significance) than Factor 5 (Clarity). This item was nevertheless assigned as before. The new Factor 7 (Magnitude) came out perfectly – and even showed the highest Cronbach's alpha ($\alpha = 0.80$) of all factors. Cumulative variance explained for this 7-factor solution including 17 items was 69%. Cf. Table C.6 for the new loadings as compared to the old loadings.

Table C.6 Factoring solution with "magnitude" as a 7th factor.

#	Item Wording (English transl.)	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
CD-01	The consequences of the decision were strongly influenced by factors over which I had no control.				**0.81** ***(0.45)***			
CD-02	The decision had a variety of consequences.			-0.24 *(--)*				**0.74** *(--)*
CD-03	The consequences of the decision had a long-term impact.						0.36 *(--)*	**0.90** *(--)*
CD-07	The consequences of the decision were of high importance.			0.29 *(--)*				**0.86** *(--)*
CD-08	When making the decision, my goals were clear to me.					**0.36** ***(0.42)***	0.46 *(0.32)*	
CD-10	My goals were concrete (not abstract).					**1.04** ***(1.04)***		
CD-19	The possible consequences of the options were known.			**0.97** ***(0.65)***				0.22 *(--)*
CD-20	The probability of the consequences occurring could be estimated.			**0.75** ***(1.04)***				
CD-21	I felt that my uncertainty in making the decision was great.	**0.52** ***(0.64)***						
CD-23	The uncertainty referred to external causes, i.e. a lack of information about the world.				**0.44** ***(1.02)***	-- *(-0.25)*		0.21 *(--)*
CD-26	The decision was unique, i.e. the decision situation would not be repeated.						**0.66** ***(0.75)***	
CD-28	The decision-making process took a long time.		**0.85** ***(0.86)***					
CD-29	The decision was very important.						**0.77** ***(0.70)***	0.42 *(--)*
CD-31	The decision was difficult.	**1.05** ***(0.73)***	-- *(0.20)*				0.22 *(--)*	
CD-32	I experienced the decision situation as a conflict.	**0.52** ***(0.77)***				0.21 *(0.28)*		
CD-35	The process of deliberation and decision-making was largely deliberate.	-- *(-0.21)*	**0.41** ***(0.42)***	-- *(0.22)*			0.25 *(--)*	
CD-36	The process of deliberation and decision-making was fast.		**-0.86** ***(-0.87)***					
--	**Cronbach's Alpha**	**0.74** (3 items)	**0.72** (3 items)	**0.78** (2 items)	**0.60** (2 items)	**0.73** (2 items)	**0.64** (2 items)	**0.80** ***(--)*** (3 items)

Note. The new items #CD-02, #CD-03, and #CD-07 are displayed on grey background. The cut-off for loadings was set to 0.2. The old loadings from the previous 6-factor solution without the factor "Magnitude" are given in parentheses and italicized below the new loadings from the present factoring solution. Allocation to a factor is indicated by bold font. The one item to factor allocation that is not warranted by the respective loadings is marked by a dotted frame (item #CD-08).

B Discussion On two criteria this 7-factor solution is superior to the 6-factor solution of the Main Version: cumulative variance explained is at 69% (as opposed to 65%), and the additional factor shows high reliability (higher than any of the old factors) and is based on a semantically sound and interesting item set. If one wanted to follow up on this version one could (a) look at where a 5-factor solution that parallel analysis suggested for these 17 items would lead to – although it would likely lead to another reductionist outcome as referred to in section A, (b) try deleting the two factors with reliabilities <.7, namely Factor 4 (Control) and Factor 6 (Significance), (c) take the loading of item #CD-08 seriously, which would leave Factor 5 (Clarity) with only one item and thus up for deletion itself, or (d) combine [b] and [c], i.e. delete Factors 4, 5 , and 6 – which would likely lead to a quite strong factoring result with Factors 1, 2, 3, and 7, covering "Difficulty", "Duration", "Predictability" and "Magnitude". However, I will not follow up on any of these points here.

Because there is one problem: as much as I'd like to recommend using this 7-factor version (from now on dubbed: "Version Magnitude"), it is almost impossible to justify where it came from – because it did not come from a single reiterative process of EFA and item deletion, but from a combination of distinct factoring attempts.

Also there is to wonder – if Factor 7 (Magnitude) showed such good properties in the end – where and why did its items get deleted in the process leading to the Main Version?[599] The answer is, items #CD-03 and #CD-07 got deleted right after the first EFA, because they showed high and close crossloadings (#CD-03: 0.63, 0.53, 0.24; #CD-07: 0.52, 0.43, 0.27), while #CD-02 got deleted after the third EFA also due to crossloadings, in this case low, but close (#CD-02: -0.29, 0.28, 0.21).

Furthermore, as delineated in the foregoing section A, the procedures followed in Attempts 1-3 were not all that different from each other, but the results differed – and even more so when compared to the Main Version. Yes, there were notable similarities and it is well-known that factor analysis is not an objective technique, but the relatively large extent of difference in results as compared to the relatively small extent of difference in procedure does point once more to the supposition that the original set of 36 items is not well-suited for factor analysis (cf. section A in 9.3.2.3).

On the other hand, the factors that did emerge – including "Magnitude" – seem to cover a range of psychologically important aspects when characterizing a decision and it might be worthwhile to follow up on them – by creating (better phrased!) items that are meant to cover these aspects.

C.2.2.2 The 14BiPole-Value Questionnaire: Same content domain, same values?⇑

Are decision situations coded to belong to the same content domain also rated as similar regarding the values perceived to be present in these situations? This question will be exemplarily answered regarding Code #1, "Studies yes/no".

[599] Remember that the criteria for item deletion leading up to the Main Version had been delimited precisely in section A in 9.3.2.3.

Figure C.2 displays the $n = 8$ decision situations coded #1 "Studies yes/no" within the theoretical model of the Schwartz Value Circle with its ten motivational types.

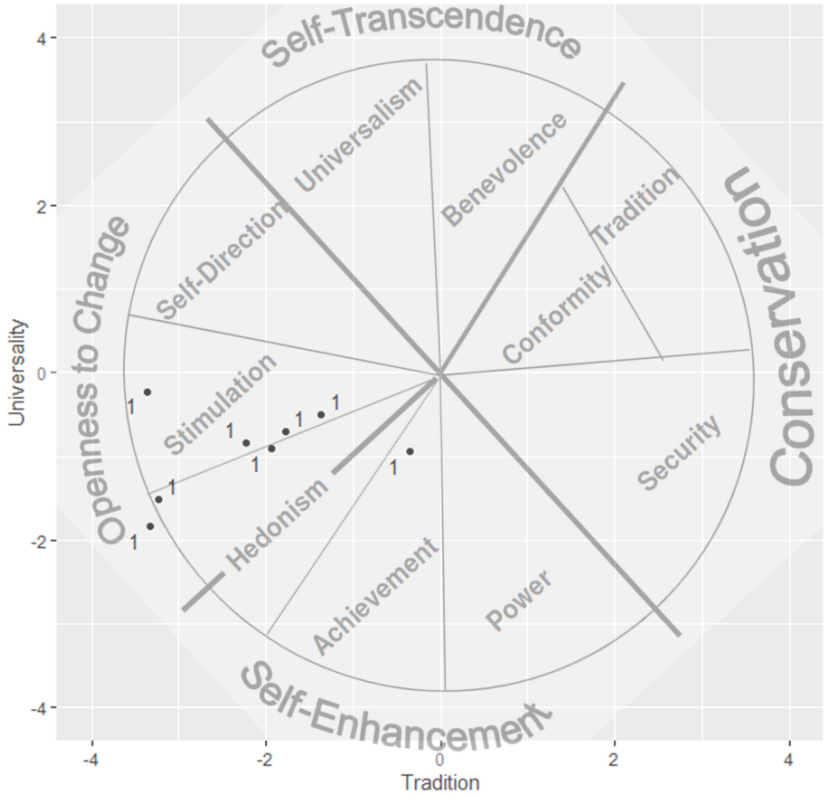


Figure C.2 Scatterplot of the eight decision situations coded #1 within the theoretical model of the Schwartz Value Circle.

Looking at Figure C.2 the question whether the decision situations coded #1 "Studies yes/no" are similar within the Schwartz Value Circle, too, is not that easily answered. On the one hand, the eight data points are rather spread out.[600] On the other hand, all but one of the data points are located in the same two wedges, namely the motivational types "Stimulation" and "Hedonism". Six of the eight data points do even seem to lie on one straight line, that is: they seem to belong to exactly the same motivational dimension, just to varying degrees. Therefore, based on the theoretical model, the eight decision situations coded #1 "Studies yes/no" are more similar than not as regards their value structure.

However, please be aware that (i) this is only one out of 21 coded collegiate decision content domains, (ii) the sample of $n = 8$ decision situations is minuscule, (iii) the interpretation is based on visual inspection only, and (iv) the allocation of the theoretical ten motivational types is not exact. Therefore, this really is only an exemplary look at the question "are there similarities in values when there are similarities in content

[600] Their coordinates are: (−1.365, −0.492), (−3.369, −0.222), (−3.241, −1.514), (−1.944, −0.908), (−0.358, −0.935), (−3.335, −1.837), (−2.232, −0.838), (−1.780, −0.703).

domain?" – which can neither be generalized to the remaining 20 collegiate decision situations nor can it be generalized to other domain taxonomies.

In order to get a better grasp of these eight decisions, cf. Table C.7 reporting their original wording in German as well as an English translation and their coordinates.

Table C.7 The eight decision situations coded #1 "Studies yes/no", and their coordinates.

#	Original in German	English Translation	Coordinates (x, y)
1	Ich musste mich nach meiner dreijährigen Schauspielausbildung entscheiden ob ich ein Studium in Kulturwissenschaften beginne oder nicht.	After my three-year acting training, I had to decide whether or not to begin a degree in cultural studies.	(-1.365, -0.492)
2	Nach meinem Bachelor, den ich berufsbegleitend als Fernstudium absolvierte, stand ich vor der Entscheidung, meinen Job stark zu reduzieren, um noch den Master als Vollzeitstudium anzustreben, verbunden mit einem kompletten Wohnort-Wechsel und Aufgabe des Umfelds. Damals entschied ich mich für diesen Schritt, worüber ich heute sehr dankbar bin.	After my bachelor's degree, which I completed part-time as a distance learning program, I was faced with the decision to greatly reduce my job in order to further pursue a master's degree as a full-time study, combined with a complete change of residence and abandonment of the environment. At that time I decided to take this step, which I am very grateful for today.	(-3.369, -0.222)
3	Nach dem Abitur bin ich für drei Monate nach Amerika gegangen und habe dort alle Pläne bezüglich meines Studiums der Violine umgeworfen und stattdessen etwas anderes machen wollen ohne jedoch einen Plan zu haben, was genau.	After graduating from high school, I went to America for three months and there I overturned all plans regarding my violin studies and instead wanted to do something else without having a plan as to what exactly.	(-3.241, -1.514)
4	Die Entscheidung, ob ein und welches Studium gewählt wird.	Deciding whether to choose a degree program and which one.	(-1.944, -0.908)
5	Ich habe mich für 10 Studienplätze beworben und 10 Absagen erhalten. Da ich immer dachte ich würde auf jeden Fall einen Platz bekommen, stand ich ohne Plan B da. Aus der Panik heraus vollkommen zu versagen und nichts mehr hinzubekommen, habe ich mich einfach in einem Studiengang eingeschrieben, in dem es 1. noch ging und der 2. irgendwie noch interessant war.	I applied for 10 degree programs and received 10 rejections. Since I always thought I would get a placement no matter what, I was left with no plan B. Out of the panic of failing completely and not getting anything done, I simply enrolled in a study program in which 1. enrolment was still possible and which 2. was still somewhat interesting.	(-0.358, -0.935)
6	Eine wichtige Entscheidung war im vergangenen Jahr, ob ich an meinen Bachelor noch einen Master anknüpfen möchte, oder ob ich lieber direkt arbeiten gehen o.ä.	An important decision last year was whether I wanted to follow up my bachelor's degree with a master's, or whether I would rather go straight to work or something similar.	(-3.335, -1.837)
7	Vor etwas mehr als einem Jahr musste ich mich entscheiden, ob und wo ich anfangen möchte, zu studieren. Ich habe zu diesem Zeitpunkt einen Dienst im Ausland geleistet und daher alle Informationen nur über das Internet bezogen. Nur einmal habe ich mit einem Bekannten aus Lüneburg und der hiesigen Studienberatung telefoniert.	A little over a year ago I had to decide if and where I wanted to start studying. At that time I was doing a service abroad and therefore I got all information only through the internet. Only once did I talk on the phone with an acquaintance from Lüneburg and the local student advisory service.	(-2.232, -0.838)
8	Entscheidung zwischen einem gut bezahlten, unbefristeten Jobangebot und der Aufnahme eines Masterstudiums mit ungewisser Sicherstellung des Lebensunterhalts. Gleichzeitig fraglich, ob Bachelorstudium allein auch in weiterer Zukunft ausreicht, um entsprechend gute Jobangebote zu bekommen. Außerdem infrage stellen der eigenen Werte und Wünsche (\"Bildung als hohes Gut\") gegenüber dem Empfinden von Existenzangst.	Deciding between a well-paid, permanent job offer and taking up a Master's degree with uncertain securing of livelihood. At the same time questioning whether a bachelor's degree alone would be enough to get good job offers in the future. In addition, questioning one's own values and desires (\"education as a high good\") versus feeling existential anxiety.	(-1.780, -0.703)

Note. Based on the given coordinates, these decision situations can be traced within the scatterplot of Figure C.2. For example, the one decision located within the wedge "Achievement" is decision #5.

C.2.3 Addenda to *Results – Descriptive Statistics*

C.2.3.1 Additional Visualizations

A Decision Categorization Scales Plotted Against Collegiate Decision Situations This section will present graphs where the responses on seven of the eight Decision Categorization Scales[601] are split by the 21 categories of the coded collegiate decision situations (described in section 9.3.2.1).

For the Situational Eight DIAMONDS Scale S8-II a description of the according graph will be provided as an example. The visualizations for the remaining six scales will be exhibited without description.

A.a The Situational Eight DIAMONDS Scale S8-II Cf. Figure C.3 and Figure C.4 for visualizations.

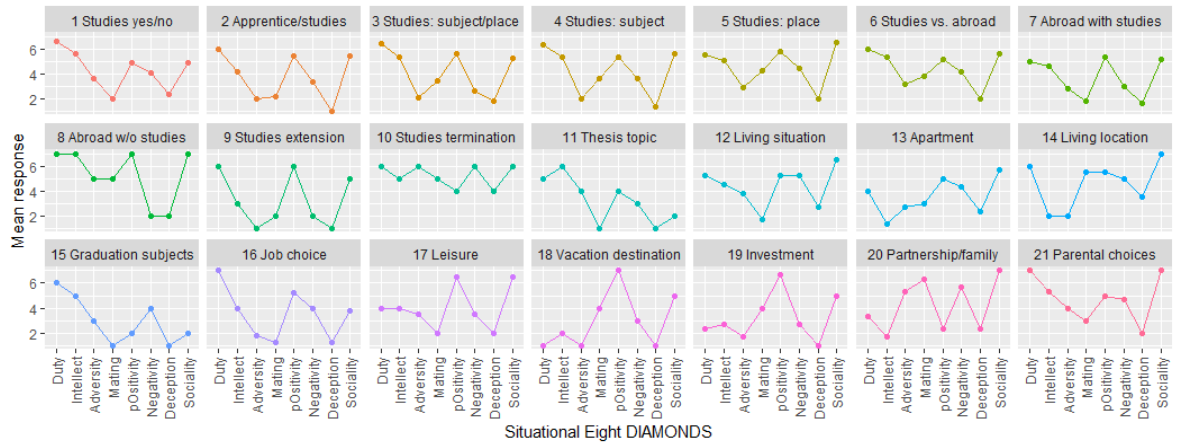


Figure C.3 Collegiate Decision Situations by the Situational Eight DIAMONDS Scale, faceted.

Comparing the response patterns visually, decision situations 1-7, 9, 15, and 16 look rather similar: Duty, Intellect, Positivity, and Sociality are rated highest. Looking closer, they fall into two groups: that where Mating is rated higher than Adversity (2-6, 9) or lower (1, 7, 15, 16). Deception is rated low in all these situations. Content-wise they have in common that they are choices about a person's professional future (whether, where, what to study, and Job choice). Further, there are a few decision situations, where Positivity and Negativity are rated to be on the same level: 12, 13, 14, and 21. The first three are about living/housing arrangements and the latter is Parental choices. Last, there are two situations where Duty, Intellect, and Adversity are exceptionally low: 18 (Vacation destination) and 19 (Investment).

In sum, the grouping of decision situations that ensues based on the similarity of patterns from the Situational Eight DIAMONDS Scale does correspond quite well to the coded domain contents.

[601] The 14 BiPole-Value Questionnaire was left out, because more suitable analyses and visualizations were provided in section C.a from 9.3.2.5.

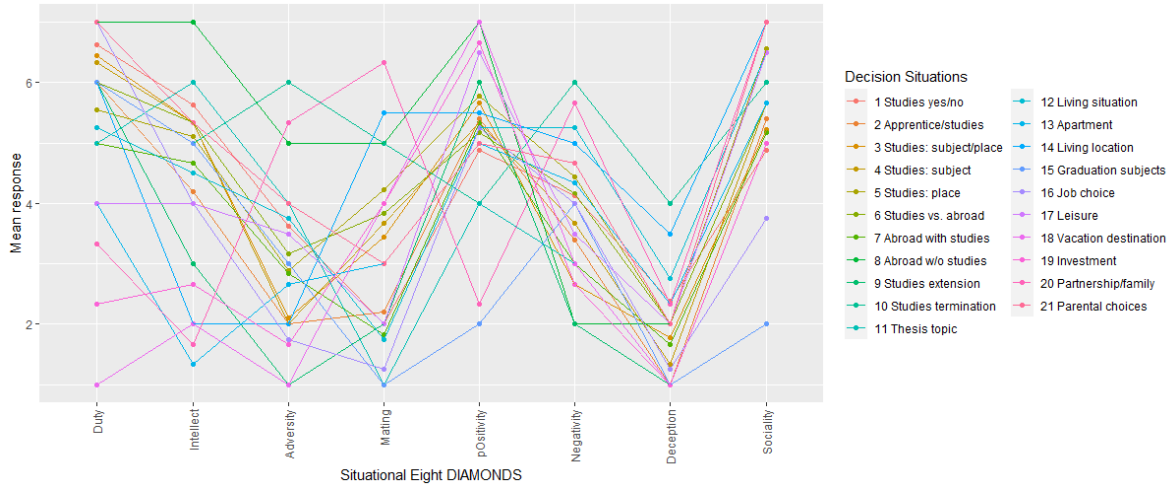


Figure C.4 Collegiate Decision Situations by the Situational Eight DIAMONDS Scale.

A.b The Evolutionary Domains Mini-Scale Cf. Figure C.5 and Figure C.6 for visualizations.

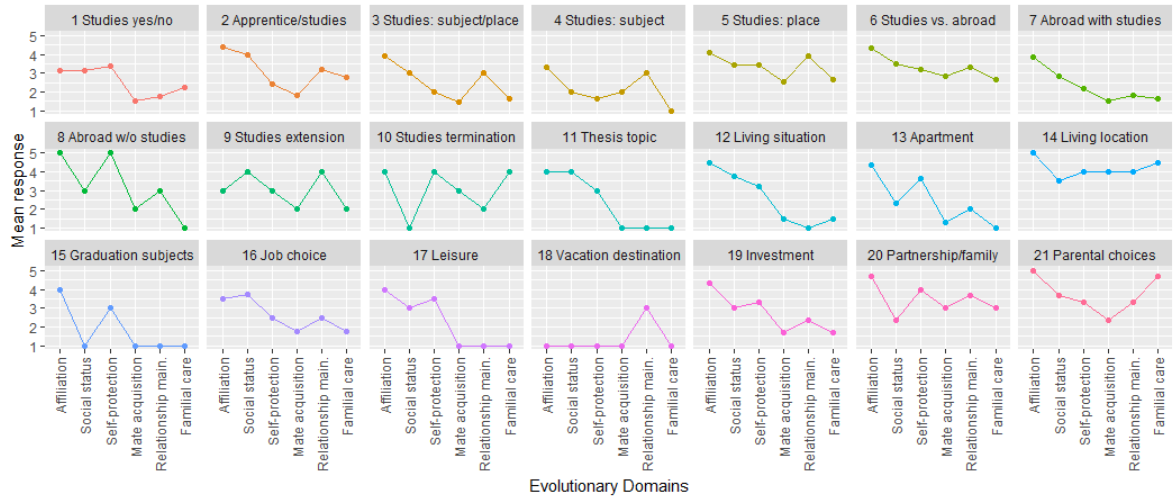


Figure C.5 Collegiate Decision Situations by the Evolutionary Domains Mini-Scale, faceted.

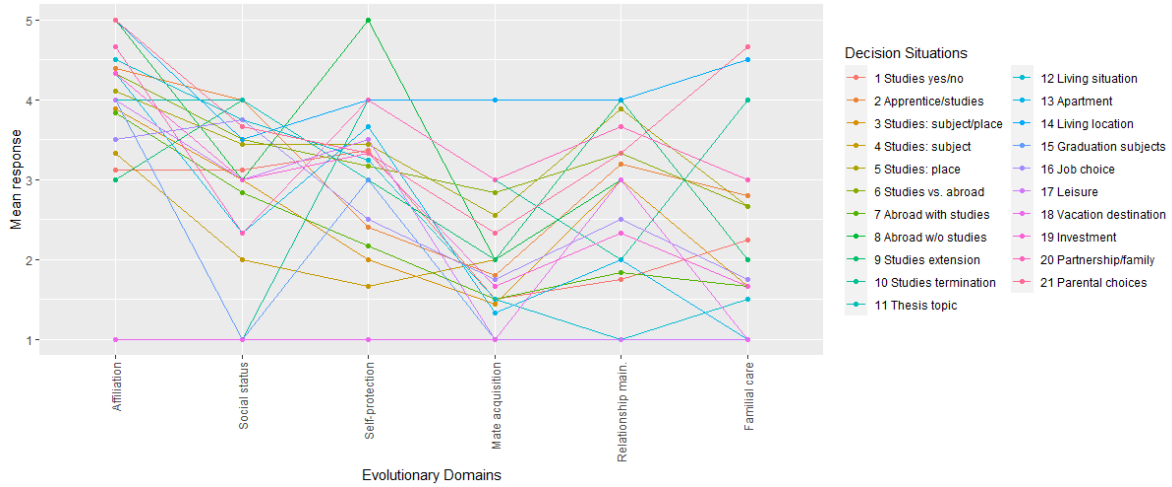


Figure C.6 Collegiate Decision Situations by the Evolutionary Domains Mini-Scale.

A.c The Moral Foundations Mini-Scale Cf. Figure C.7 and Figure C.8 for visualizations.

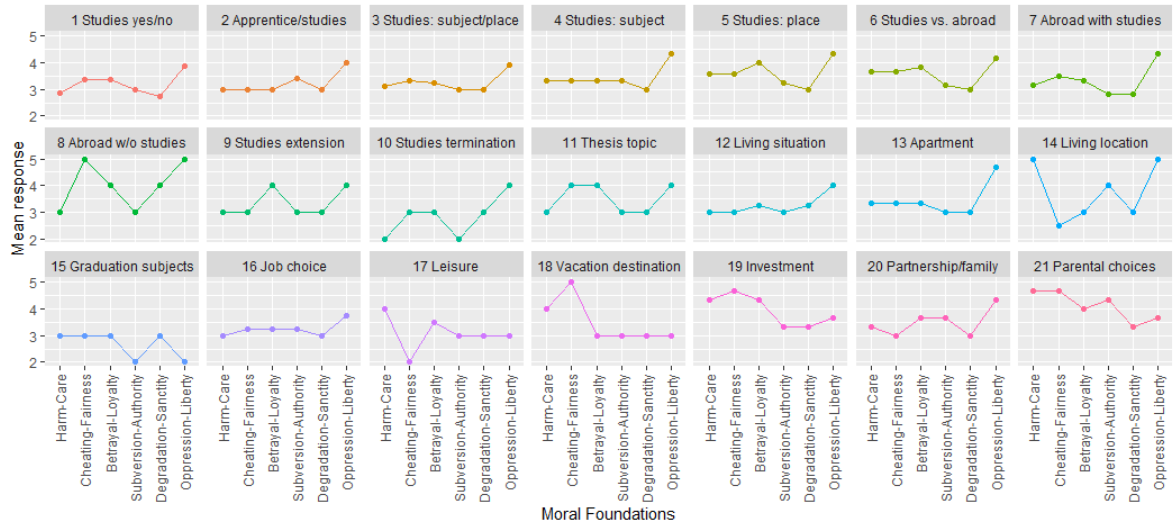


Figure C.7 Collegiate Decision Situations by the Moral Foundations Mini-Scale, faceted.

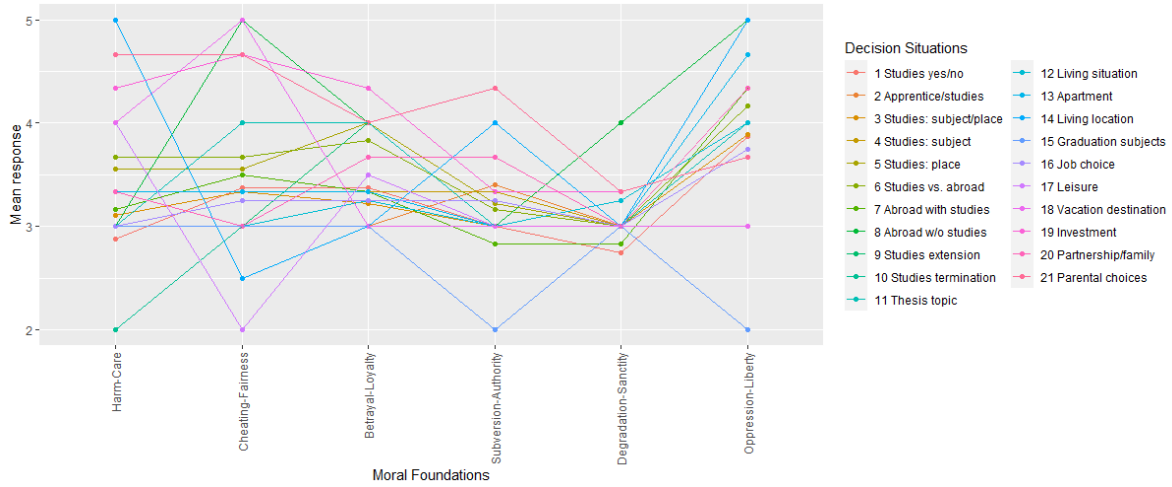


Figure C.8 Collegiate Decision Situations by the Moral Foundations Mini-Scale.

A.d The Domains of Risk Mini-Scale Cf. Figure C.9 and Figure C.10 for visualizations.

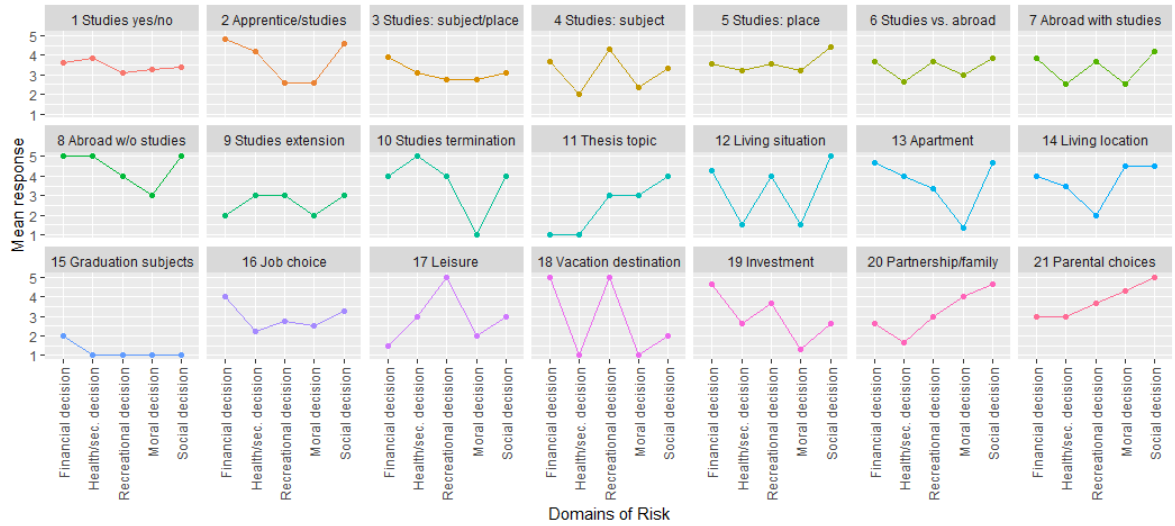


Figure C.9 Collegiate Decision Situations by the Domains of Risk Mini-Scale, faceted.

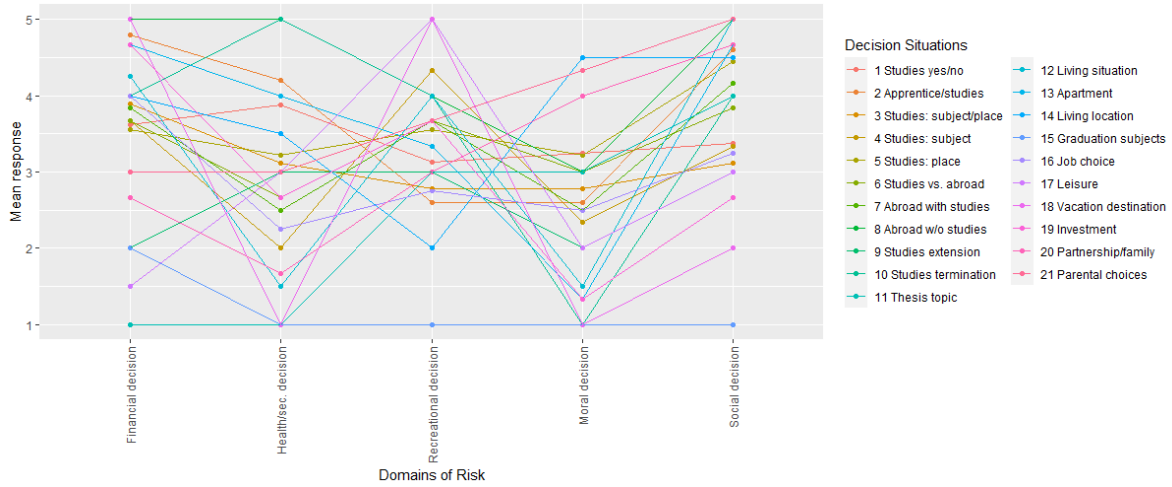


Figure C.10 Collegiate Decision Situations by the Domains of Risk Mini-Scale.

A.e The Characteristics of Decision Situations Scale Cf. Figure C.11 and Figure C.12 for visualizations.

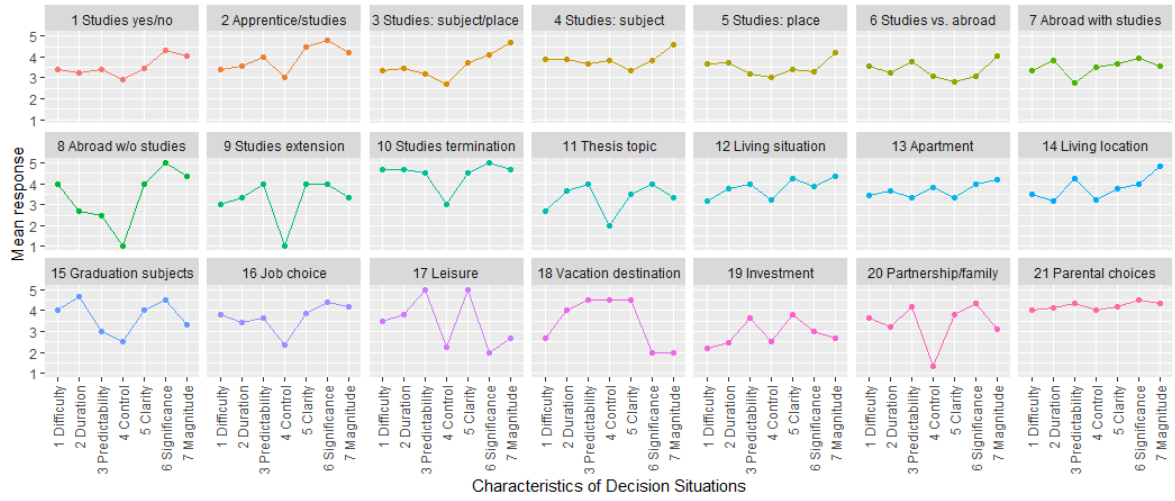


Figure C.11 Collegiate Decision Situations by the Characteristics of Decision Situations Scale, faceted.

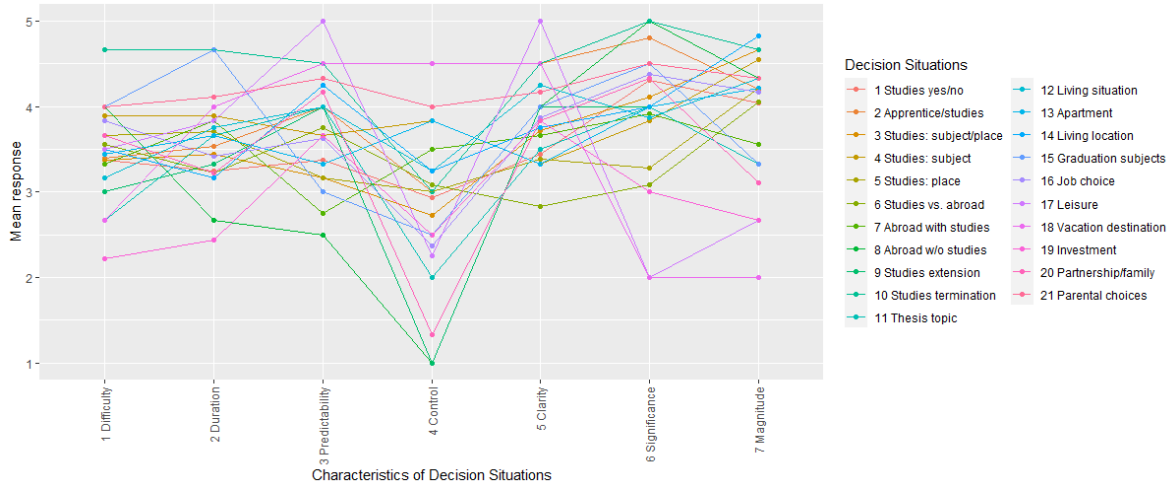


Figure C.12 Collegiate Decision Situations by the Characteristics of Decision Situations Scale.

A.f The Dimensions of Decisions Scale Cf. Figure C.13 and Figure C.14 for visualizations.

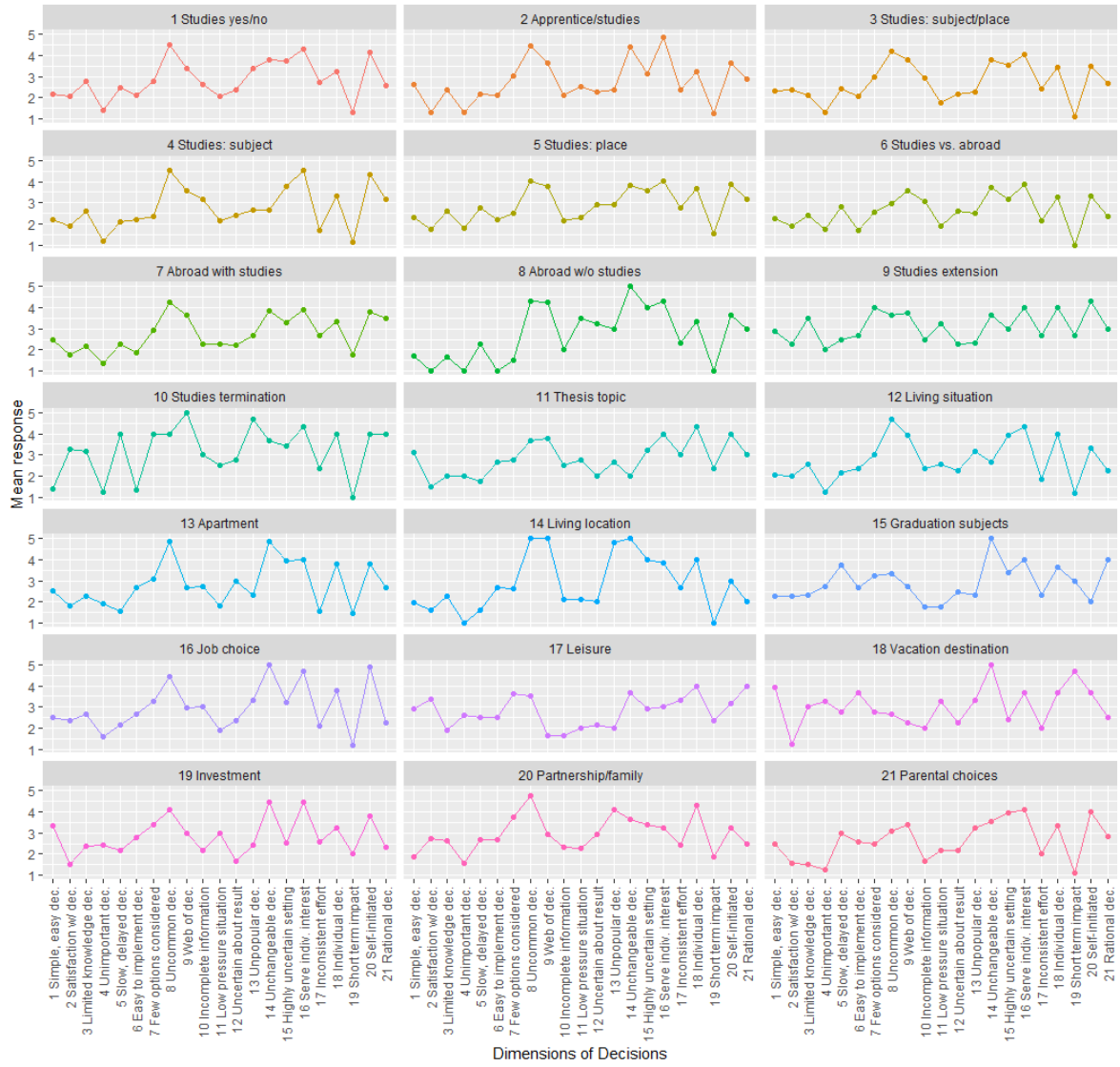


Figure C.13 Collegiate Decision Situations by the Dimensions of Decisions Scale, faceted.

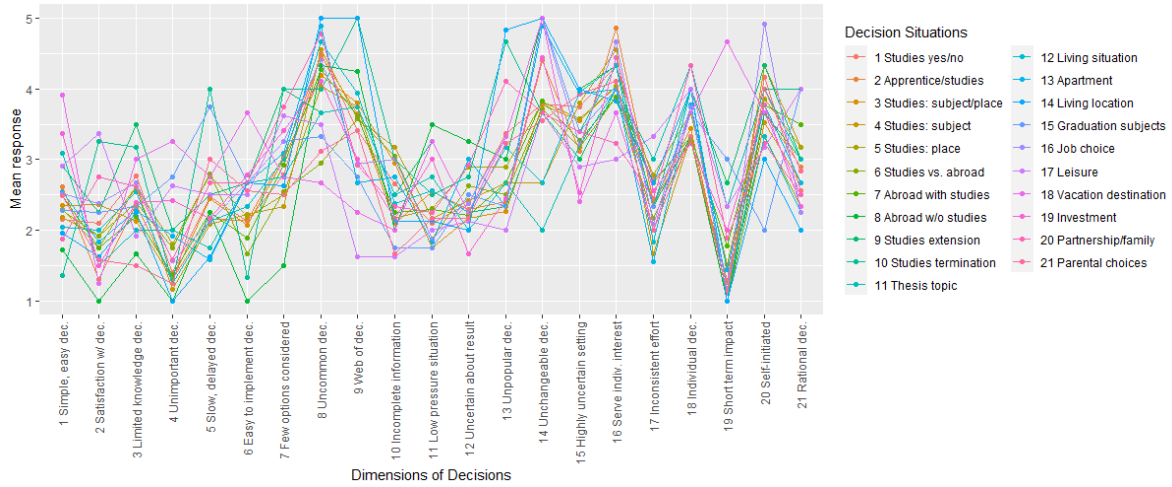


Figure C.14 Collegiate Decision Situations by the Dimensions of Decisions Scale.

A.g The Semantic Differential *Evaluation* Scale Cf. Figures C.15, C.16, and C.17 for visualizations.

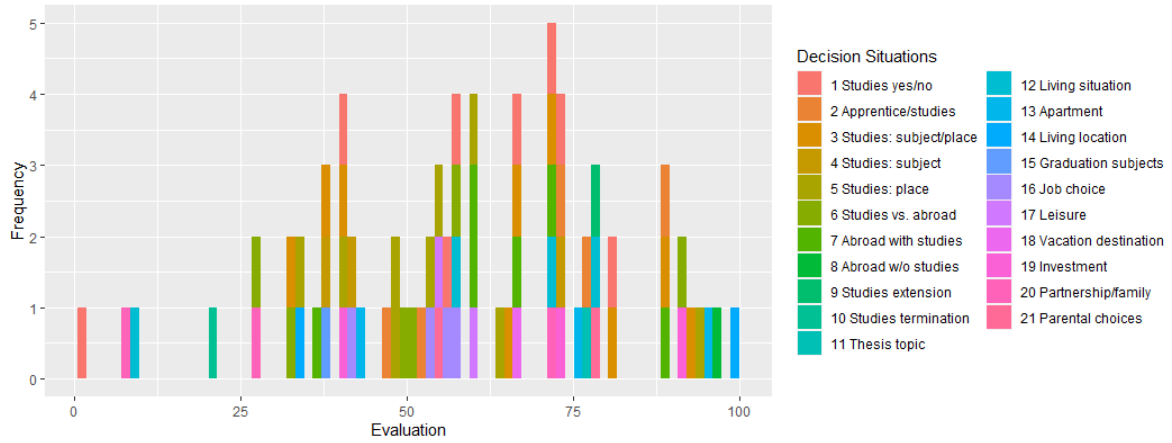


Figure C.15 Frequency plot of Collegiate Decision Situations by the Semantic Differential *Evaluation* Scale.

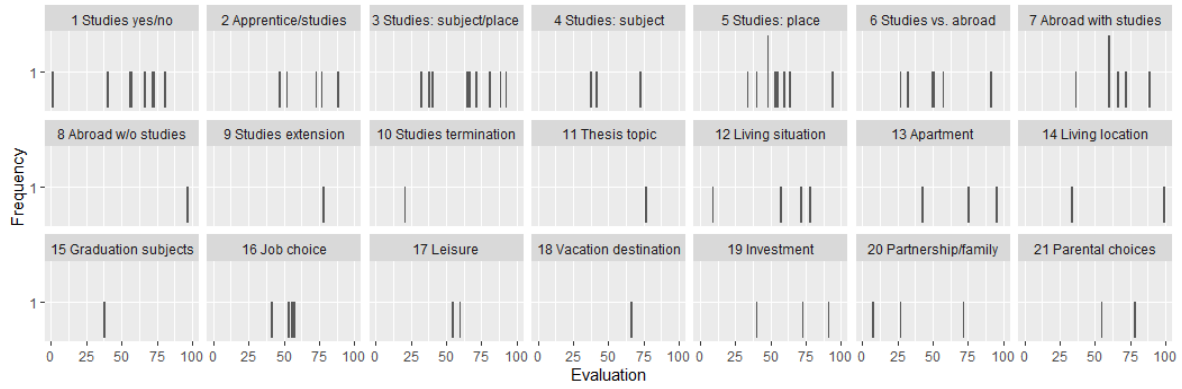


Figure C.16 Frequency plot of Collegiate Decision Situations by the Semantic Differential *Evaluation* Scale, faceted.

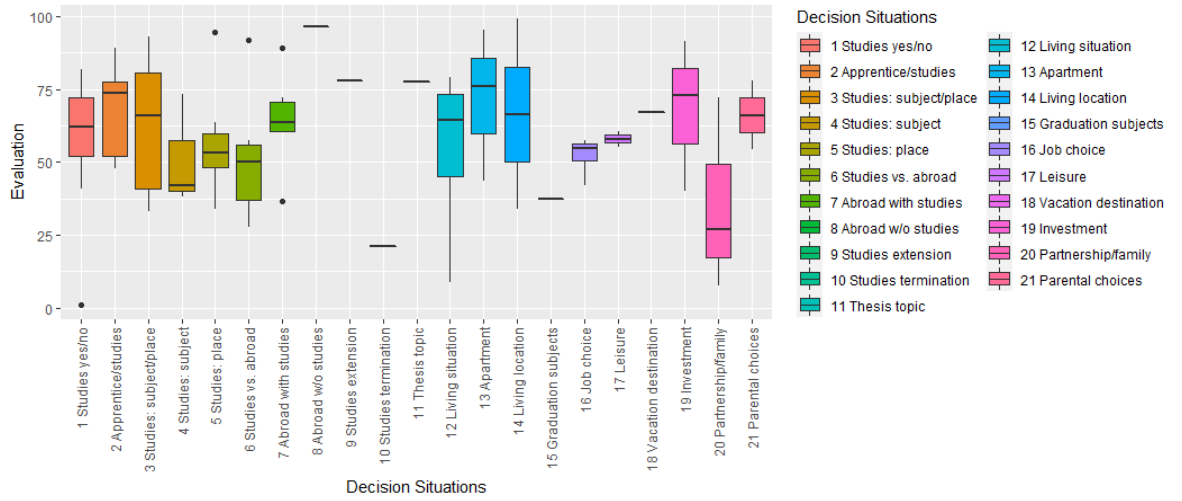


Figure C.17 Boxplot of Collegiate Decision Situations by the Semantic Differential *Evaluation* Scale.

C.2.3.2 Cluster Analyses

The following section provides dendrograms from cluster analysis for seven of the eight Decision Categorization Scales and combinations of them without further description. Clusters were marked at level six in order to facilitate (nevertheless futile) attempts at interpretation.

A Cluster Analyses With Collegiate Decision Situations as Reference

A.a The Situational Eight DIAMONDS Scale S8-II Cf. Figure C.18 for a dendrogram based on the Situational Eight DIAMONDS Scale S8-II.

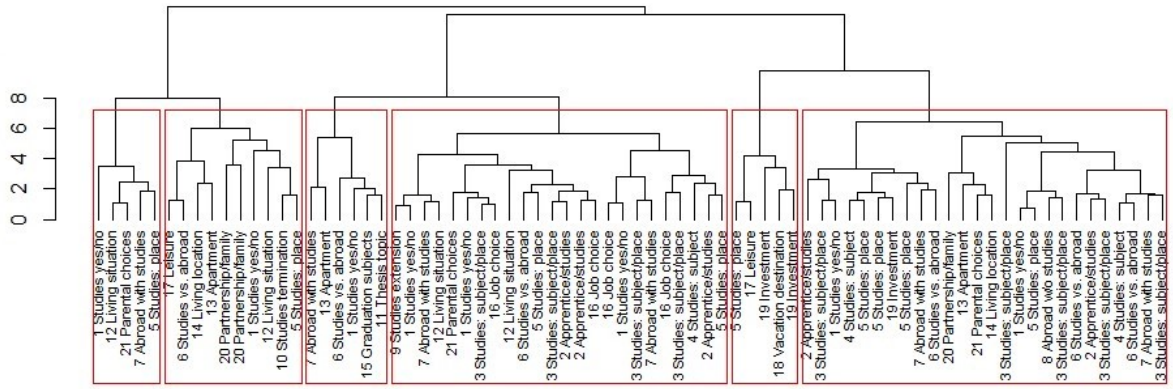


Figure C.18 Dendrogram by the Situational Eight DIAMONDS Scale S8-II.

A.b The Evolutionary Domains Mini-Scale Cf. Figure C.19 for a dendrogram based on the Evolutionary Domains Mini-Scale.

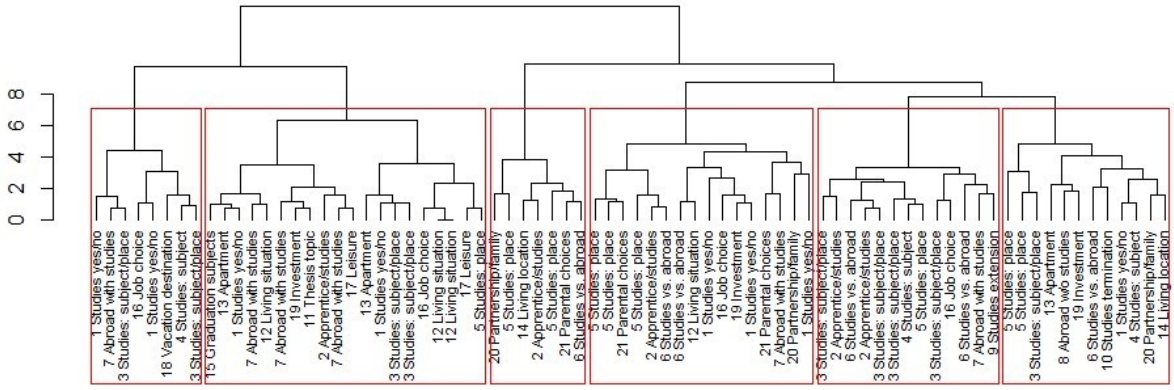


Figure C.19 Dendrogram by the Evolutionary Domains Mini-Scale.

A.c The Moral Foundations Mini-Scale Cf. Figure C.20 for a dendrogram based on the Moral Foundations Mini-Scale.

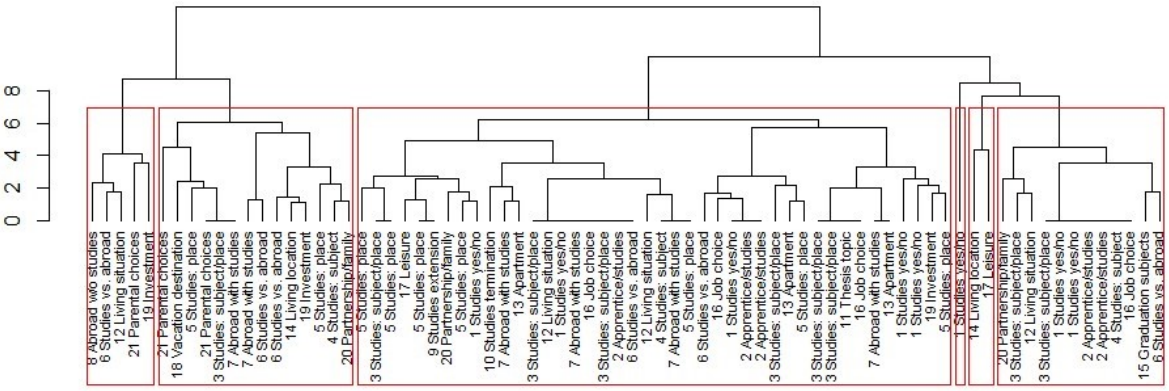


Figure C.20 Dendrogram by the Moral Foundations Mini-Scale.

A.d The Domains of Risk Mini-Scale Cf. Figure C.21 for a dendrogram based on the Domains of Risk Mini-Scale.

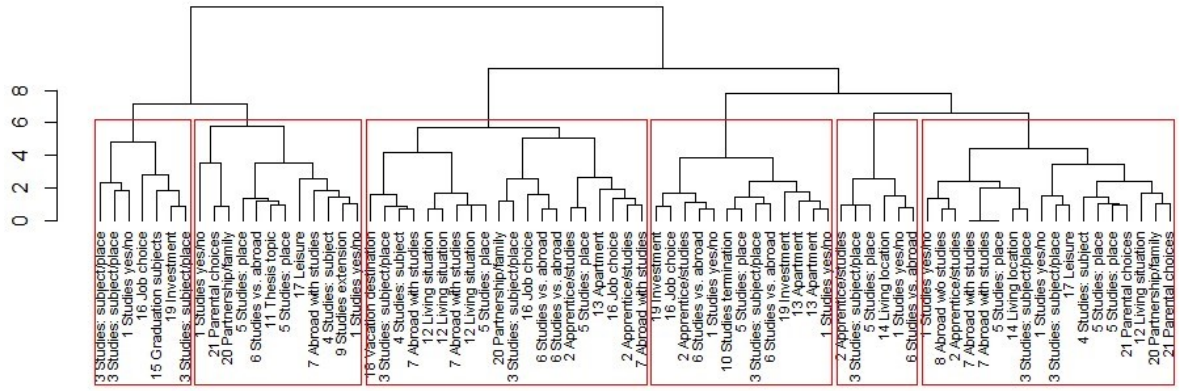


Figure C.21 Dendrogram by the Domains of Risk Mini-Scale.

A.e The Characteristics of Decision Situations Scale Cf. Figure C.22 for a dendrogram based on the Characteristics of Decision Situations Scale (7 Factors).

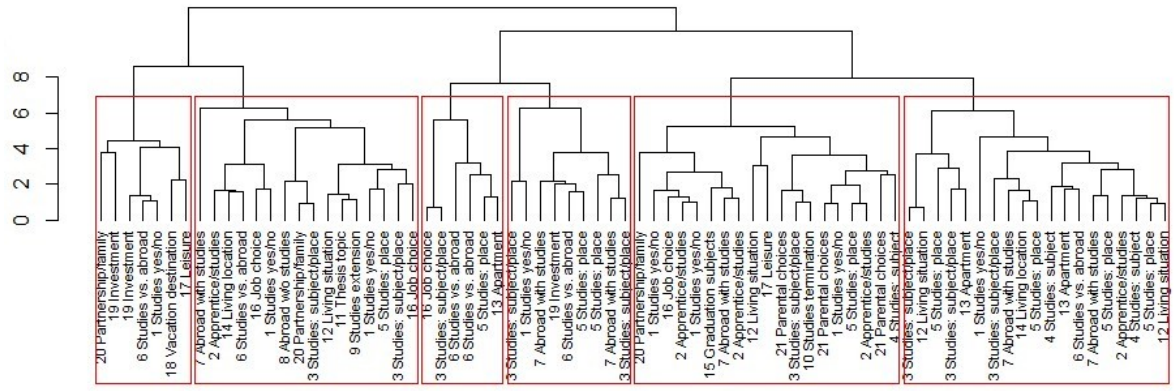


Figure C.22 Dendrogram by the Characteristics of Decision Situations Scale (7 factors).

A.f The Dimensions of Decisions Scale Cf. Figure C.23 for a dendrogram based on the Dimensions of Decisions Scale.

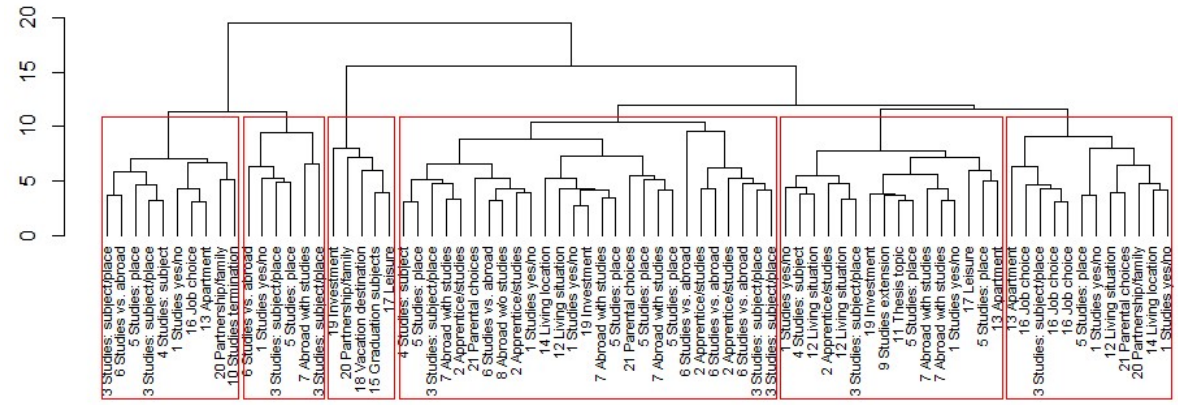


Figure C.23 Dendrogram by the Dimensions of Decisions Scale.

A.g All Content Domain Scales Cf. Figure C.24 for a dendrogram based on all scales that distinguish content domains (namely the Situational Eight DIAMONDS Scale S8-II, the Evolutionary Domains Mini-Scale, the Moral Foundations Mini-Scale, and the Domains of Risk Mini-Scale).

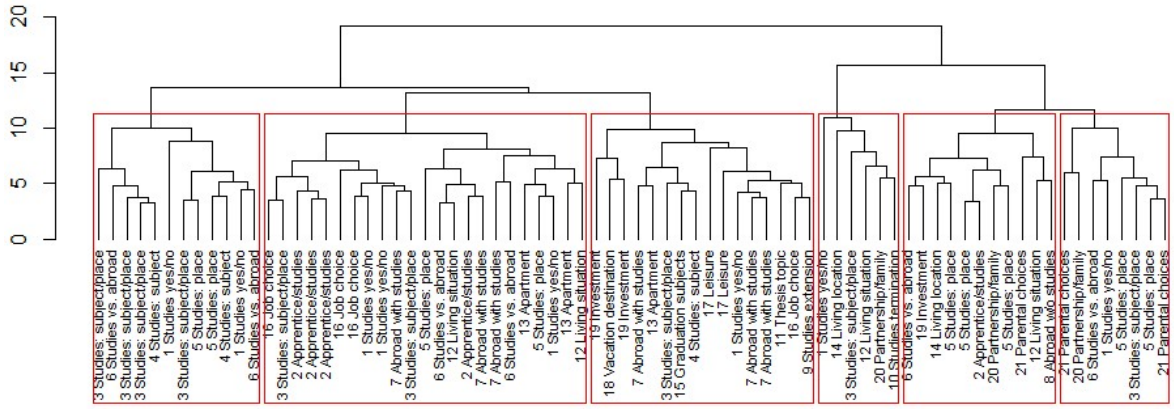


Figure C.24 Dendrogram by all content domain scales.

A.h Both Questionnaires Derived From Factor Analysis Cf. Figure C.25 for a dendrogram based on the two questionnaires derived from factor analysis (namely the Characteristics of Decision Situations Scale and the Dimensions of Decisions Scale).

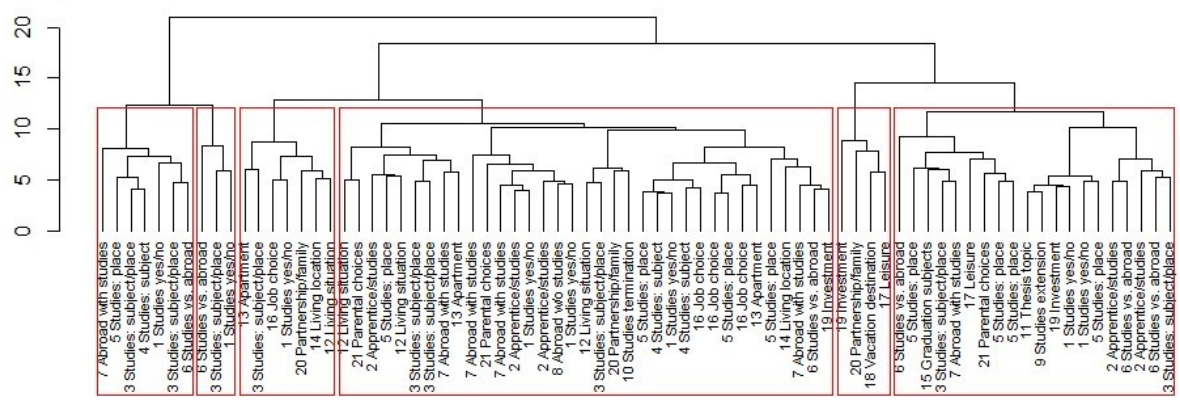


Figure C.25 Dendrogram by both questionnaires derived from factor analysis.

A.i All Scales Cf. Figure C.26 for a dendrogram based on all eight Decision Categorization Scales.

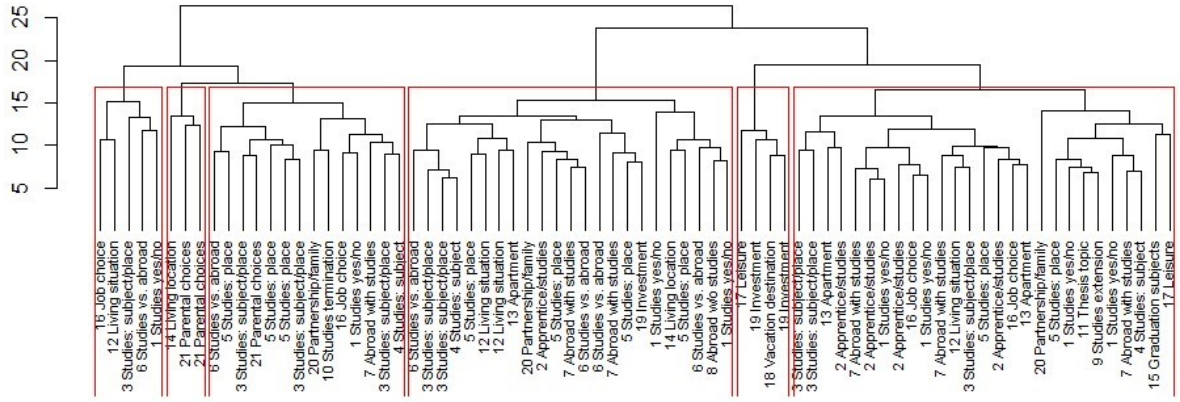


Figure C.26 Dendrogram by all scales.

D Reasons vs. Principles

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D.1 Trolley

[Jump back to main.]

D.1.1 Addenda to *Introduction*

D.1.1.1 The two Classic Trolley Scenarios

The following three depictions are quotations from Foot (1967) and Thomson (1976). The first two are often called "the Switch" and the last is dubbed "the Footbridge".

> [...] it may [...] be supposed that he is the driver of a runaway tram which he can only steer from one narrow track on to another; five men are working on one track and one man on the other; anyone on the track he enters is bound to be killed. [...] The question is why we should say, without hesitation, that the driver should steer for the less occupied track [...]. Foot (1967)

> Edward is the driver of a trolley, whose brakes have just failed. On the track ahead of him are five people; the banks are so steep that they will not be able to get of the track in time. The track has a spur leading off to the right, and Edward can turn the trolley onto it. Unfortunately there is one person on the right-hand track. Edward can turn the trolley, killing the one; or he can refrain from turning the trolley, killing the five. Thomson (1976, p.206)

> George is on a footbridge over the trolley tracks. He knows trolleys, and can see that the one approaching the bridge is out of control. On the track back of the bridge there are five people; the banks are so steep that they will not be able to get off the track in time. George knows that the only way to stop an out-of-control trolley is to drop a very heavy weight into its path. But the only available sufficiently heavy weight is a fat man, also watching the trolley from the footbridge. George can shove the fat man onto the track in the path of the trolley, killing the fat man; or he can refrain from doing this, letting the five die. Thomson (1976, p.207)

D.1.1.2 Loop Cases

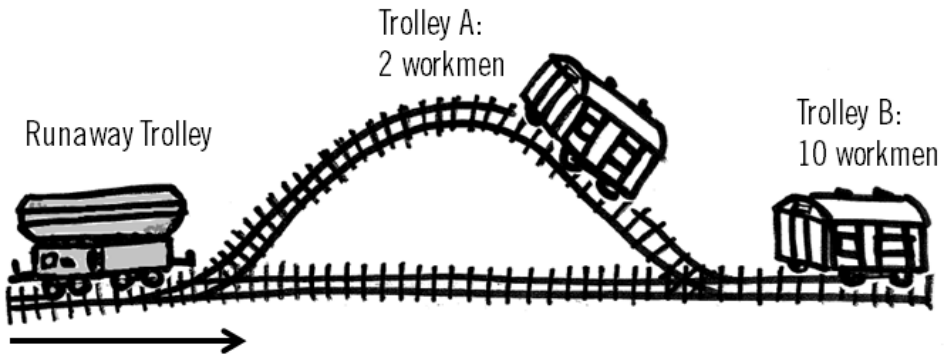


Figure D.1 Loop Case within Waldmann and Dieterich (2007).
Note. Agent intervention: move *Runaway Trolley* up the loop; patient intervention: move *Trolley A* down the loop. In both cases, *Trolley A* gets hit and *Trolley B* is safe (because of *Trolley A*). This depiction was used within one of my pilot studies.

D.1.2 Addenda to *Results*

D.1.2.1 Correlations Between DV1 *Trolley question* and DV2 *Satisfaction* per Scenario⇑

The non-formatted Table D.1 shows the correlations between DV1 *Trolley question* and DV2 *Satisfaction* per scenario.

Table D.1 Correlations between DV1 *Trolley question* and DV2 *Satisfaction* by *Decision Strategy* and *Scenario Type* per scenario.

	Type.Scenario	Decision.Strategy	var1	var2	cor	statistic	p	conf.low	conf.high	method
1	1 agent	1 by reasons	V1.Should	V1.Satisf	0.15	1.11	0.272	-0.115	0.387	Pearson
2	1 agent	2 by principle	V1.Should	V1.Satisf	0.12	1.01	0.316	-0.117	0.347	Pearson
3	1 agent	3 control	V1.Should	V1.Satisf	0.044	0.459	0.647	-0.143	0.227	Pearson
4	2 patient	1 by reasons	V1.Should	V1.Satisf	-0.24	-1.98	0.0522	-0.450	0.00205	Pearson
5	2 patient	2 by principle	V1.Should	V1.Satisf	-0.15	-1.15	0.253	-0.380	0.106	Pearson
6	2 patient	3 control	V1.Should	V1.Satisf	-0.27	-2.94	0.00398	-0.427	-0.0873	Pearson

	Type.Scenario	Decision.Strategy	var1	var2	cor	statistic	p	conf.low	conf.high	method
1	1 agent	1 by reasons	V2.Should	V2.Satisf	0.32	2.56	0.013	0.0714	0.534	Pearson
2	1 agent	2 by principle	V2.Should	V2.Satisf	0.062	0.515	0.608	-0.175	0.293	Pearson
3	1 agent	3 control	V2.Should	V2.Satisf	0.0064	0.0667	0.947	-0.179	0.192	Pearson
4	2 patient	1 by reasons	V2.Should	V2.Satisf	-0.36	-3.15	0.00247	-0.552	-0.134	Pearson
5	2 patient	2 by principle	V2.Should	V2.Satisf	-0.58	-5.54	0.000000695	-0.722	-0.386	Pearson
6	2 patient	3 control	V2.Should	V2.Satisf	-0.39	-4.57	0.0000122	-0.538	-0.228	Pearson

	Type.Scenario	Decision.Strategy	var1	var2	cor	statistic	p	conf.low	conf.high	method
1	1 agent	1 by reasons	V3.Should	V3.Satisf	0.37	3.03	0.00367	0.129	0.574	Pearson
2	1 agent	2 by principle	V3.Should	V3.Satisf	0.09	0.744	0.46	-0.148	0.318	Pearson
3	1 agent	3 control	V3.Should	V3.Satisf	-0.069	-0.721	0.472	-0.251	0.118	Pearson
4	2 patient	1 by reasons	V3.Should	V3.Satisf	-0.3	-2.57	0.0124	-0.504	-0.0681	Pearson
5	2 patient	2 by principle	V3.Should	V3.Satisf	-0.11	-0.852	0.397	-0.347	0.143	Pearson
6	2 patient	3 control	V3.Should	V3.Satisf	-0.072	-0.771	0.442	-0.251	0.112	Pearson

	Type.Scenario	Decision.Strategy	var1	var2	cor	statistic	p	conf.low	conf.high	method
1	1 agent	1 by reasons	V4.Should	V4.Satisf	0.39	3.21	0.00216	0.151	0.589	Pearson
2	1 agent	2 by principle	V4.Should	V4.Satisf	0.23	1.90	0.061	-0.0105	0.437	Pearson
3	1 agent	3 control	V4.Should	V4.Satisf	-0.0049	-0.0509	0.959	-0.190	0.181	Pearson
4	2 patient	1 by reasons	V4.Should	V4.Satisf	0.0051	0.0412	0.967	-0.234	0.243	Pearson
5	2 patient	2 by principle	V4.Should	V4.Satisf	-0.13	-1.06	0.294	-0.370	0.117	Pearson
6	2 patient	3 control	V4.Should	V4.Satisf	-0.24	-2.61	0.0103	-0.402	-0.0576	Pearson

	Type.Scenario	Decision.Strategy	var1	var2	cor	statistic	p	conf.low	conf.high	method
1	1 agent	1 by reasons	V5.Should	V5.Satisf	0.38	3.08	0.00321	0.134	0.578	Pearson
2	1 agent	2 by principle	V5.Should	V5.Satisf	0.39	3.49	0.000846	0.171	0.572	Pearson
3	1 agent	3 control	V5.Should	V5.Satisf	0.17	1.81	0.0727	-0.0158	0.345	Pearson
4	2 patient	1 by reasons	V5.Should	V5.Satisf	-0.15	-1.21	0.231	-0.373	0.0945	Pearson
5	2 patient	2 by principle	V5.Should	V5.Satisf	-0.3	-2.45	0.0173	-0.509	-0.0552	Pearson
6	2 patient	3 control	V5.Should	V5.Satisf	-0.1	-1.07	0.287	-0.277	0.0841	Pearson

Note. V1 to V5 denote the five trolley scenarios in the following order: Bus, Virus, Torpedo, Bomb, Rampage. All scenarios can be found in the Material's Appendix, cf. I.1.

D.2 Multi-Attribute Decision Making

[Jump back to main.]

D.2.1 Addenda to *Results*

D.2.1.1 Comparison of Three Correlation Analyses⇑

Table D.2 shows the correlation results for each combination of the dependent measures according to three different analyses.

Table D.2 Three methods of determining the correlations between the dependent variables.

	rstatix::cor_mat (long format)	rmcorr::rmcorr (long format)	rstatix::cor_mat (wide format)
Situation – Option	0.44	0.41	0.61
Situation – Strategy	0.20	0.08	0.74
Situation – Emotionality	0.26	0.18	0.64
Option – Strategy	0.28	0.22	0.51
Option – Emotionality	0.28	0.21	0.57
Strategy – Emotionality	0.49	0.42	0.72

Note. The first column displays which dependent variables were correlated. The second column displays the results of a standard correlation analysis that would be employed for non-repeated measures data. The third column displays the results from an R function specifically designed for repeated measures data. The last column displays the results from a standard correlation analysis used on the same data in wide format – with the respective repeated measures dependent variables averaged over vignettes. Grey background indicates a divergence from the general pattern.

Comparing these results, it becomes obvious that in the two analyses used on the long format of the data while the correlation coefficients are not identical and in one case (Situation – Strategy) even quite different, still the overall pattern is the same. However, the correlations based on the wide format data where the ratings were averaged over vignettes were not only quite different in magnitude, but also the pattern was different (indicated by grey background): the once lowest coefficients were among the highest here.

D.2.1.2 H1.3: Correlations of *Strategy satisfaction* and *Emotion* Split by Group and Vignette⇑

The non-formatted Table D.3 displays the correlation coefficients of *Strategy satisfaction* and *Emotion* split by group and vignette.

Table D.3 Correlations of *Strategy satisfaction* and *Emotion* split by *Decision Strategy* and *Vignette*.

A tibble: 18 x 10

	Decision.Strategy	Vignette_f	var1	var2	cor	statistic	p	conf.low	conf.high	method
	<fct>	<fct>	<chr>	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<chr>
1	1 by reasons	V3	StratSat	Emotion	0.4	3.08	0.00336	0.142	0.606	Pearson
2	1 by reasons	V4	StratSat	Emotion	0.22	1.62	0.111	-0.0522	0.468	Pearson
3	1 by reasons	V5	StratSat	Emotion	0.32	2.37	0.0219	0.0487	0.543	Pearson
4	1 by reasons	V6	StratSat	Emotion	0.085	0.604	0.548	-0.192	0.350	Pearson
5	1 by reasons	V7	StratSat	Emotion	0.078	0.553	0.582	-0.199	0.344	Pearson
6	1 by reasons	V8	StratSat	Emotion	0.66	6.20	0.000000105	0.472	0.790	Pearson
7	2 by principle	V3	StratSat	Emotion	0.62	5.86	0.000000284	0.431	0.762	Pearson
8	2 by principle	V4	StratSat	Emotion	0.54	4.67	0.0000206	0.318	0.700	Pearson
9	2 by principle	V5	StratSat	Emotion	0.21	1.54	0.128	-0.0605	0.445	Pearson
10	2 by principle	V6	StratSat	Emotion	0.63	6.01	0.000000165	0.444	0.768	Pearson
11	2 by principle	V7	StratSat	Emotion	0.16	1.17	0.246	-0.110	0.404	Pearson
12	2 by principle	V8	StratSat	Emotion	0.43	3.50	0.000946	0.188	0.622	Pearson
13	3 control	V3	StratSat	Emotion	0.21	1.57	0.121	-0.0567	0.448	Pearson
14	3 control	V4	StratSat	Emotion	0.46	3.81	0.000363	0.224	0.645	Pearson
15	3 control	V5	StratSat	Emotion	0.3	2.31	0.0249	0.0398	0.521	Pearson
16	3 control	V6	StratSat	Emotion	0.34	2.67	0.01	0.0863	0.555	Pearson
17	3 control	V7	StratSat	Emotion	0.34	2.69	0.00941	0.0893	0.557	Pearson
18	3 control	V8	StratSat	Emotion	0.46	3.85	0.000312	0.229	0.648	Pearson

D.3 Field Experiment

D.3.1 Handout to SPUDM Poster, 2017

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WHICH DECISION STRATEGY LEADS TO GREATER SATISFACTION?

A FIELD EXPERIMENT DISENTANGLING GENDER EFFECTS

INTRODUCTION

We make decisions all the time. Life is made up of decisions, big and small. Since every controlled, non-automatic process involves a decision. The decision of what to order in a restaurant, whom to marry or even just whether to have a cigarette, watch another episode, or eat an apple. Sometimes we wonder how to decide best, that is: what strategy to use.

One should hope to find some guidance in either normative philosophical ethics or decision sciences. One of the highest-level distinctions in the latter is the one between compensatory strategies (like WADD) and non-compensatory strategies (like LEX). A similar distinction is mirrored in moral psychology's dimension of consequentialism (weighing consequences) versus deontology (following singular rules), e.g. Cushman, 2013.

The distinction I revert to here is similar to the preceding two in some ways, and different in others, but structurally it is set at a yet lower level of explanation. It is the distinction (popularized by the emergence of moral particularism; Dancy, 2004) between *deciding by principle* and *deciding by reasons* (particularistically). Both are conceptualized as deliberate decision strategies. They are not confined to the moral realm. While deciding by principle is deciding according to a general rule holding for all situations of a kind, deciding by reasons means to decide casuistically in accordance with each specific situation. Reasons are not confined to consequences, but all facts can be reasons (e.g. Dancy, 2013).

PREVIOUS RESEARCH

While there is ample literature on decision strategies,

> "[t]he question of *how* [my italics] people arrive at satisfying decisions has not been given much attention in psychology or economics" and
>
> "previous research examining satisfaction with choice has largely been focused on satisfaction with outcomes [...]. In reality, however, one could report being satisfied with an entire decision-making process and yet be disappointed by an outcome. In such a case, one may evaluate decision quality as low, not because the decision was bad, but rather because of chance or bad luck affecting the outcome"

(Crossley & Highhouse, 2005, p. 256, p. 258).

Apart from studies on decision-making *style*, there is only little and scattered research as to the influence of strategy on satisfaction.

A FIELD EXPERIMENT

This study's aim is to investigate whether these two strategies and a third, deciding by intuition, make a difference to people's satisfaction when used in their everyday lives. Therefore, a field experiment was conducted in which participants had to successively make personal decisions by means of one of the three strategies. The results of this study could give real indications as to what strategy to adhere to when making everyday personal decisions.

Methods

Design & Hypotheses. Participants had to document 10 personal decisions. The experimental factor (between) was *decision strategy* with the levels "by principle" (P), "by reasons" (R), "by intuition" (I). The main dependent variable was *immediate satisfaction* after each decision (repeated measures). In a final questionnaire administered after the field phase participants were asked to give several overall evaluations on satisfaction and other aspects (e.g. strategy similarity). I hypothesized differences on all satisfaction DVs, while taking into account gender as well as additional descriptors of the decisions.

Materials & procedure. The field experiment was conducted online. Participants were asked to document two decisions of their choice per day on five succeeding days on their mobile phones. They were instructed to start with the questionnaire as soon as they wanted to decide something (e.g. whether to go to the gym or stay home). The questionnaire led them through the decision process according to the decision strategy they had been allocated to. Participants of all experimental groups had to describe the current decision on 11 items (e.g. importance, difficulty, number of people affected etc.) and rate *immediate satisfaction* (scaled from 1-101, 'not at all satisfied' to 'absolutely satisfied'). Demographics and a short Big Five questionnaire were recorded before the field phase and general retrospective evaluations (e.g. *global satisfaction*, *strategy satisfaction* and *outcome satisfaction*) after. University student participants received course credit for participation, privately recruited participants were not rewarded.

Participants. Participants were recruited from two German universities and through private acquisition. Filtering for diligence N=169/124 participants (of originally N=223) were retained, producing 1604 documented decisions, 6-10 decisions per person. Age ranged from 18-63 years with a mean of M=26 years (Mdn=23, SD=9.93). There were 77% females and 23% males. 75% of participants were university/college students.

Results

A multilevel approach was used to look at the repeated measures DV *satisfaction* (R package 'lmerTest'). With gender of participants included, ANOVA results showed a significant main effect of strategy ($F(2,163.27)=3.31$, $p=.039$) and a significant interaction with gender ($F(2,163.27)=3.57$, $p=.030$). Planned contrasts revealed a marginally significant difference between the two strategies *by principle* versus *by reasons* ($t(164.67)=-1.80$, $p=.073$) and a significant difference comparing these two to the strategy *by intuition* ($t(162.01)=-2.20$, $p=.030$. Satisfaction was higher when using the strategy *by principle* ($M_{(P)}=77.36$) than *by reasons* ($M_{(R)}=72.21$); lowest satisfaction ratings were obtained when using the strategy *by intuition* ($M_{(I)}=69.80$). However, these results are driven by the interaction with gender. There was a marginally significant interaction of the first contrast with gender ($t(164.67)=-1.86$, $p=.064$) and a significant interaction of the second one with gender ($t(162.01)=-2.29$, $p=.024$). While female participants showed virtually no difference in satisfaction between all three strategies ($M_{(Pf)}=71.80$, $M_{(Rf)}=71.97$, $M_{(If)}=72.08$), strategy use had an effect on male participants: highest satisfaction was reached when deciding *by principle* ($M_{(Pm)}=82.92$), lowest when deciding *by intuition* ($M_{(Im)}=67.51$), and their satisfaction when deciding *by reasons* was at the same level as that of the females ($M_{(Rm)}=72.44$). → See Figure 1 and Table 1.

As to the overall retrospective evaluations of satisfaction, no differences of strategy or gender were found regarding *outcome satisfaction*. The same initially held for *global satisfaction* with all decisions, yet when adding the covariate "similarity" where participants indicated how similar the imposed strategy was to their usual decision-making, a significant difference between the strategies *by principle* and *by reasons* emerged, $t(162)=-2.44$, $p=.016$, and no interaction with gender, showing that, when controlling for *similarity*, participants of both genders retrospectively were more satisfied with their decisions having had to decide *by principle* ($M_{(P)}=84.03$) than *by reasons* ($M_{(R)}=76.25$). → See Figure 2 and Table 2.

Strong differences were found on the variable *strategy satisfaction*, with a main effect of strategy ($F(2,163)=12.97$, $p<.001$) and an interaction thereof with gender ($F(2,163)=3.97$, $p=.021$). Overall, there was significantly more satisfaction with the strategy *by reasons* ($M_{(R)}=72.11$) than *by principle* ($M_{(P)}=57.66$), $t(163)=2.66$, $p=.009$. A significant interaction contrast ($t(163)=-2.03$, $p=.044$) revealed that while males saw little difference between the two strategies ($M_{(Pm)}=66.31$, $M_{(Rm)}=69.73$), females were much more satisfied with the strategy *by reasons* ($M_{(Rf)}=74.49$) than *by principle* ($M_{(Pf)}=49.02$). → See Figure 3 and Table 3.

Discussion

This study was partially exploratory in nature. An effect of gender was expected, but no specific pattern had been hypothesized. Yet, the differences due to gender were the most remarkable results. Why does strategy use not make a difference to *immediate satisfaction* (measured right after each decision) for women, but for men it does? The high satisfaction ratings in males under the strategy *by principle* reminds a little of Kohlberg's theory of moral development (e.g. Kohlberg, 1981) and its criticism by Gilligan (e.g. Gilligan, 1977): Is there a gender specific preference for or against the use of principles that maps onto satisfaction? Another surprising result is the discrepancy between the above *immediate satisfaction* (repeated measures) ratings and the global evaluation of *strategy satisfaction* after the field phase where both male and female participants seem to contradict themselves: Regarding global *strategy satisfaction* women now see a difference between *by reasons* and *by principle*, but men cease to do so.

REFERENCES – See handout!

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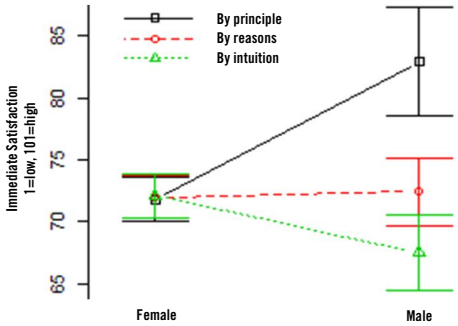


Figure 1. *Immediate satisfaction* by condition and sex.

Table 1. Adjusted means and standard errors for *immediate satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	71.80 (1.75)	82.92 (4.37)
By reasons	71.97 (1.72)	72.44 (2.73)
By intuition	72.09 (1.76)	67.51 (3.06)

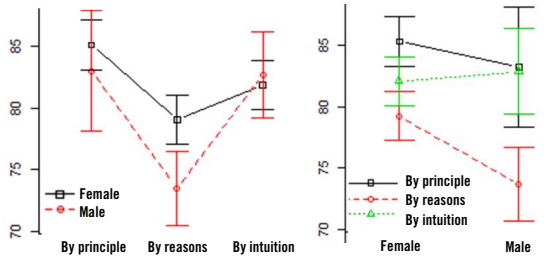


Figure 2. Adjusted means for *global satisfaction*, controlled for *similarity* of strategy used.

Table 2. Adjusted means and standard errors for *global satisfaction*, controlled for *similarity*.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	85.08 (1.99)	82.98 (4.86)
By reasons	79.03 (1.96)	73.48 (3.00)
By intuition	81.87 (1.96)	82.65 (3.46)

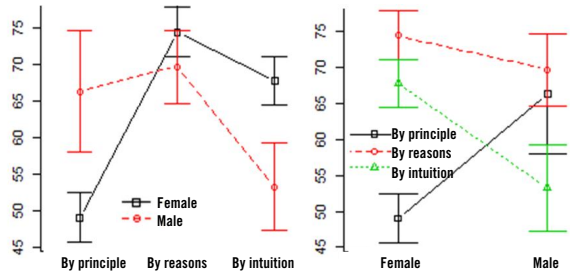


Figure 3. *Strategy satisfaction* by condition and sex.

Table 3. Adjusted means and standard errors for *strategy satisfaction* given condition and sex.

	Sex	
Condition	Female (SE)	Male (SE)
By principle	49.02 (3.41)	66.31 (8.32)
By reasons	74.49 (3.37)	69.73 (5.05)
By intuition	67.79 (3.39)	53.25 (5.97)

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Hsee, C. K., Hastie, R., & Chen, J. (2008). Hedonomics: Bridging decision research with happiness research. *Perspectives on Psychological Science, 3*(3), 224–243.

Kmett, C. M., Arkes, H. R., & Jones, S. K. (1999). The influence of decision aids on high school students' satisfaction with their college choice decision. *Personality And Social Psychology Bulletin, 25*(10), 1293-1301.

Ratner, R. K., Kahn, B. E., & Kahneman, D. (1999). Choosing less-preferred experiences for the sake of variety. *Journal Of Consumer Research, 26*(1), 1-15.

Wilson, T. D., Lisle, D. J., Schooler, J. W., Hodges, S. D., Klaaren, K. J., & LaFleur, S. J. (1993). Introspecting about reasons can reduce post-choice satisfaction. *Personality And Social Psychology Bulletin, 19*(3), 331-339.

Concluding Appendix

E Questionnaires

Contents

Main Table of Contents

E.1 Decision Style 645
E.2 Strategy Satisfaction 647

E.1 Decision Style

Table E.1 Variations of the Search String for the *Decision Style Questionnaire (DSQ)* and Number of Hits on PsycInfo.

#	Explanation Search String/ Explanation Change	Search String	PsycInfo # of Hits
1	Multi-purpose, "decision style" and synonyms for "scale"	("decision style" and (questionnaire or scale or item* or measure)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	75
2	Abstract, as above	("decision style" and (questionnaire or scale or item* or measure)).ab.	40
3	All fields, as above	("decision style" and (questionnaire or scale or item* or measure)).af.	323
4	Multi-purpose, as above, plus "style" three words adjacent to "scale" and its synonyms	("decision style" and ((questionnaire or scale or item* or measure) adj3 style)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	20
5	Abstract, as above	("decision style" and ((questionnaire or scale or item* or measure) adj3 style)).ab.	7
6	All fields, as above	("decision style" and ((questionnaire or scale or item* or measure) adj3 style)).af.	54
7	Abstract, "decision" three words adjacent to "style" and synonyms for "scale"	((decision adj3 style) and (questionnaire or scale or item* or measure)).ab.	260
8	Title, as above	((decision adj3 style) and (questionnaire or scale or item* or measure)).it.	0
9	Multi-purpose, as above	((decision adj3 style) and (questionnaire or scale or item* or measure)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	483

[Jump back to main.]

Table E.2 Screening 2 for Search #6 for the *Decision Style Questionnaire (DSQ)* and Additional Information.

	Reference	Year	Fit	About / Scales	Dual Process / Info	Based On
1	Armstrong, S. J., Cools, E., & Sadler-Smith, E. (2012). Role of cognitive styles in business and management: Reviewing 40 years of research. *International Journal of Management Reviews*, *14* (3), 238–262. https://doi.org/10.1111/j.1468-2370.2011.00315.x	2012		cognitive style	(review)	//
2	Cheek, N. N., & Goebel, J. (2020). What does it mean to maximize? "Decision difficulty," indecisiveness, and the jingle-jangle fallacies in the measurement of maximizing. *Judgment and Decision Making*, *15* (1), 7–24. https://doi.org/10.1017/S1930297500006884	2020		maximizing, indecisiveness, regret, decision difficulty		Hamilton (2016)
3	Dahling, J. J., & Thompson, M. N. (2013). Detrimental relations of maximization with academic and career attitudes. *Journal of Career Assessment*, *21* (2), 278–294. https://doi.org/10.1177/1069072712471322	2013		maximizing decision style		//
4	Dewberry, C., Juanchich, M., & Narendran, S. (2013a). Decision-making competence in everyday life: The roles of general cognitive styles, decision-making styles and personality. *Personality and Individual Differences*, *55* (7), 783–788. https://doi.org/10.1016/j.paid.2013.06.012	2013		decision compentence: cognitive style, decision style, big five personality		Leykin & DeRubeis
5	Dewberry, C., Juanchich, M., & Narendran, S. (2013b). The latent structure of decision styles. *Personality and Individual Differences*, *54* (5), 566–571. https://doi.org/10.1016/j.paid.2012.11.002	2013		latent structure: decision style, maximization, regret, Sys1-Sys2	yes	Leykin & DeRubeis
6	Engin, A., & Vetschera, R. (2017). Information representation in decision making: The impact of cognitive style and depletion effects. *Decision Support Systems*, *103*, 94–103. https://doi.org/10.1016/j.dss.2017.09.007	2017		cognitive style (analytic/intuitive)	yes	//
~~7~~	Feu, S., Ibáñez, S. J., & Gozalo, M. (2007). Propiedades psicométricas de los cuestionarios edd y epd para evaluar el estilo de planificación y decisión de los entrenadores. *Revista de Psicología del Deporte.*, *16* (2), 185–199.	~~2007~~		~~xxx~~	~~xxx~~	~~xxx~~
8	Fitzgerald, D. R., Mohammed, S., & Kremer, G. O. (2017). Differences in the way we decide: The effect of decision style diversity on process conflict in design teams. *Personality and Individual Differences*, *104*, 339–344. https://doi.org/10.1016/j.paid.2016.08.030	2017		decision making style		Scott & Bruce
9	Galles, J., Lenz, J., Peterson, G. W., & Sampson, J. P. (2019). Mindfulness and decision-making style: Predicting career thoughts and vocational identity. *The Career Development Quarterly*, *67*, 77–91.	2019		vocational decision making style		//
10	Gaston-Breton, C., & Duque, L. C. (2015). Utilitarian and hedonic promotional appeals of 99-ending prices: The influence of decision-making style. *European Journal of Marketing*, *49* (1/2), 212–237. https://doi.org/10.1108/EJM-09-2012-0556	2015		analytical or intuitive mental strategy	yes	//
11	Gati, I., Gadassi, R., & Mashiah-Cohen, R. (2012). Career decision-making profiles vs. styles: Convergent and incremental validity. *Journal of Vocational Behavior*, *81* (1), 2–16. https://doi.org/10.1016/j.jvb.2012.03.004	2012		vocational decision making styles		Scott & Bruce
12	Groves, K. S., & Vance, C. M. (2015). Linear and nonlinear thinking: A multidimensional model and measure. *The Journal of Creative Behavior*, *49* (2), 111–136. https://doi.org/10.1002/jocb.60	2015		dual process & non-linearity	yes [new instrument]	//
13	Hamilton, K., Shih, S.-I., & Mohammed, S. (2016). The development and validation of the Rational and Intuitive Decision Styles Scale. *Journal of Personality Assessment*, *98* (5), 523–535. https://doi.org/10.1080/00223891.2015.1132426	2016		develop and validate the Decision Styles Scale (DSS), focus on rational and intuitive styles	yes [new instrument]	Scott & Bruce (1995); Mann (1998); Leykin & DeRubeis (2010)
14	Hamilton, K., Shih, S.-I., & Mohammed, S. (2017). The predictive validity of the decision styles scale: An evaluation across task types. *Personality and Individual Differences*, *119*, 333–340. https://doi.org/10.1016/j.paid.2017.08.009	2017		rational vs. intuitive	yes	Scott & Bruce (1995); Mann (1998); Leykin & DeRubeis (2010)
15	Hayes, J., Allinson, C. W., Hudson, R. S., & Keasey, K. (2003). Further reflections on the nature of intuition-analysis and the construct validity of the Cognitive Style Index. *Journal of Occupational and Organizational Psychology*, *76*, 269–278.	2003		cognitive style index	yes (rebuttal)	//
16	Hough, J. R., & Ogilvie, D. (2005). An empirical test of cognitive style and strategic decision outcomes. *Journal of Management Studies*, *42* (2), 417–448. https://doi.org/10.1111/j.1467-6486.2005.00502.x	2005		cognitive style	yes [list of measures]	//
17	Kadmon, I., Pierce, P., & Antonakos, C. L. (2012). Elder women's decision-making in breast cancer care. *European Journal of Oncology Nursing*, *16* (3), 233–237. https://doi.org/10.1016/j.ejon.2011.06.005	2012		decision making in breast cancer		//
18	Lauriola, M., Panno, A., & Weller, J. A. (2019). Regret-based decision-making style acts as a dispositional factor in risky choices. *Psychological Reports*, *122* (4), 1412–1431. https://doi.org/10.1177/0033294118786687	2019		regret [Regret Decision Style; Nygren, 2000]		Scott & Bruce (1995); Mann (1998); Leykin & DeRubeis (2010)
19	Lindberg, K., & Stemmer, K. (2022). Choice experiment selection of tourism destinations in a dual process theory framework: The role of decision style and potential to promote deliberation. *PLOS ONE*, *17* (7), e0270531. https://doi.org/10.1371/journal.pone.0270531	2022		intuitive-analytic	yes [new instrument]	//
20	Mitchell, L., & Flin, R. (2007). Shooting decisions by police firearms officers. *Journal of Cognitive Engineering and Decision Making*, *1* (4), 375–390. https://doi.org/10.1518/155534307X264861	2007		decision making style		Scott & Bruce
21	Paik, Y., Lee, J. M., & Pak, Y. S. (2019). Convergence in international business ethics? A comparative study of ethical philosophies, thinking style, and ethical decision-making between US and Korean managers. *Journal of Business Ethics*, *156* (3), 839–855. https://doi.org/10.1007/s10551-017-3629-9	2019		thinking style and ethics	yes	//
22	Shiloh, S., Koren, S., & Zakay, D. (2001). Individual differences in compensatory decision-making style and need for closure as correlates of subjective decision complexity and difficulty. *Personality and Individual Differences*, *30*, 699–710.	2001		compensatory decision making style (Zakay, 1990), need for closure (Mayseless & Kruglanski, 1987)		//
23	Thunholm, P. (2008). Decision-making styles and physiological correlates of negative stress: Is there a relation? *Scandinavian Journal of Psychology*, *49*, 213–219.	2008		stress and decision style		Scott & Bruce
24	Thunholm, P. (2009). Military leaders and followers—Do they have different decision styles? *Scandinavian Journal of Psychology*, *50* (4), 317–324. https://doi.org/10.1111/j.1467-9450.2009.00714.x	2009		stress and decision style		Scott & Bruce
25	Turner, K., Cutica, I., Riva, S., Zambrelli, E., Canevini, M. P., & Pravettoni, G. (2019). Level of empowerment and decision-making style of women with epilepsy in childbirth age. *Epilepsy & Behavior*, *93*, 32–37. https://doi.org/10.1016/j.yebeh.2019.01.037	2019		decision making style (clinical sample)		Scott & Bruce
26	Yousef, D. A. (1998). Predictors of decision-making styles in a non-western country. *Leadership & Organization Development Journal*, *19* (7), 366–373. https://doi.org/10.1108/01437739810242522	1998		types of decision styles adopted by managers		//
27	Zhu, X. S., Wolfson, M. A., Dalal, D. K., & Mathieu, J. E. (2021). Team decision making: The dynamic effects of team decision style composition and performance via decision strategy. *Journal of Management*, *47* (5), 1281–1304. https://doi.org/10.1177/0149206320916232	2021		team decision style	yes	Scott & Bruce

Note. Publication #7 by Feu et al. (2007) was in Spanish language such that it could only be screened based on the English language abstract.

[Jump back to main.]

E.2 Strategy Satisfaction

Table E.3 Variations of the Search String for the *Strategy Satisfaction Questionnaire (SSQ)* and Number of Hits on PsycInfo.

#	Explanation Search String/ Explanation Change	Search String	PsycInfo # of Hits
6	Multi-purpose, without "decision"	(strategy and satisfaction and questionnaire).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	900
7	Multi-purpose, with "decision"	(decision and strategy and satisfaction and questionnaire).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]	50
8	Abstract only	(decision and strategy and satisfaction and questionnaire).ab.	20
9	All fields	(decision and strategy and satisfaction and questionnaire).af.	5712
10	Title	(decision and strategy and satisfaction and questionnaire).ti.	0
11	Title without "questionnaire"	(decision and strategy and satisfaction).ti.	4
12	Abstract without "questionnaire"	(decision and strategy and satisfaction).ab.	201
13	Abstract, synonyms for "questionnaire"	(decision and strategy and satisfaction and (questionnaire or scale or measure or dependent or item*)).ab.	58
14	Abstract, synonyms for "questionnaire" combined with satisfaction, synonym for "strategy"	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process)).ab.	28
15	Abstract, as above, plus strategy/process combined with satisfaction	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process) and ("strategy satisfaction" or "process satisfaction")).ab.	0
16	Abstract, strategy/process three words adjacent to satisfaction	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process) and ((strategy adj3 satisfaction) or (process adj3 satisfaction))).ab.	1
17	All fields, as above	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and (strategy or process) and ((strategy adj3 satisfaction) or (process adj3 satisfaction))).af.	84
18	All fields, as above, without "strategy or process" as double	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and ((strategy adj3 satisfaction) or (process adj3 satisfaction))).af.	84
19	All fields, as above, plus synonyms for "satisfaction"	(("satisfaction questionnaire" or "satisfaction item*" or "satisfaction scale" or "satisfaction measure") and decision and ((strategy adj3 satisfaction) or (process adj3 satisfaction)) and (well-being or happiness or satisfaction)).af.	84

[Jump back to main.]

Table E.4 Screening 2 for Searches #11, #13, #14, #16, and #17 for the *Strategy Satisfaction Questionnaire (SSQ)* and Additional Information.

	Reference	Year	Fit	Measure/s	Domain	Details
1	Aitken, L. M., Burmeister, E., Clayton, S., Dalais, C., & Gardner, G. (2011). The impact of nursing rounds on the practice environment and nurse satisfaction in intensive care: Pre-test post-test comparative study. *International Journal of Nursing Studies*, *48* (8), 918–925. https://doi.org/10.1016/j.ijnurstu.2010.10.004	2011		Nursing Worklife Satisfaction Scale (NWSS) (Stamps, 1997)	medical	
2	Álvarez-Rodríguez, E., Sánchez-Franco, C. M., Pérez-Haro, M. J., Bello-Otero, L., Aguado-Valcarcel, M., & González-Suárez, I. (2022). Development of a scale for the evaluation of the quality of the shared decision process in multiple sclerosis patients. *PLOS ONE*, *17* (5), e0268125. https://doi.org/10.1371/journal.pone.0268125	2022		Treatment Satisfaction Questionnaire for Medication (TSQM) [construction]	medical	
3	Anglim, J., Horwood, S., Marrero, R. J., Smillie, L. D., & Wood, J. K. (2020). Predicting psychological and subjective well-being from personality: A meta-analysis. *Psychological Bulletin*, *146* (4), 279–323.	2020		Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) [meta-analysis]	personality, well-being	
4	Basukala, S., Shrestha, O., Thapa, N., Karki, S., Pandit, A., Thapa, B. B., & Thapa, A. (2023). How informed is informed consent? -- Evaluating the quality of informed consent among surgical patients in a tertiary care hospital in Nepal. *PLOS ONE*, *18* (7), e0288074. https://doi.org/10.1371/journal.pone.0288074	2023		5-point Likert item assessed patient satisfaction: "Iam satisfied with the overall informed consent taking process"	medical	
5	Boquiren, V. M., Hack, T. F., Beaver, K., & Williamson, S. (2015). What do measures of patient satisfaction with the doctor tell us? *Patient Education and Counseling*, *98* (12), 1465–1473. https://doi.org/10.1016/j.pec.2015.05.020	2015		patient satisfaction with the doctor [list of measures, review]	medical	
6	Budden, L. M., Hayes, B. A., & Buettner, P. G. (2014). Women's decision satisfaction and psychological distress following early breast cancer treatment: A treatment decision support role for nurses. *International Journal of Nursing Practice*, *20* (1), 8–16. https://doi.org/10.1111/ijn.12243	2014		Treatment Decision Satisfaction Questionnaire (TDSQ); Decision process satisfaction, Decision outcome satisfaction, Global decision satisfaction; based on Pierce (1993)	medical	This instrument contained 16 items scored on a seven-point Likert scale divided into two dimensions through clinical judgement as: Decision Process Satisfaction (α = 0.93, 6 questions); and Decision Outcome Satisfaction (α = 0.95, 10 questions). The Global Decision Satisfaction (α = 0.95) related to the overall decision satisfaction of the treatment choice (decision process and outcome) and was calculated by totalling all the TDSQ 16 items and averaging the score.
7	Cox, C. A. (2004). *Women's career development: Self-report of experiences, developmental alliances and level of career commitment* [Doctoral dissertation]. Temple University.	2004	disser	job satisfaction	vocational	
8	Dase, M. A. L. (1996). *Evaluation of the effects of multiple communication channels on distributed group interaction and decision-making process (in a distributed group decision support system environment)* [Doctoral dissertation]. Claremont Graduate School.	1996	disser	satisfaction with process	group decision making	The Satisfaction Questionnaire was adapted from earlier research in teleconfer- encing (Bui & Sivasarkaran, 1990; Short et al., 1976).
9	Davies, N. J., Kinman, G., Thomas, R. J., & Bailey, T. (2008). Information satisfaction in breast and prostate cancer patients: Implications for quality of life. *Psycho-Oncology*, *17* (10), 1048–1052. https://doi.org/10.1002/pon.1305	2008		9-item Information Satisfaction Questionnaire (ISQ, 2004)	medical	Thomas R, Kaminski E, Stanton E, Williams M. Information Satisfaction Questionnaire (ISQ), 2004. (Available from: http://www.cancernet.co.uk/questionnaire.htm.)
10	Desborough, J., Bagheri, N., Banfield, M., Mills, J., Phillips, C., & Korda, R. (2016). The impact of general practice nursing care on patient satisfaction and enablement in Australia: A mixed methods study. *International Journal of Nursing Studies*, *64*, 108–119. https://doi.org/10.1016/j.ijnurstu.2016.10.004	2016		The Patient Enablement and Satisfaction Survey (PESS) was developed and validated for the evaluation of nursing care in Australian general practice (Desborough et al., 2013).	medical	Desborough, J., Banfield, M., Parker, R., 2013. A tool to evaluate patients' experience of nursing care in Australian general practice: development of the Patient Enablement and Satisfaction Survey (PESS). Aust. J. Prim. Health 20, 209–215.
11	Fitzsimons, G. J. (2000a). Consumer response to stockouts. *Journal of Consumer Research*, *27* (2), 249–266. https://doi.org/10.1086/314323	2000		Satisfaction was measured with two six-item scales, one to measure decision satisfaction and a second to measure consumption satisfaction	consumer satisfaction	DECISION SATISFACTION ITEMS [All items have endpoints 1 p strongly agree, 10 p strongly disagree, unless otherwise noted.] D_1. I found the process of deciding which product to buy frustrating. D_2. Several good options were available for me to choose between. D_3. How satisfied or dissatisfied are you with your experience of deciding which product option to choose? (endpoints 1 = extremely satisfied, 10 = extremely dissatisfied) D_4. I thought the choice selection was good. D_5. I would be happy to choose from the same set of product options on my next purchase occasion. D_6. I found the process of deciding which product to buy interesting.
12	Flavián, C., Gurrea, R., & Orús, C. (2016). Choice confidence in the webrooming purchase process: The impact of online positive reviews and the motivation to touch. *Journal of Consumer Behaviour*, *15* (5), 459–476. https://doi.org/10.1002/cb.1585	2016		search-process satisfaction and choice confidence	consumer satisfaction	(1) I found the information search process frustrating (R). (2) I found the information search process interesting. (3) After this information search process, I think I would make the right decision. (4) I am satisfied with my information search experience.
13	Georgiou, K., & Nikolaou, I. (2020). Are applicants in favor of traditional or gamified assessment methods? Exploring applicant reactions towards a gamified selection method. *Computers in Human Behavior*, *109*, 106356. https://doi.org/10.1016/j.chb.2020.106356	2020		process satisfaction	vocational	Process satisfaction was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), using Sylva and Mol's (2009) one item of overall process satisfaction: "Overall, I was satisfied with this application process". The original wording "application process" was replaced by 'employee selection method' for consistency.
14	Habel, J., Alavi, S., Schmitz, C., Schneider, J.-V., & Wieseke, J. (2016). When do customers get what they expect? Understanding the ambivalent effects of customers' service expectations on satisfaction. *Journal of Service Research*, *19* (4), 361–379. https://doi.org/10.1177/1094670516662350	2016		service satisfaction	consumer satisfaction	Service satisfaction (based on Voss, Parasuraman, and Grewal 1998), 7-point Likert-type scale: fully disagree to fully agree, collected after the movie: I was very satisfied with the movie. I am very satisfied with my movie choice. I was very satisfied with the movie's quality.
15	Halcomb, E. J., Caldwell, B., Salamonson, Y., & Davidson, P. M. (2011). Development and psychometric validation of the General Practice Nurse Satisfaction Scale. *Journal of Nursing Scholarship*, *43* (3), 318–327. https://doi.org/10.1111/j.1547-5069.2011.01408.x	2011		27-item General Practice Nurse Satisfaction (GPNS) scale	medical	
16	Holding, J. C., Gregg, L., & Haddock, G. (2016). Individuals' experiences and opinions of psychological therapies for psychosis: A narrative synthesis. *Clinical Psychology Review*, *43*, 142–161. https://doi.org/10.1016/j.cpr.2015.10.004	2016	review	therapy satisfaction	medical	Client Satisfaction Questionnaire-8 (CSQ-8; Attkisson & Zwick, 1982), Patient Experience Questionnaire (Increasing Access to Psychological Therapies, 2008), Satisfaction with Therapy questionnaire (STQ; Beck, Wright, Newman, & Liese, 1993)
17	Hornsby, J. S., Smith, B. N., & Gupta, J. N. D. (1994). The impact of decision-making methdology on job evaluation outcomes. *Group and Organization Management*, *19* (1), 112–128.	1994		user satisfaction, group decision making	vocational	5-point scale from 'strongly agree' (1) to 'strongly disagree' (5): 1. The decision-making process allowed for adequate group interaction. 2. The decision-making process allowed me to contribute my ideas. 3. The decision-making process lead to accurate job evaluation decisions. 4. The decision-making process was biased by group dynamics (i.e., one person dominating the process). 5. I felt like my ideas were not appreciated or accepted. 6. The job evaluation information was inadequate for making accurate decisions. 7. The amount of time alotted for decision making was adequate. 8. There was too much wasted time in the decision-making process. 9. The decision-making process restricted the flow of ideas. 10. The decision-making process made efficient use of resources. 11. This decision-making method is appropriate for job evaluation. 12. I would recommend this decision-making method for other types of business decisions.
18	Hu, H., & Krishen, A. S. (2019). When is enough, enough? Investigating product reviews and information overload from a consumer empowerment perspective. *Journal of Business Research*, *100*, 27–37. https://doi.org/10.1016/j.jbusres.2019.03.011	2019		For decision satisfaction, we adapted items from Heitmann, Lehmann, and Herrmann (2007).	consumer satisfaction	Heitmann, M., Lehmann, D. R., & Herrmann, A. (2007). Choice goal attainment and decision and consumption satisfaction. Journal of Marketing Research, 44(2), 234–250. DS01 I found the process of deciding which product to buy frustrating. DS02 I found the process of deciding which product to buy interesting. DS03 I was satisfied with my experience of deciding which product option to choose.
19	Jackson, S., Bijstra, J., Oostra, L., & Bosma, H. (1998). Adolescents' perceptions of communication with parents relative to specific aspects of relationships with parents and personal development. *Journal of Adolescence*, *21* (3), 305–322. https://doi.org/10.1006/jado.1998.0155	1998		Family Satisfaction Scale (FSS)	family satisfaction	
20	Kimman, M. L., Rotteveel, A. H., Wijsenbeek, M., Mostard, R., Tak, N. C., Van Jaarsveld, X., Storm, M., Wijnsma, K. L., Gelens, M., Van De Kar, N. C. A. J., Wetzels, J., & Dirksen, C. D. (2017). Development and pretesting of a questionnaire to assess Patient Experiences and Satisfaction with Medications (PESaM Questionnaire). *The Patient - Patient-Centered Outcomes Research*, *10* (5), 629–642. https://doi.org/10.1007/s40271-017-0234-z	2017		Patient Experiences and Satisfaction with Medications (PESaM) questionnaire	medical	The Treatment Satisfaction Questionnaire for Medication (TSQM); the Treatment Satisfaction with Medicines Questionnaire (SATMED-Q)
21	Lee, S.-Y. C. K., & Knobf, M. T. (2015). Primary breast cancer decision-making among Chinese American women: Satisfaction, regret. *Nursing Research*, *64* (5), 391. https://doi.org/10.1097/NNR.0000000000000116	2015		The Breast Cancer Decision-Making Questionnaire, the Decisional Conflict Scale, and the Decisional Regret Scale	medical	
22	Li, X., Ye, J., Deng, M., Zhao, X., & Shi, W. (2022). Decision reversibility and satisfaction: The mediating role of counterfactual thinking and anticipated regret. *Psychology Research and Behavior Management*, *15*, 2193–2203. https://doi.org/10.2147/PRBM.S364548	2022		decision satisfaction	regret	The final scale we used comprised two items (α = 0.88). The first question was, "How satisfied are you with your choice?" It was answered on a 9-point scale, ranging from 1 (very dissatisfied) to 9 (very satisfied). The second question was, "How confident are you that the selected candidate is competent for your position?" It was answered on a 9-point scale, ranging from 1 (no confidence at all) to 9 (very confident).
23	Lu, J., Chen, Y., & Fang, Q. (2022). Promoting decision satisfaction: The effect of the decision target and strategy on process satisfaction. *Journal of Business Research*, *139*, 1231–1239. https://doi.org/10.1016/j.jbusres.2021.10.056	2022		decision satisfaction	strategy, self vs. other decision making	STILL CITING (Zhang & Fitzsimons, 1999) FOR PROCESS SATISFACTION After making each decision, the participants rated the process("I find the decision process interesting." "I find the decision process frustrating." (reverse-scored) "I was satisfied with the decision process.") and outcome ("I like the decisionoutcome." "My decision is wise." "I am satisfied with my decision outcome.") satisfaction on a nine-point scale (1 = totally disagree to 9 = totally agree). These items have been widely used on decision satisfaction (Fitzsimons, 2000; Heitmann et al., 2007; Zhang & Fitzsimons, 1999).

(Continued on next page.)

Table E.4 (Continued.)

24	Machin, J. E. (2006). *Choosing by selecting or rejecting: The implications of decision strategy for consumer satisfaction* [Doctoral dissertation]. University of Pennsylvania.	2006	disser	Participants were asked to indicate their agreement on three scales anchored by the end points 1 = very dissatisfied, 10 = very satisfied; 1 = extremely disappointed, 10 = not at all disappointed; 1 = a lot o f regret, 10 = no regret at all.	decision strategy, counterfactual thinking, and satisfaction	To summarize, decision strategy is proposed to influence satisfaction, such that a rejection-based decision strategy will lead to more satisfaction compared to a selection-based decision strategy.
25	Mahomed, R., John, W. S., & Patterson, E. (2012). Understanding the process of patient satisfaction with nurse-led chronic disease management in general practice. *Journal of Advanced Nursing*, *68* (11), 2538–2549. https://doi.org/10.1111/j.1365-2648.2012	2012		patient satisfaction	medical, qualitative study	
26	McDonald-Miszczak, L. C. (1995). *Self-efficacy, self-regulation, and complex decision-making in younger and older adults* [Doctoral dissertation]. University of Victoria.	1995	disser	performance satisfaction	decision making in younger/older adults	
27	McQuaide, J. L. (1995). *Satisfaction with the decision making process impact on work satisfaction and tenure of hospital nurses* [Doctoral dissertation]. Temple University.	1995	disser	satisfaction with participation in the decision making process and overall work satisfaction	medical (nurses)	The Nurse Participation in Decision Making Scale (NPDMS) was developed specifically for this study. The Index of Work Satisfaction (IWS) developed by Stamps and Piedmonte (1986) was used to assess overall work satisfaction.
28	Mikkelson, A. C., & Ray, C. D. (2020). Development of the revised Relational Maximization Scale and explorations of how relational maximization relates to personal and relational outcomes. *Journal of Social and Personal Relationships*, *37* (8–9), 2482–2509. https://doi.org/10.1177/0265407520928122	2020		relationship of maximization, regret and life satisfaction	relationship outcomes	The satisfaction subscale from Rusbult et al.'s (1998) Investment Model Scale (IMS) measured satisfaction in the current study. The 10-item scale consists of five priming items and five global items. In accordance with the IMS, only the five global items were employed in the hypothesis tests. An example item states, "I feel satisfied with our relationship." The Satisfaction With Life Scale contains five items that measure global life satisfaction (Diener et al., 2000). An example item states, "In most ways my life is close to my ideal."
29	Miller, M. L. (1989). Process and decision control in the work place: Separate effects, independence from distributive justice, and tests of explanatory mechanisms. *Basic and Applied Social Psychology*, *10* (4), 337–354. https://doi.org/10.1207/s15324834basp1004_4	1989		job satisfaction	work place	As a measure of overall job satisfaction, the Minnesota Satisfaction Questionnaire (MSQ; Weiss, Dawis, England, & Lofquist, 1967) was employed. The Job Descriptive Index (JDI; Smith, Kendall, & Hulin, 1969)provided measures of facet satisfaction. The JDI yields indices of satisfaction with Peers, Pay, Promotions, Supervision, and the Work Itself.
30	Oetker-Black, S., & Petrochuk, M. (2012). A descriptive analysis of nursing satisfaction: First-time versus non-first-time medical-surgical patients. *Health Marketing Quarterly*, *29* (4), 303–310. https://doi.org/10.1080/07359683.2012.732853	2012		patient satisfaction	medical (nurses)	The survey utilized a 5-point Likert scale format for the satisfaction section (1 = strongly agree; 5 = strongly disagree). Within the area of nursing satisfaction, the following questions were utilized: • My nurses were friendly and courteous. • My nurses responded promptly to my calls. • My nurses had a positive attitude about my requests. • My nurses were attentive to my special or personal needs. • My nurses kept me informed. • My nurses were skilled.
31	Ostwald, G. B. (1991). *Participative decision-making as a management strategy for increasing job satisfaction at work and marital satisfaction at home* [Doctoral dissertation]. University of Denver.	1991	disser	job satisfaction, marital satisfaction	participative decision making	Section two of the survey instrument included twenty questions that make up the short form of the Minnesota Satisfaction Questionnaire (MSQ) which was used to measure job satisfaction (Weiss, Davis, England and Lofquist, 1967). Section three of the survey instrument included 24 items that make up a revised form of the Dyadic Adjustment Scale (DAS) which is used to measure marital satisfaction (Spanier, 1976).
32	PESaM Collaborating Group, Kimman, M. L., Wijsenbeek, M. S., Van Kuijk, S. M. J., Wijnsma, K. L., Van De Kar, N. C. A. J., Storm, M., Van Jaarsveld, X., & Dirksen, C. D. (2019). Validity of the Patient Experiences and Satisfaction with Medications (PESaM) Questionnaire. *The Patient - Patient-Centered Outcomes Research*, *12* (1), 149–162. https://doi.org/10.1007/s40271-018-0340-6	2019		Patient Experiences and Satisfaction with Medications (PESaM) Questionnaire	medical	
33	Pinxten, M., De Laet, T., Van Soom, C., Peeters, C., & Langie, G. (2019). Purposeful delay and academic achievement: A critical review of the Active Procrastination Scale. *Learning and Individual Differences*, *73*, 42–51. https://doi.org/10.1016/j.lindif.2019.04.010	2019		outcome satisfaction as a subscale of a procrastination scale	achievememt	The Active Procrastination Scale (APS), developed by Choi and Moran (2009) is most commonly used to measure purposeful delay. The APS discriminates between four different subcomponents: Outcome Satisfaction (i.e., students are pleased with their results even after rushing through a task), Preference for Pressure (i.e., a preference for working under tight deadlines), Intentional Decision (i.e., deliberately postponing tasks), and Ability to Meet Deadlines (i.e., the ability to complete tasks and activities on time).
34	Politi, M. C., Kaphingst, K. A., Liu, J. (Esther), Perkins, H., Furtado, K., Kreuter, M. W., Shacham, E., & McBride, T. (2016). A randomized trial examining three strategies for supporting health insurance decisions among the uninsured. *Medical Decision Making*, *36* (7), 911–922. https://doi.org/10.1177/0272989X15578635	2016		satisfaction with the information	health ensurance decisions	We used items from the Health Information National Trends Survey27 to measure satisfaction. We asked participants, "Based on the information provided about health insurance plans, how much do you agree or disagree with the following statements?" Statements included these: 1) It took a lot of effort to understand the information you needed. 2) You felt frustrated when viewing the information. 3) You were concerned about the quality of the health insurance plans. 4) You were concerned about the quality of information presented about the plans. 5) The information was hard to understand. Information was rated on a 4-point scale from strongly disagree (1) to strongly agree (4).
35	Prosen, M., & Piskar, F. (2015). Job satisfaction of Slovenian hospital nursing workforce. *Journal of Nursing Management*, *23* (2), 242–251. https://doi.org/10.1111/jonm.12121	2015		job satisfaction	medical (nurses)	The MMSS was developed in the early 1970s and further refined in 1990 (Mueller & McCloskey 1990). The instrument consists of 31 items on a Likert-type rating scale from 1 to 5 (1 indicating 'very dissatisfied' and 5 indicating 'very satisfied'). The MMSS measures the job satisfaction of nurses with: extrinsic rewards, scheduling, family and work balance, representing a safety rewards dimension; co-workers and interaction opportunities, representing a social rewards dimension; and professional opportunities, praise and recognition, control and responsibility, representing a psycholoqical rewards dimension.
36	Ritchie, J. B., & Miles, R. E. (1970). An analysis of quantity and quality of participation as mediating variables in the participative decision making process. *Personnel Psychology*, *23* (3), 347–359. https://doi.org/10.1111/j.1744-6570.1970.tb01661.x	1970		satisfaction with supervision	participative decision making	Our measures of perceived participation, superiors' attitudes toward their subordinates' capabilities, and satisfaction with immediate supervision were taken from a "Management DecisionMaking, Attitude, and Job Satisfaction Questionnaire."
37	Shukla, P. (2014). The impact of organizational efforts on consumer concerns in an online context. *Information & Management*, *51* (1), 113–119. https://doi.org/10.1016/j.im.2013.11.003	2014		process satisfaction	consumer satisfaction	Apart from the process satisfaction measure, items were taken from existing scales. SL1 I am happy with refund and return policy on this site. SL2 I am happy with warranty of product on this site. SL3 The site allows me to buy at my own pace. SL4 I can save my shopping preferences on this site. SL5 I am happy with the site that allows me to create products or services to exactly fit my needs.
38	Skyring, T. A., Mansfield, K. J., & Mullan, J. R. (2021a). Factors affecting satisfaction with the decision-making process and decision regret for men with a new diagnosis of prostate cancer. *American Journal of Men's Health*, *15* (4), 15579883211026812. https://doi.org/10.1177/15579883211026812	2021		satisfaction with the decision making process, Treatment Decision-Making Satisfaction Scale (Victorson et al., 2016) and the Decision Regret Scale (Brehaut et al., 2003)	medical	A modification of the Treatment Decision-Making Satisfaction Scale (TDM-SAT) (Victorson et al., 2016) was used to measure satisfaction with the decision making process. Item 1: My treatment decision making options were clear to me. Item 2: It was easy for me to decide on the treatment I chose. Item 3: I am satisfied with the level of communication I had with my physician about treatment options. Item 4: Overall, I am satisfied with my treatment decision making experience. Item 5: Overall, I am satisfied with the treatment I chose.
39	Smith, R. W. (1996). *Participatory decision-making, job satisfaction, and teacher absenteeism in selected Florida middle schools* [Doctoral dissertation]. Mississippi State University.	1996	disser	job satisfaction, participatory decision making	work place (school teachers)	A questionnaire entitled Participatory Decision-Making/Job Satisfaction Questionnaire developed by the researcher and the Job Satisfaction Index developed by Brayfield and Rothe (1951) along with three open-ended questions designed by the researcher were used to survey the teacher population.
40	Steel, P., Schmidt, J., & Shultz, J. (2008). Refining the relationship between personality and subjective well-being. *Psychological Bulletin*, *134* (1), 138–161. https://doi.org/10.1037/0033-2909.134.1.138	2008	meta-	life satisfaction	personality, well-being [list of well-being scales]	[list of well-being scales]
41	Strickland, S. (2014). *Analysis of job satisfaction among North Carolina community college faculty teaching in traditional, distance education, and blended learning systems* [Doctoral dissertation]. Trident University.	2014	disser	job satisfaction, Minnesota Satisfaction Questionnaire (MSQ)	work place (teaching)	
42	Sun, H., Fang, Y., & Hsieh, J. J. P.-A. (2014). Consuming information systems: An economic model of user satisfaction. *Decision Support Systems*, *57*, 188–199. https://doi.org/10.1016/j.dss.2013.09.002	2014		user satisfaction, We adopted the single-item 0 to 100 ratio scale [59,96] to measure user satisfaction	information system (IS)	Overall, how satisfied have you been with the SIS?; Not at all satisfied (0%) -- Half satisfied (50%) -- Completely satisfied (100%); Oliver et al. (1983, 1982), Westbrook (1980, 1981)
43	Szrek, H. (2017). How the number of options and perceived variety influence choice satisfaction: An experiment with prescription drug plans. *Judgment and Decision Making*, *12* (1), 42–59. https://doi.org/10.1017/S1930297500005234	2017		choice outcome satisfaction, and choice process satisfaction	consumer satisfaction	Outcome satisfaction: How much do you like the plan you decided to pick? Scale 1–7, (1) Not at all, (7) Extremely; Process satisfaction: How much did you enjoy making the choice? Scale 1–7, (1) Not at all, (7) Extremely
44	Thirumalai, S., & Sinha, K. K. (2013). To personalize or not to personalize online purchase interactions: Implications of self-selection by retailers. *Information Systems Research*, *24* (3), 683–708. https://doi.org/10.1287/isre.1120.0471	2013		satisfaction with the different aspects of the online purchase	customer satisfaction	The first part of the survey assesses the levels of satisfaction with the different aspects of the online purchase such as ease of ordering, product selection, product information, prices, website performance, and shipping on a tenpoint scale.
45	Thomas, K. (2022). *Quantitative study of succession planning and employee morale* [Doctoral dissertation]. Northcentral University.	2022	disser	Minnesota Satisfaction Questionnaire 20 Question Short-Form	employee satisfaction	
46	Wang, H., & Liu, Y. (2014). Effect of compatibility between decision target and processing strategy on postdecision satisfaction. *Social Behavior & Personality: An International Journal*, *42* (3), 423–435. https://doi.org/10.2224/sbp.2014.42.3.423	2014		postdecision satisfaction	self vs. other decision, processing strategy	degree of postdecision satisfaction (1 = not at all satisfied to 7 = extremely satisfied)
47	Wijngaards, I., King, O. C., Burger, M. J., & van Exel, J. (2022). Worker well-being: What it is, and how it should be measured. *Applied Research in Quality of Life*, *17* (2), 795–832. https://doi.org/10.1007/s11482-021-09930-w	2022	review	job satisfaction, life satisfaction	worker well-being [list of scales]	The second question will be addressed by creating an illustrative overview of measures for ten constructs that fall under the conceptual umbrella of worker well-being: life satisfaction, dispositional affect, moods, emotions, psychological well-being, job satisfaction, dispositional job affect, job moods, job emotions and work engagement.

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F Reasons and Principles

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F.1 Search String 1

F.1.1 PsycInfo

Table F.1 Variations of Search String 1 and Number of Hits on PsycInfo.

#	Explanation Search String/ Explanation Change	Search String	PsycInfo # of Hits
1	Multi-purpose, mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment).mp.	1
2	All fields, truncated	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment).af.	251
	Less Specific		
3	All fields, "experiment" truncated	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment*).af.	793
4	All fields, without "experiment"	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process")).af.	1054
	More Specific		
5	All fields, "reasoning" and "reasonable" excluded	(((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment) not (reasoning or reasonable)).af.	73
	Less and More Specific		
6	All fields, "experiment" truncated; "reasoning" and "reasonable" excluded	(((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and experiment*) not (reasoning or reasonable)).af.	253

Note. All searches were performed in Feb. 2024. Searches are numbered and will be referred to by number. The search on grey background will be used for further processing.

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Comment on the Choice of Searches (Search String 1, PsycInfo) The multi-purpose search (Search #1) – which included title and abstract – needed to be broadened. Even when including 'all fields' (Search #2) the number of results is small. The search could be made less specific truncating 'experiment' (#3) or leaving it out altogether (#4). Looking at first results however, I decided against this de-specification. Furthermore, based on a first screening of abstracts, it turned out that several hits were due to common formulations such as "the reason why..." or "in principle,..." or "ruled out that..." etc.; most of these formulation-based hits seemed due to words starting with 'reason' as the word stem (to reason, reasoning, reasonable). Thus, I tested to exclude 'reasoning' and 'reasonable' which substantially reduced the number of hits (#5, #6). Yet, it does not make sense to entirely exclude terms that are used often and in very general scientific discourse.

Accordingly, Search #2 (on grey background) was chosen to be the main search to be further processed.

Table F.2 Screening 2 for Search #2 from Search String 1 on PsycInfo and Additional Information.

	Reference	Year	Fit	Domain / Content	(Mis-)Fit Bc /About
1	Baranski, J. V., & Petrusic, W. M. (2001). Testing architectures of the decision-confidence relation. *Canadian Journal of Experimental Psychology* , *55* (3), 195–206. https://doi.org/10.1037/h0087366	2001		confidence processing occurs both during the decision process and postdecisionally	confidence judgments
2	Basu, S., & Savani, K. (2017). Choosing one at a time? Presenting options simultaneously helps people make more optimal decisions than presenting options sequentially. *Organizational Behavior and Human Decision Processes* , *139* , 76–91. https://doi.org/10.1016/j.obhdp.2017.01.004	2016		options presented simultaneously or sequentially	choosing the dominating option
3	Bilancini, E., & Boncinelli, L. (2018). Rational attitude change by reference cues when information elaboration requires effort. *Journal of Economic Psychology* , *65* , 90–107. https://doi.org/10.1016/j.joep.2018.03.004	2018		parsimonious model of persuasion by means of reference cues	persuasion and processing
4	Broniarczyk, S. M., & Griffin, J. G. (2014). Decision difficulty in the age of consumer empowerment. *Journal of Consumer Psychology* , *24* (4), 608–625. https://doi.org/10.1016/j.jcps.2014.05.003	2014		decision difficulty	review
5	Brown, N. R. (2008). How metastrategic considerations influence the selection of frequency estimation strategies. *Journal of Memory and Language* , *58* (1), 3–18. https://doi.org/10.1016/j.jml.2007.09.004	2007		optimizes performance at the task level rather than the trial level	strategy selection
6	Bryant, D. J. (2014). Strategy selection in cue-based decision making. *Canadian Journal of Experimental Psychology / Revue Canadienne de Psychologie Expérimentale* , *68* (2), 97–110. https://doi.org/10.1037/cep0000020	2014		contradict the view that heuristics are more likely to be adopted when a task is made more cognitively demanding	strategy selection, classification
7	Cheng, J., & González-Vallejo, C. (2017). Action dynamics in intertemporal choice reveal different facets of decision process. *Journal of Behavioral Decision Making* , *30* (1), 107–122. https://doi.org/10.1002/bdm.1923	2017		supports the distinction of decision uncertainty and decision conflict	intertemporal choice
8	Clithero, J. A. (2018). Response times in economics: Looking through the lens of sequential sampling models. *Journal of Economic Psychology* , *69* , 61–86. https://doi.org/10.1016/j.joep.2018.09.008	2018		many RT phenomena in the economics literature are consistent with the predictions of the DDM	RT in economic analysis
9	Elbanna, S., Ali, A. J., & Dayan, M. (2011). Conflict in strategic decision making: Do the setting and environment matter? *International Journal of Conflict Management* , *22* (3), 278–299. https://doi.org/10.1108/10444061111152973	2010		conflict in strategic decision making in Egypt	not experimental
10	Esch, M., Schnellbächer, B., & Wald, A. (2019). Does integrated reporting information influence internal decision making? An experimental study of investment behavior. *Business Strategy and the Environment* , *28* (4), 599–610. https://doi.org/10.1002/bse.2267	2018		how financial, unlinked financial and nonfinancial, and integrated information affect the outcomes of investment decisions	information and investment decision
11	Ettlin, F., Bröder, A., & Henninger, M. (2015). A new task format for investigating information search and organization in multiattribute decisions. *Behavior Research Methods* , *47* (2), 506–518. https://doi.org/10.3758/s13428-014-0482-y	2014		we often face information that is not well-structured; that is, we not only have to search for, but we also need to organize the information	subjective information organization
12	Fisher, G., & Neubert, E. (2023). Evaluating ventures fast and slow: Sensemaking, intuition, and deliberation in entrepreneurial resource provision decisions. *Entrepreneurship Theory and Practice* , *47* (4), 1298–1326. https://doi.org/10.1177/10422587221093291	2023		decision process of individuals evaluating whether to support an entrepreneurial endeavor	conceptual paper
13	Giblin, C. E., Morewedge, C. K., & Norton, M. I. (2013). Unexpected benefits of deciding by mind wandering. *Frontiers in Psychology* , *4* , Article 598. https://doi.org/10.3389/fpsyg.2013.00598	2013		compare post-choice satisfaction from choices made by mind wandering to reason-based choices and randomly assigned outcomes	poster study, satisfaction
14	Gist, M. E., Hopper, H., & Daniels, D. (1998). Behavioral simulation: Application and potential in management research. *Organizational Research Methods* , *1* (3), 251–295.	1998		methodology for adressing contextual factors in organizations	behavioral simulation
15	Jacoby, J., Troutman, T., Mazursky, D., & Kuss, A. (1984). When feedback is ignored: Disutility of outcome feedback. *Journal of Applied Psychology* , *69* (3), 531–545.	1984		better performing decision makers are more likely to ignore outcome-only feedback	feedback, security analysis
16	Kirschenbaum, S. S. (1992). Influence of experience on information-gathering strategies. *Journal of Applied Psychology* , *77* (3), 343–352.	1992		differences according to level of experience	information gathering strategies
17	Konovalov, A., & Ruff, C. C. (2022). Enhancing models of social and strategic decision making with process tracing and neural data. *WIREs Cognitive Science* , *13* (1), e1559. https://doi.org/10.1002/wcs.1559	2022		use of process data	social decision making
18	Koop, G. J., & Johnson, J. G. (2011). Response dynamics: A new window on the decision process. *Judgment and Decision Making* , *6* (8), 750–758. https://doi.org/10.1017/S1930297500004186	2011		tracking mouse paths during a continuous response	measure the growth of preference
19	Koop, G. J., & Johnson, J. G. (2013). The response dynamics of preferential choice. *Cognitive Psychology* , *67* (4), 151–185. https://doi.org/10.1016/j.cogpsych.2013.09.001	2013		validate response dynamics for use in preferential choice tasks	response dynamics
20	Kuvaas, B., & Selart, M. (2004). Effects of attribute framing on cognitive processing and evaluation. *Organizational Behavior and Human Decision Processes* , *95* (2), 198–207. https://doi.org/10.1016/j.obhdp.2004.08.001	2004		that negative framing stimulates more effortful and thorough information processing than positive framing	recall, confidence
21	Lehnert, K., Park, Y., & Singh, N. (2015). Research note and review of the empirical ethical decision-making literature: Boundary conditions and extensions. *Journal of Business Ethics* , *129* (1), 195–219. https://doi.org/10.1007/s10551-014-2147-2	2014		Awarenessm Judgment, Intent, Behavior, business literature	ethical decision making
22	Li, H., Huang, L., Zhang, Y., & Ni, S. (2016). Effects of intuition and deliberation on escape judgment and decision-making under different complexities of crisis situations. *Safety Science* , *89* , 106–113. https://doi.org/10.1016/j.ssci.2016.06.006	2016		people prefer searching for an exit and avoiding smoke rather than following the crowd	intuition vs. deliberation, crisis
23	Li, H., Shi, Y., Zhang, Y., Huang, L., & Gao, A. A. (2015). Influence of information sources on escape judgment with intuition and after deliberation. *Safety Science* , *78* , 101–110. https://doi.org/10.1016/j.ssci.2015.03.024	2015		inattentional blindness in intuition in a crisis situation	intuitive decision processses

(Continued on next page.)

Table F.2 (Continued.)

24	Lindner, F., & Rose, J. (2017). No need for more time: Intertemporal allocation decisions under time pressure. *Journal of Economic Psychology* , *60* , 53–70. https://doi.org/10.1016/j.joep.2016.12.004	2017		stability of time preferences under time pressure	intertemporal allocation choices
25	Lu, H.-C., Chen, M., & Chang, J.-J. (2005). Are more alternatives better for decision-makers? A note on the role of decision cost. *Theory and Decision* , *58* (3), 283–304. https://doi.org/10.1007/s11238-005-5063-1	2005		a formal theoretical model that introduces decision costs into the rational decision process	a larger feasible set may actually lower an individual's level of satisfaction
26	Lunn, P. D., Bohacek, M., McGowan, F. P., & Ní Choisdealbha, Á. (2020). The surplus identification task and limits to multiattribute consumer choice. *Journal of Experimental Psychology: Applied* , *26* (2), 312–338. https://doi.org/10.1037/xap0000252	2020		a novel experimental method for investigating the accuracy of consumer decision making	precision-bias trade-off
27	McManus, J. (2018). Hubris and unethical decision making: The tragedy of the uncommon. *Journal of Business Ethics* , *149* (1), 169–185. https://doi.org/10.1007/s10551-016-3087-9	2016		CEO hubris and the unethical practice of earnings manipulation	hubris, ethical decision making
28	Nocella, G., Boecker, A., Hubbard, L., & Scarpa, R. (2012). Eliciting consumer preferences for certified animal-friendly foods: Can elements of the Theory of Planned Behavior improve choice experiment analysis? *Psychology & Marketing* , *29* (11), 850–868. https://doi.org/10.1002/mar.20569	2012		constructs developed using the Ajzen model are useful in explaining heterogeneity of preferences	explain stated preferences over certified animal-friendly foods
29	Otto, A. S., Clarkson, J. J., & Martin, N. S. (2022). Working hard to take the easy way out: How the need for cognitive closure shapes strategic effort investment to ease future decision making. *Journal of Consumer Psychology* , *32* (2), 350–356. https://doi.org/10.1002/jcpy.1245	2022		conceptual framework for when and why those seeking closure allocate effort in decision making	effort, repeat decisions
30	Pfeiffer, J., Duzevik, D., Rothlauf, F., Bonabeau, E., & Yamamoto, K. (2015). An optimized design of choice experiments: A new approach for studying decision behavior in choice task experiments. *Journal of Behavioral Decision Making* , *28* (3), 262–280. https://doi.org/10.1002/bdm.1847	2014		the proposed genetic algorithm is capable of generating diagnostic choice tasks	optimal experiment design
31	Quintane, E., & Carnabuci, G. (2016). How do brokers broker? Tertius gaudens, tertius iungens, and the temporality of structural holes. *Organization Science* , *27* (6), 1343–1360. https://doi.org/10.1287/orsc.2016.1091	2016		brokers as a dynamic force driving change in organizational networks	organizational network research
32	Samson, K., & Bhanugopan, R. (2022). Strategic human capital analytics and organisation performance: The mediating effects of managerial decision-making. *Journal of Business Research* , *144* , 637–649. https://doi.org/10.1016/j.jbusres.2022.01.044	2022		strategic human capital analytics	not experimental
33	Schneider, S., & Leyer, M. (2019). Me or information technology? Adoption of artificial intelligence in the delegation of personal strategic decisions. *Managerial and Decision Economics* , *40* (3), 223–231. https://doi.org/10.1002/mde.2982	2019		the impact of choice complexity and cognitive perceptions on the willingness to delegate a strategic decision to an algorithm	subjective perceptions of decision complexity
34	Shi, Y., & Li, H. (2021). How a crisis mindset activates intuitive decision process: Role of inattentional blindness. *Psychological Research* , *85* (2), 592–604. https://doi.org/10.1007/s00426-019-01281-4	2021		crisis literature	relationship among crisis mindset, inattentional blindness, and intuitive decision
35	Spadaro, G., Graf, C., Jin, S., Arai, S., Inoue, Y., Lieberman, E., Rinderu, M. I., Yuan, M., Lissa, C. J. V., & Balliet, D. (2022). Cross-cultural variation in cooperation: A meta-analysis. *Journal of Personality and Social Psychology* , *123* (5), 1024–1088.	2022		cross-societal variation in impersonal cooperation	meta-analysis of 1,506 studies of impersonal cooperation in social dilemmas
36	Speier, C. (2006). The influence of information presentation formats on complex task decision-making performance. *International Journal of Human-Computer Studies* , *64* (11), 1115–1131. https://doi.org/10.1016/j.ijhcs.2006.06.007	2006		relationship between information presentation format and decision performance is moderated by the complexity of the task	effectiveness, human-computer interaction user interface design
37	Vermeir, I., Kenhove, P. V., & Hendrickx, H. (2002). The influence of need for closure on consumer's choice behaviour. *Journal of Economic Psychology* , *23* , 703–727.	2002		the influence of NFC on choice behav- iour in a low involvement purchase situation	amount of information sought, the amount of information used, the use of decision rules and the level of confidence
38	Villegas De Posada, C., & Vargas-Trujillo, E. (2015). Moral reasoning and personal behavior: A meta-analytical review. *Review of General Psychology* , *19* (4), 408–424. https://doi.org/10.1037/gpr0000053	2015		moral development on 4 domains of action (real life, honesty, altruism, and resistance to conformity)	meta-analytic review, morality
39	Von Helversen, B., & Mata, R. (2012). Losing a dime with a satisfied mind: Positive affect predicts less search in sequential decision making. *Psychology and Aging* , *27* (4), 825–839. https://doi.org/10.1037/a0027845	2012		positive affect is a key factor determining search in sequential decision making	positive affect lowered the initial threshold for accepting an attractive option, choice satisfaction
40	Vuckovic, A., Kwantes, P. J., & Neal, A. (2013). Adaptive decision making in a dynamic environment: A test of a sequential sampling model of relative judgment. *Journal of Experimental Psychology: Applied* , *19* (3), 266–284. https://doi.org/10.1037/a0034384	2013		people adapt to their own uncertainty by adjusting their criterion and the amount of time they take to collect evidence in order to make a more accurate decision	performance in relative judgment tasks
41	Walsh, S. E., & Feigh, K. M. (2022). Understanding human decision processes: Inferring decision strategies from behavioral data. *Journal of Cognitive Engineering and Decision Making* , *16* (4), 301–325. https://doi.org/10.1177/15553434221122899	2022		infer and classify decision strategies from human behavior	decision strategies = how many attributes used

Note. Only the $n = 41$ publications with full text were subjected to Screening 2.

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F.1.2 Google Scholar

Table F.3 Variations of Search String 1 and Number of Hits on Google Scholar.

#	Explanation Search String/ Explanation Change	Search String	Google Scholar # of Hits
1	All fields, automatically truncated	(reason* OR reason*-based) AND (principle* OR rule* OR maxim* OR rule-based) AND ("decision strategy" OR "decision process") AND experiment	19.600
2	All fields, truncation suppressed by ""	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND "experiment"	18.200
3	All fields, restricted to years 2014-2024	ditto	17.900
	More Specific		
4	In title, without space	intitle:(("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND "experiment")	902
5	In title, with space	intitle: (("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND "experiment")	79
6	In title, per group of synonyms	(intitle:"reason" OR "reason-based") AND (intitle:"principle" OR "rule" OR "maxim" OR "rule-based") AND (intitle:"decision strategy" OR "decision process") AND "experiment"	689
	More Restricted		
7	In title, just one term, without "experiment"	(intitle:reason) AND (intitle:rule) AND (intitle:"decision strategy")	0
8	In text, just one term, without "experiment"	(intext:reason) AND (intext:rule) AND (intext:"decision strategy")	9.860
9	In text / in title "decision strategy", just one term, without "experiment"	(intext:reason) AND (intext:rule) AND (intitle:"decision strategy")	71

Note. All searches were performed in Feb. 2024. Searches are numbered and will be referred to by number. The searches on grey background will be used for further processing.

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Comment on Search Functioning and Choice of Searches (Search String 1, Google Scholar) Google Scholar has limited search functions as compared to an academic database. Further differences are these: Google scholar automatically truncates and/or looks for similar words or synonyms which should be suppressed by quotation marks. Furthermore, the standard search is an 'all fields' search, but it is possible to specify to 'intitle' and 'intext'. It is important to not use a space after these field operators, because otherwise they are interpreted as further search terms. In my own experience, several of these functions are not reliable. For example, 'intitle' seems to default to the abstract, it certainly is not restricted to the title. Moreover, google seems to exaggerate the number of results; it may happen that you reach the end of results, but the number is smaller than displayed at the beginning. This hypothesis is consistent with the otherwise unlikely result that restricted to just one decade (2014-2024, Search #3) the number of results decreased by less than 2% as compared to the number of results without time constriction (Search #2).

In order to be comparable with the search on PsycInfo, for Google Scholar, too, an 'all fields' search was chosen to be the basic search, but since I was specifically interested in newer literature, I split it into two searches (Search #2 and #3). Furthermore, in spite of the fact that 'intitle' and 'intext' seem to be unreliable operators, a simple and restricted search with few results was added for screening (Search #9).

F.1.3 Summary

Table F.4 All Publications From Both PsycInfo and Google Scholar Rated 'Medium Fit' Based on Search String 1.

	Reference	Year	About
1	Anderson, C. J. (2003). The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. *Psychological Bulletin* , *129* (1), 139–167. https://doi.org/10.1037/0033-2909.129.1.139	2003	decision avoidance
2	Basu, S., & Savani, K. (2017). Choosing one at a time? Presenting options simultaneously helps people make more optimal decisions than presenting options sequentially. *Organizational Behavior and Human Decision Processes* , *139* , 76–91. https://doi.org/10.1016/j.obhdp.2017.01.004	2017	option presentation
3	Broniarczyk, S. M., & Griffin, J. G. (2014). Decision difficulty in the age of consumer empowerment. *Journal of Consumer Psychology* , *24* (4), 608–625. https://doi.org/10.1016/j.jcps.2014.05.003	2014	decision difficulty
4	Brown, N. R. (2008). How metastrategic considerations influence the selection of frequency estimation strategies. *Journal of Memory and Language* , *58* (1), 3–18. https://doi.org/10.1016/j.jml.2007.09.004	2008	strategy selection
5	Bryant, D. J. (2014). Strategy selection in cue-based decision making. *Canadian Journal of Experimental Psychology / Revue Canadienne de Psychologie Expérimentale* , *68* (2), 97–110. https://doi.org/10.1037/cep0000020	2014	strategy selection, classification
6	Chernev, A. (2003). Product assortment and individual decision processes. *Journal of Personality and Social Psychology* , *85* (1), 151–162. https://doi.org/10.1037/0022-3514.85.1.151	2003	strategy selection and preference articulation
7	Connolly, T., & Reb, J. (2012). Regret aversion in reason-based choice. *Theory and Decision* , *73* (1), 35–51. https://doi.org/10.1007/s11238-011-9269-0	2012	regret aversion
8	Croson, R. T. A. (1999). The disjunction effect and reason-based choice in games. *Organizational Behavior and Human Decision Processes* , *80* (2), 118–133. https://doi.org/10.1006/obhd.1999.2846	1999	reason-based choice and prisoner's dilemma
9	Ettlin, F., Bröder, A., & Henninger, M. (2015). A new task format for investigating information search and organization in multiattribute decisions. *Behavior Research Methods* , *47* (2), 506–518. https://doi.org/10.3758/s13428-014-0482-y	2015	subjective information organization
10	Glöckner, A., & Betsch, T. (2008). *Multiple-reason decision making based on automatic processing* (Working Paper 2008, 12; Preprints of the Max Planck Institute for Research on Collective Goods). Max Planck Institute for Research on Collective Goods. http://hdl.handle.net/10419/26949	2008	automatic processing
11	Hong, J., & Chang, H. H. (2015). "I" follow my heart and "we" rely on reasons: The impact of self-construal on reliance on feelings versus reasons in decision making. *Journal of Consumer Research* , *41* (6), 1392–1411. https://doi.org/10.1086/680082	2015	feelings versus reasoning
12	Liu, Z. (2018). Does reason writing reduce decision bias? Experimental evidence from judges in China. *The Journal of Legal Studies* , *47* (1), 83–118. https://doi.org/10.1086/696879	2018	reason writing and bias in judges
13	Ma, J., & Roese, N. J. (2014). The maximizing mind-set. *Journal of Consumer Research* , *41* (1), 71–92. https://doi.org/10.1086/674977	2014	deliberative vs. implemental mind-set and regret
14	Machin, J. E. (2016). Choosing by selecting or rejecting: How decision strategy influences consumer satisfaction. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior* , *29* , 5–29.	2016	decision thoughts and consumption satisfaction
15	Oh, H., Beck, J. M., Zhu, P., Sommer, M. A., Ferrari, S., & Egner, T. (2016). Satisficing in split-second decision making is characterized by strategic cue discounting. *Journal of Experimental Psychology: Learning, Memory, and Cognition* , *42* (12), 1937–1956. https://doi.org/10.1037/xlm0000284	2016	probabilistic classification task and varying time pressure
16	Ranyard, R. (1982). Binary choice patterns and reasons given for simple risky choice. *Acta Psychologica* , *52* (1–2), 125–135. https://doi.org/10.1016/0001-6918(82)90030-0	1982	reasons for choice with two risk dimensions
17	Takemura, K., Tamari, Y., & Ideno, T. (2023). Avoiding the worst decisions: A simulation and experiment. *Mathematics* , *11* (5), 1165. https://doi.org/10.3390/math11051165	2023	preventing bad decisions vs. seeking better ones
18	Vermeir, I., Kenhove, P. V., & Hendrickx, H. (2002). The influence of need for closure on consumer's choice behaviour. *Journal of Economic Psychology* , *23* , 703–727.	2002	need for closure and choice
19	Von Helversen, B., & Mata, R. (2012). Losing a dime with a satisfied mind: Positive affect predicts less search in sequential decision making. *Psychology and Aging* , *27* (4), 825–839. https://doi.org/10.1037/a0027845	2012	positive affect and search
20	Wichary, S., Kossowska, M., Orzechowski, J., Ślifierz, S., & Marković, J. (2008). Individual differences in decisiveness: Pre-decisional information search and decision strategy use. *Polish Psychological Bulletin* , *39* (1). https://doi.org/10.2478/v10059-008-0007-6	2008	information search, strategy selection, need for closure

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Evaluation of the Literature Search Yield As expected, there was not much literature to be found. The basis for the search was Search String 1 which did not include 'satisfaction'/'happiness'/'well-being'. I screened all $N = 251$ hits from PsycInfo and about the same amount of hits from Google Scholar where the total number of hits was given with roundabout $N = 20.000$.

After Screening 1, in total $N_{total} = 168$ hits[602] remained for Screening 2. Screening 2 sorted into three categories of fit (good/medium/no fit) and apart from Google Search #2, all searches produced >80% of 'no fit'.

In total, there were 4 articles with good fit (= 2% of 168) and 20 articles with medium fit (= 12% of 168). However, my filter for assigning 'medium fit' was very undemanding, such that the 'medium fit' articles are rather only useful for inspiration.

F.2 Search String 2

F.2.1 PsycInfo

Table F.5 Variations of Search String 2 and Number of Hits on PsycInfo.

#	Explanation Search String/ Explanation Change	Search String	PsycInfo # of Hits
1	Abstract	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and (satisfaction or happiness or well-being) and experiment*).ab.	1
	Less Specific		
2	All fields	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and (satisfaction or happiness or well-being) and experiment*).af.	303
3	All fields, without "experiment"	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process") and (satisfaction or happiness or well-being)).af.	387
	More Specific		
4	Abstract: "satisfaction"	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based) and ("decision strategy" or "decision process")).af. and (satisfaction or happiness or well-being).ab.	48
5	Abstract: "satisfaction" & "strategy"	((reason* or reason*-based) and (principle* or rule* or maxim* or rule-based)).af. and ((satisfaction or happiness or well-being) and ("decision strategy" or "decision process")).ab.	8

Note. All searches were performed in Feb. 2024. Searches are numbered and will be referred to by number. The searches on grey background were chosen for further processing. Be aware that Search #4 ($N = 48$ hits) entails Searches #1 and #5.

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[602] PsycInfo ($n = 41 + 27 = 68$) + Google #2 ($n = 34$) + Google #3 ($n = 48$) + Google #9 ($n = 18$) $\Longrightarrow N_{total} = 168$.

Table F.6 Screening 2 for Search #4 from Search String 2 on PsycInfo and Additional Information.

	Reference	Year	Fit	Double
1	Atkins, K. G., & Kim, Y.-K. (2016). Smart apparel shopping: A multidimensional and gender-neutral measure. *Clothing and Textiles Research Journal* , *34* (1), 3–19. https://doi.org/10.1177/0887302X15602097	2016		
2	Carter, T. J. (2009). *Comparative evaluations and centrality to the self: The causes and consequences of greater satisfaction with experiential over material purchases* [Doctoral dissertation, Cornell University]. https://ecommons.cornell.edu/server/api/core/bitstreams/86b556af-34fa-411c-b295-d1940a9e7479/content	2009		
3	Denstadli, J. M., & Lines, R. (2007). Conjoint respondents as adaptive decision makers. *International Journal of Market Research* , *49* (1), 117–132. https://doi.org/10.1177/147078530704900110	2007		
4	DePaoli, A. M. (2017). *Reason-product (in)compatibility: Implications of consumer reasoning for post-choice satisfaction* [Doctoral dissertation, Stanford University]. http://purl.stanford.edu/kf481qy0875	2017		Google, Str.2
5	Fiedler, S., & Glöckner, A. (2012). The dynamics of decision making in risky choice: An eye-tracking analysis. *Frontiers in Psychology* , *3* , Article 335.	2012		
6	Galotti, K. M., & Clare, L. R. (2014). Goals, styles, and decisions: Changes and interactions during the first year of college. *The American Journal of Psychology* , *127* (3), 383–396. https://doi.org/10.5406/amerjpsyc.127.3.0383	2014		
7	Giblin, C. E., Morewedge, C. K., & Norton, M. I. (2013). Unexpected benefits of deciding by mind wandering. *Frontiers in Psychology* , *4* , Article 598. https://doi.org/10.3389/fpsyg.2013.00598	2013		PsycInfo, Str.1 Google, Str.2
8	Gurel-Atay, E., Giese, J. L., & Godek, J. (2010). Retailer evaluation: The crucial link between in-store processes and shopping outcomes. *The International Review of Retail, Distribution and Consumer Research* , *20* (3), 297–310. https://doi.org/10.1080/09593969.2010.491202	2010		
9	Hartman, E. M. (2006). Can we teach character? An Aristotelian answer. *Academy of Management Learning & Education* , *5* (1), 68–81.	2006		
10	Heshmat, S. (2015). *Addiction: A behavioral economic perspective* . Routledge.	2015		
11	Hettich, D., Hattula, S., & Bornemann, T. (2018). Consumer decision-making of older people: A 45-year review. *The Gerontologist* , *58* (6), e349–e368. https://doi.org/10.1093/geront/gnx007	2018		
12	Huber, F., Köcher, S., Vogel, J., & Meyer, F. (2012). Dazing diversity: Investigating the determinants and consequences of decision paralysis. *Psychology & Marketing* , *29* (6), 467–478. https://doi.org/10.1002/mar.20535	2012		
13	Jeong, H. G., Christensen, K., & Drolet, A. (2016). The short-lived benefits of variety seeking among the chronically indecisive. *Journal of Experimental Psychology: Applied* , *22* (4), 423–435. https://doi.org/10.1037/xap0000098	2016		
14	Kane, G. A., James, M. H., Shenhav, A., Daw, N. D., Cohen, J. D., & Aston-Jones, G. (2022). Rat anterior cingulate cortex continuously signals decision variables in a patch foraging task. *The Journal of Neuroscience* , *42* (29), 5730. https://doi.org/10.1523/JNEUROSCI.1940-21.2022	2022		
15	Karimi, S., Holland, C. P., & Papamichail, K. N. (2018). The impact of consumer archetypes on online purchase decision-making processes and outcomes: A behavioural process perspective. *Journal of Business Research* , *91* , 71–82. https://doi.org/10.1016/j.jbusres.2018.05.038	2018		
16	Kleinman, G., Palmon, D., & Lee, P. (2003). The effects of personal and group level factors on the outcomes of simulated auditor and client teams. *Group Decision and Negotiation* , *12* , 57–84.	2003		
17	Lu, H.-C., Chen, M., & Chang, J.-J. (2005). Are more alternatives better for decision-makers? A note on the role of decision cost. *Theory and Decision* , *58* (3), 283–304. https://doi.org/10.1007/s11238-005-5063-1	2005		PsycInfo, Str.1
18	Orquin, J. L., & Mueller Loose, S. (2013). Attention and choice: A review on eye movements in decision making. *Acta Psychologica* , *144* (1), 190–206. https://doi.org/10.1016/j.actpsy.2013.06.003	2013		
19	Pieterse, A. H., de Vries, M., Kunneman, M., Stiggelbout, A. M., & Feldman-Stewart, D. (2013). Theory-informed design of values clarification methods: A cognitive psychological perspective on patient health-related decision making. *Social Science & Medicine* , *77* , 156–163. https://doi.org/10.1016/j.socscimed.2012.11.020	2013		Google, Str.2
20	Polman, E. (2010). Why are maximizers less happy than satisficers? Because they maximize positive and negative outcomes. *Journal of Behavioral Decision Making* , *23* (2), 179–190. https://doi.org/10.1002/bdm.647	2010		
21	Schwartz, B. (2020). Freedom as a cross to bear: Choice overload, the burdens of freedom, and the benefits of constraint. In K. E. Vail & C. Routledge (Eds.), *The Science of Religion, Spirituality, and Existentialism* (pp. 141–150). Academic Press. https://doi.org/10.1016/B978-0-12-817204-9.00011-1	2020		
22	Sirgy, M. J. (2021). *The psychology of quality of life: Wellbeing and positive mental health* (3rd ed., Vol. 83). Springer International Publishing. https://doi.org/10.1007/978-3-030-71888-6	2021		
23	Wells, R. E., & Iyengar, S. S. (2005). Positive illusions of preference consistency: When remaining eluded by one's preferences yields greater subjective well-being and decision outcomes. *Organizational Behavior and Human Decision Processes* , *98* (1), 66–87. https://doi.org/10.1016/j.obhdp.2005.05.001	2005		

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F.2.2 Google Scholar

Table F.7 Variations of Search String 2 and Number of Hits on Google Scholar.

#	Explanation Search String/ Explanation Change	Search String	Google Scholar # of Hits	Without Quotation Marks
		Search String 1 for Comparison		
	Search String 1, Google Search #1	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND "experiment"	18.100	
	Without quotation marks	(reason OR reason-based) AND (principle OR rule OR maxim OR rule-based) AND ("decision strategy" OR "decision process") AND experiment		20.100
		Search String 2 incl. Satisfaction Group		
	Basic Searches			
1	Based on Search String 1, plus satisfaction group	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND ("satisfaction" OR "happiness" OR "well-being") AND "experiment"	17.800	18.000
2	**In text** for satisfaction group	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND (intext:("satisfaction" OR "happiness" OR "well-being")) AND "experiment"	18.200	17.900
3	In text for satisfaction group, **each term**	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND ((intext:"satisfaction") OR (intext:"happiness") OR (intext:"well-being")) AND "experiment"	18.000	18.100
	More Specific			
4	**In title** for satisfaction group	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND (intitle:("satisfaction" OR "happiness" OR "well-being")) AND "experiment"	17.200	18.100
	Less Specific			
5	In title for satisfaction group, **without** "experiment"	("reason" OR "reason-based") AND ("principle" OR "rule" OR "maxim" OR "rule-based") AND ("decision strategy" OR "decision process") AND (intitle:("satisfaction" OR "happiness" OR "well-being"))	18.100	18.100
	More Restricted			
6	In title for **every** group, without "experiment"	(intitle:("reason" OR "reason-based")) AND (intitle:("principle" OR "rule" OR "maxim" OR "rule-based")) AND (intitle:("decision strategy" OR "decision process")) AND (intitle:("satisfaction" OR "happiness" OR "well-being"))	444	444

Note. All searches were performed in Feb. 2024. Searches are numbered and will be referred to by number. The searches on grey background will be used for further processing.

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Comment on Search Functioning and Choice of Searches (Search String 2, Google Scholar) The specifics and problems coming with a search in Google Scholar have already been commented on regarding Search String 1.

The numbers in the above table corroborate the suspicion that making a Google Scholar search more specific is difficult to do. The operator 'intext' makes virtually no difference (Searches #1, #2, #3), neither does using 'intitle' for the satisfaction group of search terms (Search #4). Only the last search (Search #6), using 'intitle' for every group of search terms, significantly reduced the number of search hits. A first inspection of hits indicated that these were reasonable search results, although certainly the operator 'intitle' *did not* guarantee the presence of search terms within the title as it should. (I already voiced the suspicion that 'intitle' rather generates results where the search terms come up within the abstract.)

Two searches were chosen for further processing: the most basic search which only added the satisfaction group of search terms to Search String 1 (Search #1) and the search with $N = 444$ hits (Search #6). Furthermore, I decided to use the versions without quotation marks since using them seemed to not make a viable difference. The rationale behind that choice was to keep it as simple as possible.

F.2.3 Summary

Table F.8 All Publications From Both PsycInfo and Google Scholar Rated 'Medium Fit' Based on Search String 2.

	Reference	Double Within Google String 2	Double To Further Searches
	PsycInfo		
1	Carter, T. J. (2009). *Comparative evaluations and centrality to the self: The causes and consequences of greater satisfaction with experiential over material purchases* [Doctoral dissertation, Cornell University]. https://ecommons.cornell.edu/server/api/core/bitstreams/86b556af-34fa-411c-b295-d1940a9e7479/content		
2	Gurel-Atay, E., Giese, J. L., & Godek, J. (2010). Retailer evaluation: The crucial link between in-store processes and shopping outcomes. *The International Review of Retail, Distribution and Consumer Research* , *20* (3), 297–310. https://doi.org/10.1080/09593969.2010.491202		
3	Karimi, S., Holland, C. P., & Papamichail, K. N. (2018). The impact of consumer archetypes on online purchase decision-making processes and outcomes: A behavioural process perspective. *Journal of Business Research* , *91* , 71–82. https://doi.org/10.1016/j.jbusres.2018.05.038		
	Google Scholar		
1	Amir, O. (2003). *Individual decision making: Pain, rules, and effort* [Doctoral dissertation, Massachusetts Institute of Technology]. https://dspace.mit.edu/bitstream/handle/1721.1/29945/52915302-MIT.pdf?sequence=2&isAllowed=y		
2	Anderson, C. J. (2003). The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. *Psychological Bulletin* , *129* (1), 139–167. https://doi.org/10.1037/0033-2909.129.1.139	X	Google, Str.1
3	Botti, S., & McGill, A. L. (2011). The locus of choice: Personal causality and satisfaction with hedonic and utilitarian decisions. *Journal of Consumer Research* , *37* (6), 1065–1078. https://doi.org/10.1086/656570	X	
4	Dijksterhuis, A., & Nordgren, L. F. (2006). A theory of unconscious thought. *Perspectives on Psychological Science* , *1* (2), 95–109. https://doi.org/10.1111/j.1745-6916.2006.00007.x		
5	Gallo, I., Sood, S., Mann, T. C., & Gilovich, T. (2017). The heart and the head: On choosing experiences intuitively and possessions deliberatively. *Journal of Behavioral Decision Making* , *30* (3), 754–768. https://doi.org/10.1002/bdm.1997		
6	Gu, Y., Botti, S., & Faro, D. (2013). Turning the page: The impact of choice closure on satisfaction. *Journal of Consumer Research* , *40* (2), 268–283. https://doi.org/10.1086/670252	X	
7	Hess, S., & Stathopoulos, A. (2013). A mixed random utility-random regret model linking the choice of decision rule to latent character traits. *Journal of Choice Modelling* , *9* , 27–38. https://doi.org/10.1016/j.jocm.2013.12.005		
8	Hong, J., & Chang, H. H. (2015). "I" follow my heart and "we" rely on reasons: The impact of self-construal on reliance on feelings versus reasons in decision making. *Journal of Consumer Research* , *41* (6), 1392–1411. https://doi.org/10.1086/680082		Google, Str.1
9	Hsee, C. K. (1999). Value seeking and prediction-decision inconsistency: Why don't people take what they predict they'll like the most? *Psychonomic Bulletin & Review* , *6* (4), 555–561. https://doi.org/10.3758/BF03212963		
10	Hsee, C. K., Hastie, R., & Chen, J. (2008). Hedonomics: Bridging decision research with happiness research. *Perspectives on Psychological Science* , *3* (3), 224–243. https://doi.org/10.1111/j.1745-6924.2008.00076.x		
11	Hsee, C. K., Zhang, J., Yu, F., & Xi, Y. (2003). Lay rationalism and inconsistency between predicted experience and decision. *Journal of Behavioral Decision Making* , *16* (4), 257–272. https://doi.org/10.1002/bdm.445		
12	Laborde, S., & Raab, M. (2013). The tale of hearts and reason: The influence of mood on decision making. *Journal of Sport and Exercise Psychology* , *35* (4), 339–357. https://doi.org/10.1123/jsep.35.4.339		
13	Liu, Z. (2018). Does reason writing reduce decision bias? Experimental evidence from judges in China. *The Journal of Legal Studies* , *47* (1), 83–118. https://doi.org/10.1086/696879		Google, Str.1
14	Ma, J., & Roese, N. J. (2014). The maximizing mind-set. *Journal of Consumer Research* , *41* (1), 71–92. https://doi.org/10.1086/674977		Google, Str.1
15	Mellers, B. A., Schwartz, A., & Cooke, A. D. J. (1998). Judgment and decision making. *Annual Review of Psychology* , *49* (1), 447–477. https://doi.org/10.1146/annurev.psych.49.1.447		
16	Pieters, R., & Zeelenberg, M. (2005). On bad decisions and deciding badly: When intention-behavior inconsistency is regrettable. *Organizational Behavior and Human Decision Processes* , *97* (1), 18–30. https://doi.org/10.1016/j.obhdp.2005.01.003		
17	Reb, J., & Connolly, T. (2010). The effects of action, normality, and decision carefulness on anticipated regret: Evidence for a broad mediating role of decision justifiability. *Cognition & Emotion* , *24* (8), 1405–1420. https://doi.org/10.1080/02699930903512168		
18	Schindler, D., Maiberger, T., Koschate-Fischer, N., & Hoyer, W. D. (2023). How speaking versus writing to conversational agents shapes consumers' choice and choice satisfaction. *Journal of the Academy of Marketing Science* . https://doi.org/10.1007/s11747-023-00987-7		
19	Schwartz, B. (2015). What does it mean to be a rational decision maker? *Journal of Marketing Behavior* , *1* (2), 113–145. https://doi.org/10.1561/107.00000007		
20	Shiv, B., & Huber, J. (2000). The impact of anticipating satisfaction on consumer choice. *Journal of Consumer Research* , *27* (2), 202–216. https://doi.org/10.1086/314320		
21	Siebert, J. U., Kunz, R. E., & Rolf, P. (2020). Effects of proactive decision making on life satisfaction. *European Journal of Operational Research* , *280* (3), 1171–1187. https://doi.org/10.1016/j.ejor.2019.08.011		
22	Strick, M., Dijksterhuis, A., Bos, M. W., Sjoerdsma, A., Van Baaren, R. B., & Nordgren, L. F. (2011). A meta-analysis on unconscious thought effects. *Social Cognition* , *29* (6), 738–762. https://doi.org/10.1521/soco.2011.29.6.738		
23	Tada, Y. (2000). *Descriptive meta-model of decision making* [Doctoral dissertation, Ohio State University]. https://www.proquest.com/docview/304609745/abstract/CE1C84F568444780PQ/1		
24	Voß, T. (2016). *The impact of choice expression modalities on choice rationality and choice satisfaction: An empirical investigation* [Doctoral dissertation]. Universität Mannheim.		
25	Zeelenberg, M. (1999). Anticipated regret, expected feedback and behavioral decision making. *Journal of Behavioral Decision Making* , *12* (2), 93–106. https://doi.org/10.1002/(SICI)1099-0771(199906)12:2<93::AID-BDM311>3.0.CO;2-S		

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Original Materials

Introduction to Original Materials

All studies presented in this manuscript – correlational studies as well as experiments – were conducted online via the tool SoSciSurvey (`https://www.soscisurvey.de/`). Original materials therefore are the web pages of the respective online questionnaires. Accordingly, the original materials will be presented as screenshots.

However, please note that the screenshots presented here were shot in the so-called "debug" mode of the online tool, and thus are different to what participants saw in two respects: Participants did not see the yellow bar on top and they did not see the little yellow bubbles to the right marking the respective variables. These are the only differences (you can keep in mind that participants simply did not see any yellow stuff). Why did I choose this version instead of exactly what participants saw? The reason is that the debug mode entails more information. If ever someone wanted to reanalyze the data this additional information, especially the variable names, might be helpful.

Second, please note that the original materials are presented in chronological order where possible. However, in case of online experiments, a chronological order only holds for each condition. Thereby, there are some parts that are identical over all conditions (the introduction, the end, the scenario contents) and the parts where the conditions differ (by the levels of the experimental factors). Accordingly, the presentation of online experiments cannot be completely chronological unless each condition would be presented as a whole including the identical parts, which would be extremely uneconomical, especially because of the repeated measures aspect due to the presentation of several scenario contents. Therefore, the presentation of the original materials of the online experiments is exemplary in part, but all showcased material was chosen such that (i) the experiment's general formal aspects are exemplarily displayed in that one condition is reported in full, (ii) the formal differences of the remaining conditions to the one fully presented condition are separately outlined, and (iii) that which needs extra comparison outside the logic of the conditions is additionally added. Furthermore, the screenshots are entitled such that their position within the design of the experiment is well-defined, and when specifics of a condition are displayed, the levels of the according experimental factors defining that condition are explicated.

Third, for some of the scales or subscales of scales I programmed their items to be displayed at random order. In these cases, the order of items as seen in the screenshots is just one of many possible orders. When a randomization of items was programmed for a scale or subscale this is reported in the Methods section of the respective study.

Forth, large pictures unfortunately create unwanted blank pages. This is a bug in LaTeX that I cannot solve right now. Please excuse.

Last, I am aware that the display of materials is rather small. Reading the digital version, this is easily remedied by enlarging the pdf. In the printed version, however,

long web pages with accordingly small print will likely be illegible. Please be reminded that all materials are described, translated and punctually visualized in the Materials section of the respective studies. The display of the original materials here is meant to provide a visual impression of how the study looked like rather than being the basis for a scrutiny of contents.

G Pilot Study (incl. SSQ & DSQ)

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G.1 Pilot Study

G.1.1 Reminder of the Study's Design

Type: combined study
- experiment (Part A) plus 1 additional questionnaire
- questionnaire study (Part B and Part C)

Factors (Part A): 2 independent variables (between) with 2 levels each
- *Decision Strategy*:
  - "decide by principle"
  - "decide by reasons"
- *Outcome*:
  - "positive"
  - "negative"

Scenario Contents (Part A): 1 scenario
- *Vignette:* meet friends or work on application

Dependent Variables (Part A): 4 dependent measures incl.1 questionnaire (Part B)
- pre outcome
  - *Option satisfaction*
  - *Strategy satisfaction*
- post outcome
  - *Mood* (3 items)
  - *Strategy Satisfaction Questionnaire (SSQ)* (Part B)

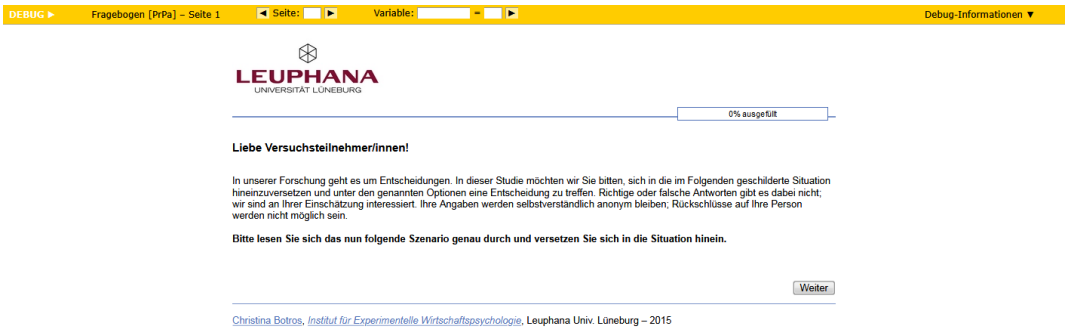
Additional Questionnaires (Part A):
- the Situational Eight DIAMONDS Scale S8-II

Questionnaire Study (Part B and Part C):
- the Strategy Satisfaction Questionnaire, SSQ (Part B)
- the Decision Style Questionnaire, DSQ (Part C)

G.1.2 Screenshots of the Original Online Study

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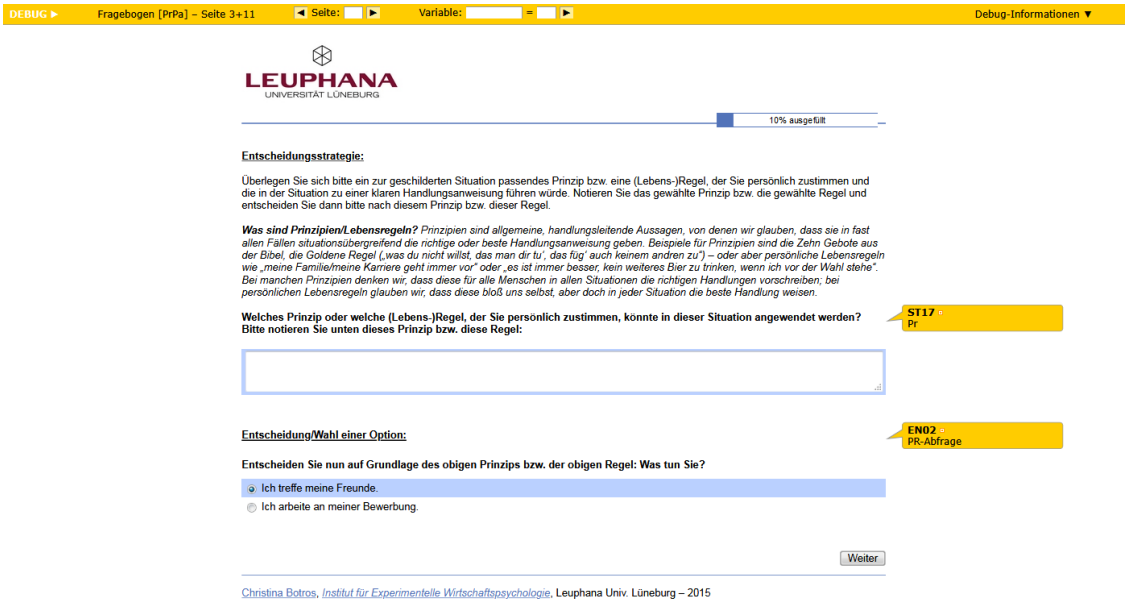
Introduction



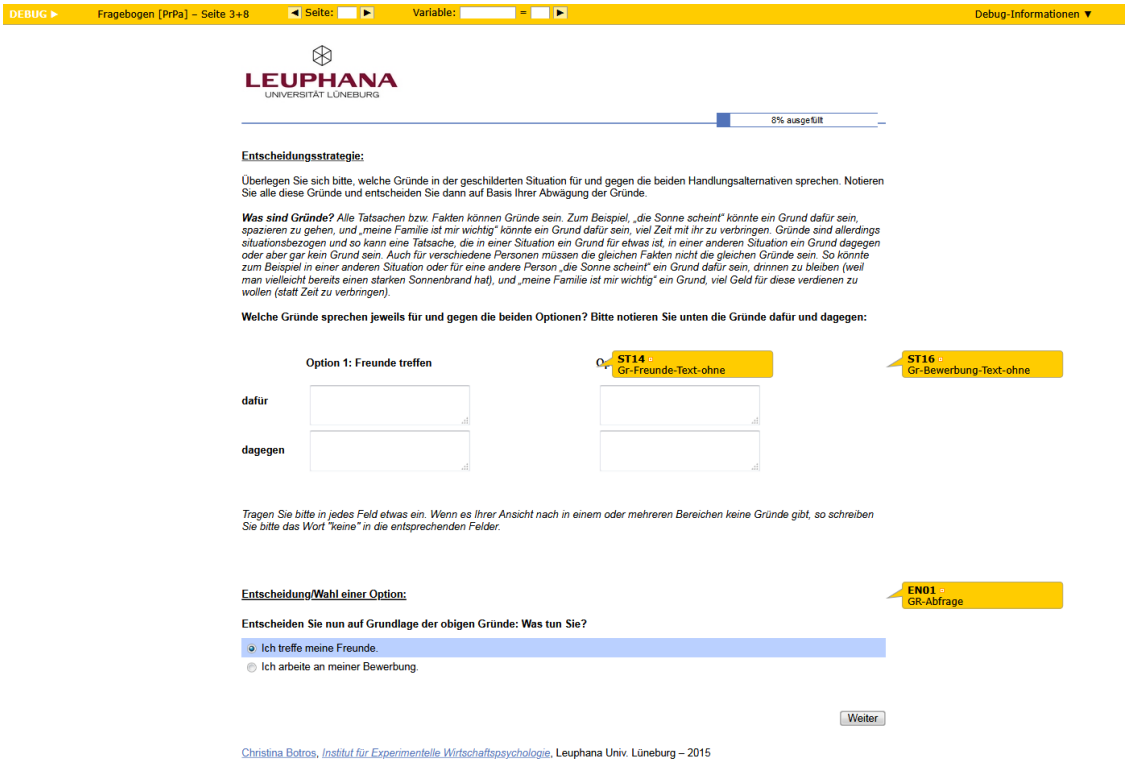
Scenario



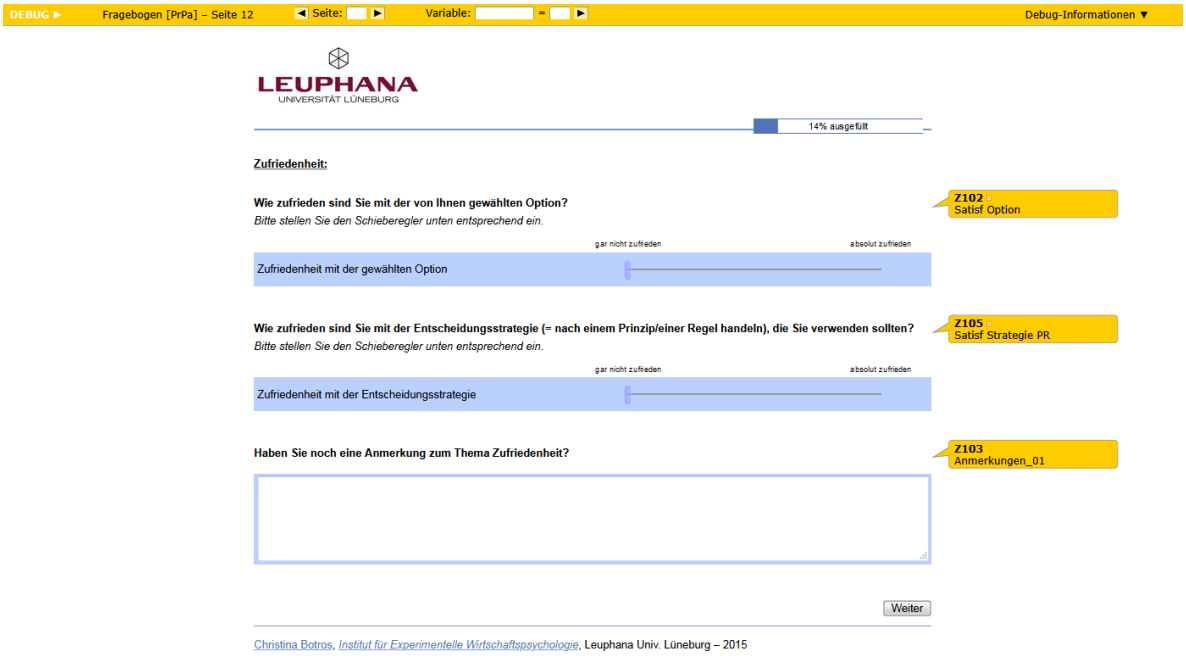
Decision Strategy Manipulation – Principle



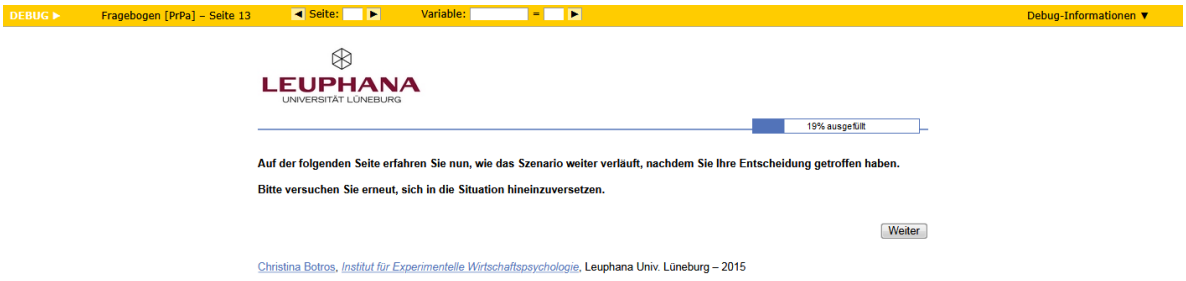
Decision Strategy Manipulation – Reasons



Dependent Measures (Pre Outcome)



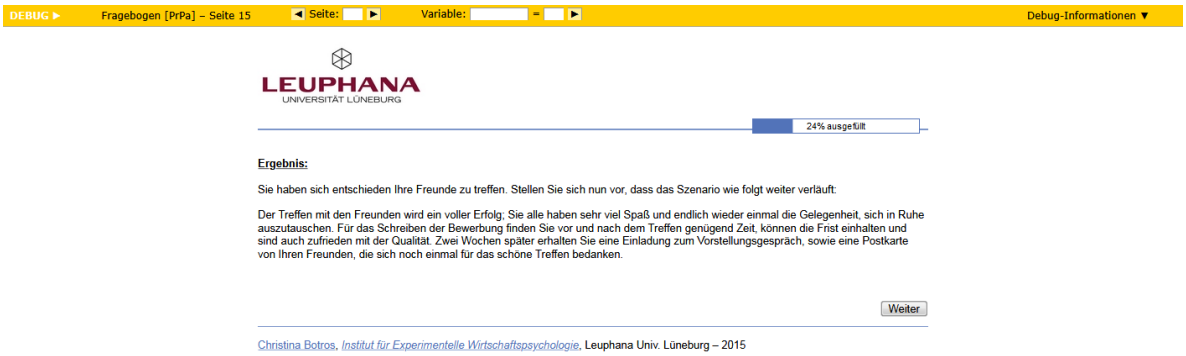
Intro Outcome



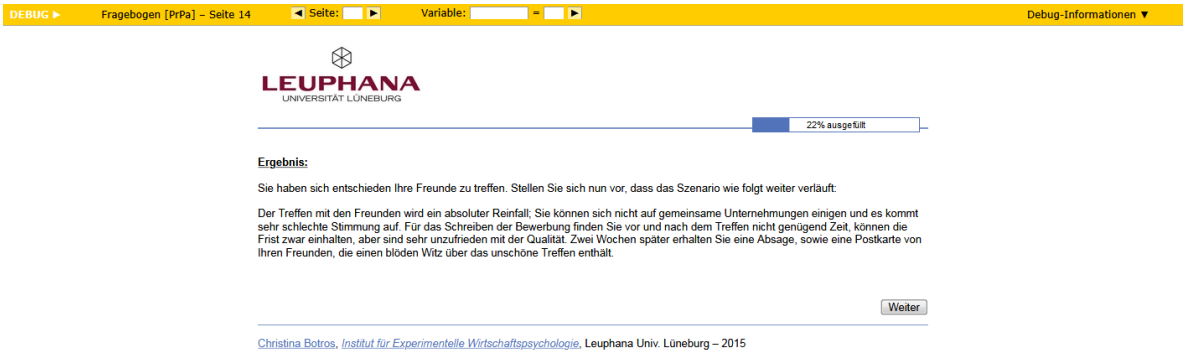
Outcomes

Friends

Positive Outcome

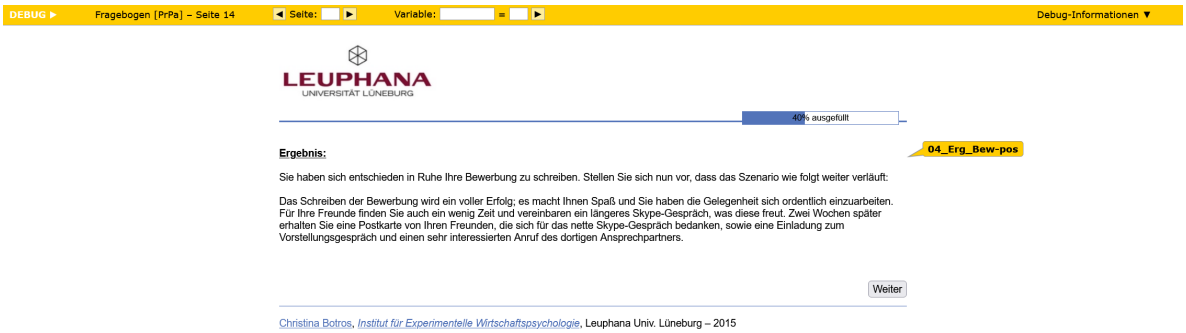


Negative Outcome



Application

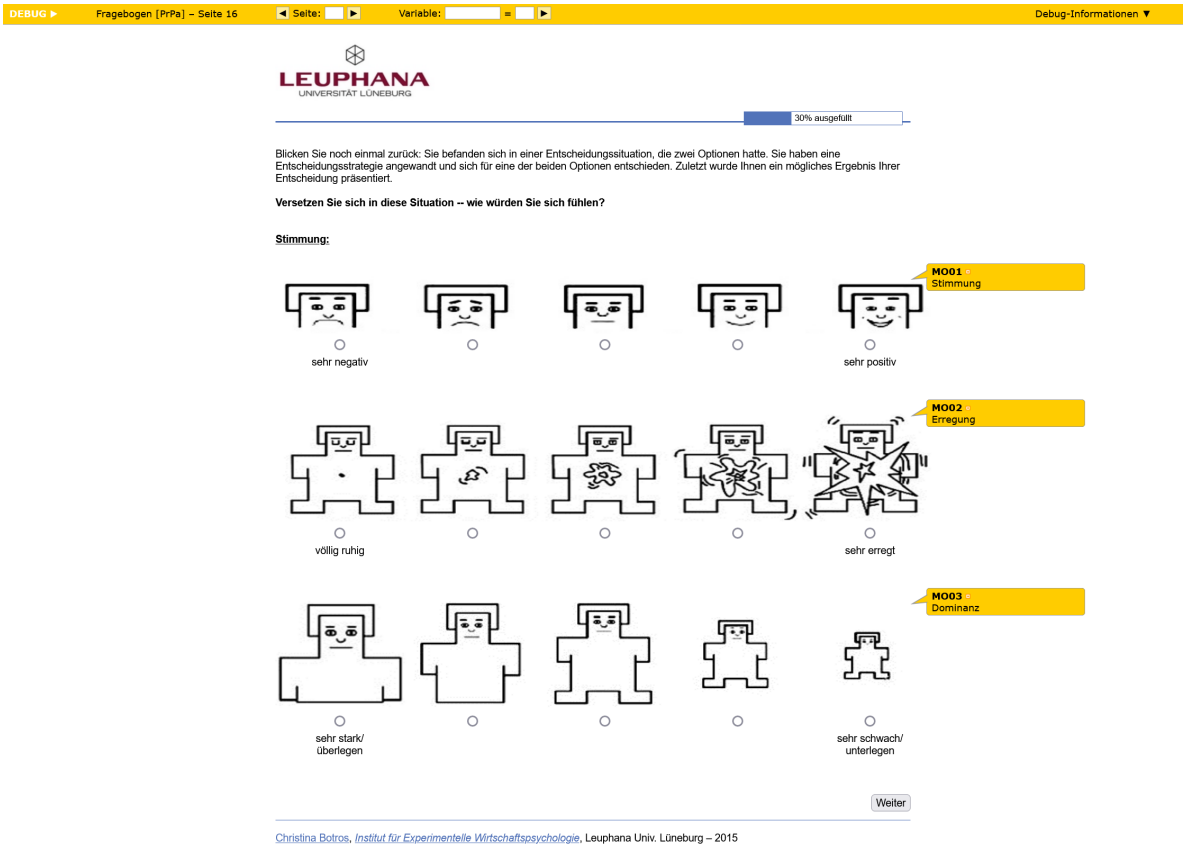
Positive Outcome



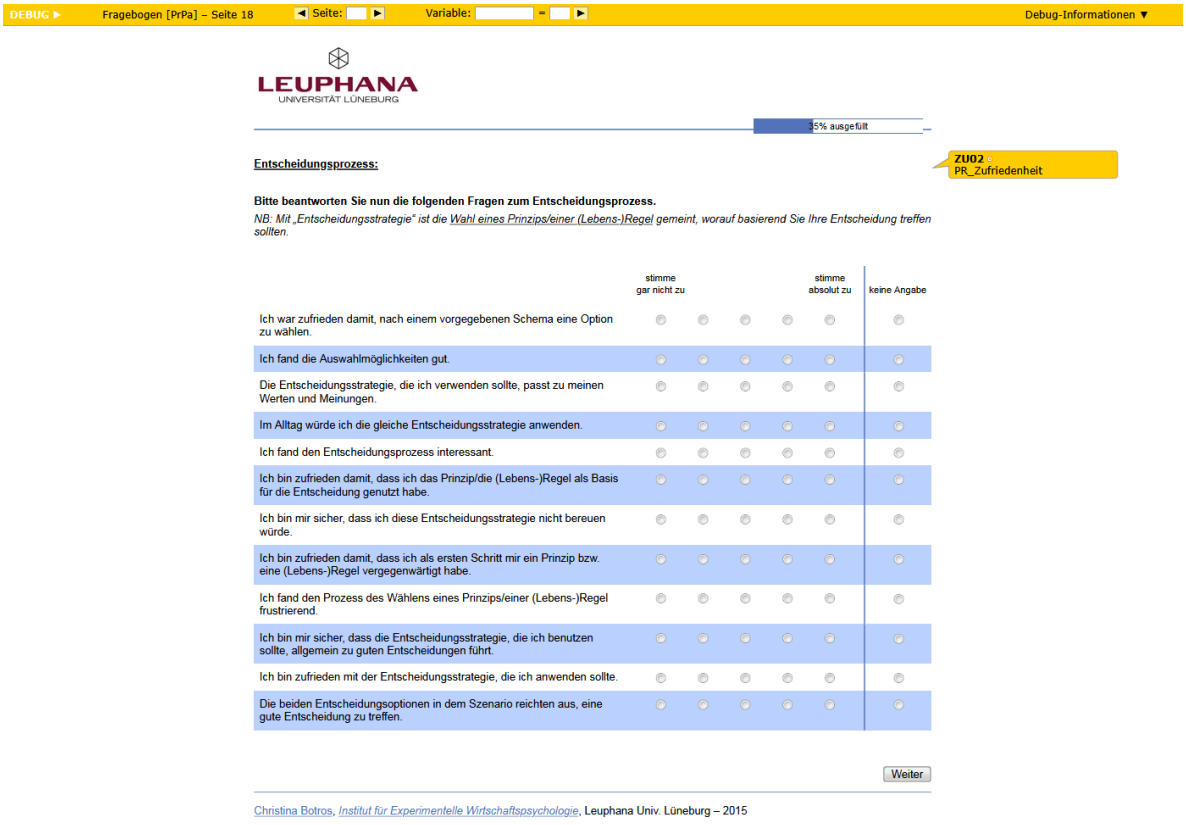
Negative Outcome



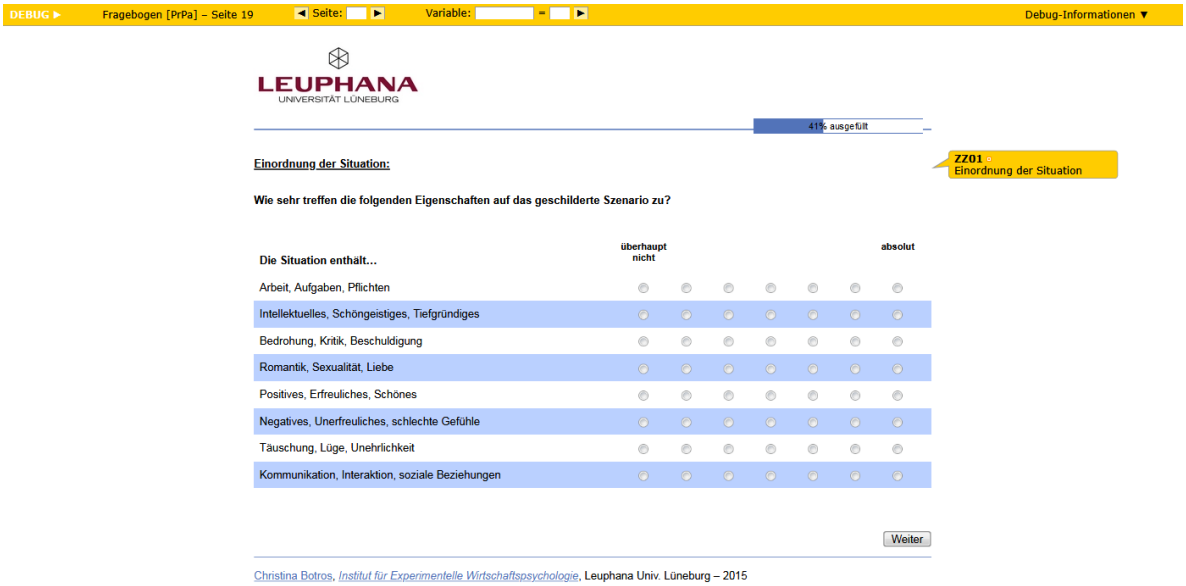
Mood (Post Outcome)



Strategy Satisfaction Questionnaire, SSQ (Post Outcome)



Situational Eight DIAMONDS Scale S8-II

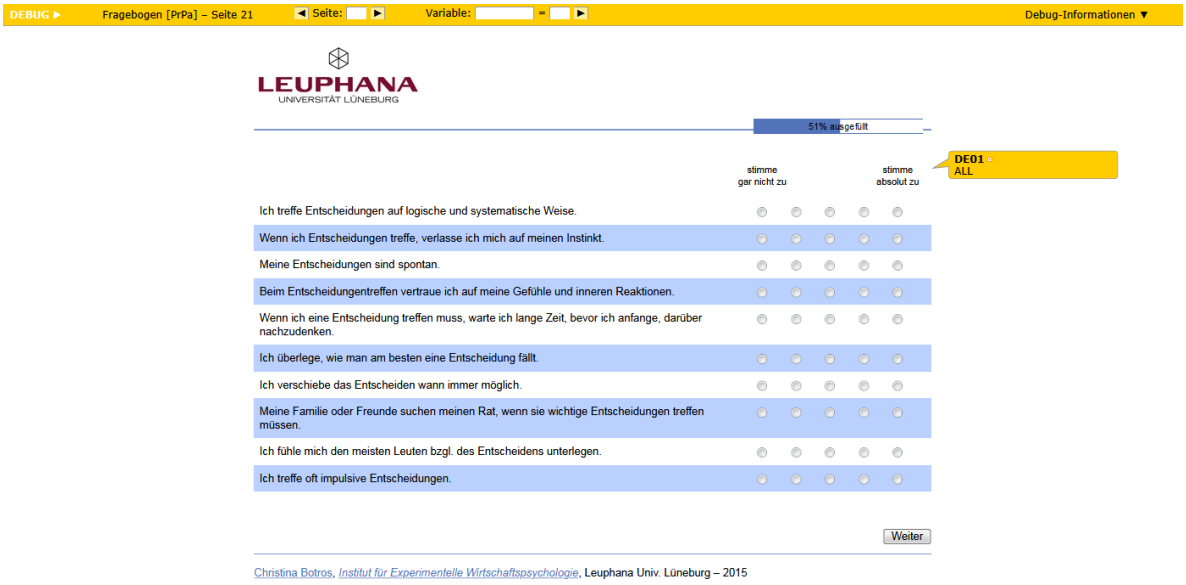


Decision Style Questionnaire (DSQ)

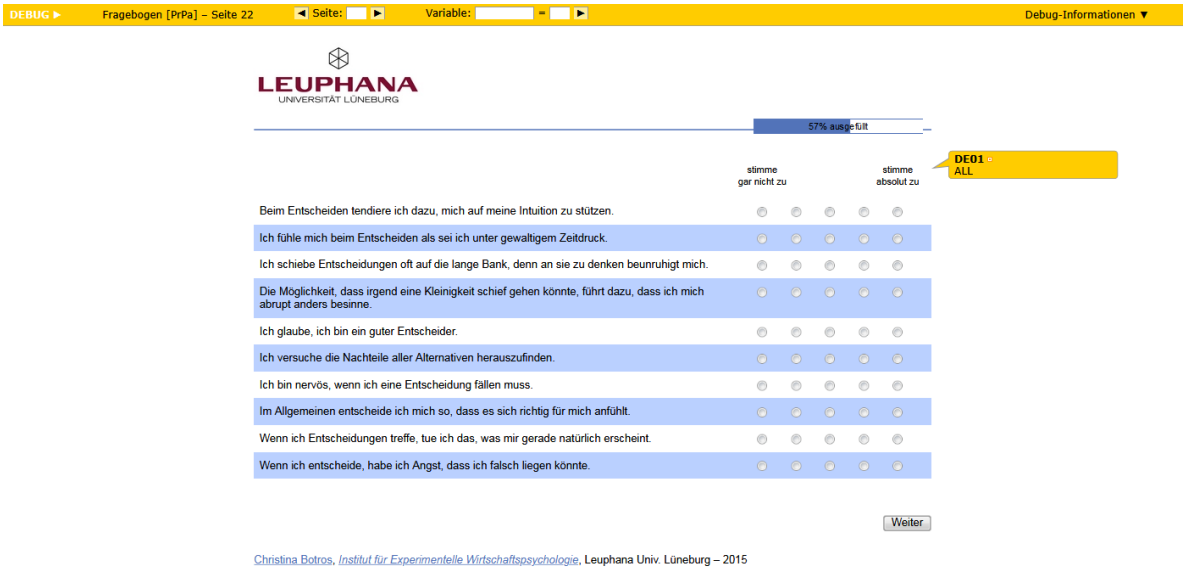
Intro



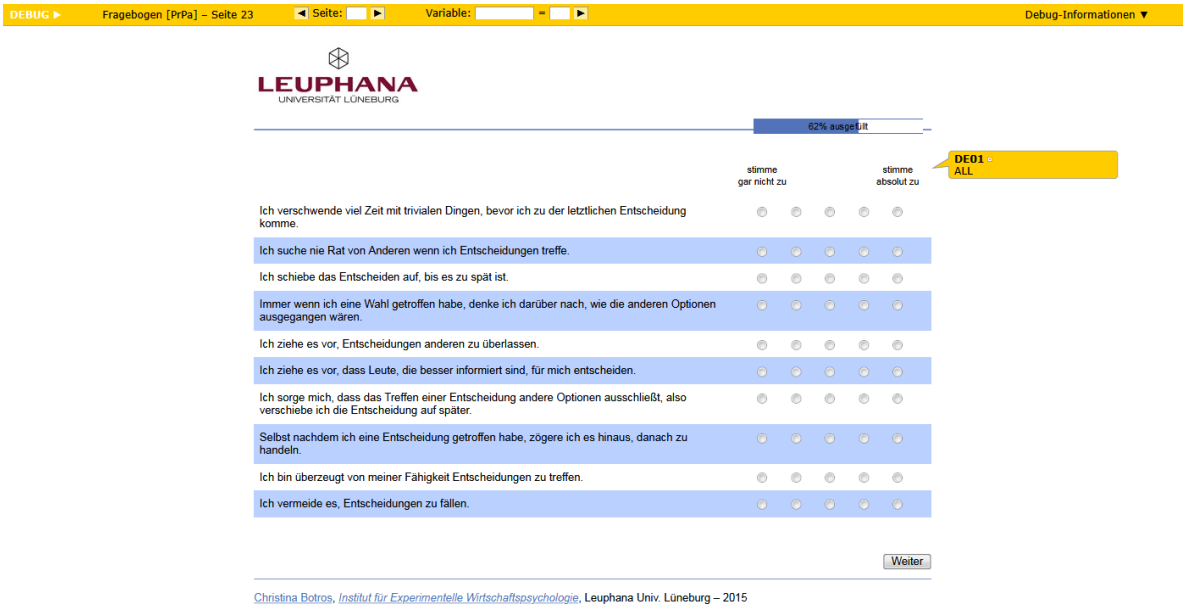
Page 1


DEBUG
Fragebogen [PrPa] – Seite 21
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LEUPHANA
UNIVERSITÄT LÜNEBURG
51% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Ich treffe Entscheidungen auf logische und systematische Weise.
Wenn ich Entscheidungen treffe, verlasse ich mich auf meinen Instinkt.
Meine Entscheidungen sind spontan.
Beim Entscheidungentreffen vertraue ich auf meine Gefühle und inneren Reaktionen.
Wenn ich eine Entscheidung treffen muss, warte ich lange Zeit, bevor ich anfange, darüber nachzudenken.
Ich überlege, wie man am besten eine Entscheidung fällt.
Ich verschiebe das Entscheiden wann immer möglich.
Meine Familie oder Freunde suchen meinen Rat, wenn sie wichtige Entscheidungen treffen müssen.
Ich fühle mich den meisten Leuten bzgl. des Entscheidens unterlegen.
Ich treffe oft impulsive Entscheidungen.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

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DEBUG
Fragebogen [PrPa] – Seite 22
Seite:
Variable:
Debug-Informationen
LEUPHANA
UNIVERSITÄT LÜNEBURG
57% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Beim Entscheiden tendiere ich dazu, mich auf meine Intuition zu stützen.
Ich fühle mich beim Entscheiden als sei ich unter gewaltigem Zeitdruck.
Ich schiebe Entscheidungen oft auf die lange Bank, denn an sie zu denken beunruhigt mich.
Die Möglichkeit, dass irgend eine Kleinigkeit schief gehen könnte, führt dazu, dass ich mich abrupt anders besinne.
Ich glaube, ich bin ein guter Entscheider.
Ich versuche die Nachteile aller Alternativen herauszufinden.
Ich bin nervös, wenn ich eine Entscheidung fällen muss.
Im Allgemeinen entscheide ich mich so, dass es sich richtig für mich anfühlt.
Wenn ich Entscheidungen treffe, tue ich das, was mir gerade natürlich erscheint.
Wenn ich entscheide, habe ich Angst, dass ich falsch liegen könnte.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

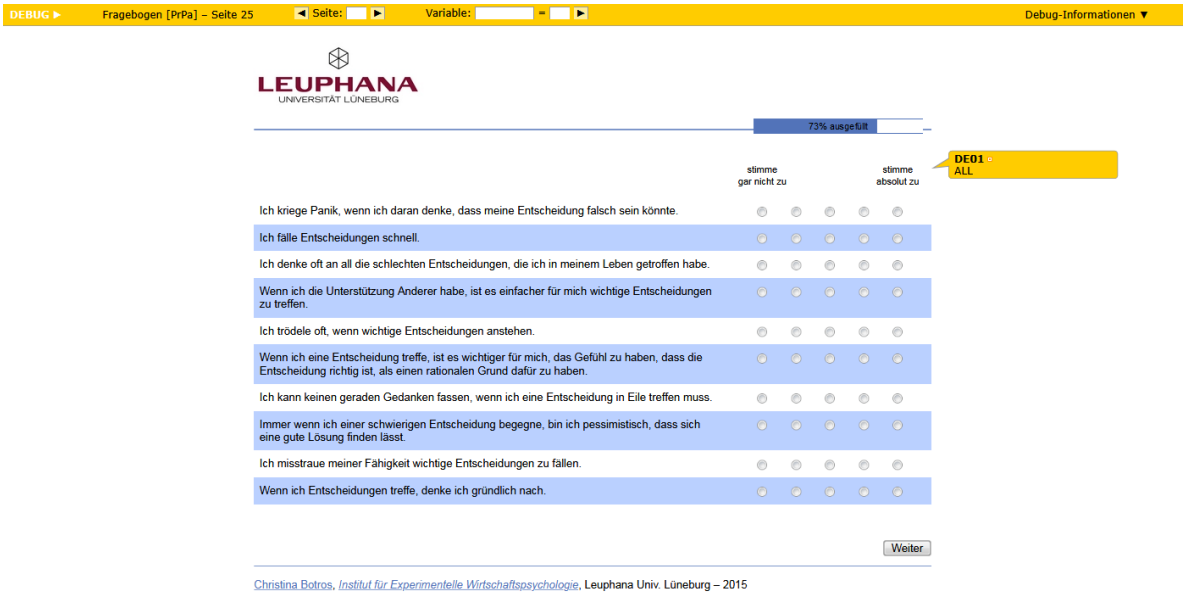
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LEUPHANA
UNIVERSITÄT LÜNEBURG
62% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Ich verschwende viel Zeit mit trivialen Dingen, bevor ich zu der letztlichen Entscheidung komme.
Ich suche nie Rat von Anderen wenn ich Entscheidungen treffe.
Ich schiebe das Entscheiden auf, bis es zu spät ist.
Immer wenn ich eine Wahl getroffen habe, denke ich darüber nach, wie die anderen Optionen ausgegangen wären.
Ich ziehe es vor, Entscheidungen anderen zu überlassen.
Ich ziehe es vor, dass Leute, die besser informiert sind, für mich entscheiden.
Ich sorge mich, dass das Treffen einer Entscheidung andere Optionen ausschließt, also verschiebe ich die Entscheidung auf später.
Selbst nachdem ich eine Entscheidung getroffen habe, zögere ich es hinaus, danach zu handeln.
Ich bin überzeugt von meiner Fähigkeit Entscheidungen zu treffen.
Ich vermeide es, Entscheidungen zu fällen.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

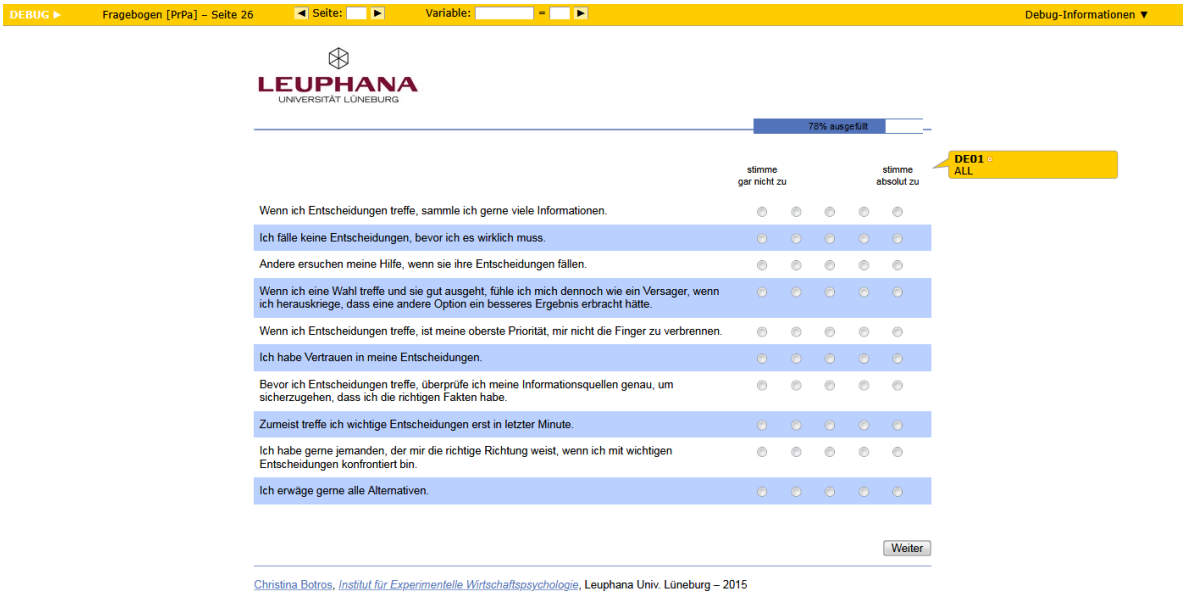
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LEUPHANA
UNIVERSITÄT LÜNEBURG
68% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Ich treffe Entscheidungen oft der Eingebung des Augenblicks folgend.
Ich nutze den Rat anderer Leute beim Fällen wichtiger Entscheidungen.
Ich versuche mir über meine Ziele klar zu sein, bevor ich eine Wahl treffe.
Nachdem eine Entscheidung getroffen ist, verbringe ich viel Zeit damit, mich selbst zu überzeugen, dass sie korrekt war.
Ich übernehme nicht gern die Verantwortung für das Treffen von Entscheidungen.
Ich brauche oft die Hilfe anderer Leute bei wichtigen Entscheidungen.
Wenn eine Entscheidung von mir oder von einer anderen Person gefällt werden kann, dann lasse ich die andere Person sie treffen.
Beim Entscheiden ziehe ich verschiedene Optionen in Betracht mit Hinblick auf ein bestimmtes Ziel.
Wenn ich eine Entscheidung treffen muss, ziehe ich Familie oder Freunde hinzu.
Ich wäge die Vor- und Nachteile jeder Option ab, bevor ich eine Entscheidung fälle.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

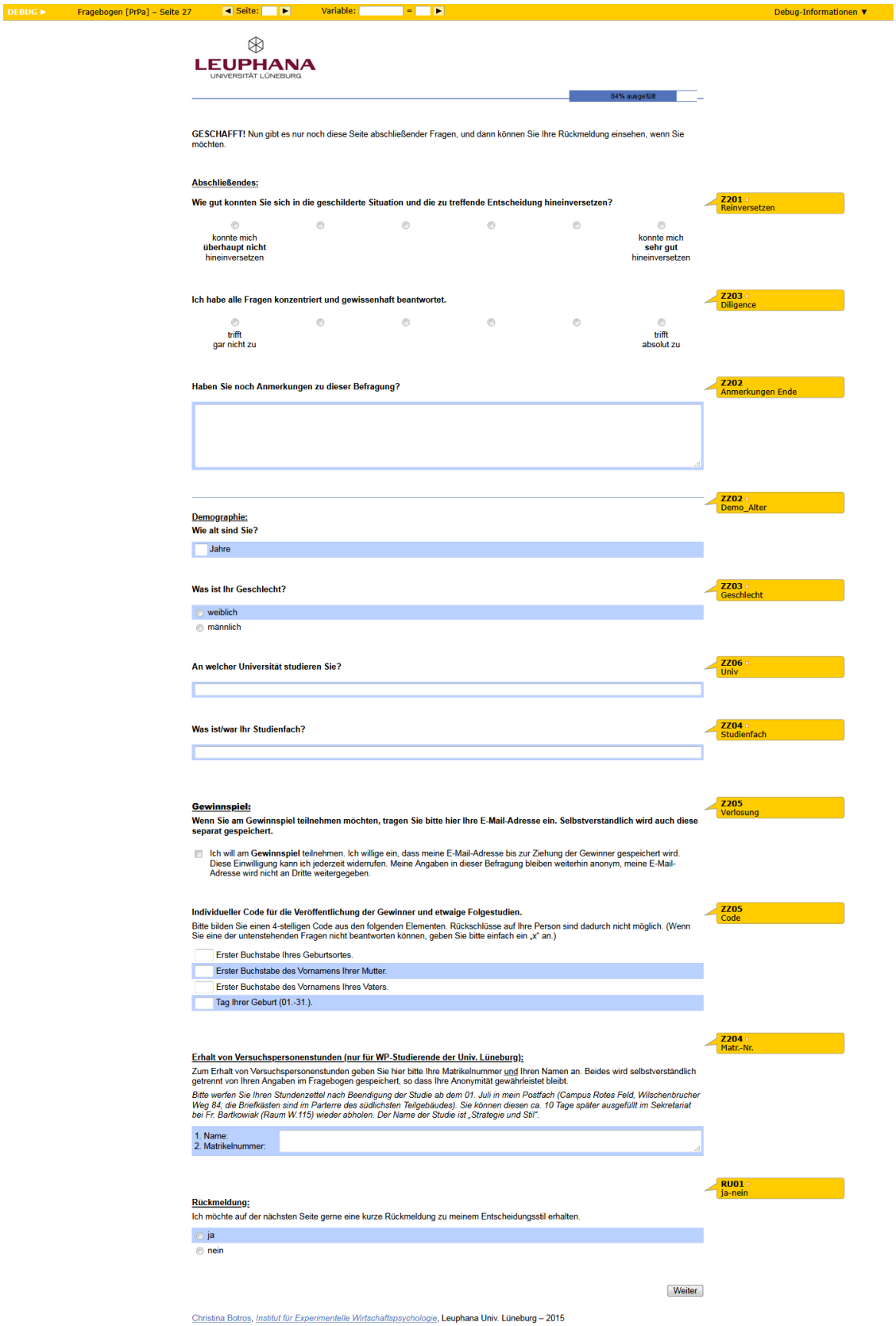
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LEUPHANA
UNIVERSITÄT LÜNEBURG
73% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Ich kriege Panik, wenn ich daran denke, dass meine Entscheidung falsch sein könnte.
Ich fälle Entscheidungen schnell.
Ich denke oft an all die schlechten Entscheidungen, die ich in meinem Leben getroffen habe.
Wenn ich die Unterstützung Anderer habe, ist es einfacher für mich wichtige Entscheidungen zu treffen.
Ich trödele oft, wenn wichtige Entscheidungen anstehen.
Wenn ich eine Entscheidung treffe, ist es wichtiger für mich, das Gefühl zu haben, dass die Entscheidung richtig ist, als einen rationalen Grund dafür zu haben.
Ich kann keinen geraden Gedanken fassen, wenn ich eine Entscheidung in Eile treffen muss.
Immer wenn ich einer schwierigen Entscheidung begegne, bin ich pessimistisch, dass sich eine gute Lösung finden lässt.
Ich misstraue meiner Fähigkeit wichtige Entscheidungen zu fällen.
Wenn ich Entscheidungen treffe, denke ich gründlich nach.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

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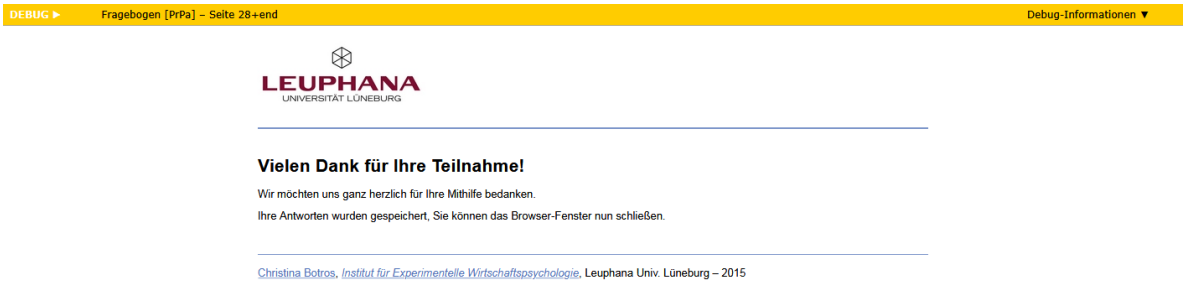

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Debug-Informationen ▼
LEUPHANA
UNIVERSITÄT LÜNEBURG
78% ausgefüllt
DE01
ALL
stimme gar nicht zu
stimme absolut zu
Wenn ich Entscheidungen treffe, sammle ich gerne viele Informationen.
Ich fälle keine Entscheidungen, bevor ich es wirklich muss.
Andere ersuchen meine Hilfe, wenn sie ihre Entscheidungen fällen.
Wenn ich eine Wahl treffe und sie gut ausgeht, fühle ich mich dennoch wie ein Versager, wenn ich herauskriege, dass eine andere Option ein besseres Ergebnis erbracht hätte.
Wenn ich Entscheidungen treffe, ist meine oberste Priorität, mir nicht die Finger zu verbrennen.
Ich habe Vertrauen in meine Entscheidungen.
Bevor ich Entscheidungen treffe, überprüfe ich meine Informationsquellen genau, um sicherzugehen, dass ich die richtigen Fakten habe.
Zumeist treffe ich wichtige Entscheidungen erst in letzter Minute.
Ich habe gerne jemanden, der mir die richtige Richtung weist, wenn ich mit wichtigen Entscheidungen konfrontiert bin.
Ich erwäge gerne alle Alternativen.
Weiter
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

Closing Questions and Demographics



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Fragebogen [PrPa] – Seite 28+end
Debug-Informationen ▼
LEUPHANA
UNIVERSITÄT LÜNEBURG
Vielen Dank für Ihre Teilnahme!
Wir möchten uns ganz herzlich für Ihre Mithilfe bedanken.
Ihre Antworten wurden gespeichert, Sie können das Browser-Fenster nun schließen.
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

H Questionnaires

Please be reminded that the screenshots (i.e., the original materials) of the Strategy Satisfaction Questionnaire (SSQ) and the Decision Style Questionnaire (DSQ) are part of the *Pilot Study*!

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H.1 Decision Categorization Scales (DCSs)

H.1.1 Reminder of the Study's Design

Type: questionnaire study
Questionnaires: 8 questionnaires/scales
– the Situational Eight DIAMONDS Scale S8-II, 8 items
– a Semantic Differential Scale, 12 items
– the 14BiPole-Value Questionnaire, 14 items
– the Evolutionary Domains Mini-Scale, 6 items
– the Moral Foundations Mini-Scale, 6 items
– the Domains of Risk Mini-Scale, 5 items
– the Characteristics of Decision Situations Scale, 36 items
– the Dimensions of Decisions Scale, 84 items
Additional Dependent Measures:
– collection of (collegiate) decision situations (free text field)

H.1.2 Screenshots of the Original Online Study

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Collection of Collegiate Decision Situations 680
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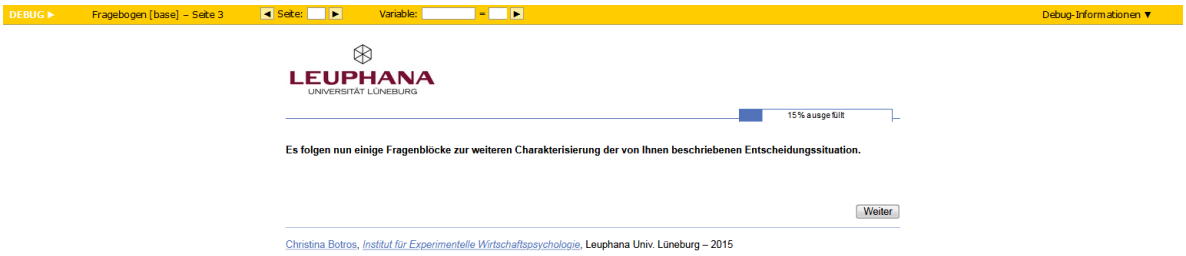
Introduction



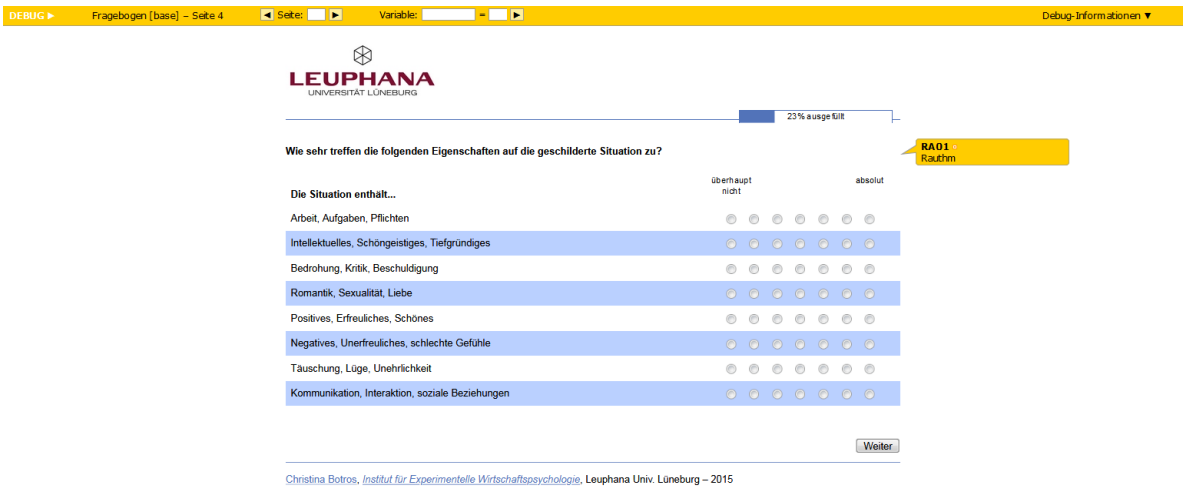
Collection of Collegiate Decision Situations



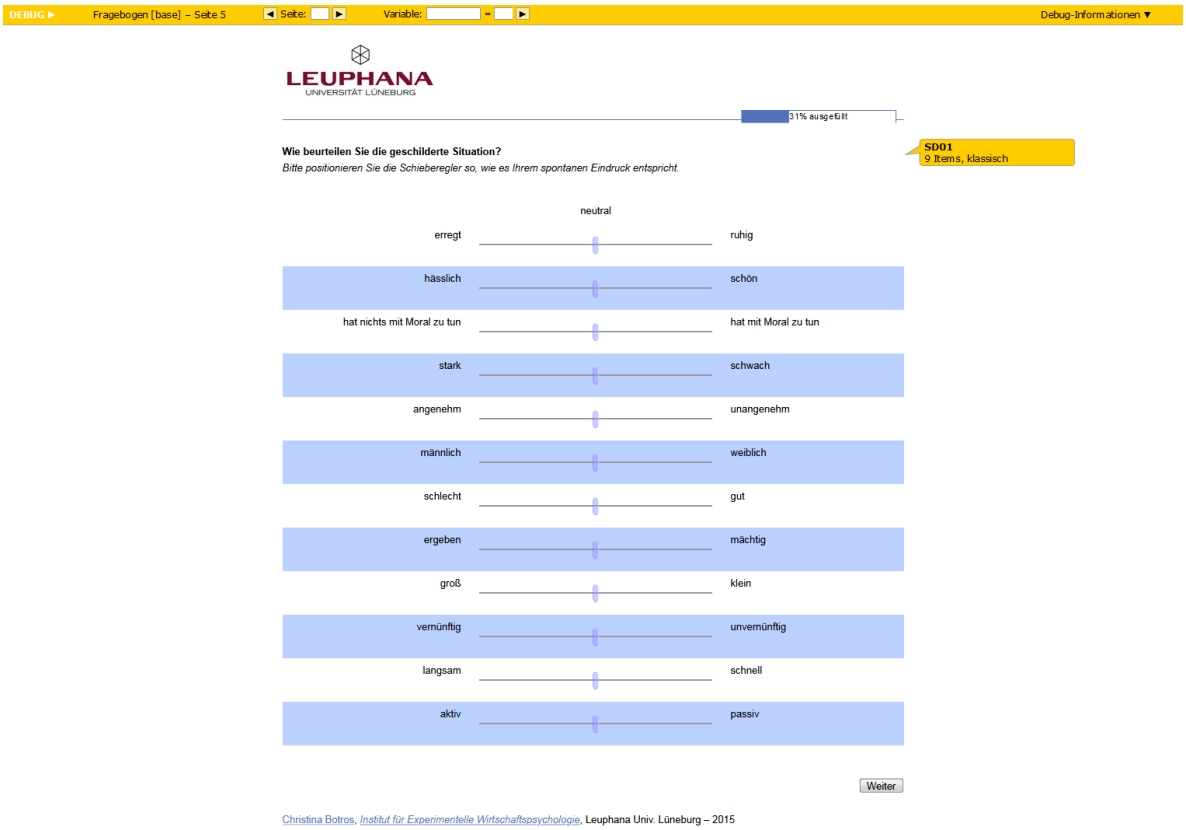
Introduction to Scales



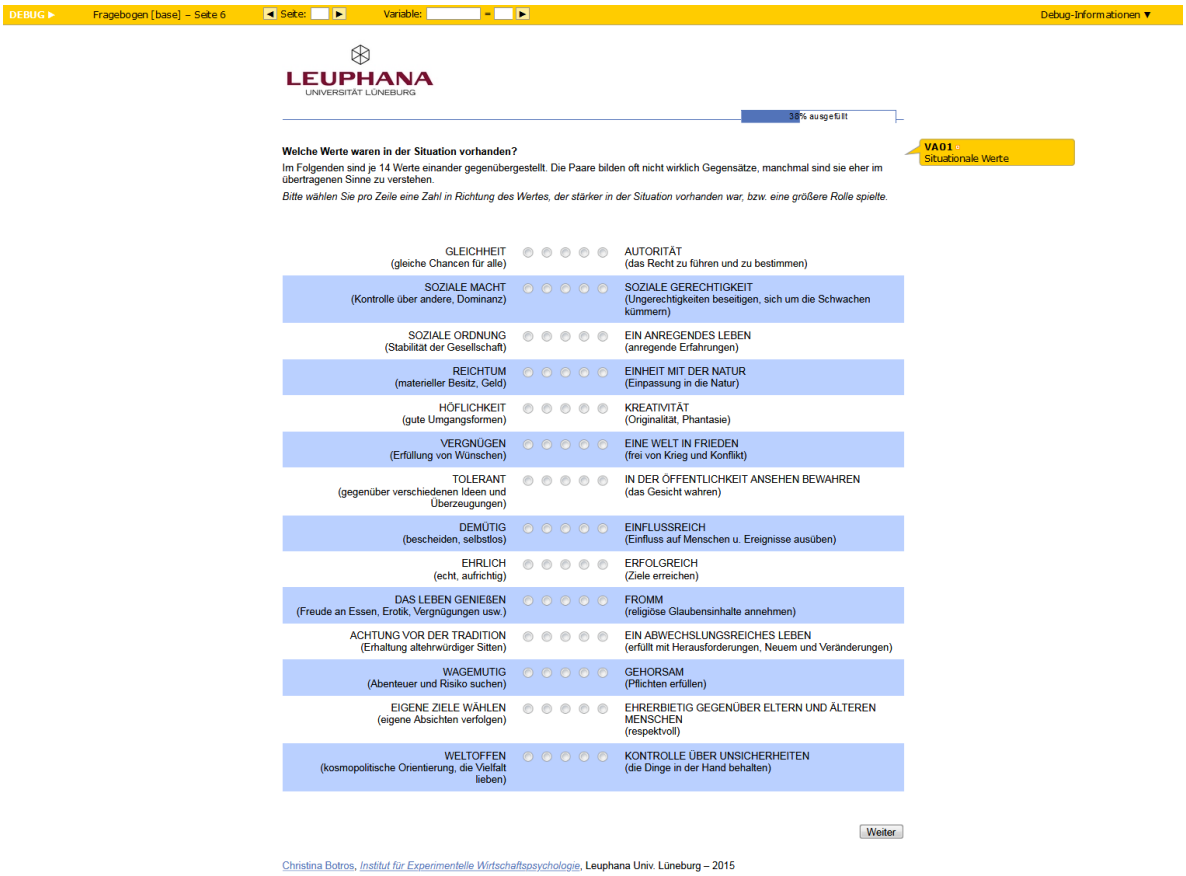
The Situational Eight DIAMONDS Scale S8-II



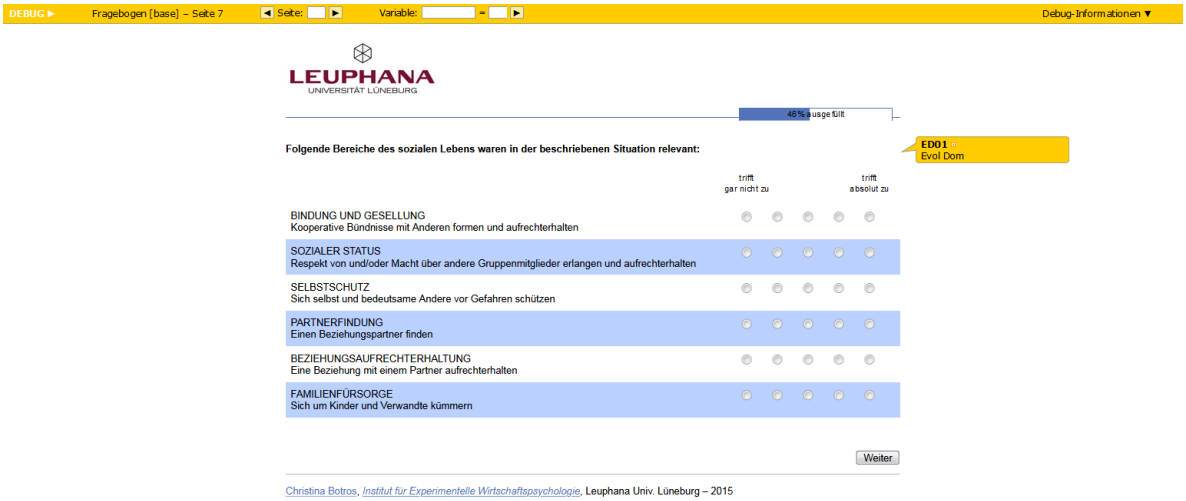
A Semantic Differential Scale



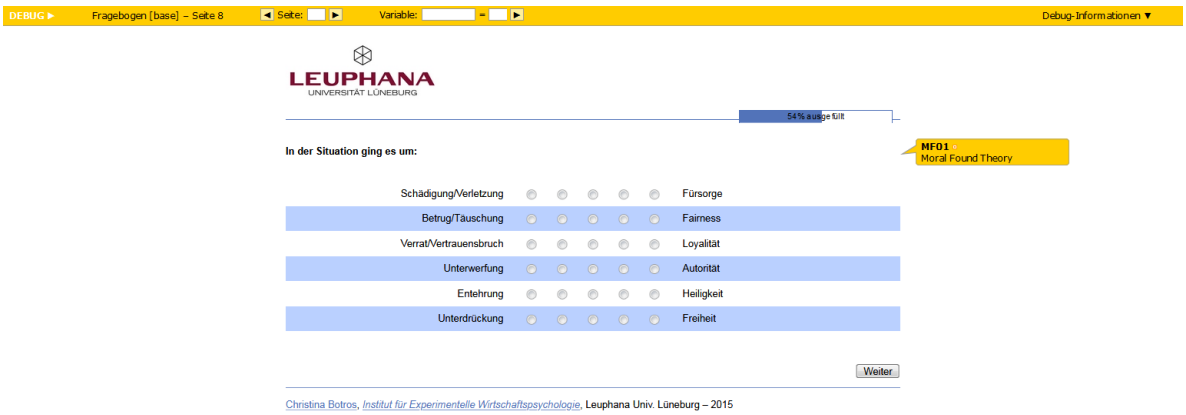
The 14BiPole-Value Questionnaire



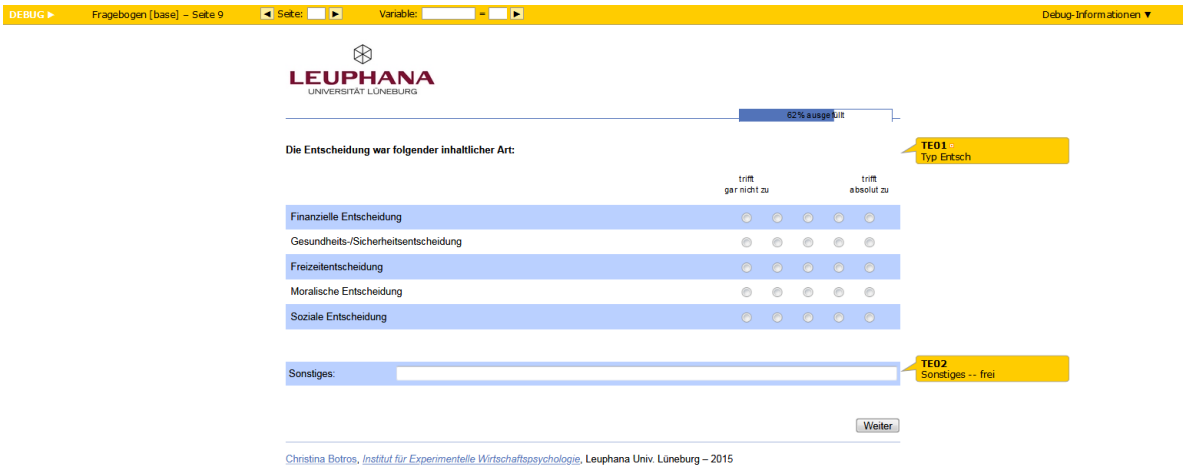
The Evolutionary Domains Mini-Scale



The Moral Foundations Mini-Scale



The Domains of Risk Mini-Scale



Introduction to Long Scales



The Characteristics of Decision Situations Scale



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77% ausgefüllt

Wie sehr treffen die folgenden Eigenschaften auf die geschilderte Situation zu?

DEO4 □ Sonstiges

	trifft gar nicht zu		teils/teils bzw. weder/noch		trifft absolut zu
Die Entscheidung war schwer.	○	○	○	○	○
Die Entscheidung war sehr wichtig.	○	○	○	○	○
Die Entscheidungsfindung dauerte lange.	○	○	○	○	○
Die Entscheidung konnte nicht zurückgenommen werden.	○	○	○	○	○
Ähnliche Entscheidungen hatte ich schon oft getroffen.	○	○	○	○	○
Die Entscheidung war einmalig, d.h. die Entscheidungssituation würde sich nicht wiederholen.	○	○	○	○	○
Ich habe die Entscheidungssituation als Konflikt erlebt.	○	○	○	○	○
Eine der möglichen Optionen war deutlich besser als alle anderen.	○	○	○	○	○
Von der Entscheidung hingen weitere Entscheidungen ab.	○	○	○	○	○

DEO1 □ Unsicherheit

	trifft gar nicht zu		teils/teils bzw. weder/noch		trifft absolut zu
Die Unsicherheit bezog sich auf interne Ursachen, also Unsicherheit bzgl. meiner Gefühle, Meinungen oder Gründe etc.	○	○	○	○	○
Es war von Anfang an klar, welche Entscheidungsoptionen es gab.	○	○	○	○	○
Die Wahrscheinlichkeit des Eintretens der Konsequenzen konnte abgeschätzt werden.	○	○	○	○	○
Gefühlt war meine Unsicherheit bei der Entscheidung groß.	○	○	○	○	○
Ich musste die möglichen Optionen zuerst suchen bzw. selbst entwerfen.	○	○	○	○	○
Die möglichen Konsequenzen der Optionen waren bekannt.	○	○	○	○	○
Ich hatte das Gefühl, die Entscheidungssituation unter Kontrolle zu haben.	○	○	○	○	○
Die Unsicherheit bezog sich auf externe Ursachen, also einen Mangel an Informationen über die Welt.	○	○	○	○	○

DEO3 □ Komponenten

	trifft gar nicht zu		teils/teils bzw. weder/noch		trifft absolut zu
Keine der gegebenen Optionen hätte zur Verwirklichung aller meiner entscheidungsrelevanten Ziele geführt.	○	○	○	○	○
Die Konsequenzen der Entscheidung waren von hoher Bedeutung.	○	○	○	○	○
Die Konsequenzen der Entscheidung waren von langfristiger Wirkung.	○	○	○	○	○
Ich musste meine Ziele gegeneinander abwägen.	○	○	○	○	○
Gründe für und gegen die Optionen in der Entscheidungssituation spielten eine wichtige Rolle.	○	○	○	○	○
Das Abwägen erwünschter und unerwünschter möglicher Konsequenzen der Entscheidung war schwierig.	○	○	○	○	○
Die Entscheidung hatte (auch) unerwartete Konsequenzen.	○	○	○	○	○
Ich habe mich auf mein Gefühl verlassen und intuitiv entschieden.	○	○	○	○	○
Das Einhalten bestimmter Regeln und Prinzipien spielte eine wichtige Rolle bei der Entscheidung.	○	○	○	○	○
Meine Ziele waren eine wichtige Grundlage für meine Entscheidung.	○	○	○	○	○
Die Konsequenzen der Entscheidung wurden stark von Faktoren mitbestimmt, auf die ich keinen Einfluss hatte.	○	○	○	○	○
Bei der Entscheidung waren mir meine Ziele klar.	○	○	○	○	○
Ich hatte mehrere Ziele.	○	○	○	○	○
Welche Konsequenzen ich mir wünschte oder vermeiden wollte, war mir klar.	○	○	○	○	○
Die Entscheidung hatte vielfältige Konsequenzen.	○	○	○	○	○
Meine Ziele waren konkret (nicht abstrakt).	○	○	○	○	○

DEO2 □ Kognitiver Aufwand

	trifft gar nicht zu		teils/teils bzw. weder/noch		trifft absolut zu
Der kognitive, also gedankliche Aufwand bei der Entscheidung war hoch.	○	○	○	○	○
Der Prozess des Überlegens und Entscheidens war schnell.	○	○	○	○	○
Der Prozess des Überlegens und Entscheidens war weitgehend überlegt.	○	○	○	○	○

Weiter

Christina Botros, *Institut für Experimentelle Wirtschaftspsychologie*, Leuphana Univ. Lüneburg – 2015

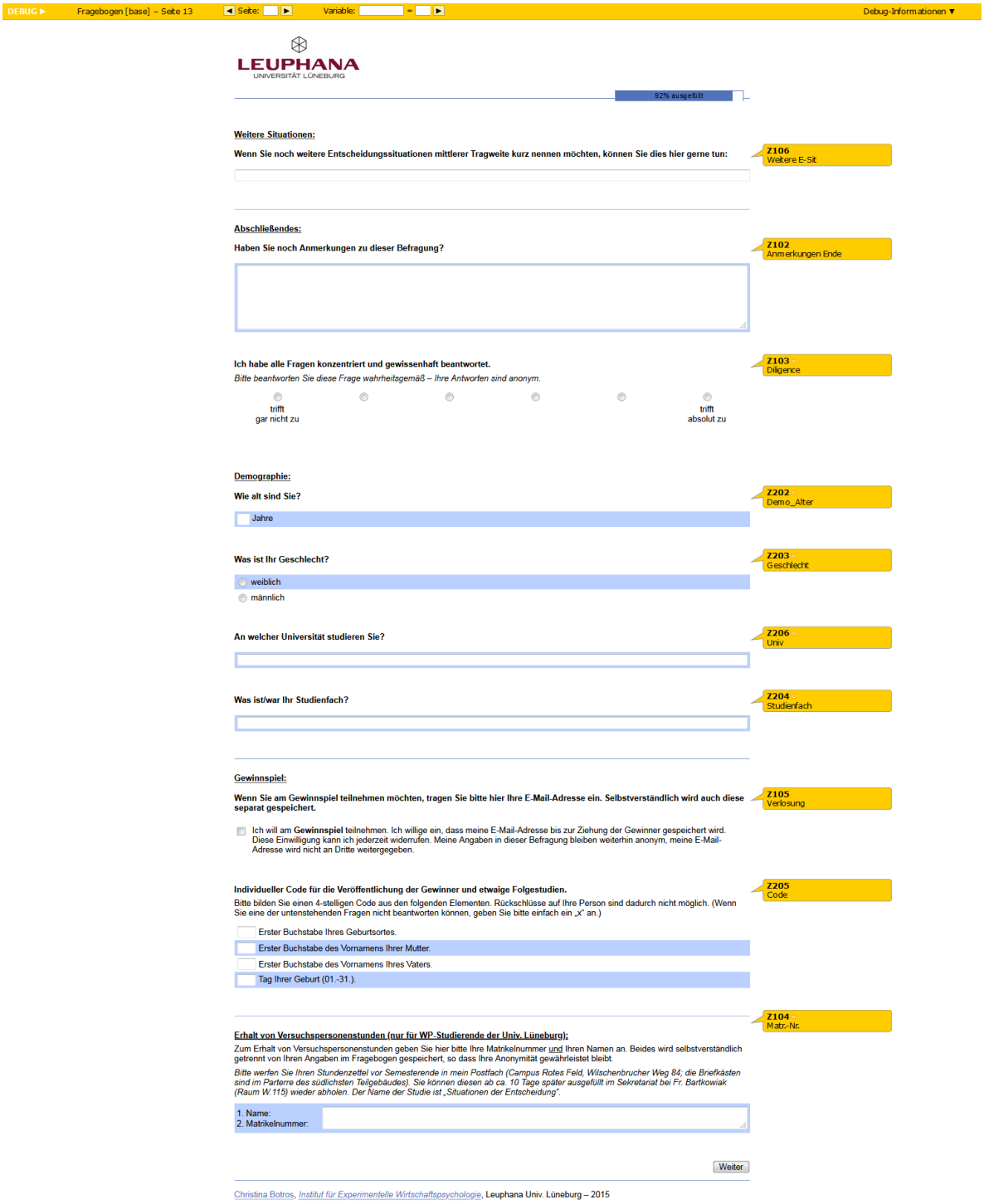
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The Dimensions of Decisions Scale



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Closing Questions and Demographics


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LEUPHANA
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92% ausgefüllt

Weitere Situationen:

Wenn Sie noch weitere Entscheidungssituationen mittlerer Tragweite kurz nennen möchten, können Sie dies hier gerne tun: Z106 Weitere E-Sit

Abschließendes:

Haben Sie noch Anmerkungen zu dieser Befragung? Z102 Anmerkungen Ende

Ich habe alle Fragen konzentriert und gewissenhaft beantwortet. Z103 Diligence

Bitte beantworten Sie diese Frage wahrheitsgemäß – Ihre Antworten sind anonym.

trifft gar nicht zu — trifft absolut zu

Demographie:

Wie alt sind Sie? Z202 Demo_Alter

Jahre

Was ist Ihr Geschlecht? Z203 Geschlecht

weiblich
männlich

An welcher Universität studieren Sie? Z206 Univ

Was ist/war Ihr Studienfach? Z204 Studienfach

Gewinnspiel:

Wenn Sie am Gewinnspiel teilnehmen möchten, tragen Sie bitte hier Ihre E-Mail-Adresse ein. Selbstverständlich wird auch diese separat gespeichert. Z105 Verlosung

Ich will am **Gewinnspiel** teilnehmen. Ich willige ein, dass meine E-Mail-Adresse bis zur Ziehung der Gewinner gespeichert wird. Diese Einwilligung kann ich jederzeit widerrufen. Meine Angaben in dieser Befragung bleiben weiterhin anonym, meine E-Mail-Adresse wird nicht an Dritte weitergegeben.

Individueller Code für die Veröffentlichung der Gewinner und etwaige Folgestudien. Z205 Code

Bitte bilden Sie einen 4-stelligen Code aus den folgenden Elementen. Rückschlüsse auf Ihre Person sind dadurch nicht möglich. (Wenn Sie eine der untenstehenden Fragen nicht beantworten können, geben Sie bitte einfach ein „x" an.)

Erster Buchstabe Ihres Geburtsortes.
Erster Buchstabe des Vornamens Ihrer Mutter.
Erster Buchstabe des Vornamens Ihres Vaters.
Tag Ihrer Geburt (01.-31.).

Z104 Matr.-Nr.

Erhalt von Versuchspersonenstunden (nur für WP-Studierende der Univ. Lüneburg):

Zum Erhalt von Versuchspersonenstunden geben Sie hier bitte Ihre Matrikelnummer und Ihren Namen an. Beides wird selbstverständlich getrennt von Ihren Angaben im Fragebogen gespeichert, so dass Ihre Anonymität gewährleistet bleibt.

Bitte werfen Sie Ihren Stundenzettel vor Semesterende in mein Postfach (Campus Rotes Feld, Wilschenbrucher Weg 84; die Briefkästen sind im Parterre des südlichsten Teilgebäudes). Sie können diesen ab ca. 10 Tage später ausgefüllt im Sekretariat bei Fr. Bartkowiak (Raum W.115) wieder abholen. Der Name der Studie ist „Situationen der Entscheidung".

1. Name:
2. Matrikelnummer:

Weiter

Christina Botros, *Institut für Experimentelle Wirtschaftspsychologie*, Leuphana Univ. Lüneburg – 2015

Last Page


DEBUG ▶
Fragebogen [base] – Seite end
Debug-Informationen ▼
LEUPHANA
UNIVERSITÄT LÜNEBURG
Vielen Dank für Ihre Teilnahme!
Wir möchten uns ganz herzlich für Ihre Mithilfe bedanken.
Ihre Antworten wurden gespeichert, Sie können das Browser-Fenster nun schließen.
Christina Botros, Institut für Experimentelle Wirtschaftspsychologie, Leuphana Univ. Lüneburg – 2015

I Reasons vs. Principles

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I.1 Trolley Paradigm

I.1.1 Reminder of the Study's Design

Type: experiment

Factors: 2 independent variable (between) with 2 and 3 levels

- *Intervention/Scenario Type*:
  - "agent intervention"
  - "patient intervention"
- *Decision Strategy*:
  - "by intuition"/control
  - "by principle"
  - "by reasons"

Scenario Contents: 5 trolley scenarios (within)

- *Sc1:* Bus
- *Sc2:* Virus
- *Sc3:* Torpedo
- *Sc4:* Bomb
- *Sc5:* Rampage

Dependent Variables: 2 one-item dependent measures

- *Trolley question*
- *Decision satisfaction*

I.1.2 German Original of all Scenarios

Table I.1 Trolley scenarios [Jump back: A on page 371.]

Scenario Content	Scenario Type: Agent	Scenario Type: Patient
Bus	Ein Kleinbus mit zehn Insassen steht aufgrund eines Motorschadens auf einem Zuggleis. Ein Zug fährt mit hoher Geschwindigkeit heran, so dass für die Businsassen keine Möglichkeit besteht, rechtzeitig auszusteigen. Ein Gleiswärter sieht die Situation. Er könnte den Zug durch Verstellen eines Gleises so umleiten, dass der Zug auf eine andere Kreuzung zufährt, wo er einen Bus mit zwei Insassen erfassen würde. In beiden Fällen würden die Businsassen schwer verletzt werden.	Ein Kleinbus mit zehn Insassen steht aufgrund eines Motorschadens auf einem Zuggleis. Ein Zug fährt mit hoher Geschwindigkeit heran, so dass für die Businsassen keine Möglichkeit besteht, rechtzeitig auszusteigen. Ein Gleiswärter sieht die Situation. Er befindet sich auf dem Weg zur Arbeit und steht mit seinem Lastwagen in der Autoschlange hinter dem Fahrzeug auf den Gleisen. Er könnte durch Anschieben der vor ihm stehenden Fahrzeuge den Bus von der Kreuzung schieben. Dies würde aber dazu führen, dass er einen anderen Bus mit zwei Insassen auf die Kreuzung schieben würde, der dann vom Zug erfasst würde. In beiden Fällen würden die Businsassen schwer verletzt werden.
Virus	In einer Universitätsklinik, die ihren Forschungsschwerpunkt auf die Untersuchung neuartiger Viruserkrankungen legt, kommt es zu einer Panne an der Sicherheitsschleuse eines Labors. Ein Virus, das sich über die Luft verbreitet und Stoffe des Rückenmarks zersetzt, ist bereits in den angeschlossenen Flur ausgetreten. Das Virus verursacht nach wenigen Stunden eine Querschnittlähmung bei den Infizierten. Vier Patienten der Virusstation sind von der Infektion bedroht. Die Virenstation ist mit einem besonderen Sicherheitssystem ausgestattet, das vor allem im Brandfall dazu dient, das Feuer in bestimmte Räume zu leiten und so kontrollierbar zu machen. Luftdichte Schleusentüren können deshalb automatisch einzelne Gänge verschließen und andere öffnen. Der leitende Chefarzt könnte nun anordnen, eine dieser Schleusentüren entsprechend zu schließen, um so den Flur der vier Patienten luftdicht zu verriegeln. Allerdings würde man dadurch den anderen Gang öffnen, der zu einer Station führt, auf der ein Patient liegt. Dieser Patient wäre dann von der Virus-Infektion bedroht.	In einer Universitätsklinik, die ihren Forschungsschwerpunkt auf die Untersuchung neuartiger Viruserkrankungen legt, kommt es zu einer Panne an der Sicherheitsschleuse eines Labors. Ein Virus, das sich über die Luft verbreitet und Stoffe des Rückenmarks zersetzt, ist bereits in den angeschlossenen Flur ausgetreten. Das Virus verursacht nach wenigen Stunden eine Querschnittlähmung bei den Infizierten. Vier Patienten der Virusstation sind von der Infektion bedroht. In der Klinik befindet sich allerdings ein weiterer Patient, dessen Rückenmark Stoffe enthält, die vor dem Virus schützen würden. Der leitende Chefarzt könnte anordnen, Teile des Rückenmarks dieses Patienten zu entnehmen und die vier Patienten damit zu impfen. Die infizierten Patienten würden somit vor der Virus-Infektion bewahrt werden, der Spender hingegen würde durch diese Operation eine Querschnittslähmung erleiden.
Torpedo	Ein Marinegeneral erhält während eines Manövers die Meldung, dass ein außer Kontrolle geratener Torpedo unter Wasser auf ein kleines Küstenpatrouilleboot mit sechs Matrosen Besatzung zusteuert und dieses bei einem Treffer sinken würde.	Ein Marinegeneral erhält während eines Manövers die Meldung, dass ein außer Kontrolle geratener Torpedo unter Wasser auf ein kleines Küstenpatrouilleboot mit sechs Matrosen Besatzung zusteuert und dieses bei einem Treffer sinken würde. Da der Torpedo auf „automatische Zielverfolg" programmiert ist, könnte man ihn durch ein entsprechendes Manöver mit einem anderen Boot ablenken.

(Continued on next page.)

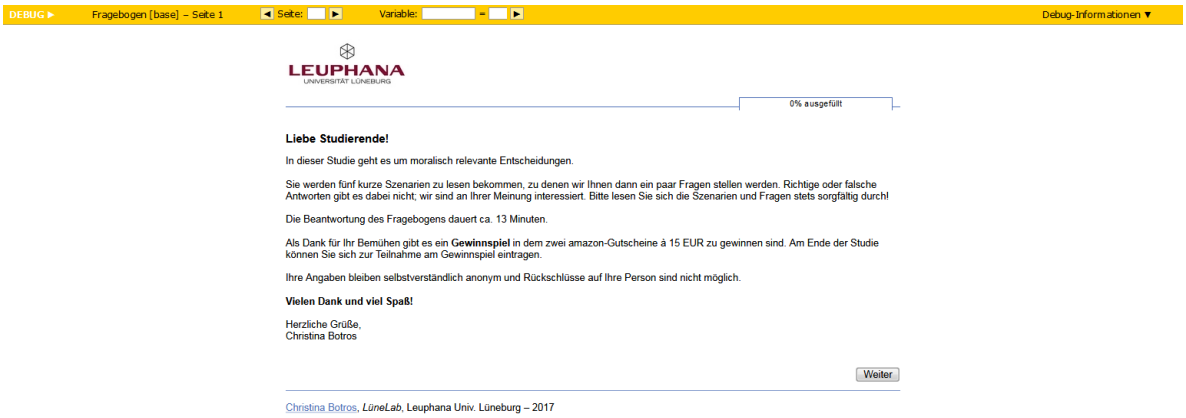
Table I.1 (Continued.)

	Er könnte per Fernzündung diesen Torpedo sprengen. Da sich der Torpedo aber sehr dicht an einem U-Boot mit drei Matrosen an Bord befindet, würde die entstehende Druckwelle das U-Boot schwer beschädigen. In beiden Fällen wären die jeweiligen Matrosen lebensgefährlich bedroht.	Der General könnte drei Matrosen, die sich in der Nähe in einem U-Boot befinden, befehlen, dieses U-Boot so zu manövrieren, dass der Torpedo seinen Weg ändern und auf das U-Boot zusteuern würde. In beiden Fällen wären die jeweiligen Matrosen lebensgefährlich bedroht.
Bomb	Der Polizeichef einer Großstadt erhält die Information in einem anonymen Anruf, dass in einem großen Restaurant der Stadt eine Bombe versteckt sei und in der nächsten Stunde gezündet werden solle. Er schickt sofort den Spezialisten der Bombenentschärfung dort hin, lässt die Gegend absperren und evakuieren. Als der Entschärfungsspezialist beim Restaurant eintrifft und die Bombe findet, sieht er, dass diese in fünf Sekunden detonieren wird und eine Entschärfung unmöglich ist. Zu diesem Zeitpunkt befinden sich noch neun Gäste im Restaurant, die noch nicht evakuiert werden konnten. Er könnte die Bombe auf die Terrasse werfen, wo sich gerade einer der neun Gäste aufhält. So könnten die verbleibenden acht Gäste von den Splittern verschont werden.	Der Polizeichef einer Großstadt erhält die Information in einem anonymen Anruf, dass in einem großen Restaurant der Stadt eine Bombe versteckt sei und in der nächsten Stunde gezündet werden solle. Er schickt sofort den Spezialisten der Bombenentschärfung dort hin, lässt die Gegend absperren und evakuieren. Als der Entschärfungsspezialist beim Restaurant eintrifft und die Bombe findet, sieht er, dass diese in fünf Sekunden detonieren wird und eine Entschärfung unmöglich ist. Zu diesem Zeitpunkt befinden sich noch neun Gäste im Restaurant, die noch nicht evakuiert werden konnten. Er könnte einen neben der Bombe stehenden Gast so anstoßen, dass dieser auf die Splitterbombe fällt, da er sich selbst nicht mehr auf die Bombe werfen kann. So könnten die verbleibenden acht Gäste von den Splittern verschont werden.
Rampage	In einem Universitätsgebäude befindet sich ein Amokläufer, welcher mit einer Waffe um sich schießt. Über ein Videoüberwachungssystem kann der Universitätsleiter von seinem Büro aus beobachten, dass der Amokläufer gerade auf dem Weg zum Seminarraum A ist, in dem sich 15 Studierende befinden. Das polizeiliche Einsatzkommando wird bald eintreffen, aber nicht rechtzeitig vor Betreten des nächsten Seminarraums. Der Universitätsleiter hat nur einen kurzen Moment Zeit, in dem er nur eine Durchsage machen kann. Er könnte mit dieser Durchsage den Dozenten in Seminarraum A dazu auffordern, die Tür zu verschließen, sodass der Amokläufer den Seminarraum A nicht betreten kann. Dadurch würde der Amokläufer allerdings den daneben liegenden Seminarraum B als Ziel anvisieren, in dem sich 7 Studierende befinden. In beiden Fällen wären die Studierenden in akuter Lebensgefahr.	In einem Universitätsgebäude befindet sich ein Amokläufer, welcher mit einer Waffe um sich schießt. Über ein Videoüberwachungssystem kann der Universitätsleiter von seinem Büro aus beobachten, dass der Amokläufer gerade auf dem Weg zum Seminarraum A ist, in dem sich 15 Studierende befinden. Das polizeiliche Einsatzkommando wird bald eintreffen, aber nicht rechtzeitig vor Betreten des nächsten Seminarraums. Der Universitätsleiter hat nur einen kurzen Moment Zeit, in dem er nur eine Durchsage machen kann. Im neben Seminarraum A liegenden Seminarraum B befinden sich 7 Studierende, welche der Universitätsleiter mit dieser Durchsage dazu auffordern könnte, den Raum zu verlassen und auf den Flur zu rennen. Dies würde den Amokläufer aufhalten, sodass der Dozent in Seminarraum A Zeit bekäme, die Tür zu verschließen. In beiden Fällen wären die Studierenden in akuter Lebensgefahr.

I.1.3 Screenshots of the Original Online Experiment

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Introduction


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0% ausgefüllt

Liebe Studierende!

In dieser Studie geht es um moralisch relevante Entscheidungen.

Sie werden fünf kurze Szenarien zu lesen bekommen, zu denen wir Ihnen dann ein paar Fragen stellen werden. Richtige oder falsche Antworten gibt es dabei nicht; wir sind an Ihrer Meinung interessiert. Bitte lesen Sie sich die Szenarien und Fragen stets sorgfältig durch!

Die Beantwortung des Fragebogens dauert ca. 13 Minuten.

Als Dank für Ihr Bemühen gibt es ein **Gewinnspiel** in dem zwei amazon-Gutscheine à 15 EUR zu gewinnen sind. Am Ende der Studie können Sie sich zur Teilnahme am Gewinnspiel eintragen.

Ihre Angaben bleiben selbstverständlich anonym und Rückschlüsse auf Ihre Person sind nicht möglich.

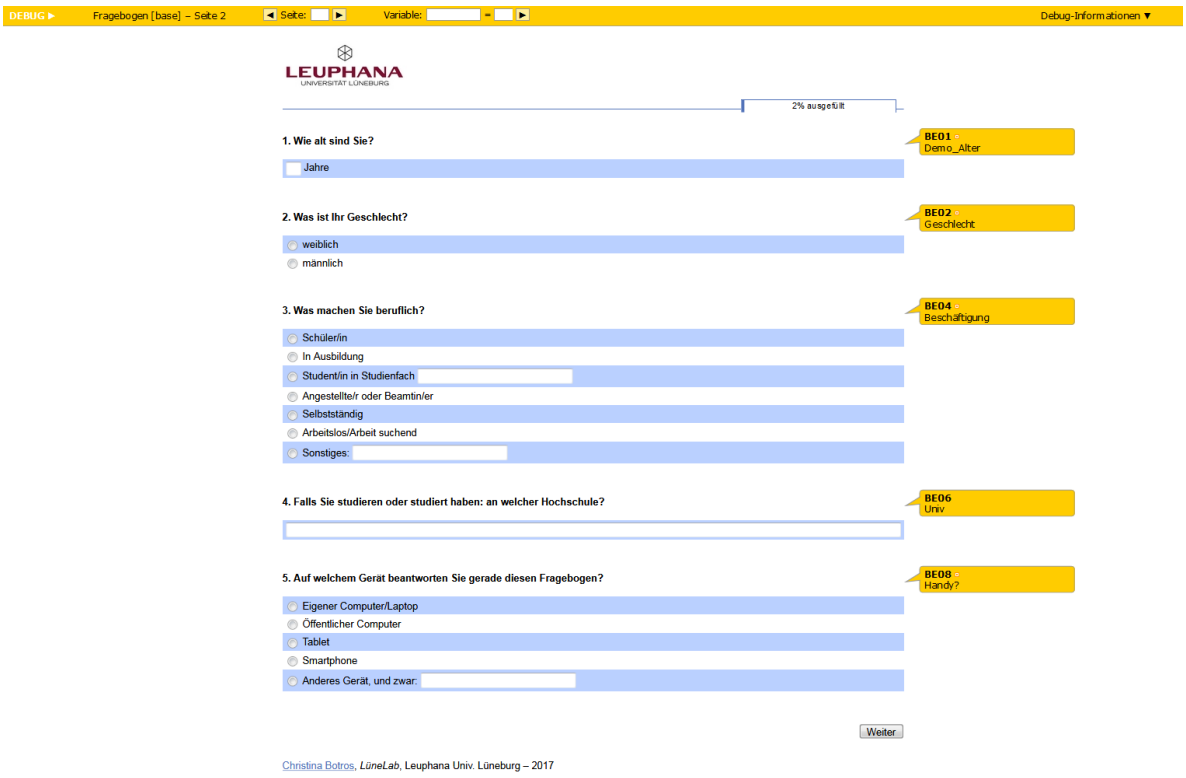
Vielen Dank und viel Spaß!

Herzliche Grüße,
Christina Botros

Weiter

Christina Botros, *LüneLab*, Leuphana Univ. Lüneburg – 2017

Demographics


DEBUG ▶ Fragebogen [base] – Seite 2 ◀ Seite: ▶ Variable: = Debug-Informationen ▼

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2% ausgefüllt

1. Wie alt sind Sie?

BE01 : Demo_Alter

Jahre

2. Was ist Ihr Geschlecht?

BE02 : Geschlecht

weiblich
männlich

3. Was machen Sie beruflich?

BE04 : Beschäftigung

Schüler/in
In Ausbildung
Student/in in Studienfach
Angestellte/r oder Beamtin/er
Selbstständig
Arbeitslos/Arbeit suchend
Sonstiges:

4. Falls Sie studieren oder studiert haben: an welcher Hochschule?

BE06 Univ

5. Auf welchem Gerät beantworten Sie gerade diesen Fragebogen?

BE08 : Handy?

Eigener Computer/Laptop
Öffentlicher Computer
Tablet
Smartphone
Anderes Gerät, und zwar:

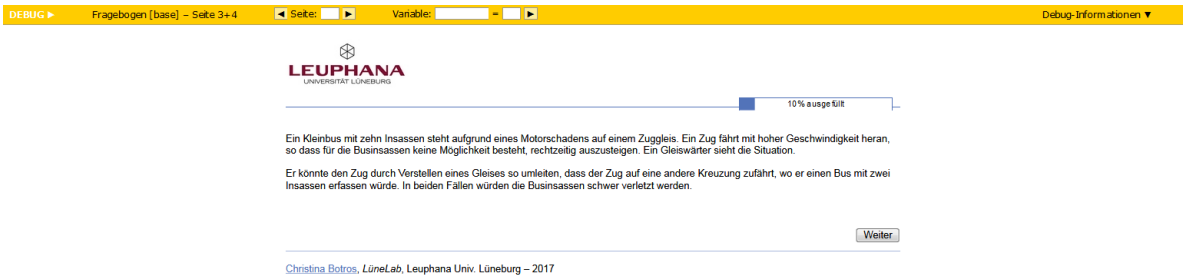
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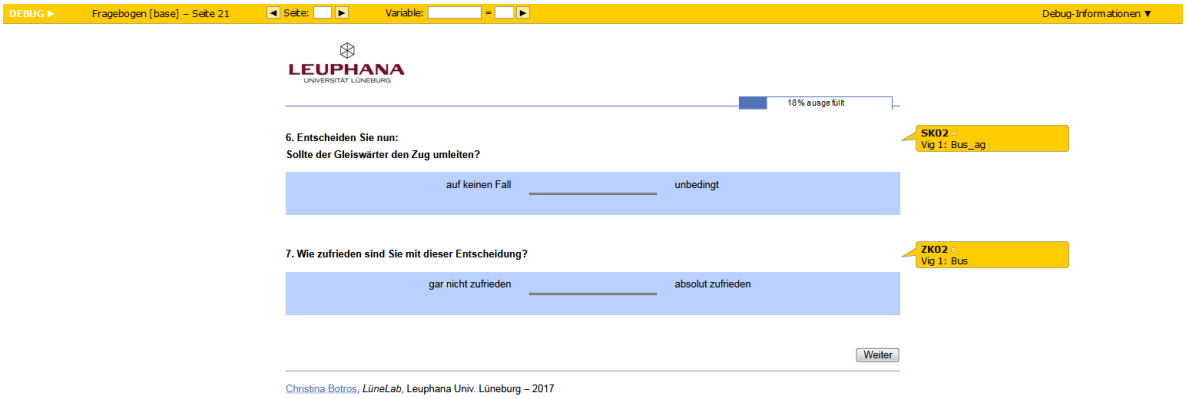
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Fully Reported Condition:
Scenario Type = Agent, Decision Strategy = Control

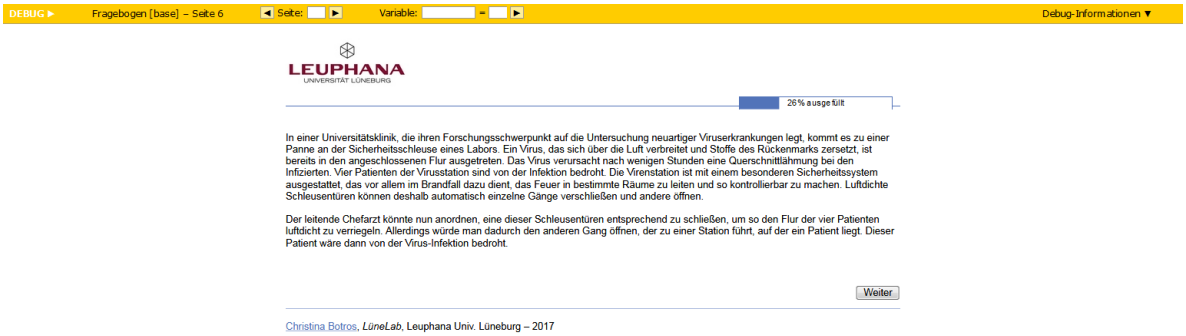
Scenario Content = Bus, Virus, Torpedo, Bomb, Rampage

Bus Scenario and Dependent Measures



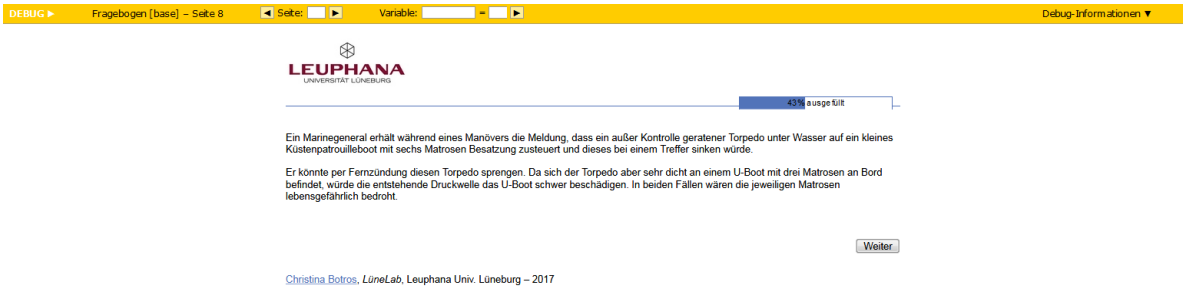


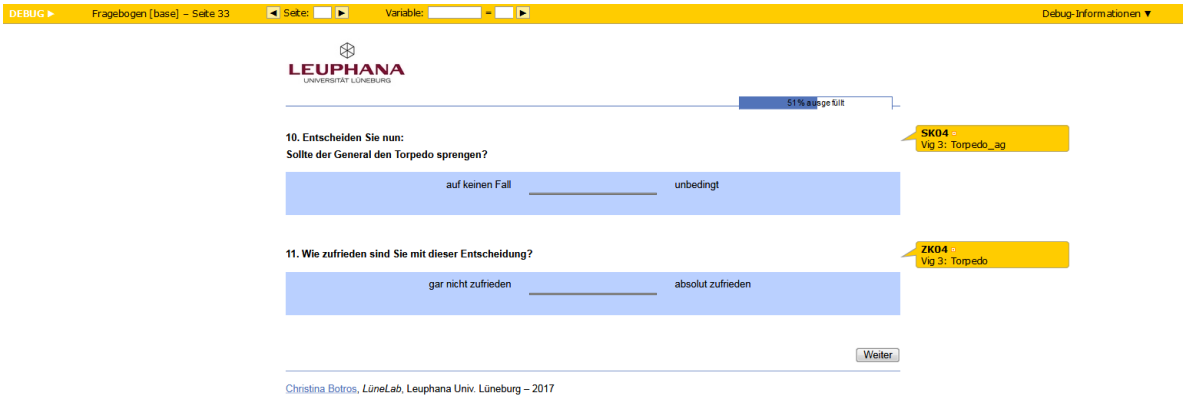
Virus Scenario and Dependent Measures



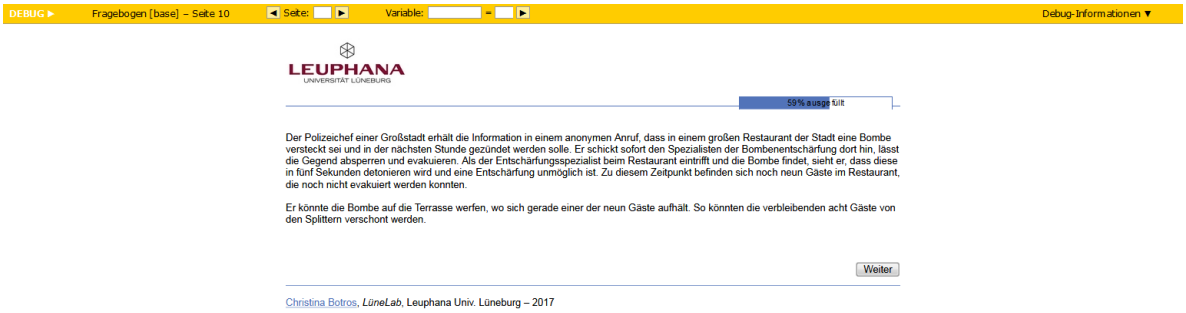


Torpedo Scenario and Dependent Measures





Bomb Scenario and Dependent Measures



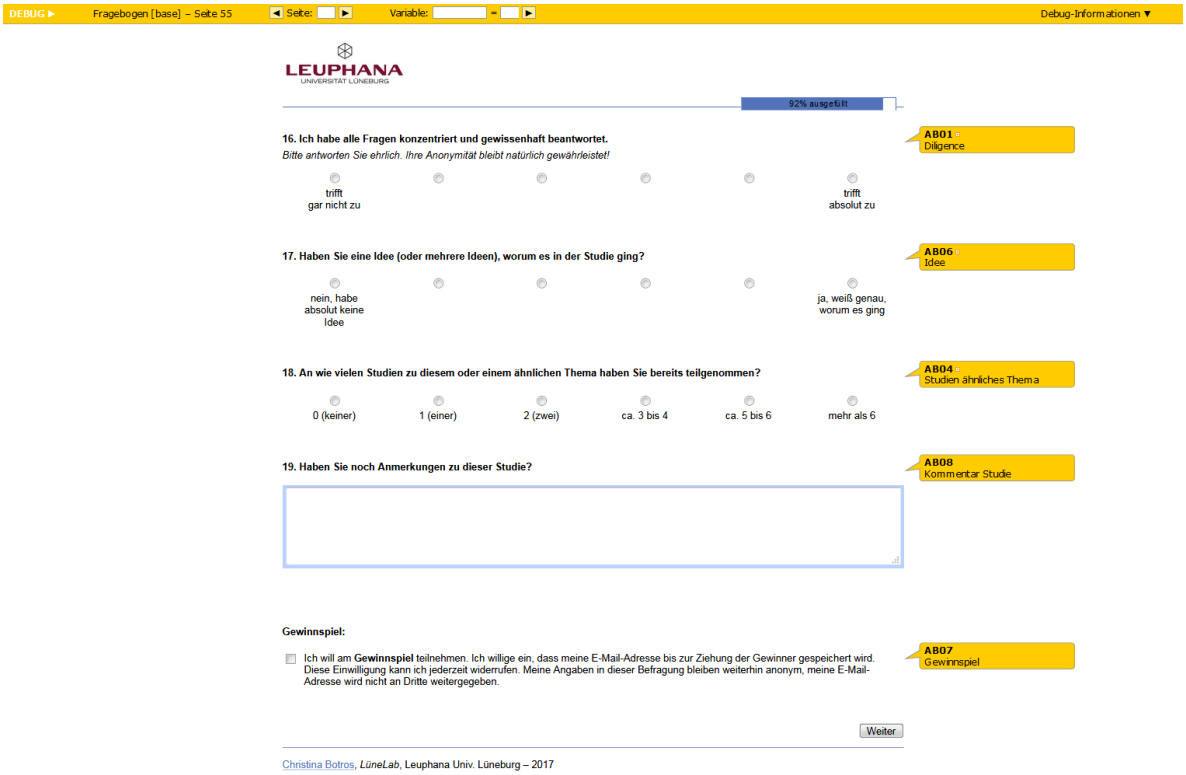


Rampage Scenario and Dependent Measures

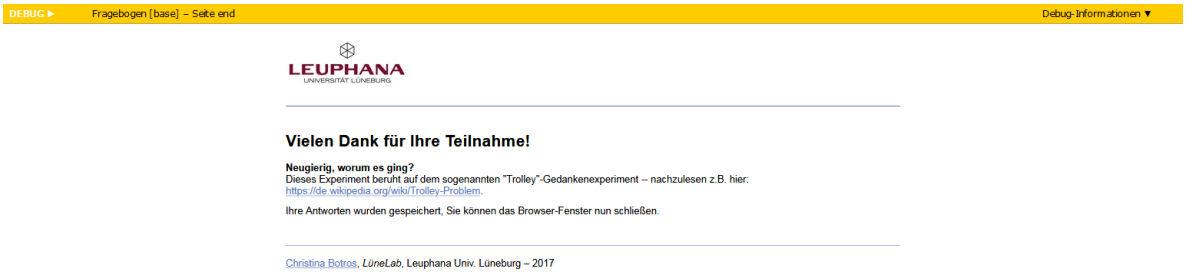




Closing Questions

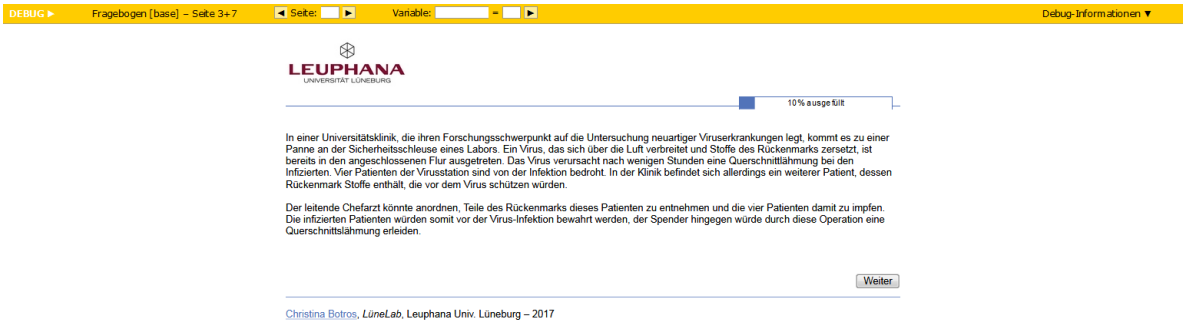


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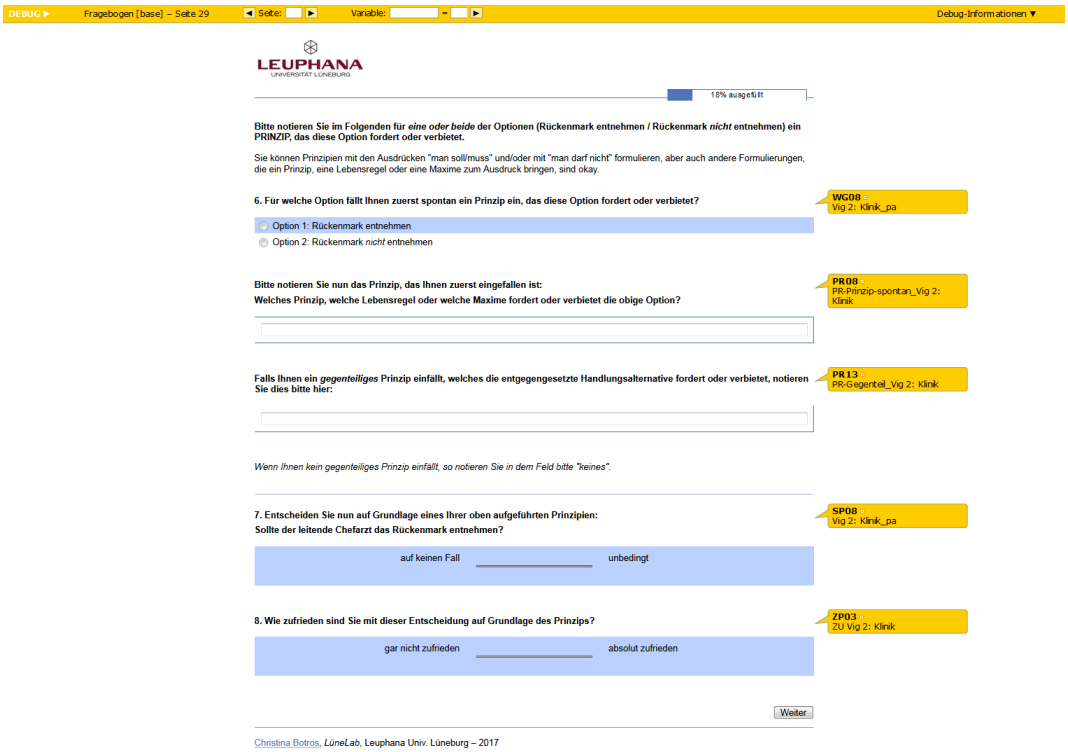


Example 1: Scenario Type = Patient, Decision Strategy = Principle

Scenario Content = Virus (exemplary)

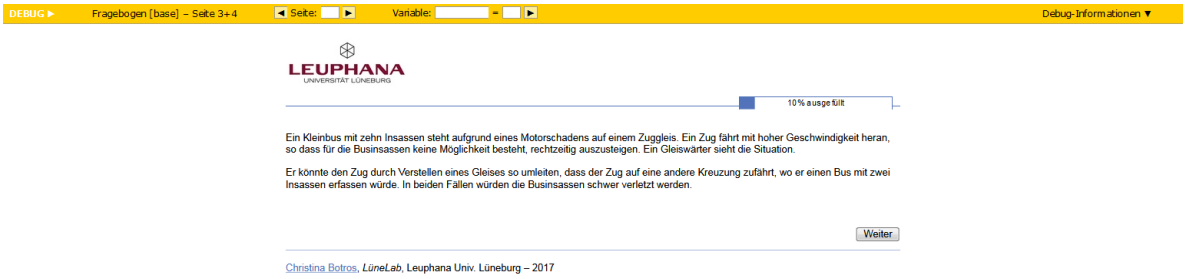


Decision Strategy Manipulation Principle

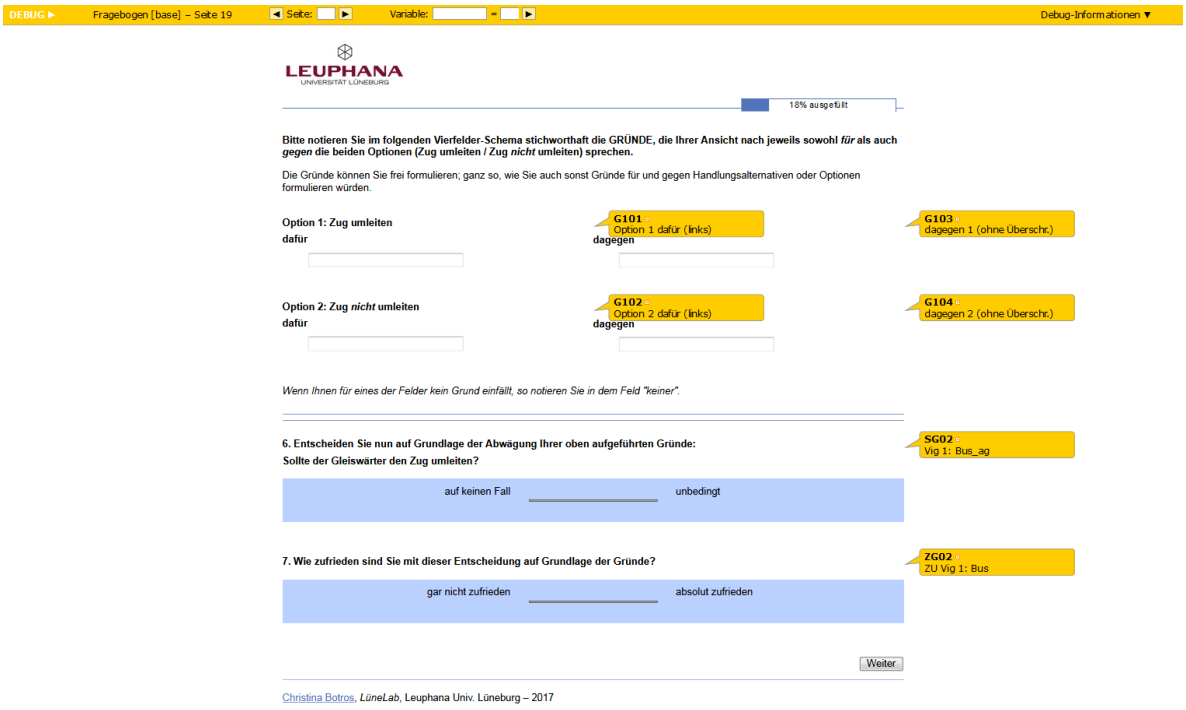


Example 2: Scenario Type = Agent, Decision Strategy = Reasons

Scenario Content = Bus (exemplary)

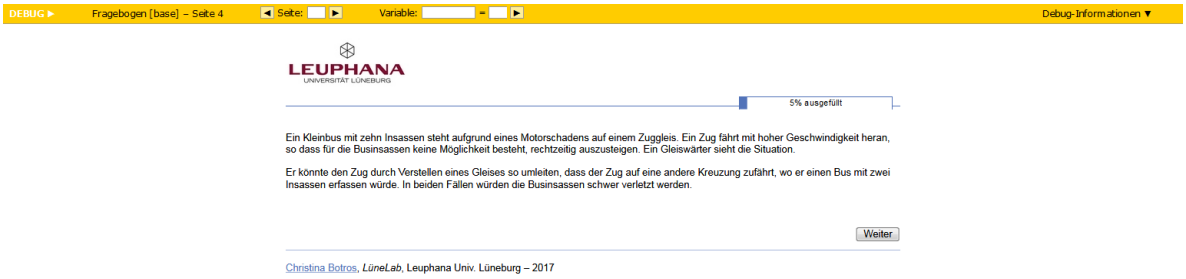


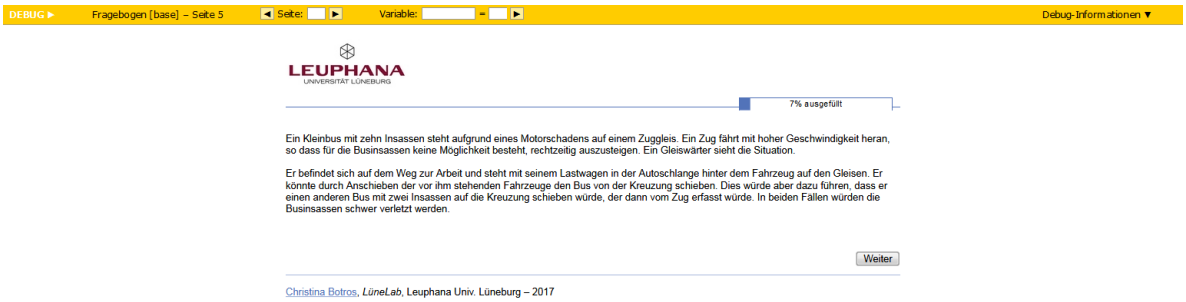
Decision Strategy Manipulation Reasons



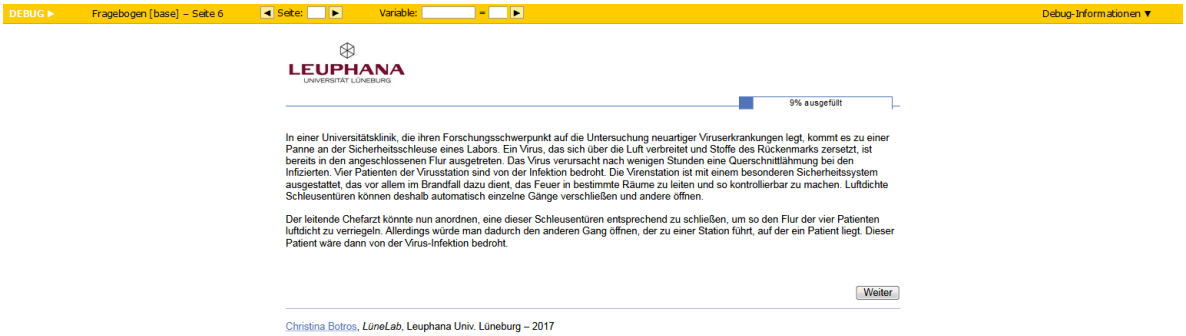
Comparison of Scenario Type (Agent vs. Patient) per Scenario Content

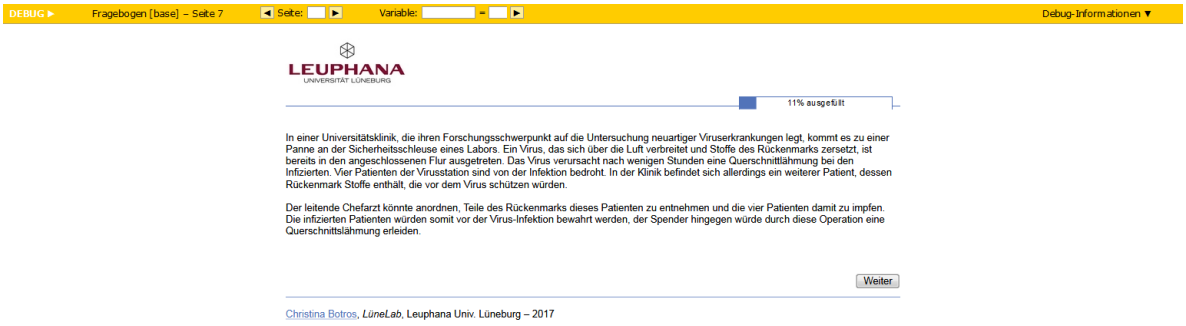
V1 – Bus Agent vs. Patient



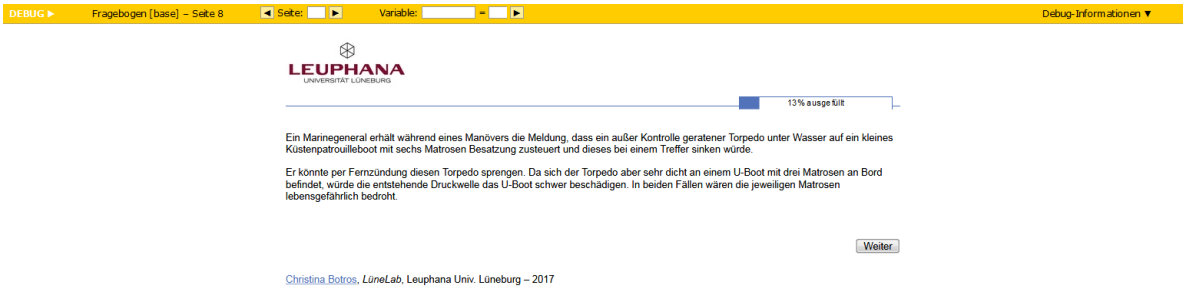


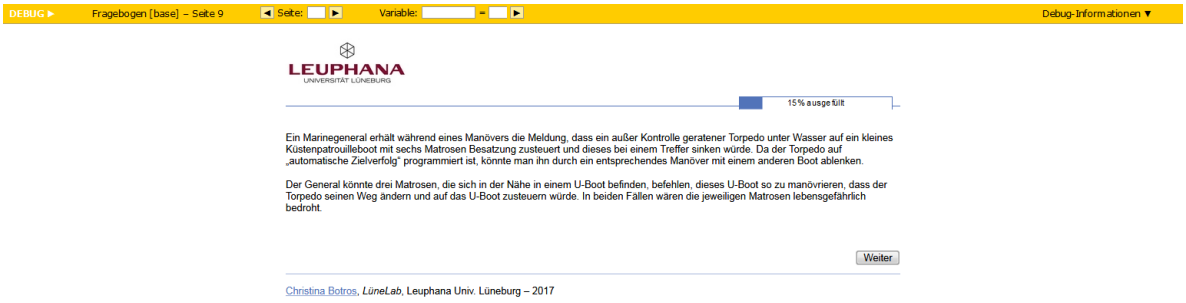
V2 – Virus Agent vs. Patient



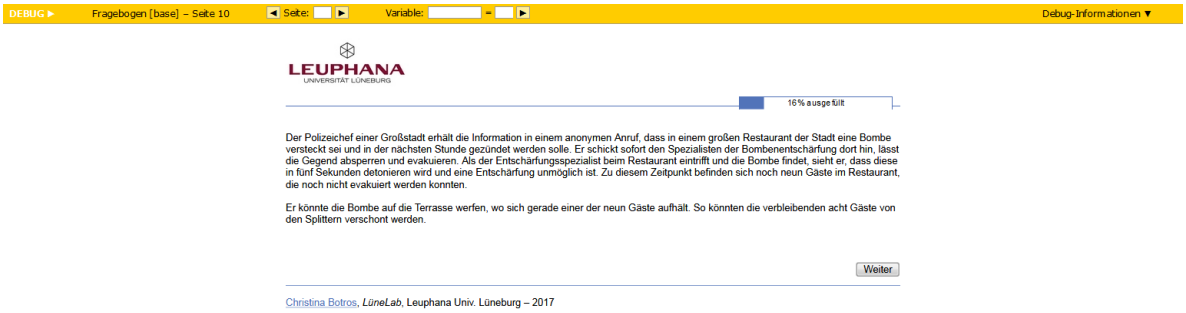


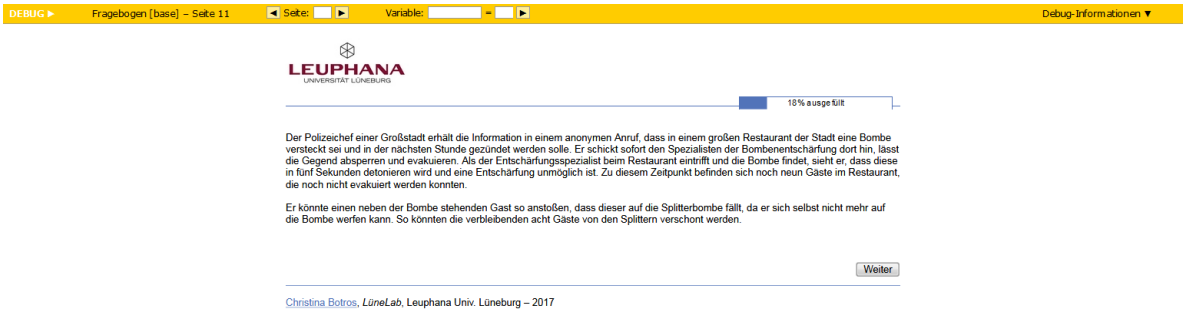
V3 – Torpedo Agent vs. Patient





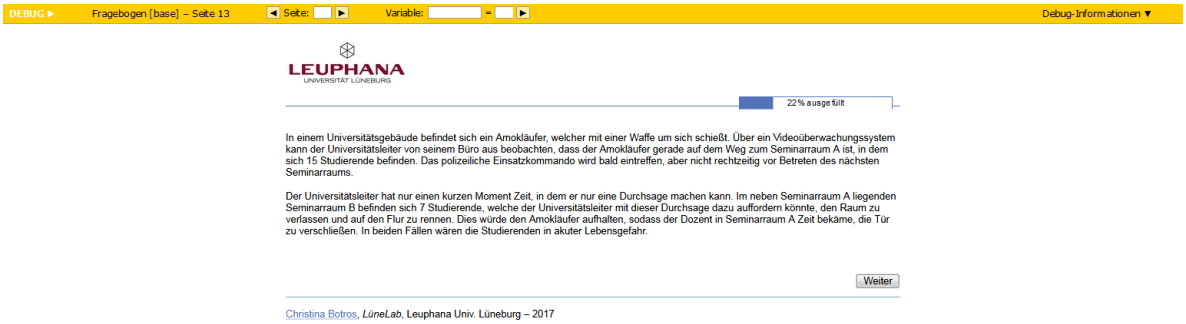
V4 – Bomb Agent vs. Patient





V5 – Rampage Agent vs. Patient

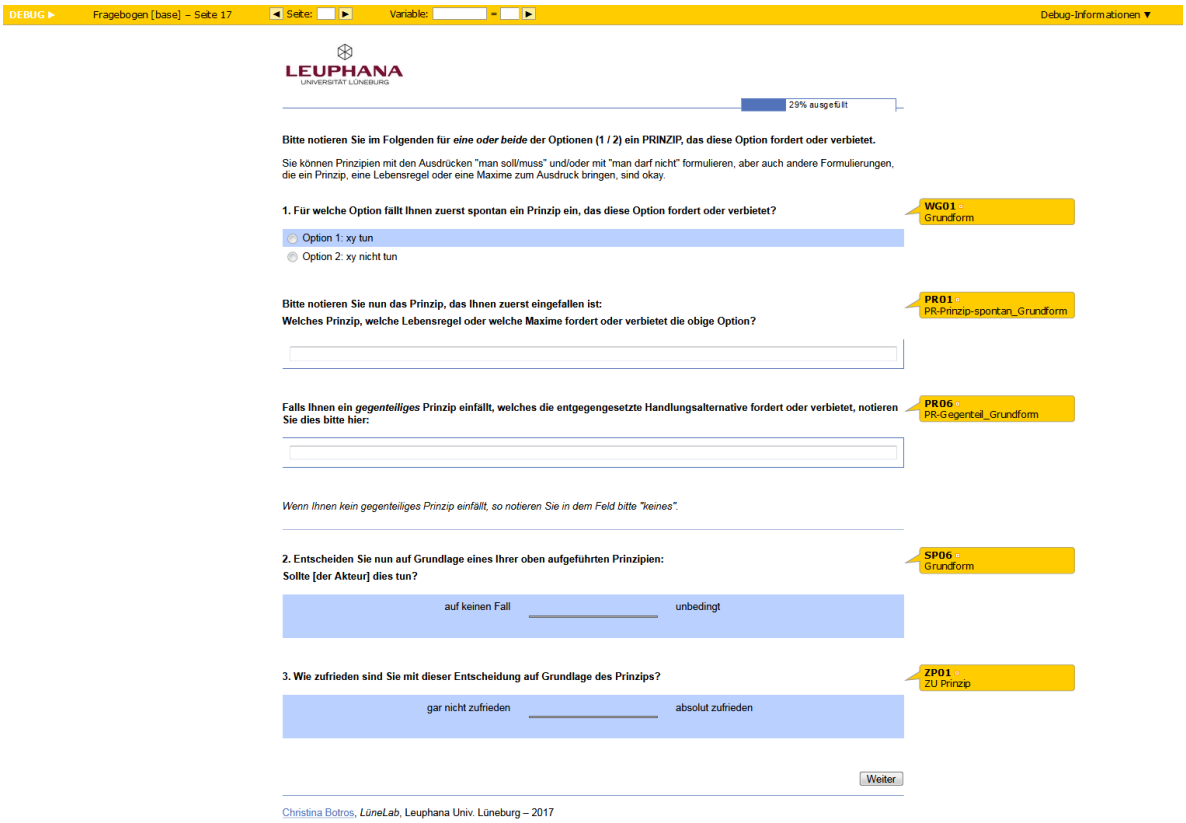




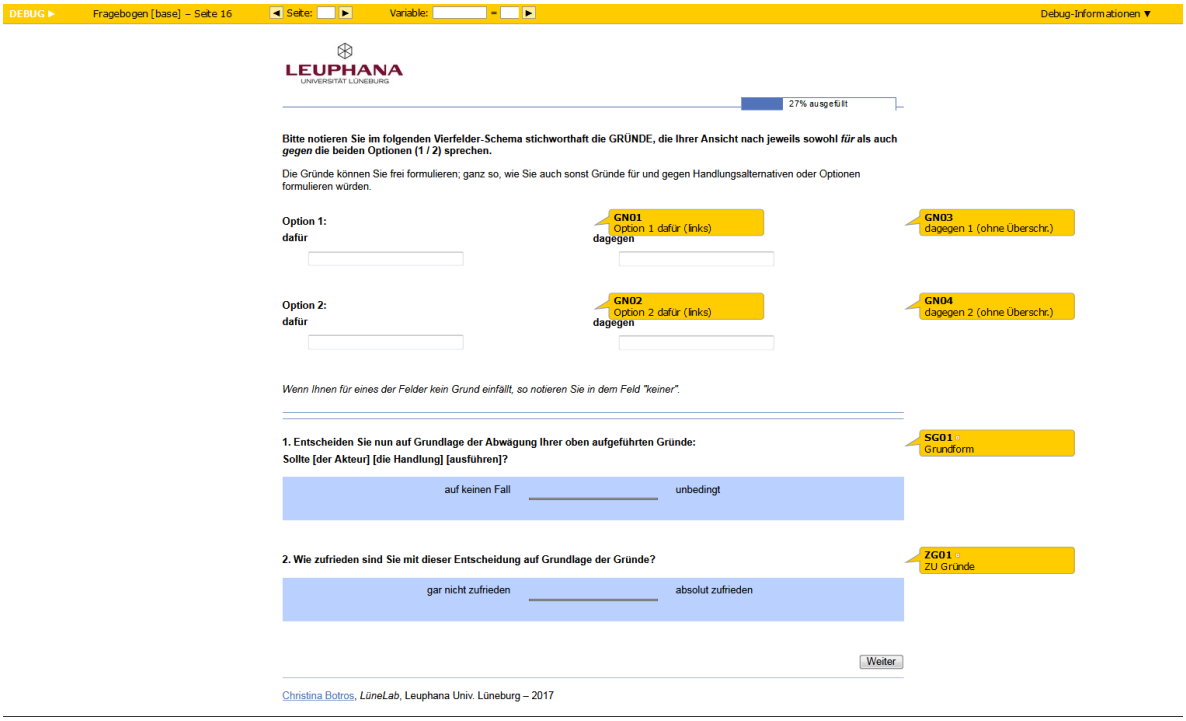
Formal Versions

The formal versions were not part of the experiment. They are only displayed to explicate the formal structure of the decision strategy manipulations.

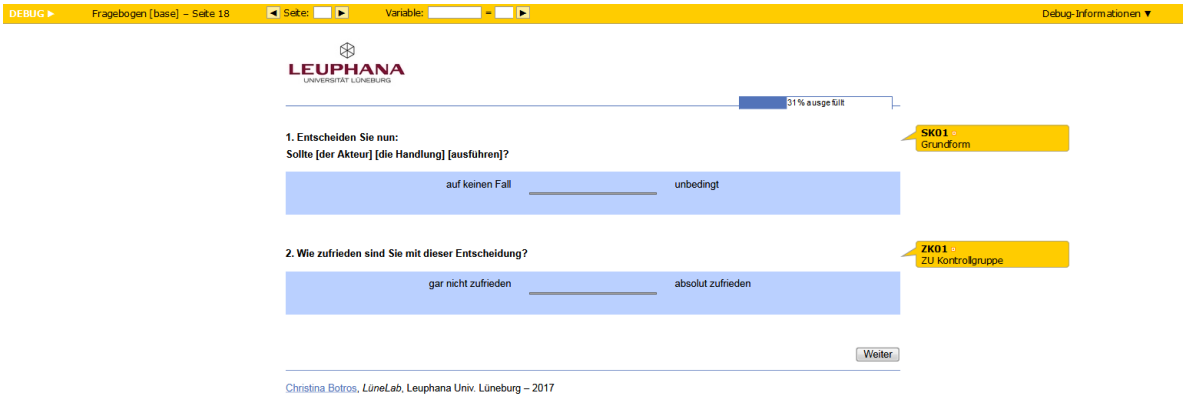
Principle



Reasons



Control



I.2 Multi-Attribute Decision Making Paradigm

I.2.1 Reminder of the Study's Design

Type: experiment plus 2 additional questionnaires
Factors: 1 independent variable (between) with 3 levels
– *Decision Strategy*:
  – "decide by self-chosen strategy"/control
  – "decide by principle"
  – "decide by reasons"
Scenario Contents: 8 multi-attribute decision situation vignettes (within)
– *V1:* Moving for the place of study
– *V2:* Apartment hunting
– *V3:* Celebrate Christmas with father/mother
– *V4:* Exam option
– *V5:* Take up master's studies
– *V6:* Job during studies
– *V7:* Termination of studies
– *V8:* Vacation destination
Dependent Variables: 4 one-item dependent measures
– *Situation satisfaction*
– *Option satisfaction*
– *Strategy satisfaction*
– *Emotionality*
Additional Questionnaires:
– subscale "rational/vigilant" of the Decision Style Questionnaire (DSQ)
– the 14BiPole-Value Questionnaire

I.2.2 Screenshots of the Original Online Experiment

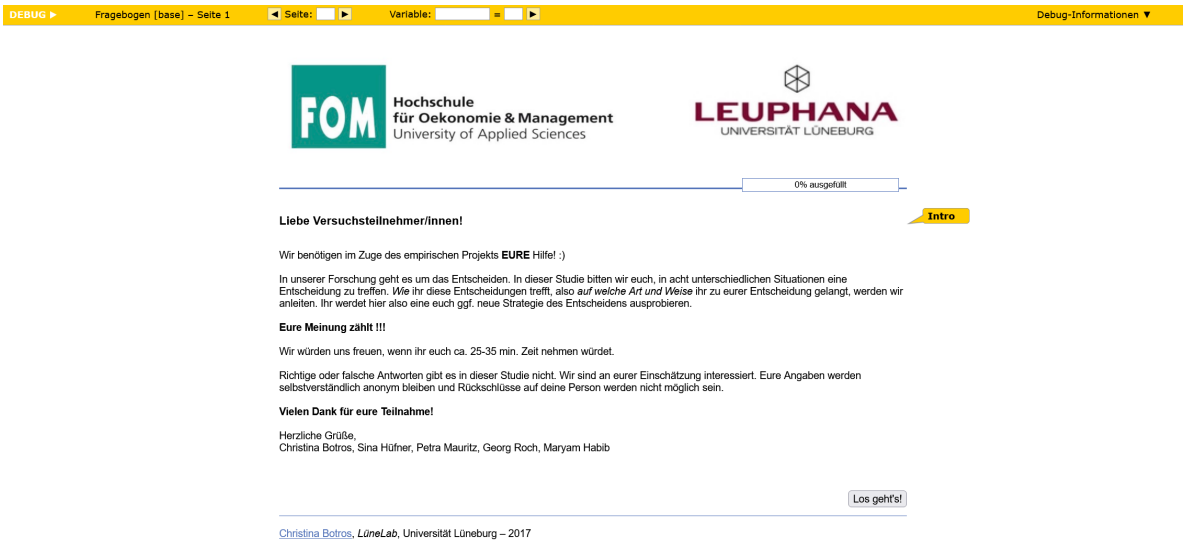
Introduction . . . 712
Demographics . . . 713
Fully Reported Condition: Control . . . 714
- Introduction . . . 714
- V1 - Moving for the place of study . . . 715
- V2 - Apartment hunting . . . 717
- V3 - Celebrate Christmas with father/mother . . . 719
- V4 - Exam option . . . 721
- V5 - Take up master's studies . . . 723
- V6 - Job during studies . . . 725
- V7 - Termination of studies . . . 727
- V8 - Vacation destination . . . 729
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DSQ Subscale "rational/vigilant" . . . 731
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- Introduction . . . 735
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- Dependent Measures . . . 737

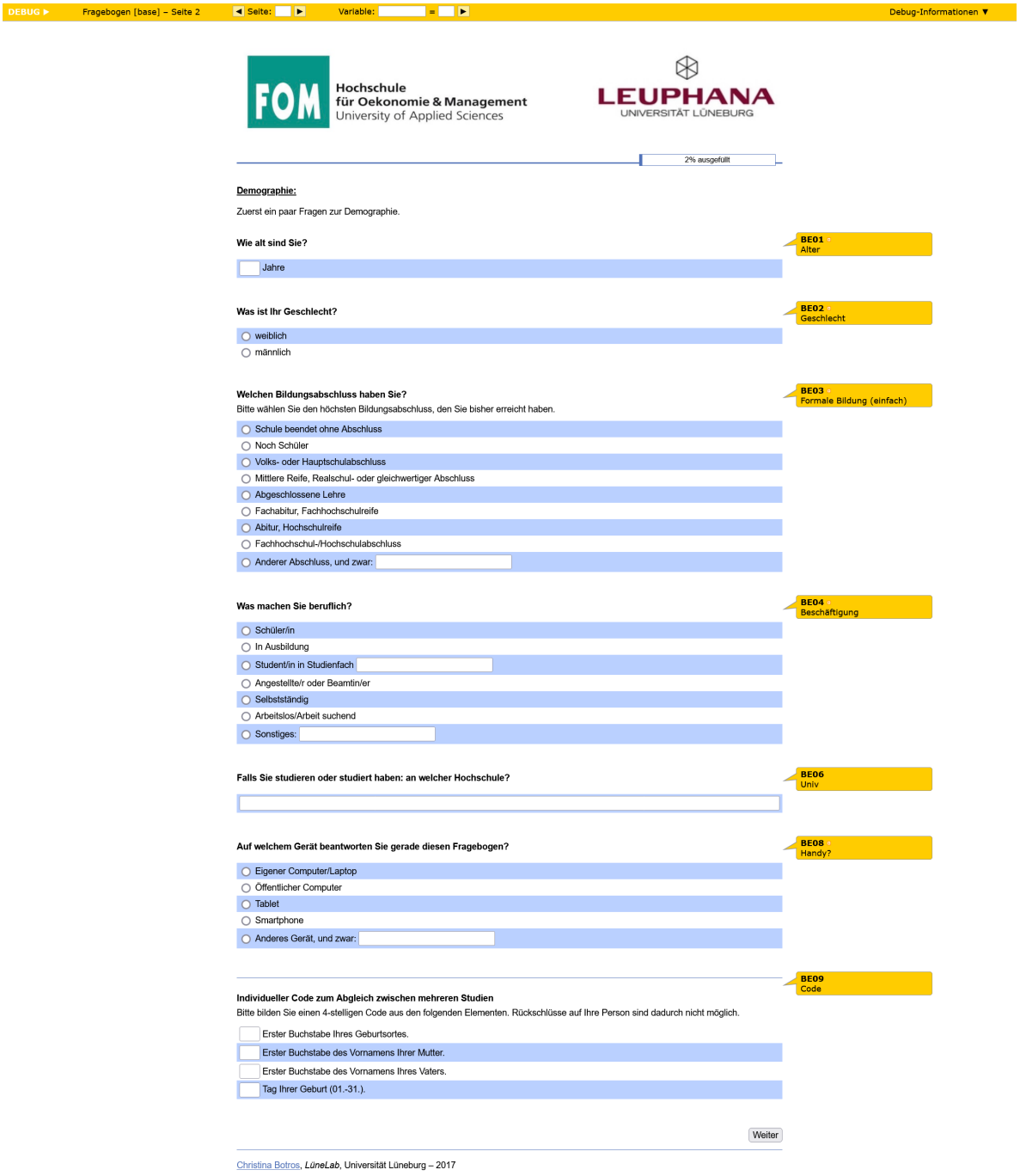
Example 2: Reasons . . . 738
- Introduction . . . 738
- Explanation . . . 738
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Comparison Retrospective . . . 741
Comparison *Introduction* to Decision Strategies . . . 742
Comparison *Explanation* of Decision Strategies . . . 743
Comparison *Manipulation* of Decision Strategies . . . 744

Introduction



Demographics



DEBUG ▶ Fragebogen [base] – Seite 2 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

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Demographie:

Zuerst ein paar Fragen zur Demographie.

Wie alt sind Sie? — BE01 Alter

Jahre

Was ist Ihr Geschlecht? — BE02 Geschlecht

- weiblich
- männlich

Welchen Bildungsabschluss haben Sie? — BE03 Formale Bildung (einfach)

Bitte wählen Sie den höchsten Bildungsabschluss, den Sie bisher erreicht haben.

- Schule beendet ohne Abschluss
- Noch Schüler
- Volks- oder Hauptschulabschluss
- Mittlere Reife, Realschul- oder gleichwertiger Abschluss
- Abgeschlossene Lehre
- Fachabitur, Fachhochschulreife
- Abitur, Hochschulreife
- Fachhochschul-/Hochschulabschluss
- Anderer Abschluss, und zwar:

Was machen Sie beruflich? — BE04 Beschäftigung

- Schüler/in
- In Ausbildung
- Student/in in Studienfach
- Angestellte/r oder Beamtin/er
- Selbstständig
- Arbeitslos/Arbeit suchend
- Sonstiges:

Falls Sie studieren oder studiert haben: an welcher Hochschule? — BE06 Univ

Auf welchem Gerät beantworten Sie gerade diesen Fragebogen? — BE08 Handy?

- Eigener Computer/Laptop
- Öffentlicher Computer
- Tablet
- Smartphone
- Anderes Gerät, und zwar:

BE09 Code

Individueller Code zum Abgleich zwischen mehreren Studien

Bitte bilden Sie einen 4-stelligen Code aus den folgenden Elementen. Rückschlüsse auf Ihre Person sind dadurch nicht möglich.

- Erster Buchstabe Ihres Geburtsortes.
- Erster Buchstabe des Vornamens Ihrer Mutter.
- Erster Buchstabe des Vornamens Ihres Vaters.
- Tag Ihrer Geburt (01.-31.).

Weiter

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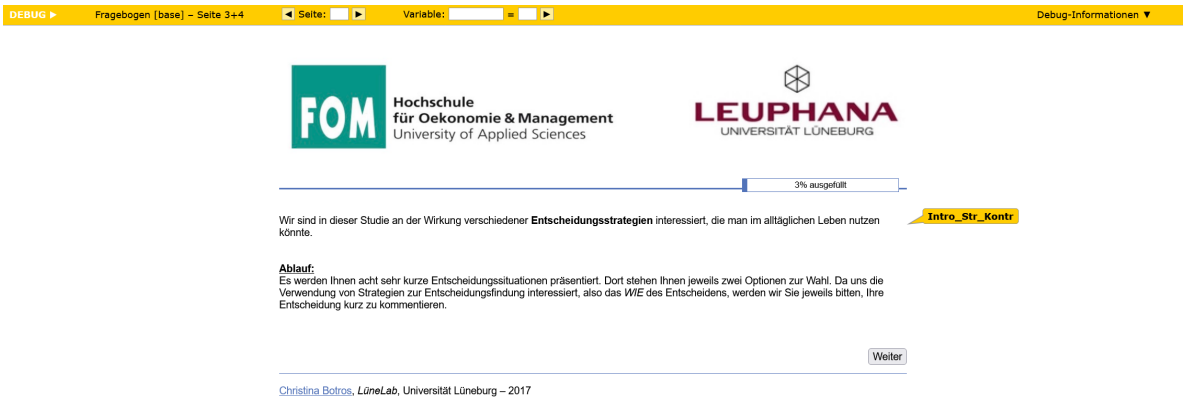
Fully Reported Condition: Decision Strategy = Control

Scenario Content =

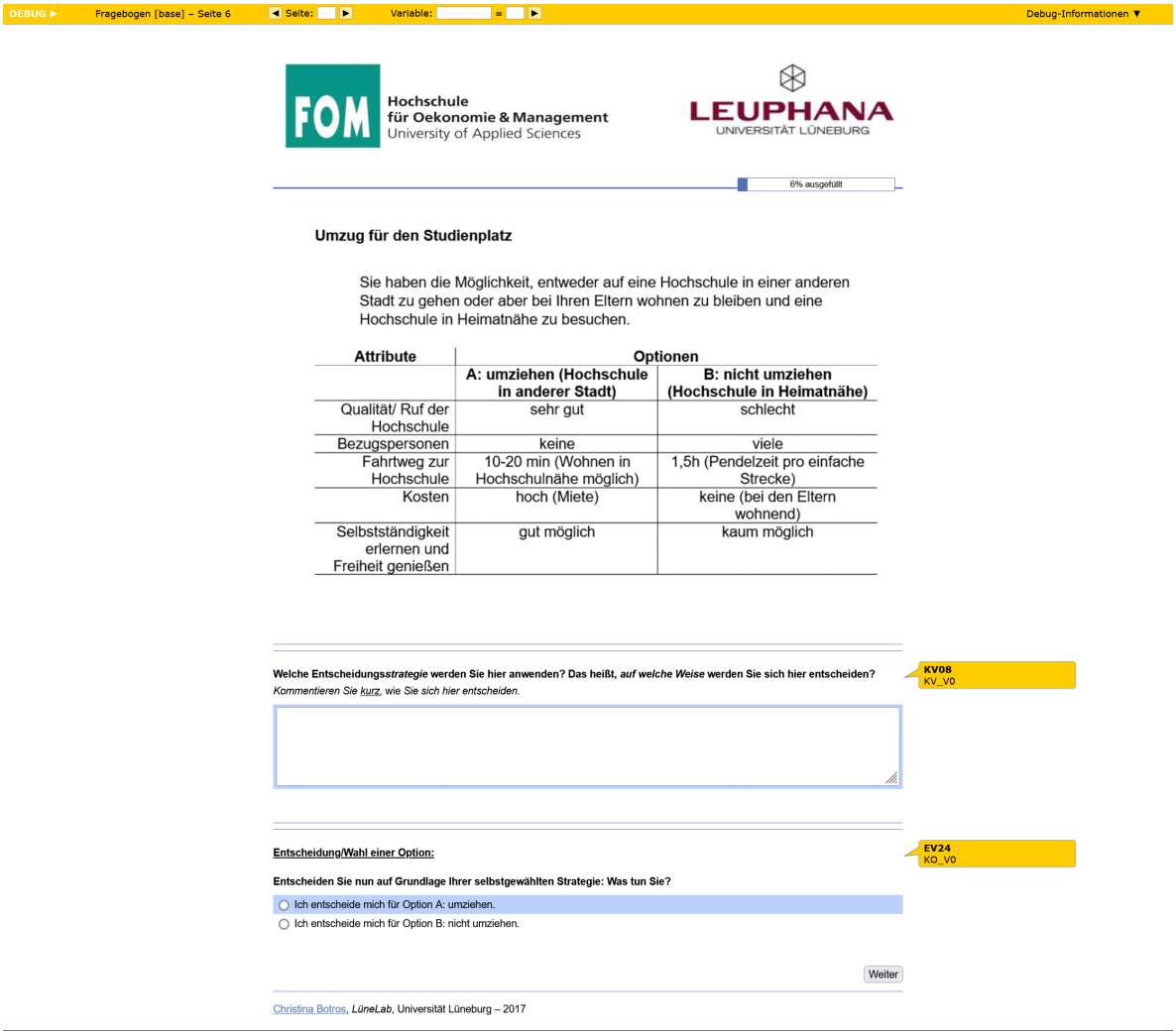
V1: Moving for the place of study
V2: Apartment hunting
V3: Celebrate Christmas with father/mother
V4: Exam option
V5: Take up master's studies
V6: Job during studies
V7: Termination of studies
V8: Vacation destination

Note that per scenario/vignette there were two pages displayed to participants: the scenario/vignette and the decision (the choice between one of two options) on the first page and the 4 dependent measures on the second page. The 4 dependent variables were always worded the same, i.e.: they were not adjusted to scenario content. Nevertheless, in the following display of the materials of the control group, both pages per vignette will be displayed (in spite of the second page always being the same) in order to provide the reader with an impression of how the experiment looked like to participants.

Introduction



V1 - Moving for the place of study Vignette and Dependent Measures



DEBUG ▶ Fragebogen [base] – Seite 6 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

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Umzug für den Studienplatz

Sie haben die Möglichkeit, entweder auf eine Hochschule in einer anderen Stadt zu gehen oder aber bei Ihren Eltern wohnen zu bleiben und eine Hochschule in Heimatnähe zu besuchen.

Attribute	Optionen	
	A: umziehen (Hochschule in anderer Stadt)	**B: nicht umziehen (Hochschule in Heimatnähe)**
Qualität/ Ruf der Hochschule	sehr gut	schlecht
Bezugspersonen	keine	viele
Fahrtweg zur Hochschule	10-20 min (Wohnen in Hochschulnähe möglich)	1,5h (Pendelzeit pro einfache Strecke)
Kosten	hoch (Miete)	keine (bei den Eltern wohnend)
Selbstständigkeit erlernen und Freiheit genießen	gut möglich	kaum möglich

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV08 KV_V0

Entscheidung/Wahl einer Option:

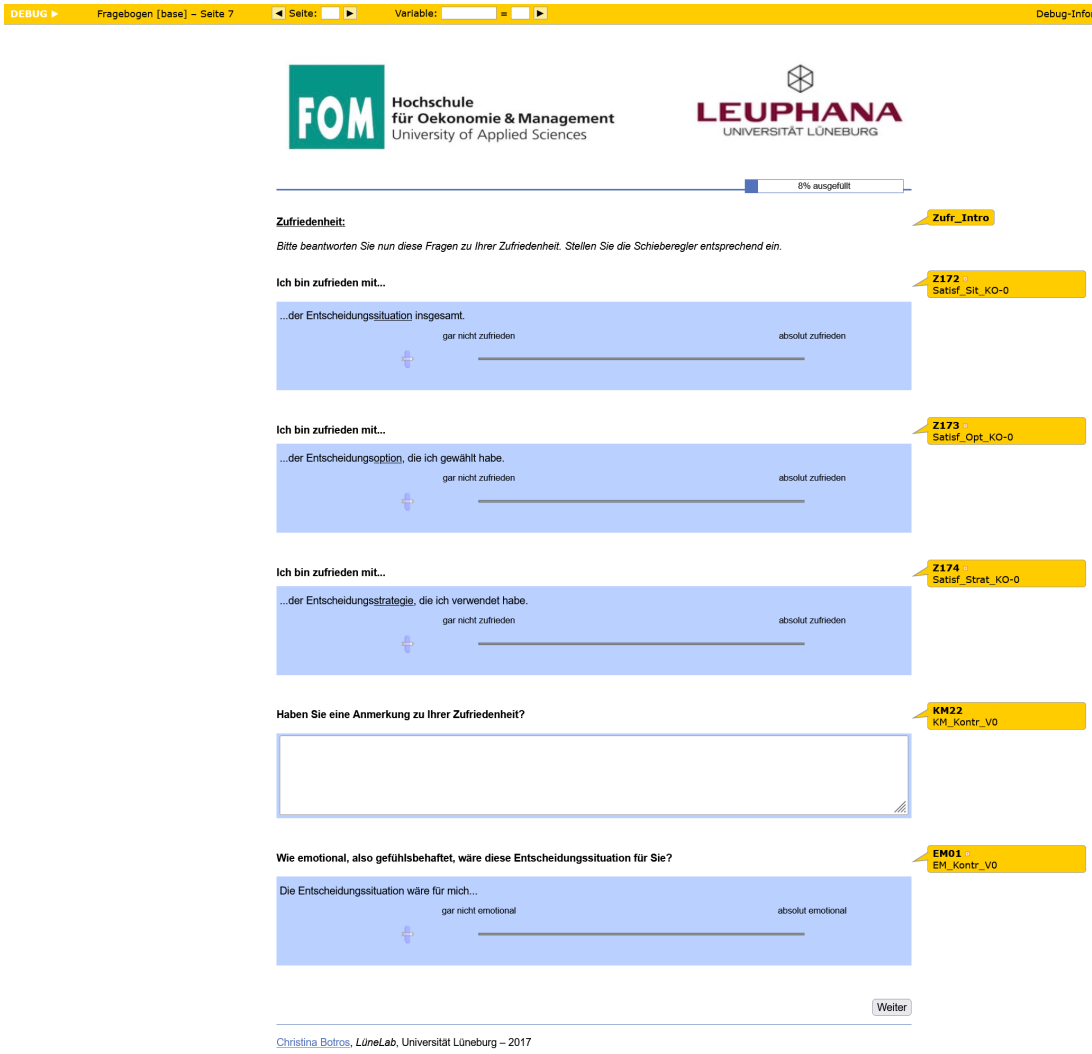
EV24 KO_V0

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

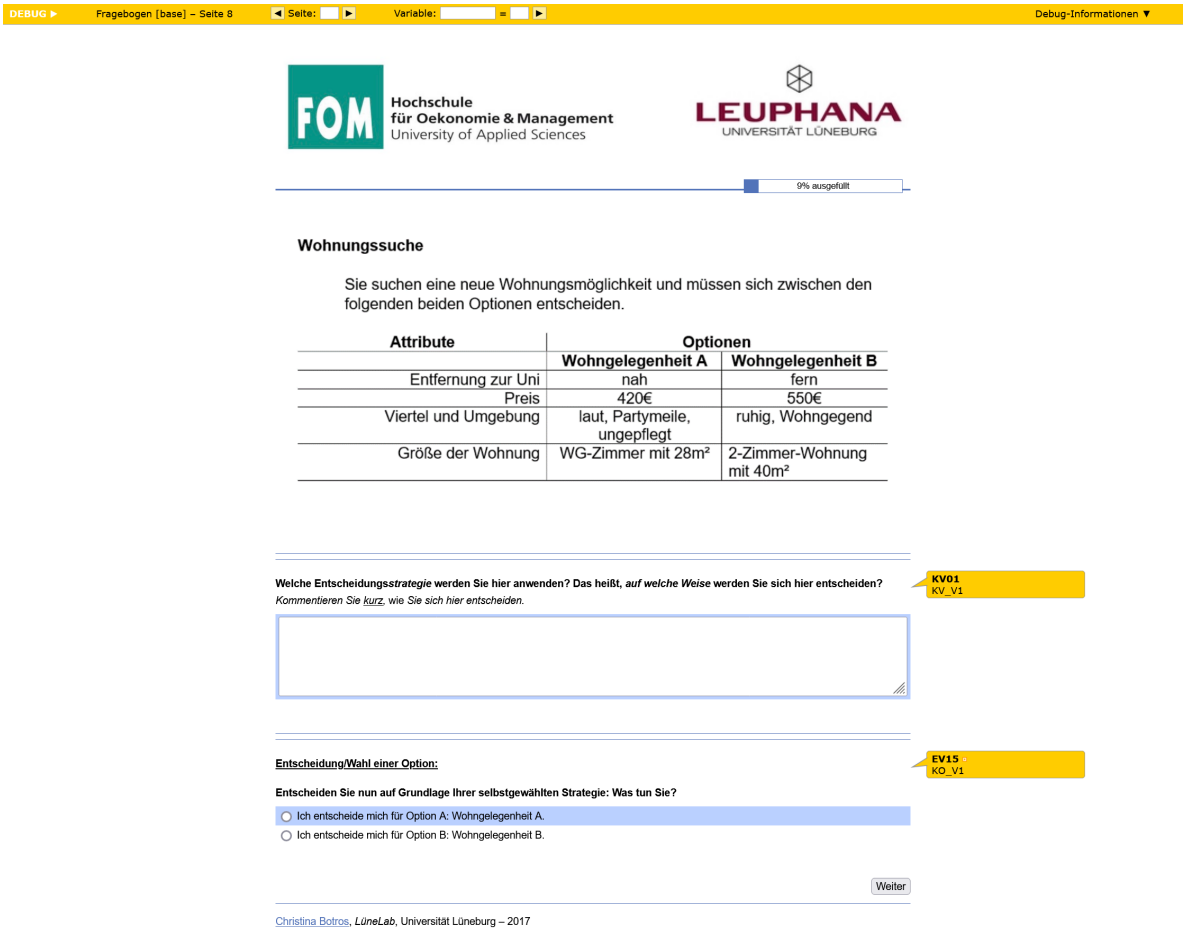
- Ich entscheide mich für Option A: umziehen.
- Ich entscheide mich für Option B: nicht umziehen.

Weiter

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DEBUG ▶
Fragebogen [base] – Seite 7
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
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Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z172
Satisf_Sit_KO-0
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z173
Satisf_Opt_KO-0
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z174
Satisf_Strat_KO-0
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM22
KM_Kontr_V0
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM01
EM_Kontr_V0
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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V2 - Apartment hunting Vignette and Dependent Measures


DEBUG ▶ Fragebogen [base] – Seite 8 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

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Wohnungssuche

Sie suchen eine neue Wohnungsmöglichkeit und müssen sich zwischen den folgenden beiden Optionen entscheiden.

Attribute	Optionen	
	Wohngelegenheit A	**Wohngelegenheit B**
Entfernung zur Uni	nah	fern
Preis	420€	550€
Viertel und Umgebung	laut, Partymeile, ungepflegt	ruhig, Wohngegend
Größe der Wohnung	WG-Zimmer mit 28m²	2-Zimmer-Wohnung mit 40m²

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV01 KV_V1

Entscheidung/Wahl einer Option:

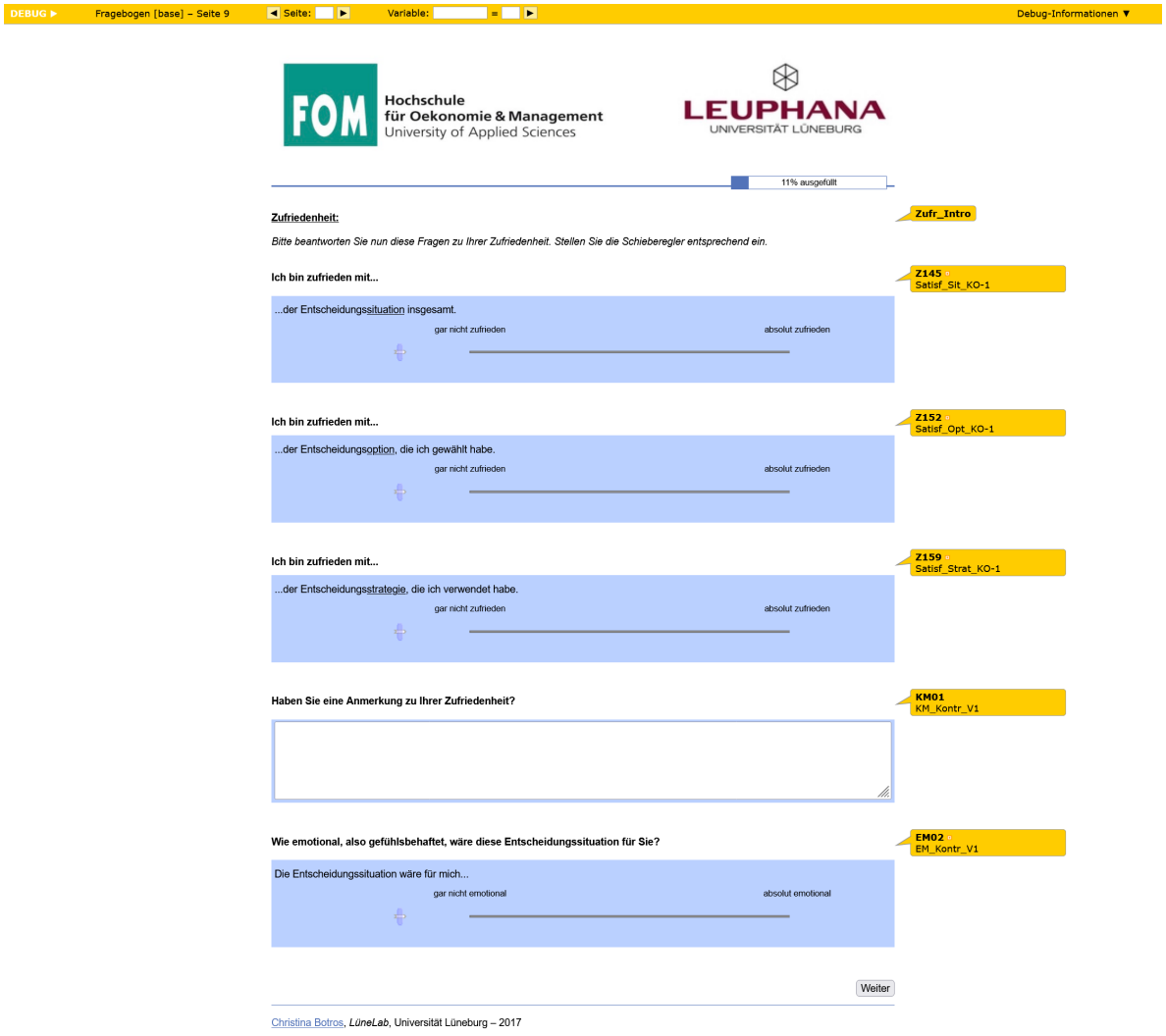
EV15 KO_V1

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

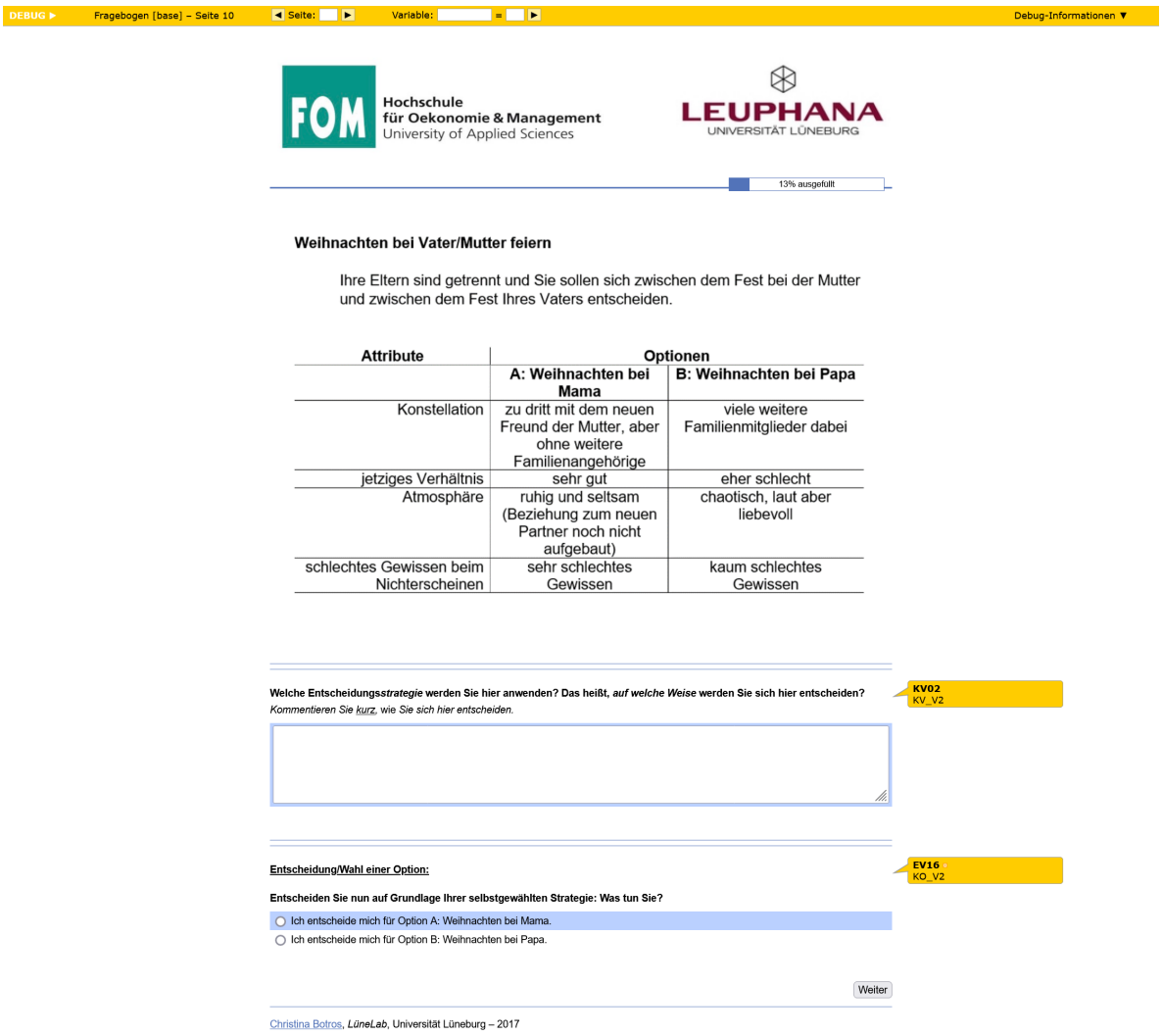
- ○ Ich entscheide mich für Option A: Wohngelegenheit A.
- ○ Ich entscheide mich für Option B: Wohngelegenheit B.

Weiter

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DEBUG ▶
Fragebogen [base] – Seite 9
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
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Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z145
Satisf_Sit_KO-1
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z152
Satisf_Opt_KO-1
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z159
Satisf_Strat_KO-1
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM01
KM_Kontr_V1
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM02
EM_Kontr_V1
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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V3 - Celebrate Christmas with father/mother Vignette and Dependent Measures



DEBUG ▶ Fragebogen [base] – Seite 10 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

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Weihnachten bei Vater/Mutter feiern

Ihre Eltern sind getrennt und Sie sollen sich zwischen dem Fest bei der Mutter und zwischen dem Fest Ihres Vaters entscheiden.

Attribute	Optionen	
	A: Weihnachten bei Mama	**B: Weihnachten bei Papa**
Konstellation	zu dritt mit dem neuen Freund der Mutter, aber ohne weitere Familienangehörige	viele weitere Familienmitglieder dabei
jetziges Verhältnis	sehr gut	eher schlecht
Atmosphäre	ruhig und seltsam (Beziehung zum neuen Partner noch nicht aufgebaut)	chaotisch, laut aber liebevoll
schlechtes Gewissen beim Nichterscheinen	sehr schlechtes Gewissen	kaum schlechtes Gewissen

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV02
KV_V2

Entscheidung/Wahl einer Option:

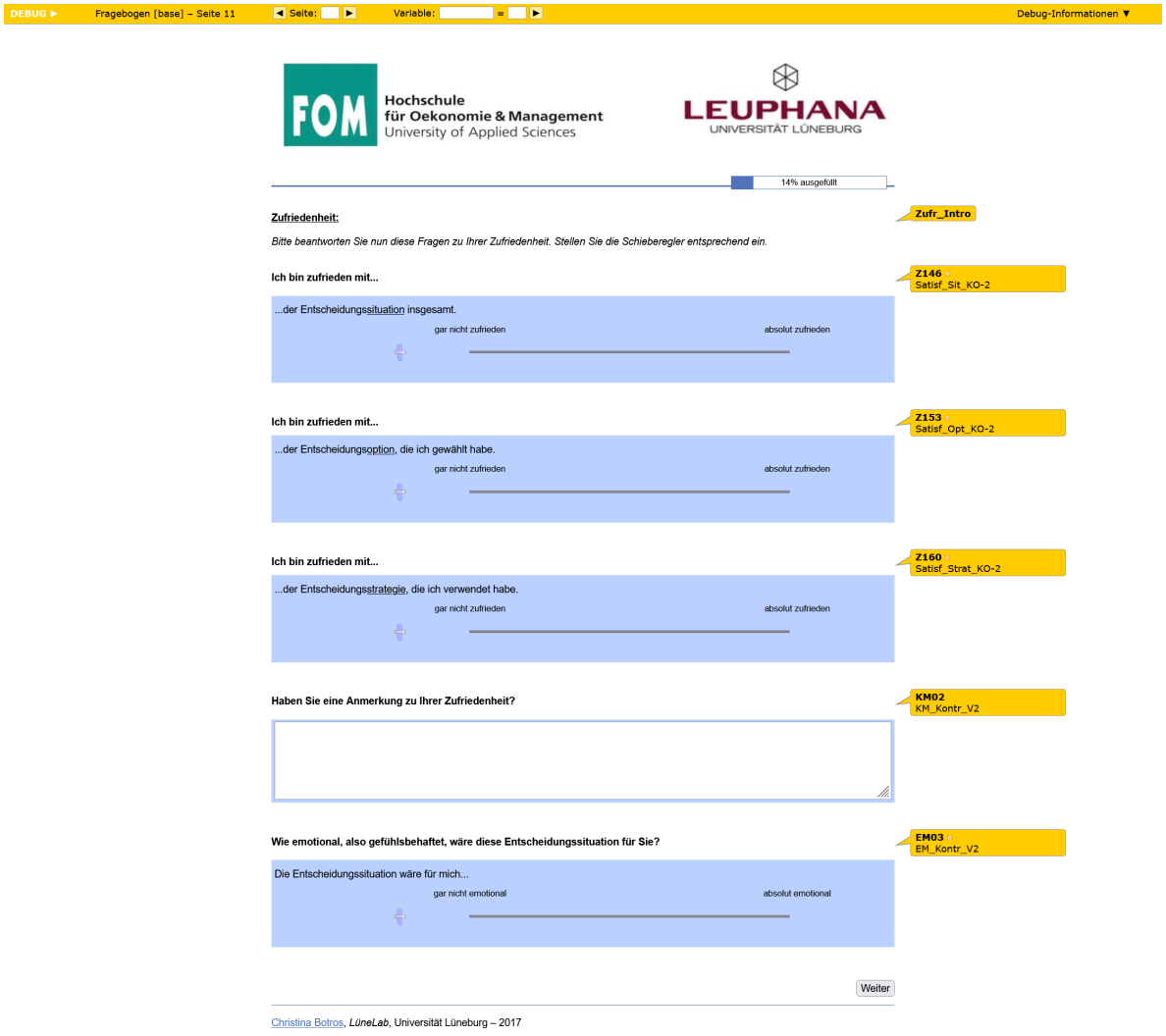
EV16
KO_V2

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

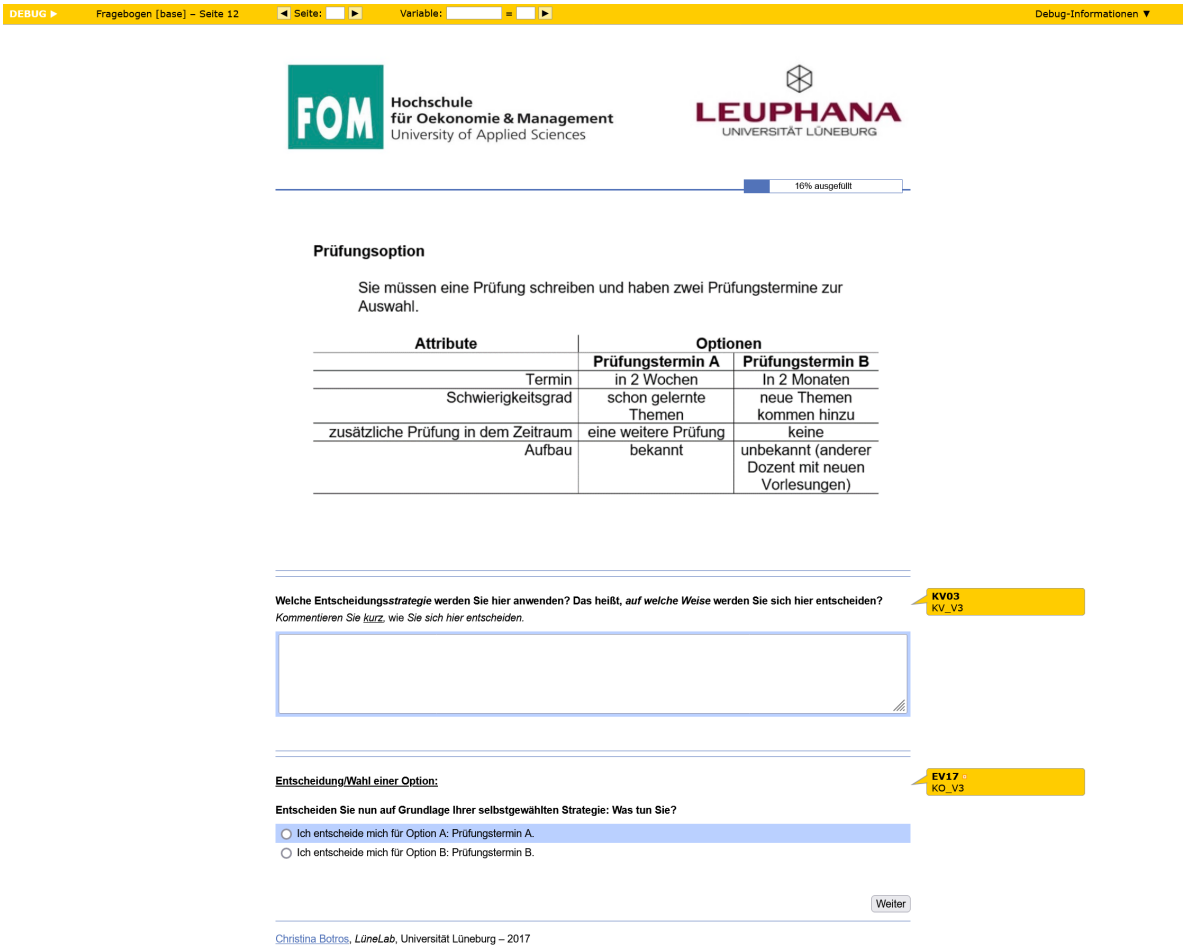
- Ich entscheide mich für Option A: Weihnachten bei Mama.
- Ich entscheide mich für Option B: Weihnachten bei Papa.

Weiter

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Fragebogen [base] – Seite 11
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
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Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z146
Satisf_Sit_KO-2
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z153
Satisf_Opt_KO-2
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z160
Satisf_Strat_KO-2
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM02
KM_Kontr_V2
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM03
EM_Kontr_V2
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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V4 - Exam option Vignette and Dependent Measures


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Prüfungsoption

Sie müssen eine Prüfung schreiben und haben zwei Prüfungstermine zur Auswahl.

Attribute	Optionen	
	Prüfungstermin A	**Prüfungstermin B**
Termin	in 2 Wochen	In 2 Monaten
Schwierigkeitsgrad	schon gelernte Themen	neue Themen kommen hinzu
zusätzliche Prüfung in dem Zeitraum	eine weitere Prüfung	keine
Aufbau	bekannt	unbekannt (anderer Dozent mit neuen Vorlesungen)

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV03
KV_V3

Entscheidung/Wahl einer Option:

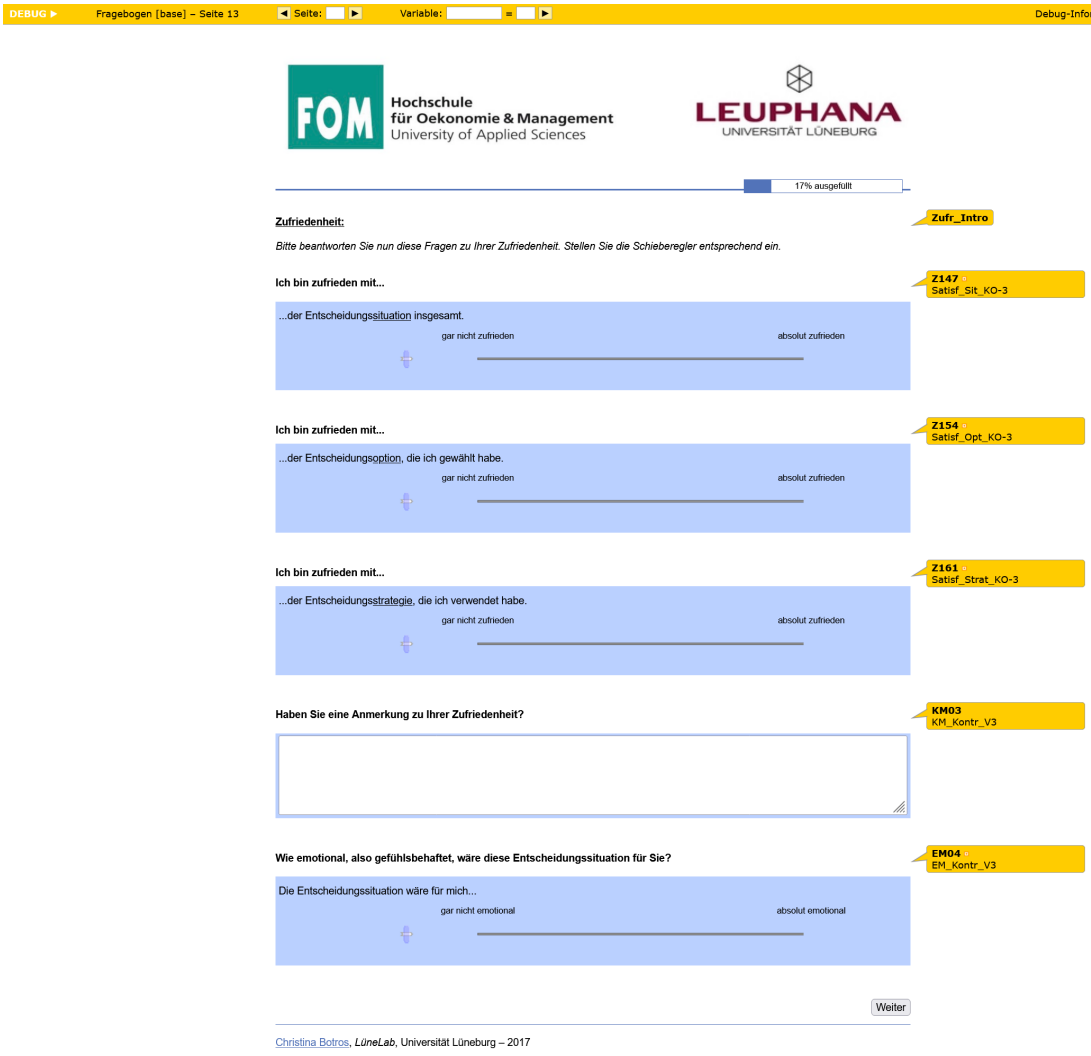
EV17
KO_V3

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

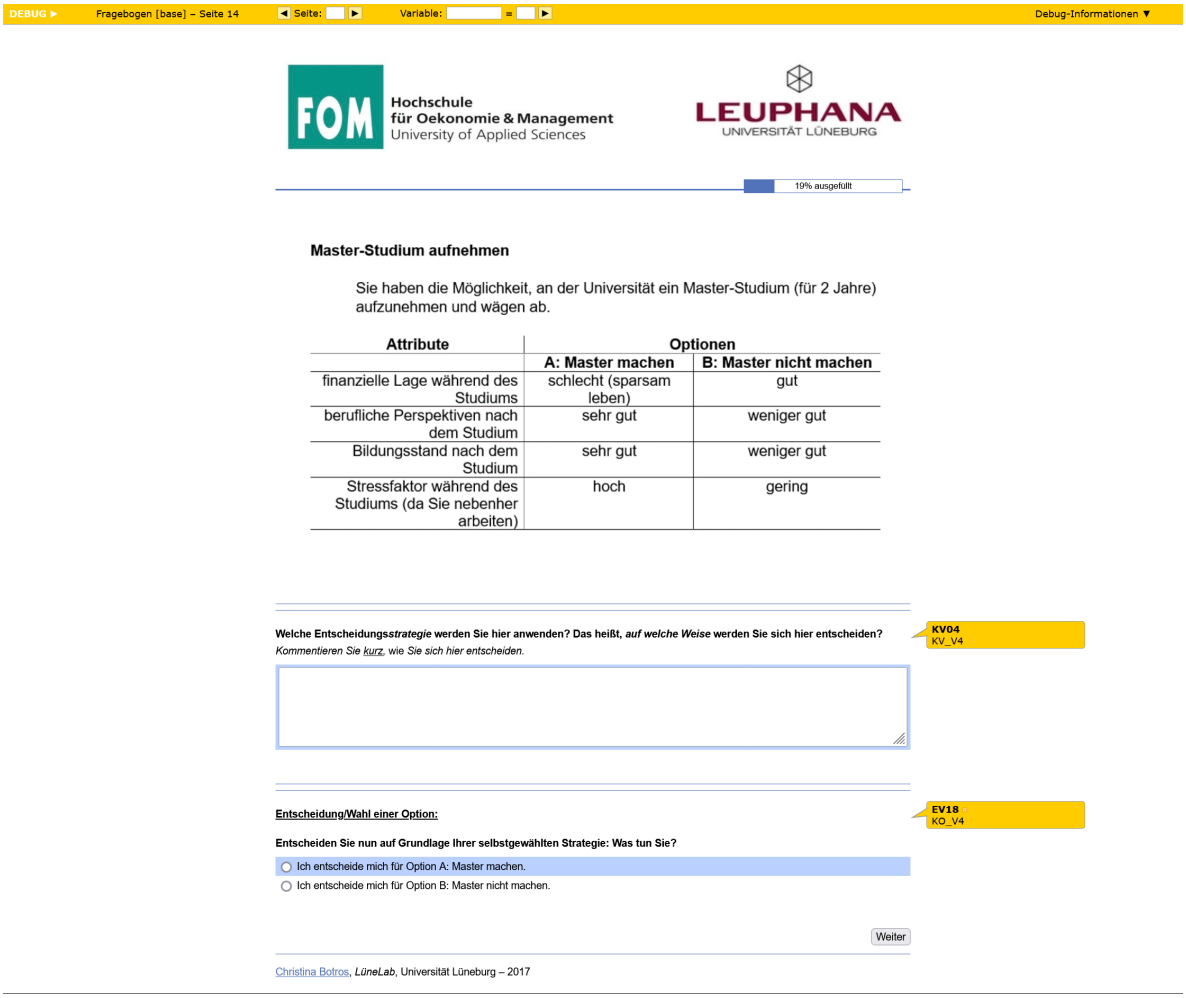
- ○ Ich entscheide mich für Option A: Prüfungstermin A.
- ○ Ich entscheide mich für Option B: Prüfungstermin B.

Weiter

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DEBUG ▶
Fragebogen [base] – Seite 13
◀ Seite: ▶
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Debug-Informationen ▼
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Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z147
Satisf_Sit_KO-3
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z154
Satisf_Opt_KO-3
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z161
Satisf_Strat_KO-3
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM03
KM_Kontr_V3
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM04
EM_Kontr_V3
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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V5 - Take up master's studies Vignette and Dependent Measures



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Master-Studium aufnehmen

Sie haben die Möglichkeit, an der Universität ein Master-Studium (für 2 Jahre) aufzunehmen und wägen ab.

Attribute	Optionen	
	A: Master machen	**B: Master nicht machen**
finanzielle Lage während des Studiums	schlecht (sparsam leben)	gut
berufliche Perspektiven nach dem Studium	sehr gut	weniger gut
Bildungsstand nach dem Studium	sehr gut	weniger gut
Stressfaktor während des Studiums (da Sie nebenher arbeiten)	hoch	gering

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV04
KV_V4

Entscheidung/Wahl einer Option:

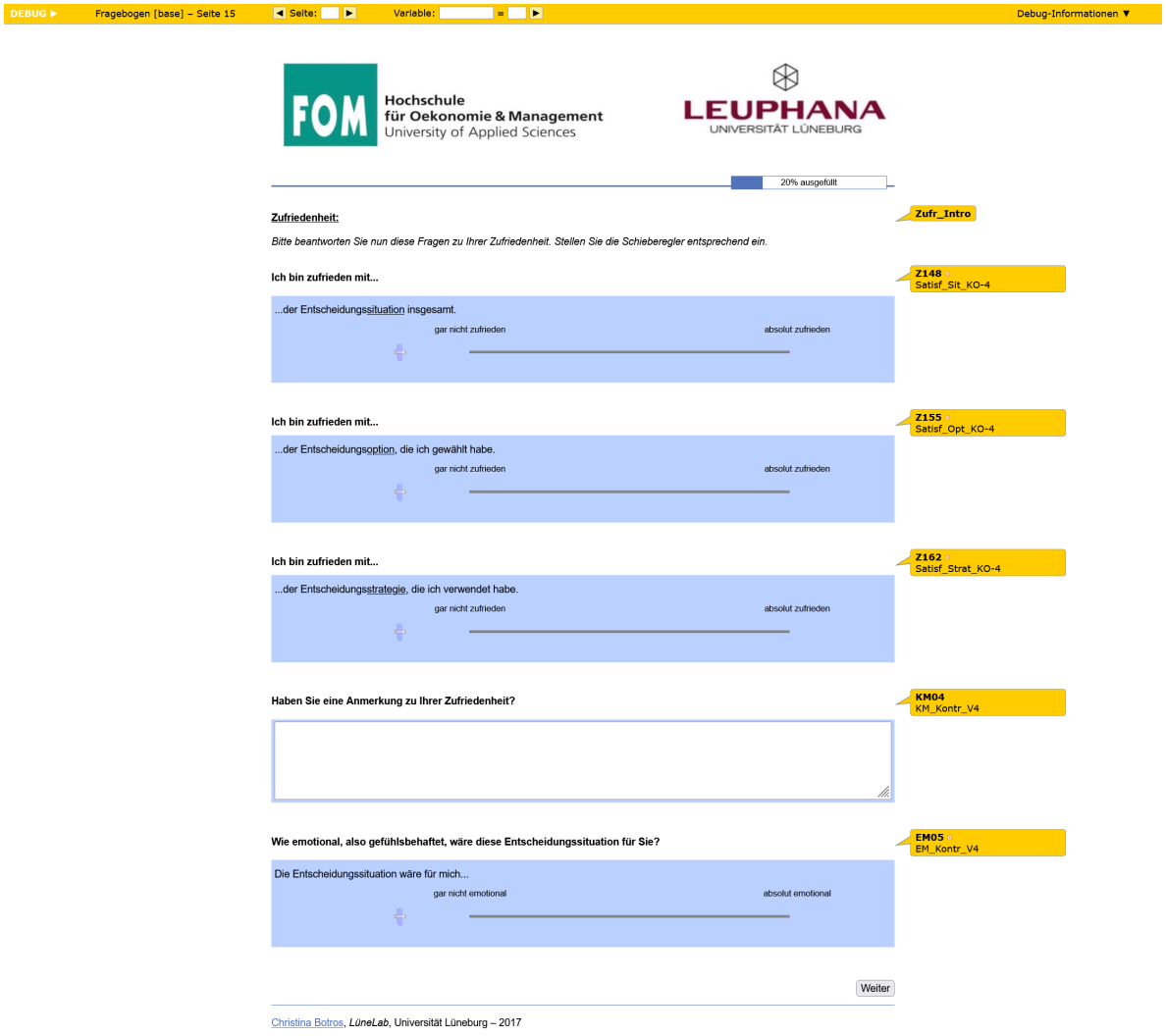
EV18
KO_V4

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

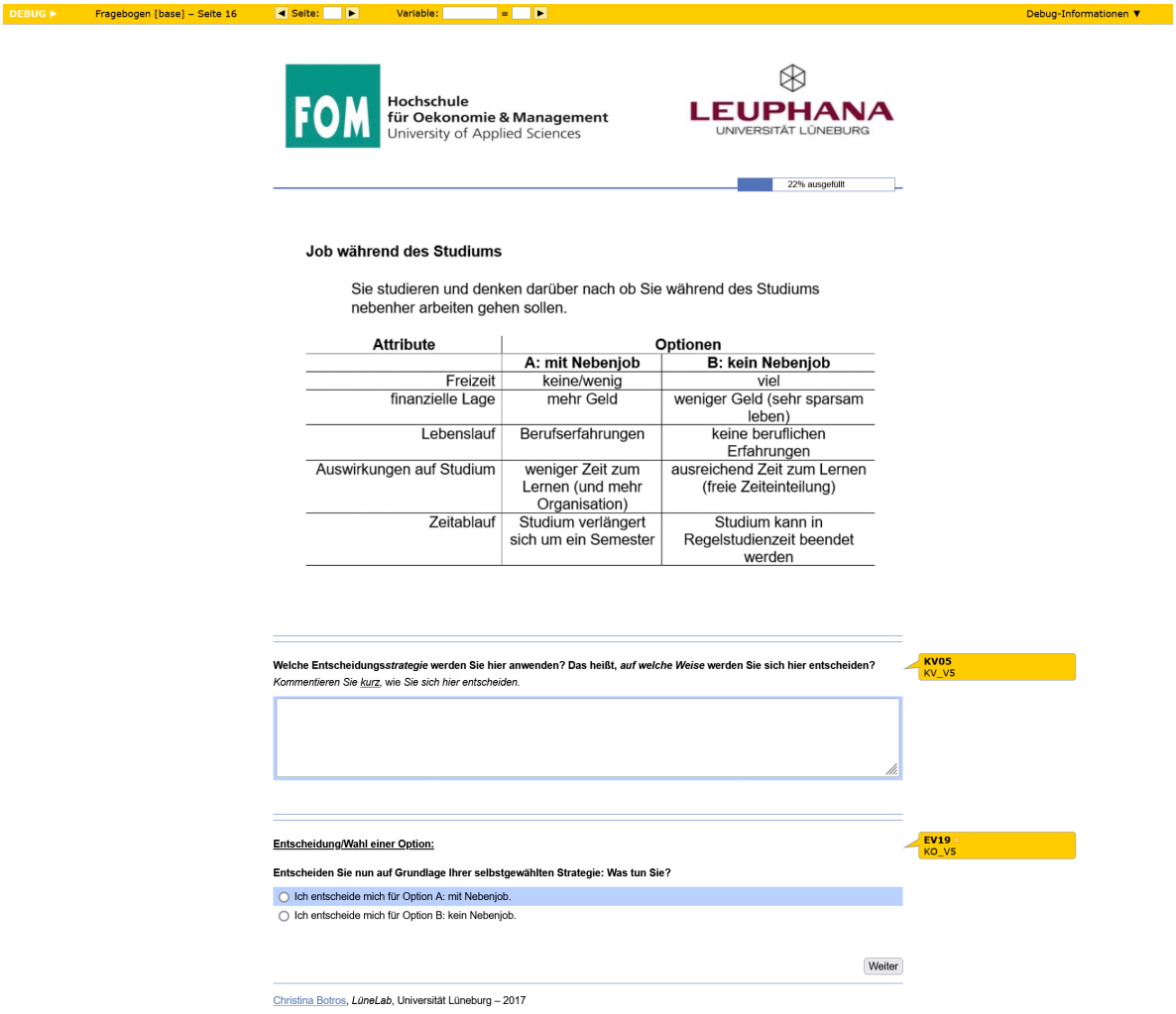
- Ich entscheide mich für Option A: Master machen.
- Ich entscheide mich für Option B: Master nicht machen.

Weiter

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DEBUG ▶
Fragebogen [base] – Seite 15
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
Hochschule
für Oekonomie & Management
University of Applied Sciences
LEUPHANA
UNIVERSITÄT LÜNEBURG
20% ausgefüllt
Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z148
Satisf_Sit_KO-4
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z155
Satisf_Opt_KO-4
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z162
Satisf_Strat_KO-4
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM04
KM_Kontr_V4
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM05
EM_Kontr_V4
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
Christina Botros, LüneLab, Universität Lüneburg – 2017

V6 - Job during studies Vignette and Dependent Measures



DEBUG ▶ Fragebogen [base] – Seite 16 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

Hochschule für Oekonomie & Management
University of Applied Sciences

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UNIVERSITÄT LÜNEBURG

22% ausgefüllt

Job während des Studiums

Sie studieren und denken darüber nach ob Sie während des Studiums nebenher arbeiten gehen sollen.

Attribute	Optionen	
	A: mit Nebenjob	**B: kein Nebenjob**
Freizeit	keine/wenig	viel
finanzielle Lage	mehr Geld	weniger Geld (sehr sparsam leben)
Lebenslauf	Berufserfahrungen	keine beruflichen Erfahrungen
Auswirkungen auf Studium	weniger Zeit zum Lernen (und mehr Organisation)	ausreichend Zeit zum Lernen (freie Zeiteinteilung)
Zeitablauf	Studium verlängert sich um ein Semester	Studium kann in Regelstudienzeit beendet werden

Welche Entscheidungs*strategie* werden Sie hier anwenden? Das heißt, *auf welche Weise* werden Sie sich hier entscheiden?
Kommentieren Sie kurz, wie Sie sich hier entscheiden.

KV05
KV_V5

Entscheidung/Wahl einer Option:

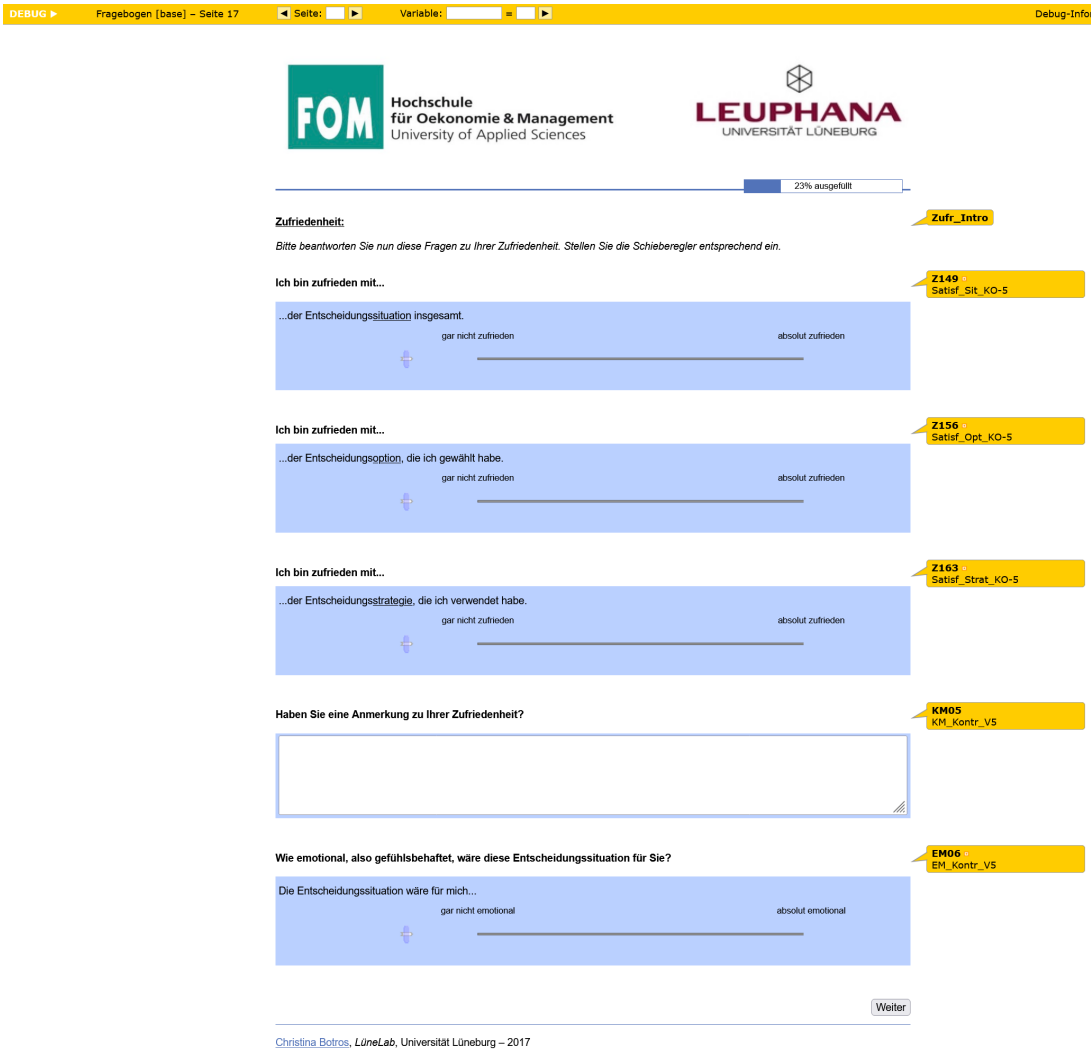
EV19
KO_V5

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

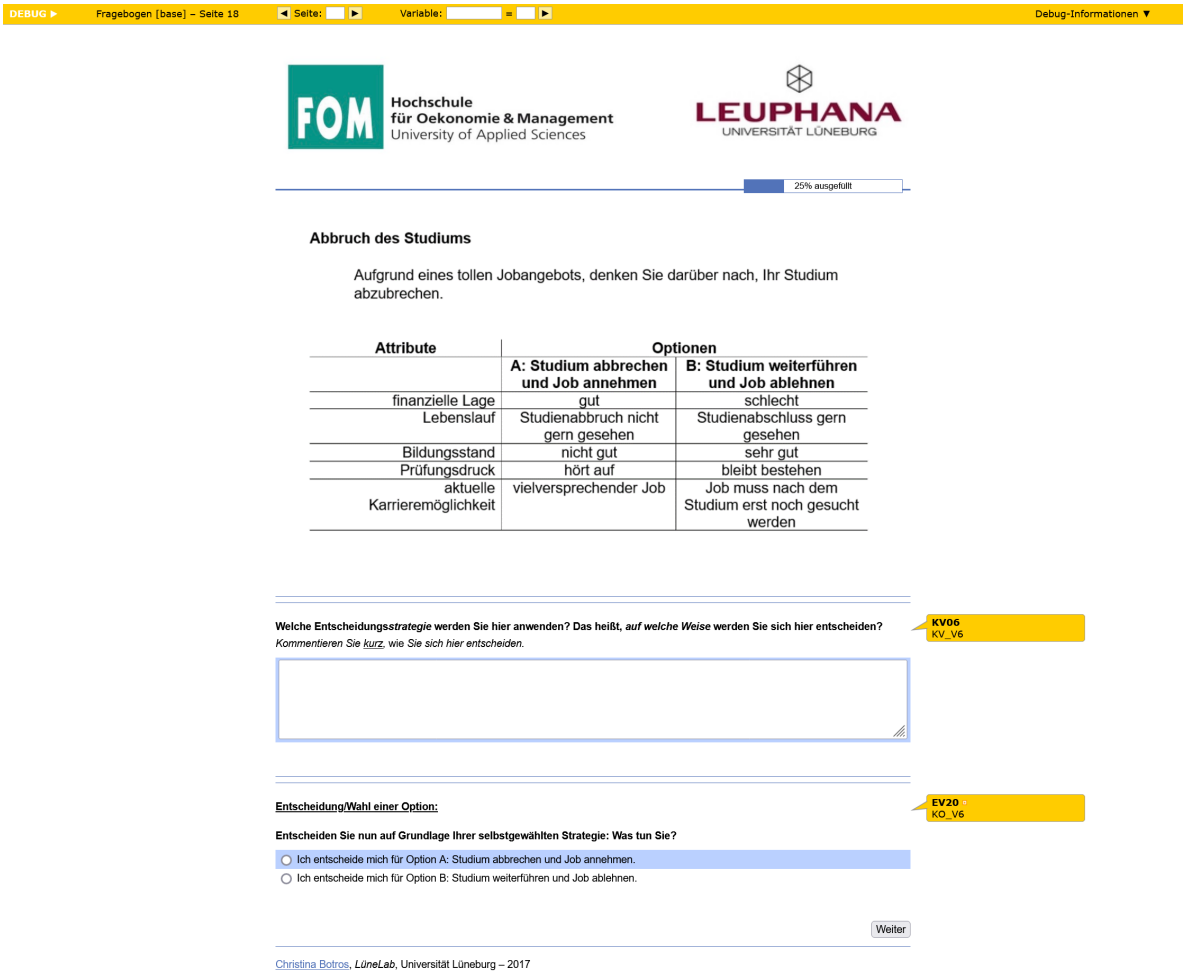
- ○ Ich entscheide mich für Option A: mit Nebenjob.
- ○ Ich entscheide mich für Option B: kein Nebenjob.

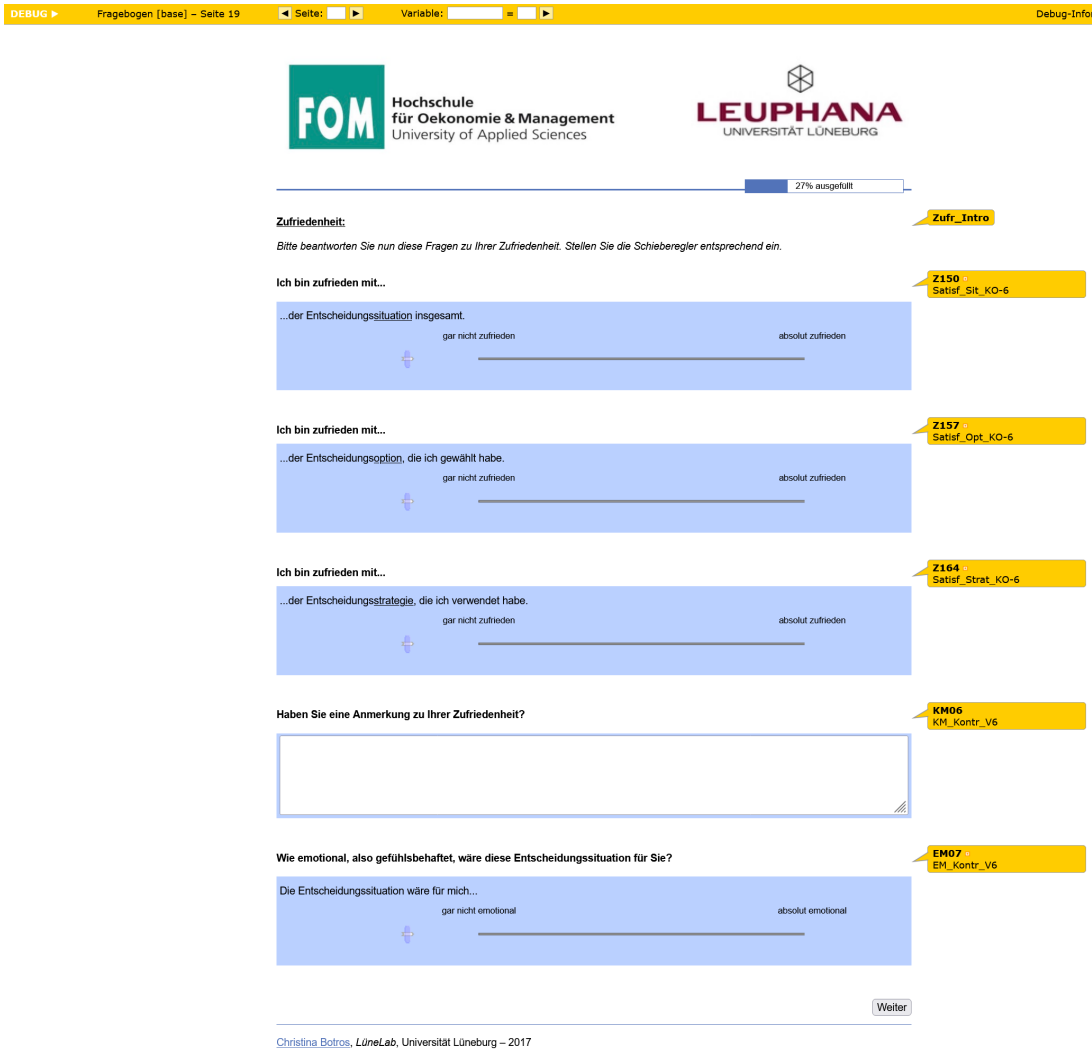
Weiter

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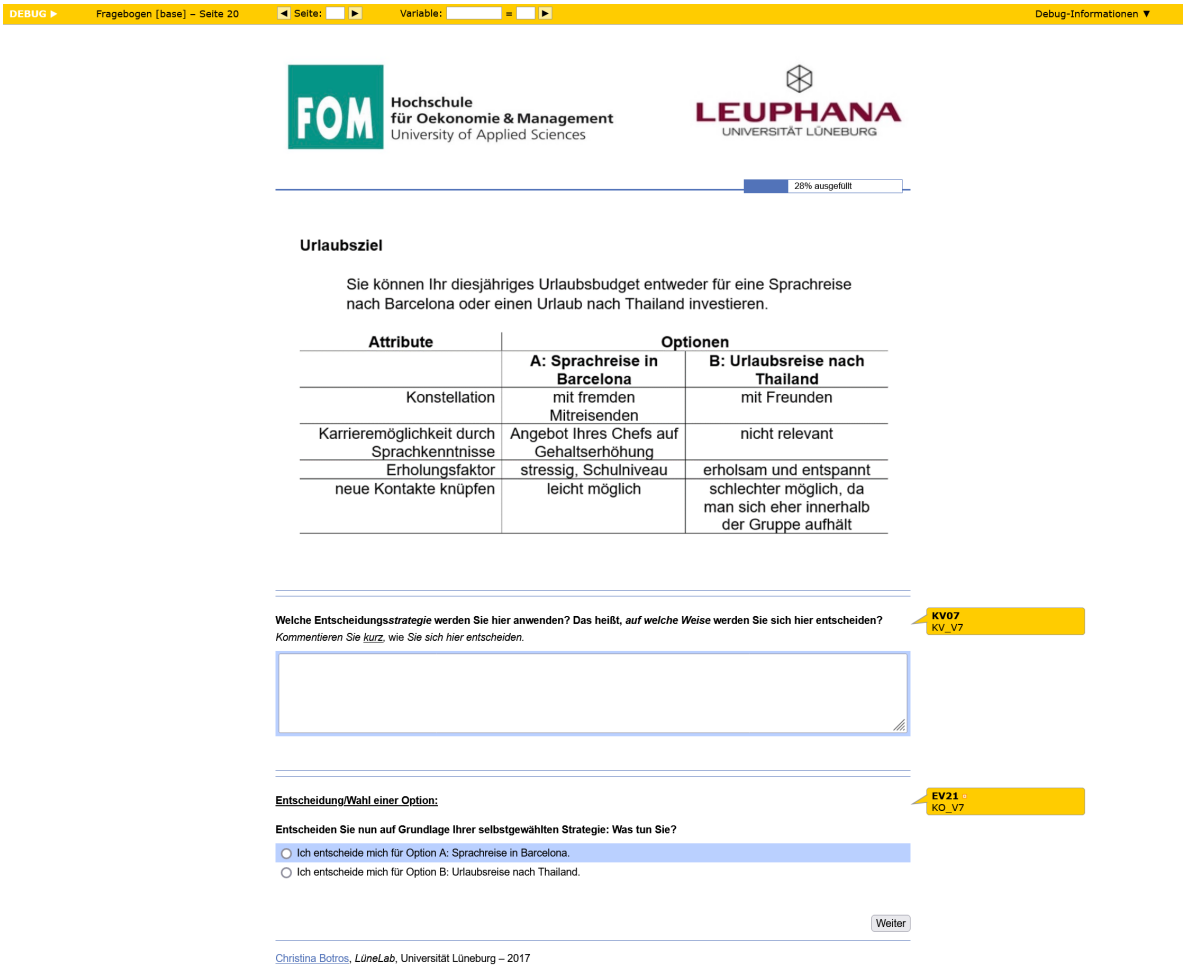

DEBUG ▶
Fragebogen [base] – Seite 17
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
FOM Hochschule für Oekonomie & Management University of Applied Sciences
LEUPHANA UNIVERSITÄT LÜNEBURG
23% ausgefüllt
Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z149
Satisf_Sit_KO-5
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z156
Satisf_Opt_KO-5
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z163
Satisf_Strat_KO-5
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM05
KM_Kontr_V5
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM06
EM_Kontr_V5
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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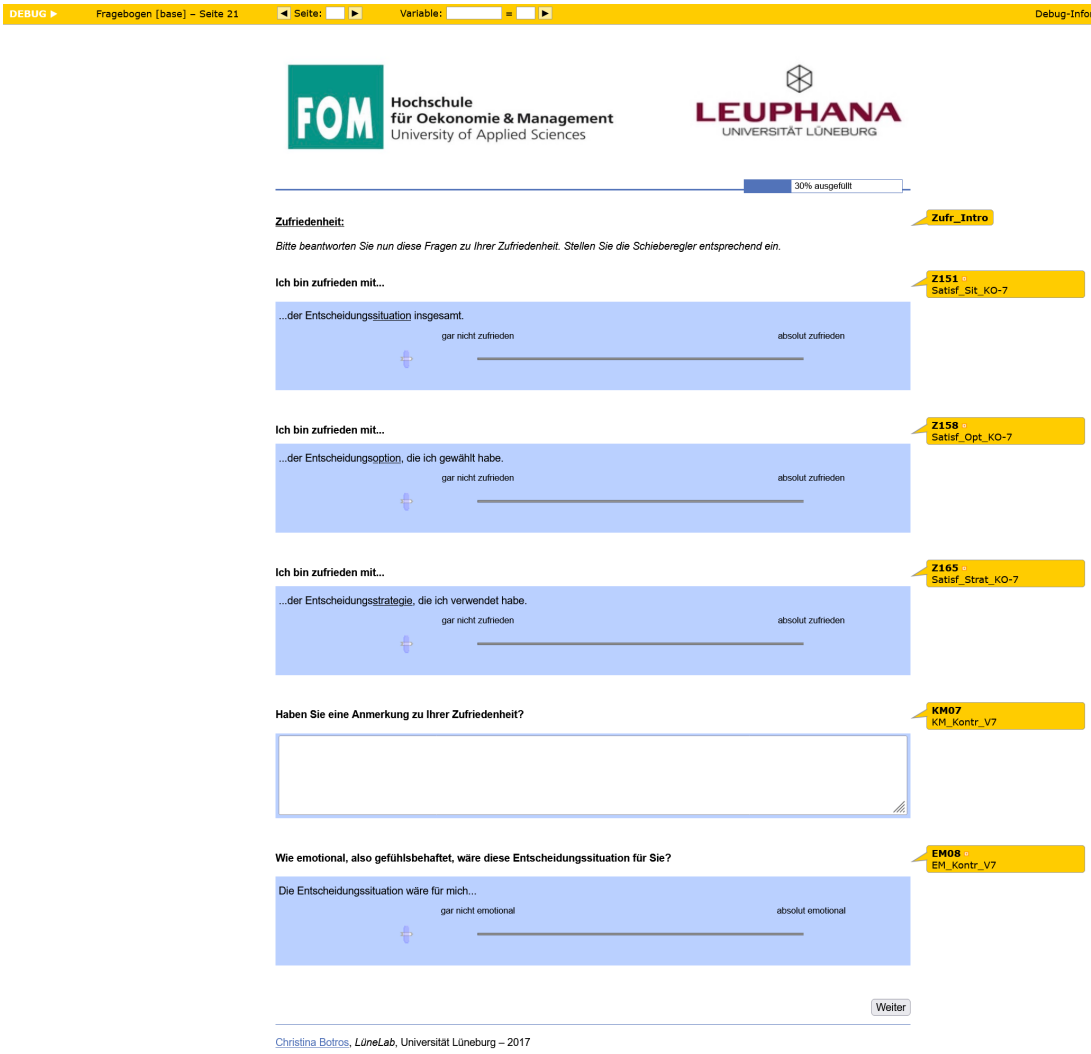
V7 - Termination of studies Vignette and Dependent Measures



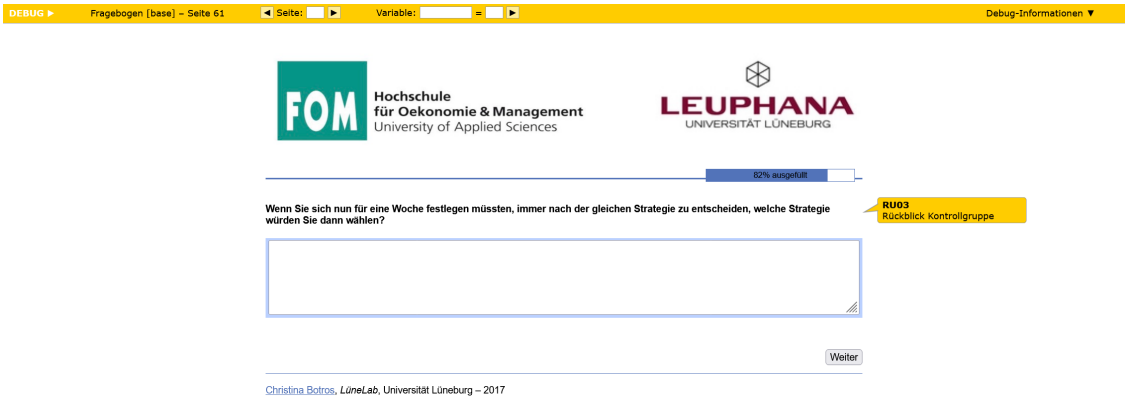

DEBUG ▶
Fragebogen [base] – Seite 19
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
Hochschule
für Oekonomie & Management
University of Applied Sciences
LEUPHANA
UNIVERSITÄT LÜNEBURG
27% ausgefüllt
Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z150
Satisf_Sit_KO-6
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z157
Satisf_Opt_KO-6
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z164
Satisf_Strat_KO-6
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM06
KM_Kontr_V6
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM07
EM_Kontr_V6
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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V8 - Vacation destination Vignette and Dependent Measures

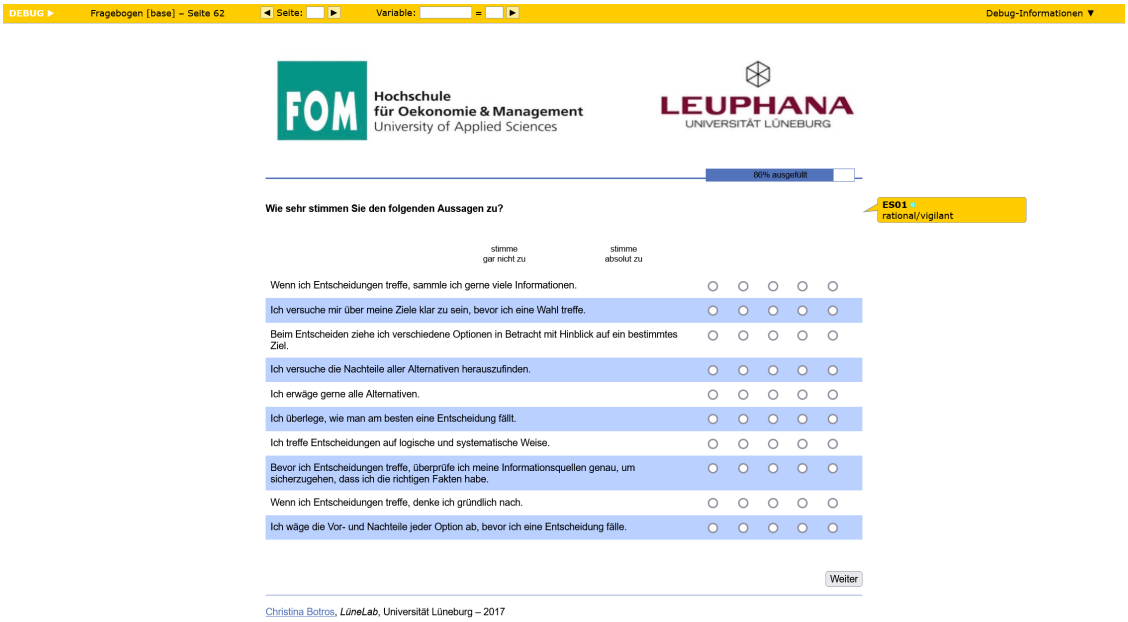



DEBUG ▶
Fragebogen [base] – Seite 21
◀ Seite: ▶
Variable: =
Debug-Informationen ▼
FOM Hochschule für Oekonomie & Management University of Applied Sciences
LEUPHANA UNIVERSITÄT LÜNEBURG
30% ausgefüllt
Zufriedenheit:
Zufr_Intro
Bitte beantworten Sie nun diese Fragen zu Ihrer Zufriedenheit. Stellen Sie die Schieberegler entsprechend ein.
Ich bin zufrieden mit...
Z151
Satisf_Sit_KO-7
...der Entscheidungssituation insgesamt.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z158
Satisf_Opt_KO-7
...der Entscheidungsoption, die ich gewählt habe.
gar nicht zufrieden
absolut zufrieden
Ich bin zufrieden mit...
Z165
Satisf_Strat_KO-7
...der Entscheidungsstrategie, die ich verwendet habe.
gar nicht zufrieden
absolut zufrieden
Haben Sie eine Anmerkung zu Ihrer Zufriedenheit?
KM07
KM_Kontr_V7
Wie emotional, also gefühlsbehaftet, wäre diese Entscheidungssituation für Sie?
EM08
EM_Kontr_V7
Die Entscheidungssituation wäre für mich...
gar nicht emotional
absolut emotional
Weiter
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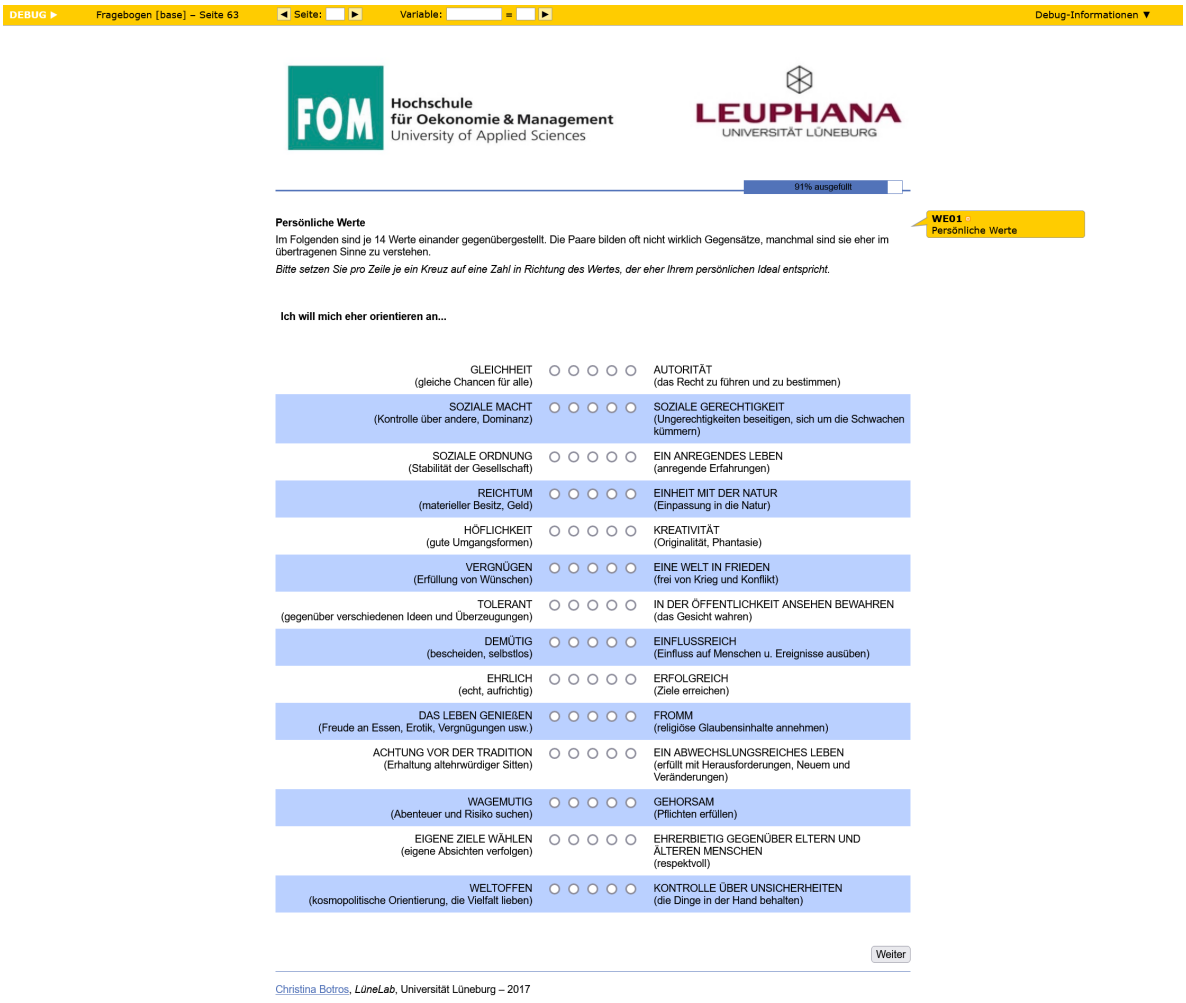
Retrospective Control Group



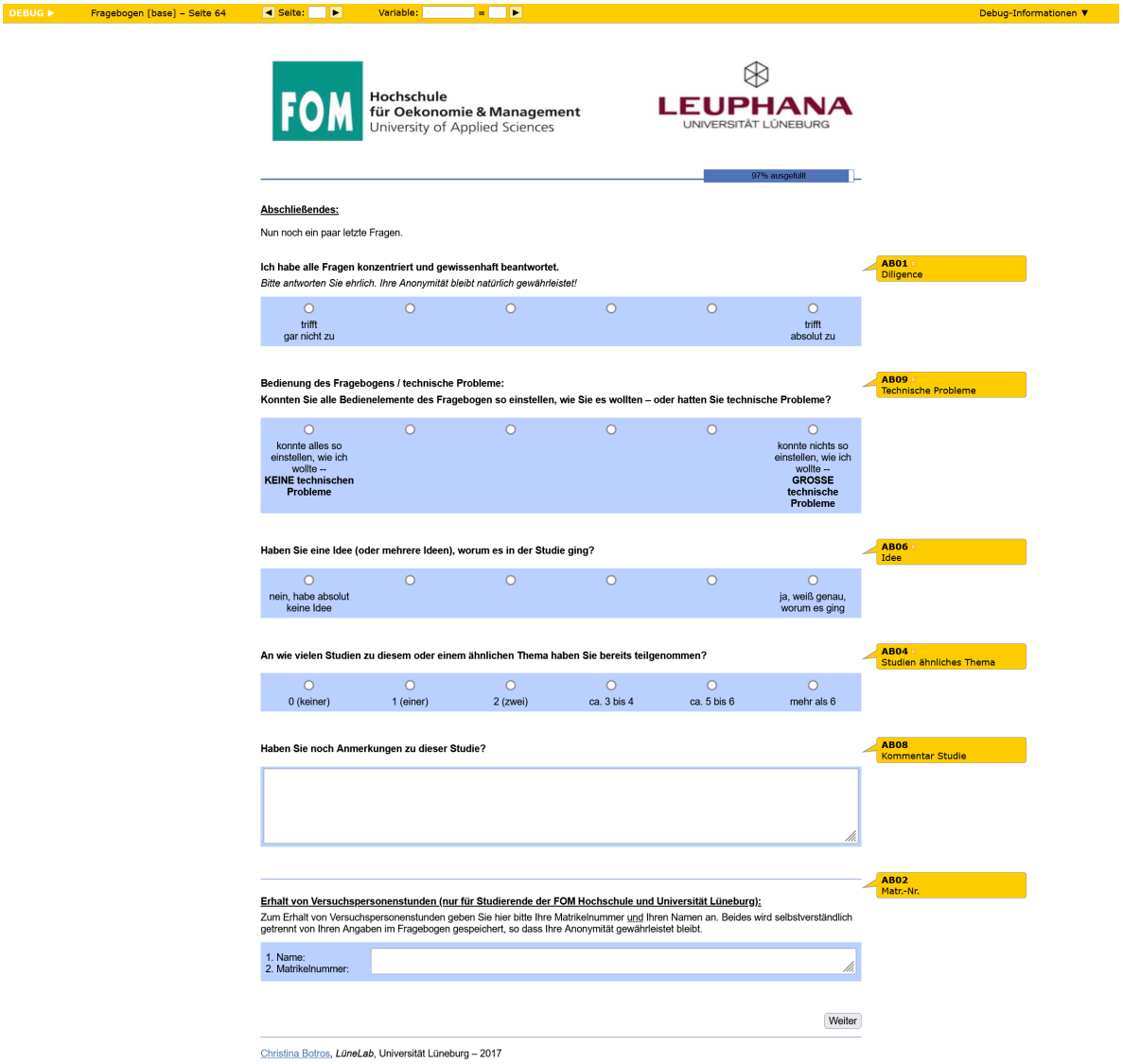
DSQ Subscale "rational/vigilant"



The 14BiPole-Value Questionnaire



Closing Questions



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Abschließendes:

Nun noch ein paar letzte Fragen.

Ich habe alle Fragen konzentriert und gewissenhaft beantwortet.
Bitte antworten Sie ehrlich. Ihre Anonymität bleibt natürlich gewährleistet!

AB01 Diligence

trifft gar nicht zu — trifft absolut zu

Bedienung des Fragebogens / technische Probleme:
Konnten Sie alle Bedienelemente des Fragebogen so einstellen, wie Sie es wollten – oder hatten Sie technische Probleme?

AB09 Technische Probleme

konnte alles so einstellen, wie ich wollte -- **KEINE technischen Probleme** — konnte nichts so einstellen, wie ich wollte -- **GROSSE technische Probleme**

Haben Sie eine Idee (oder mehrere Ideen), worum es in der Studie ging?

AB06 Idee

nein, habe absolut keine Idee — ja, weiß genau, worum es ging

An wie vielen Studien zu diesem oder einem ähnlichen Thema haben Sie bereits teilgenommen?

AB04 Studien ähnliches Thema

0 (keiner) | 1 (einer) | 2 (zwei) | ca. 3 bis 4 | ca. 5 bis 6 | mehr als 6

Haben Sie noch Anmerkungen zu dieser Studie?

AB08 Kommentar Studie

AB02 Matr.-Nr.

Erhalt von Versuchspersonenstunden (nur für Studierende der FOM Hochschule und Universität Lüneburg):

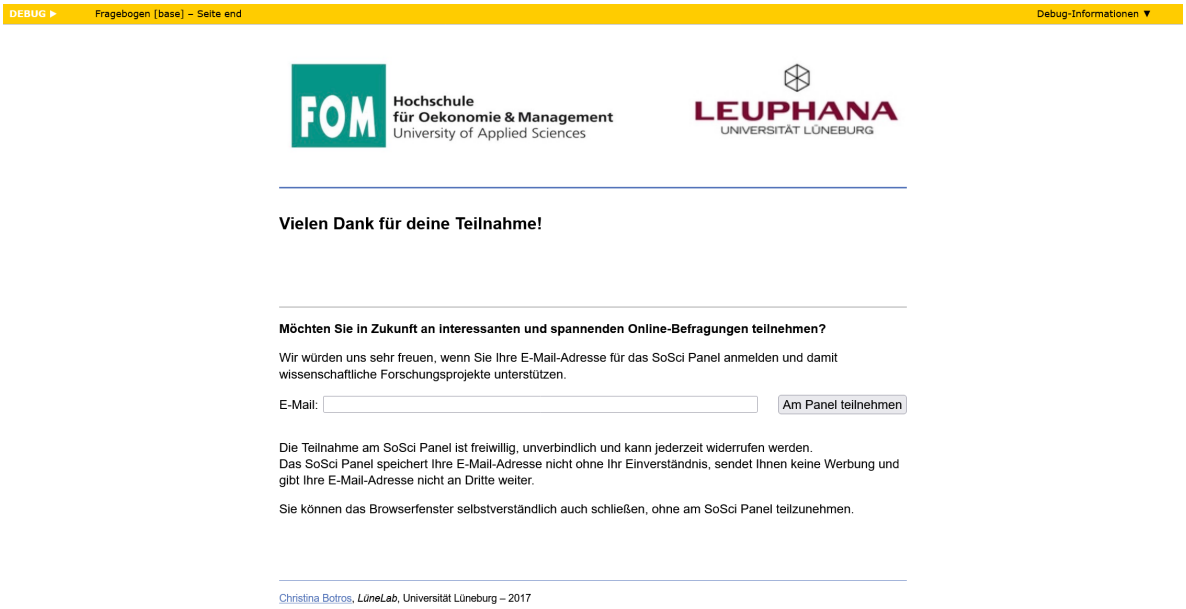
Zum Erhalt von Versuchspersonenstunden geben Sie hier bitte Ihre Matrikelnummer und Ihren Namen an. Beides wird selbstverständlich getrennt von Ihren Angaben im Fragebogen gespeichert, so dass Ihre Anonymität gewährleistet bleibt.

1. Name:
2. Matrikelnummer:

Weiter

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Last Page


DEBUG ▶ Fragebogen [base] – Seite end Debug-Informationen ▼

FOM Hochschule für Oekonomie & Management University of Applied Sciences

LEUPHANA UNIVERSITÄT LÜNEBURG

Vielen Dank für deine Teilnahme!

Möchten Sie in Zukunft an interessanten und spannenden Online-Befragungen teilnehmen?

Wir würden uns sehr freuen, wenn Sie Ihre E-Mail-Adresse für das SoSci Panel anmelden und damit wissenschaftliche Forschungsprojekte unterstützen.

E-Mail: Am Panel teilnehmen

Die Teilnahme am SoSci Panel ist freiwillig, unverbindlich und kann jederzeit widerrufen werden.
Das SoSci Panel speichert Ihre E-Mail-Adresse nicht ohne Ihr Einverständnis, sendet Ihnen keine Werbung und gibt Ihre E-Mail-Adresse nicht an Dritte weiter.

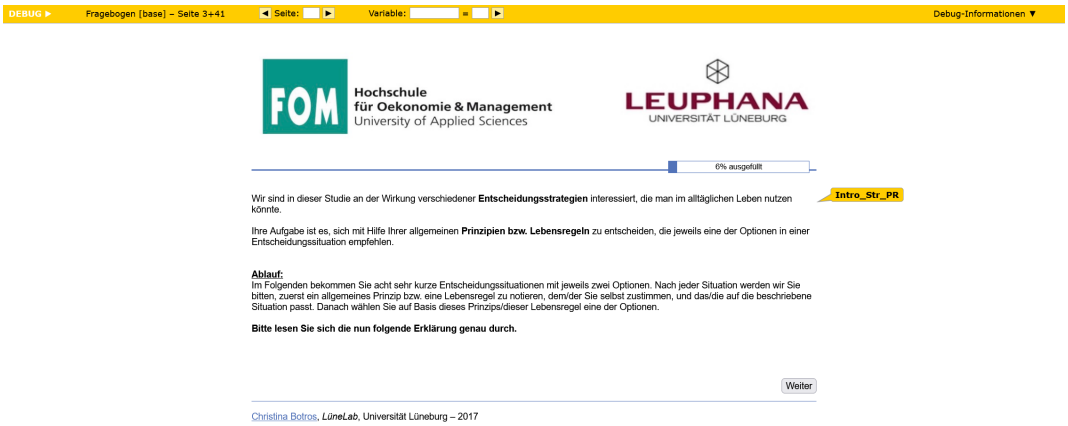
Sie können das Browserfenster selbstverständlich auch schließen, ohne am SoSci Panel teilzunehmen.

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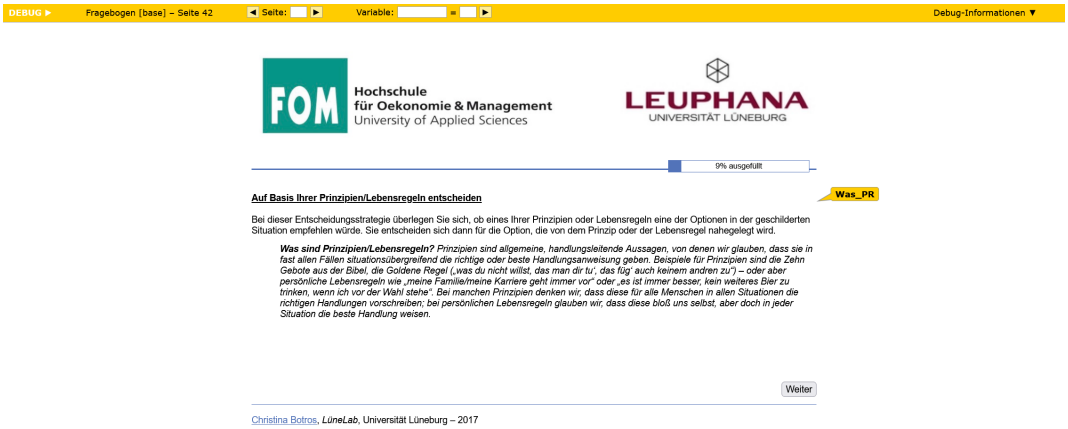
Example 1: Decision Strategy = Principle

Scenario Content = V4 – Exam option (exemplary)

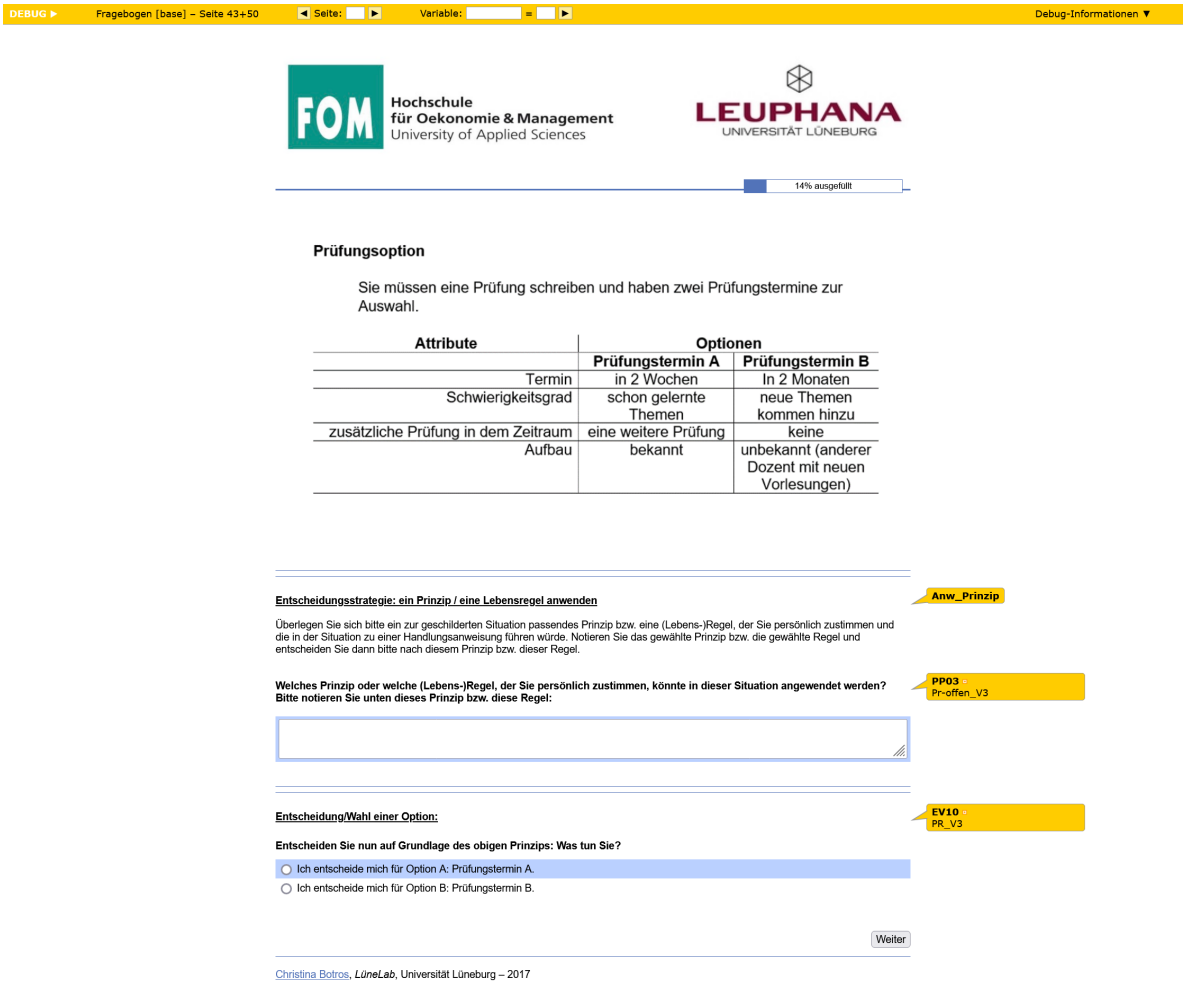
Introduction Principle



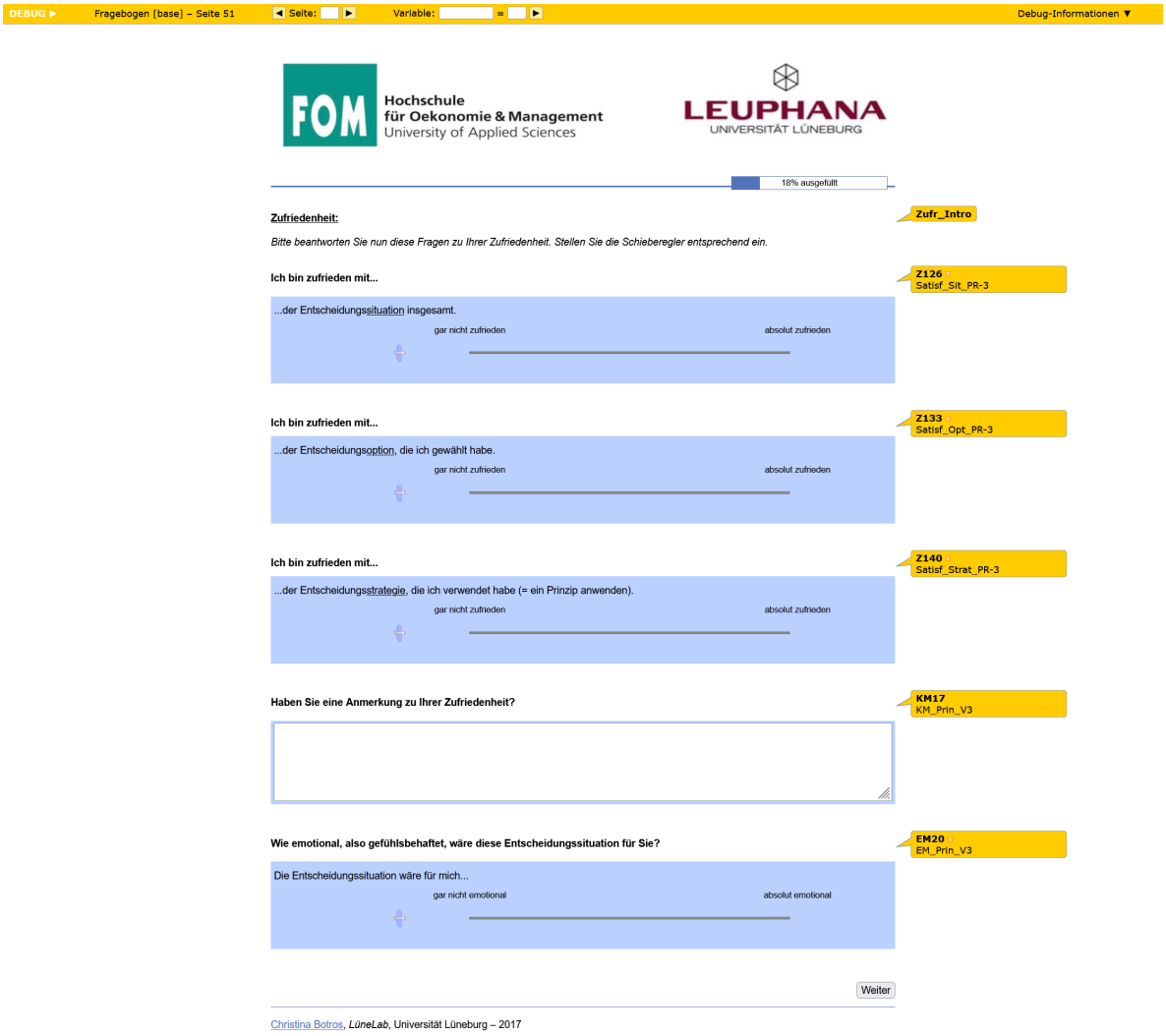
Explanation Principle



Decision Strategy Manipulation Principle



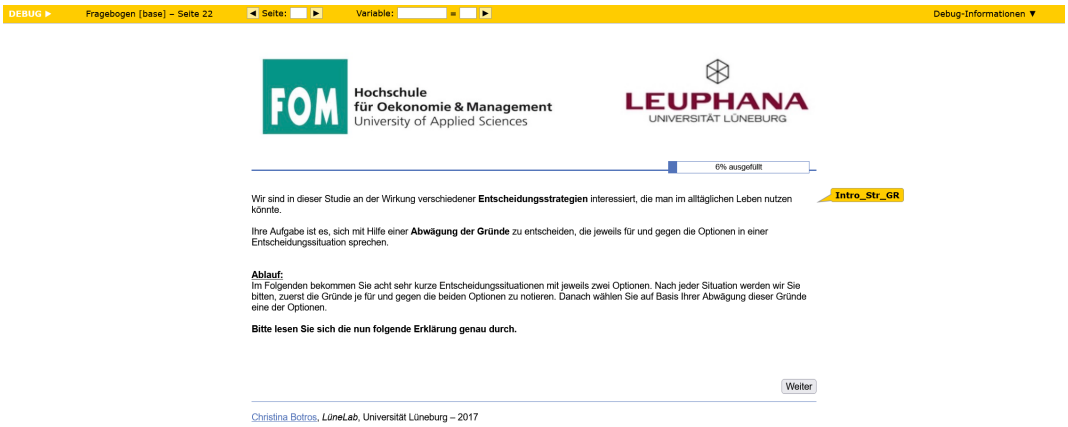
Dependent Measures Principle



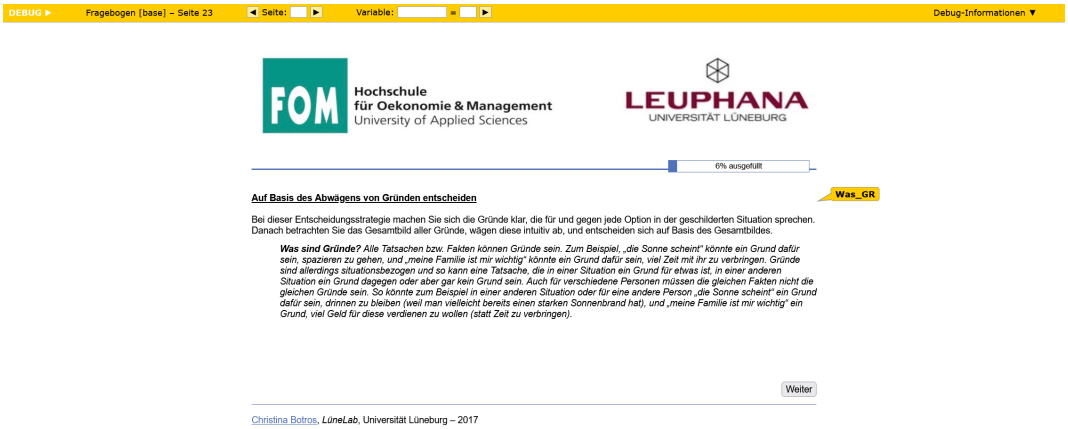
Example 2: Decision Strategy = Reasons

Scenario Content = V7 – Termination of studies (exemplary)

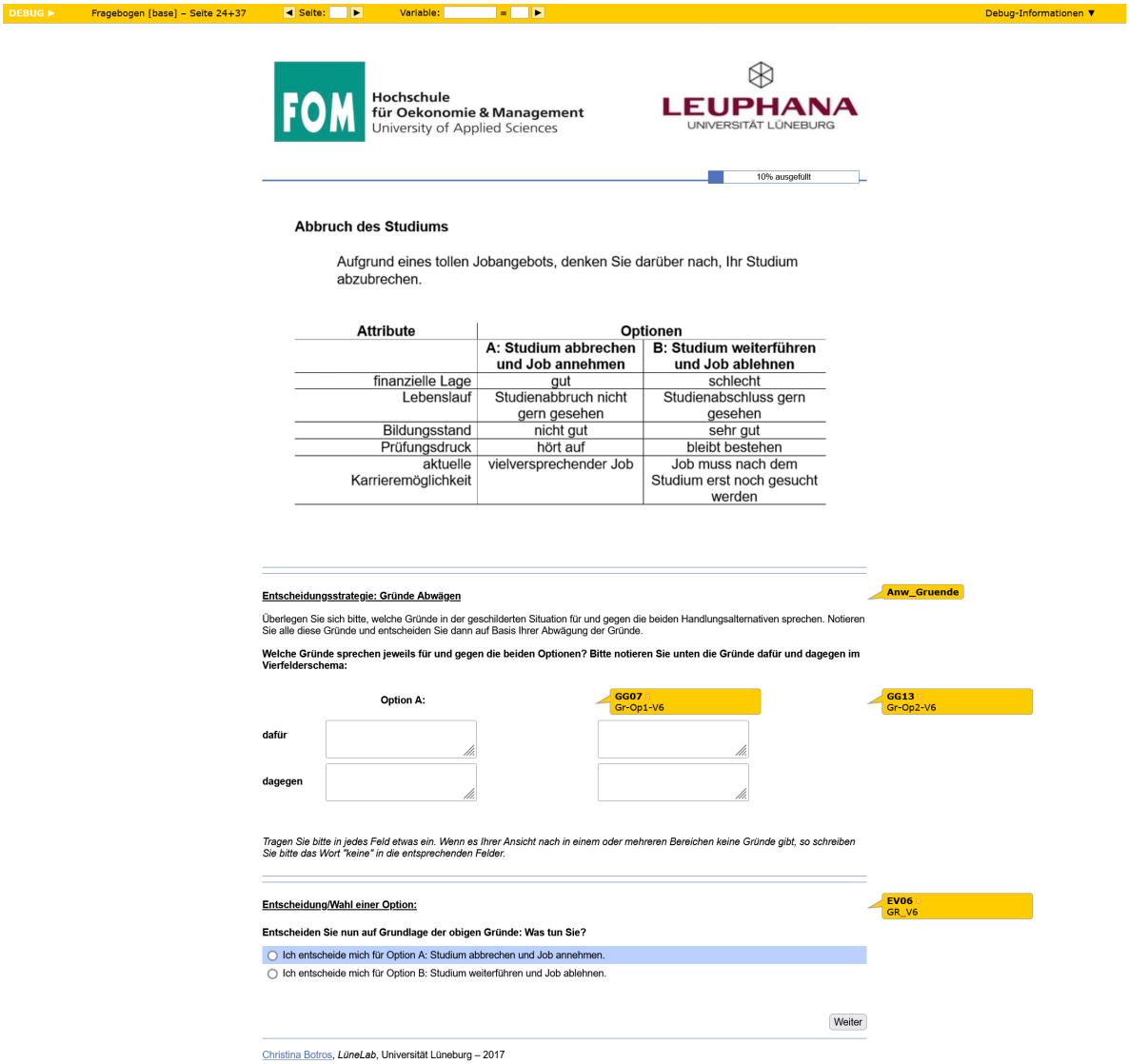
Introduction Reasons



Explanation Reasons



Decision Strategy Manipulation Reasons



DEBUG ▶ Fragebogen [base] – Seite 24+37 ◀ Seite: ▶ Variable: = ▶ Debug-Informationen ▼

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UNIVERSITÄT LÜNEBURG

10% ausgefüllt

Abbruch des Studiums

Aufgrund eines tollen Jobangebots, denken Sie darüber nach, Ihr Studium abzubrechen.

Attribute	Optionen	
	A: Studium abbrechen und Job annehmen	**B: Studium weiterführen und Job ablehnen**
finanzielle Lage	gut	schlecht
Lebenslauf	Studienabbruch nicht gern gesehen	Studienabschluss gern gesehen
Bildungsstand	nicht gut	sehr gut
Prüfungsdruck	hört auf	bleibt bestehen
aktuelle Karrieremöglichkeit	vielversprechender Job	Job muss nach dem Studium erst noch gesucht werden

Entscheidungsstrategie: Gründe Abwägen Anw_Gruende

Überlegen Sie sich bitte, welche Gründe in der geschilderten Situation für und gegen die beiden Handlungsalternativen sprechen. Notieren Sie alle diese Gründe und entscheiden Sie dann auf Basis Ihrer Abwägung der Gründe.

Welche Gründe sprechen jeweils für und gegen die beiden Optionen? Bitte notieren Sie unten die Gründe dafür und dagegen im Vierfelderschema:

Option A:	GG07 Gr-Op1-V6	GG13 Gr-Op2-V6
dafür		
dagegen		

Tragen Sie bitte in jedes Feld etwas ein. Wenn es Ihrer Ansicht nach in einem oder mehreren Bereichen keine Gründe gibt, so schreiben Sie bitte das Wort "keine" in die entsprechenden Felder.

Entscheidung/Wahl einer Option: EV06 GR_V6

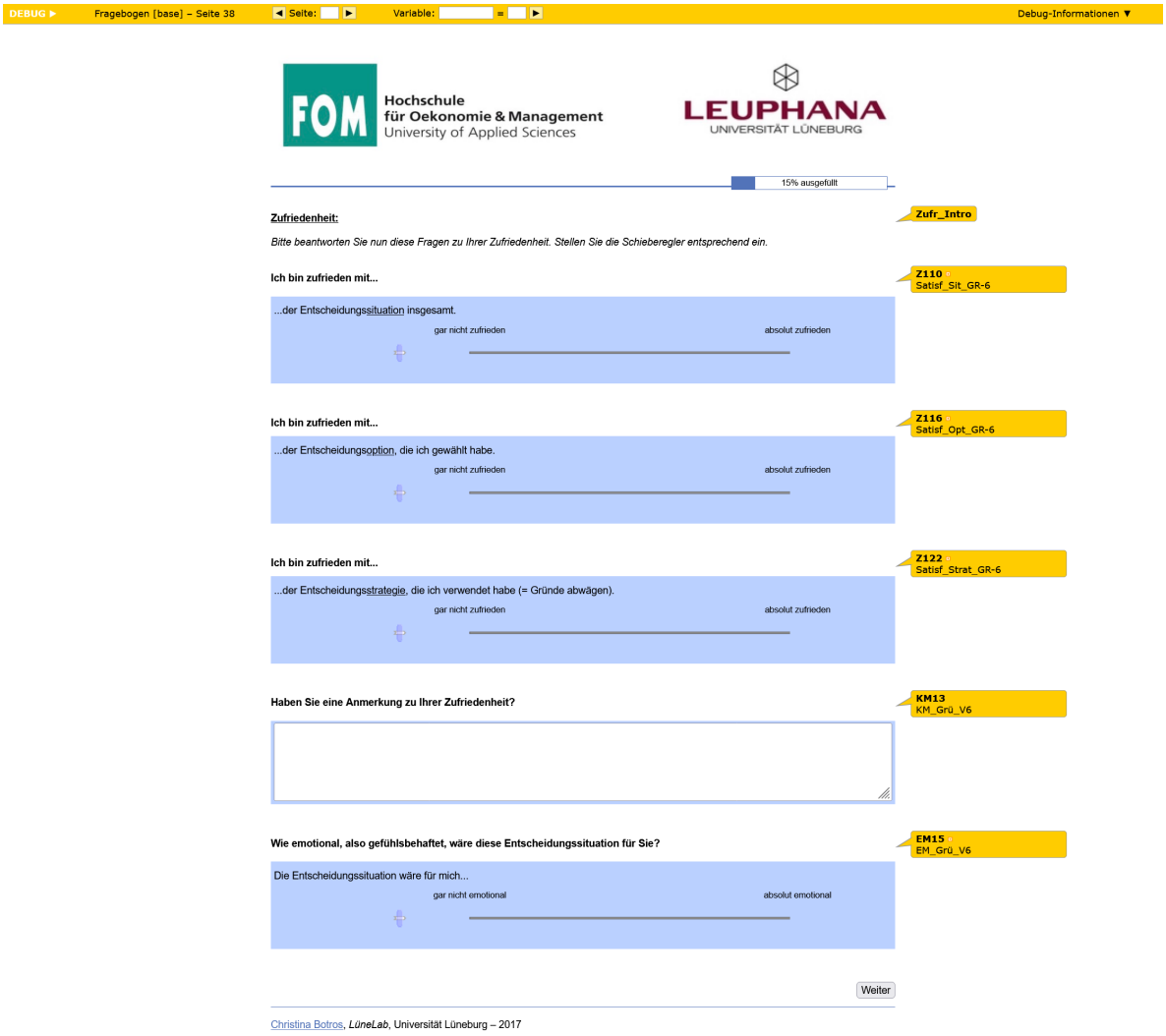
Entscheiden Sie nun auf Grundlage der obigen Gründe: Was tun Sie?

- ○ Ich entscheide mich für Option A: Studium abbrechen und Job annehmen.
- ○ Ich entscheide mich für Option B: Studium weiterführen und Job ablehnen.

Weiter

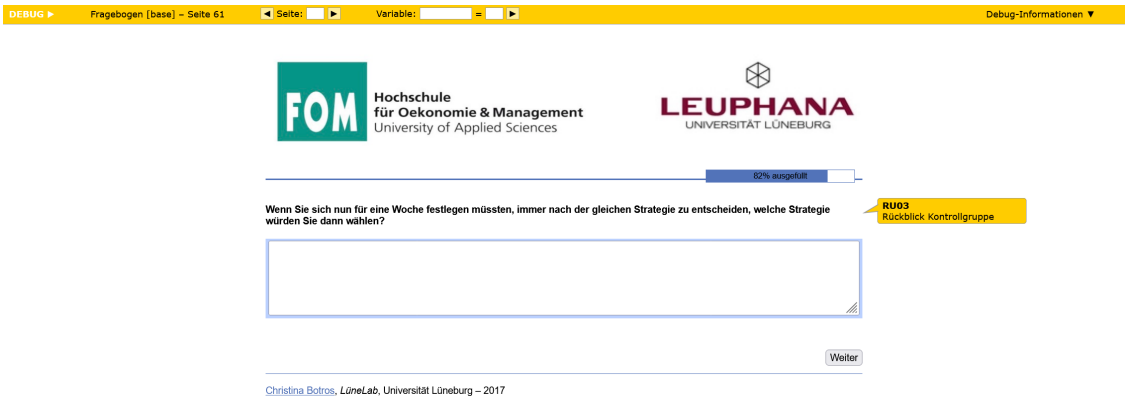
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Dependent Measures Reasons

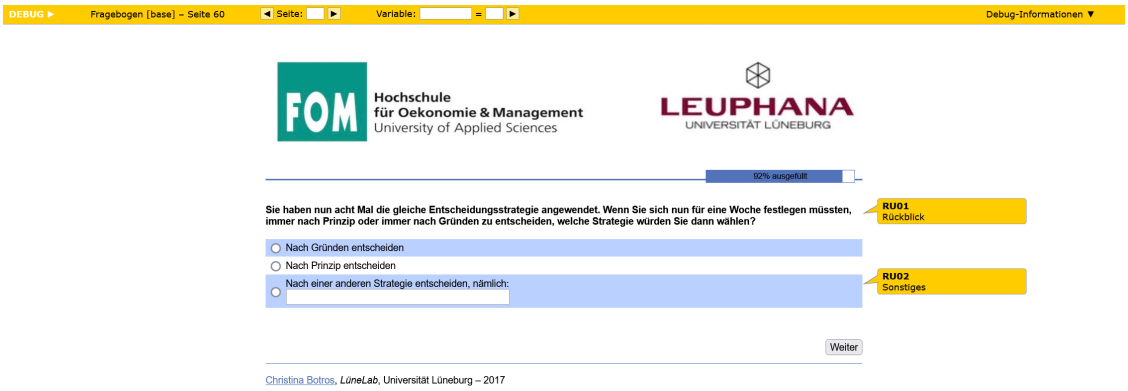


Comparison Retrospective

Control Group



Experimental Groups (Principle, Reasons)



Comparison *Introduction* to Decision Strategies

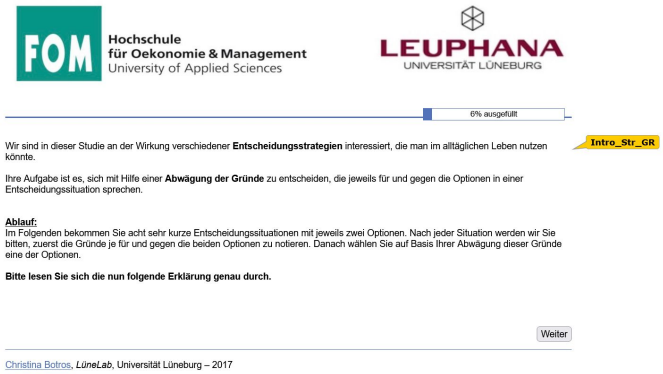
Control Group



Principle

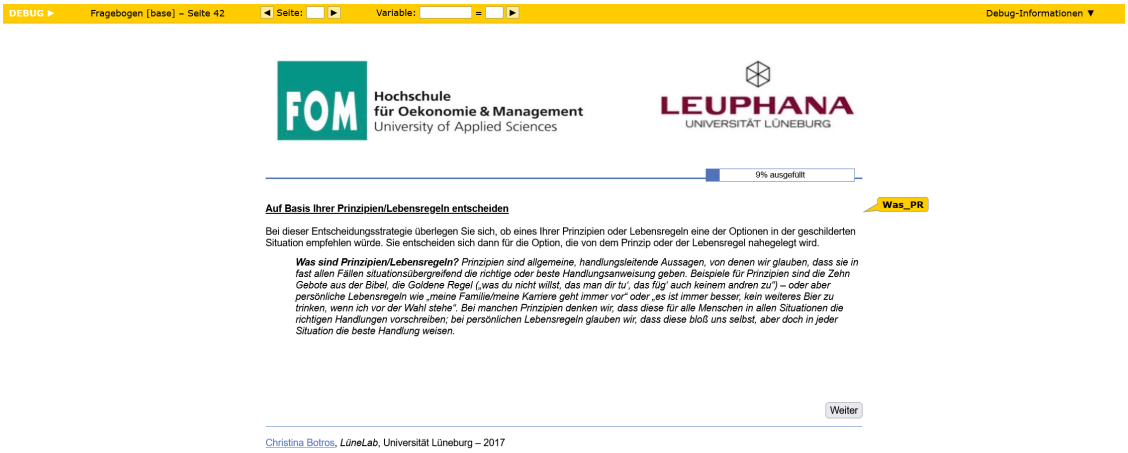


Reasons

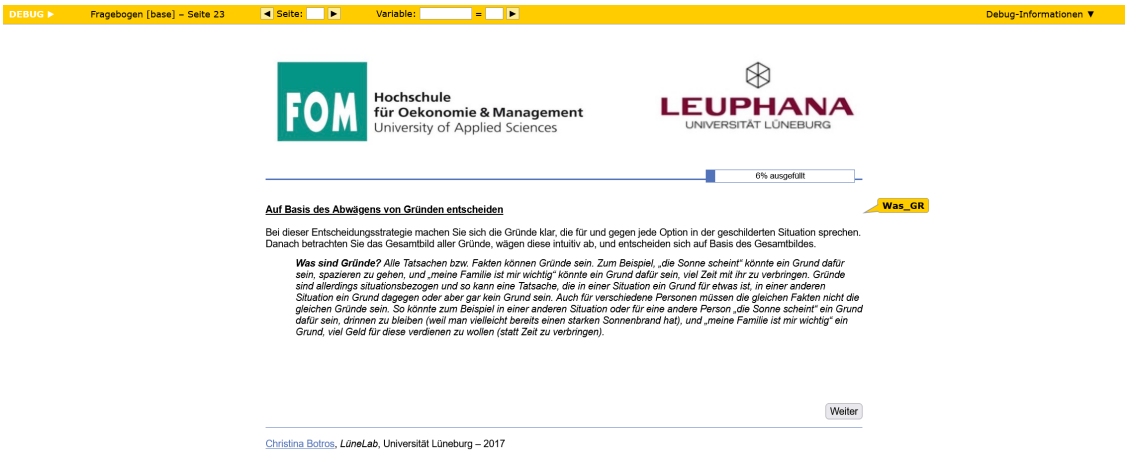


Comparison *Explanation* of Decision Strategies

Principle



Reasons



Comparison *Manipulation* of Decision Strategies

Control Group

Umzug für den Studienplatz

Sie haben die Möglichkeit, entweder auf eine Hochschule in einer anderen Stadt zu gehen oder aber bei Ihren Eltern wohnen zu bleiben und eine Hochschule in Heimatnähe zu besuchen.

Attribute	Optionen	
	A: umziehen (Hochschule in anderer Stadt)	B: nicht umziehen (Hochschule in Heimatnähe)
Qualität/ Ruf der Hochschule	sehr gut	schlecht
Bezugspersonen	keine	viele
Fahrweg zur Hochschule	10-20 min (Wohnen in Hochschulnähe möglich)	1,5h (Pendelzeit pro einfache Strecke)
Kosten	hoch (Miete)	keine (bei den Eltern wohnend)
Selbstständigkeit erlernen und Freiheit genießen	gut möglich	kaum möglich

Welche Entscheidungsstrategie werden Sie hier anwenden? Das heißt, auf welche Weise werden Sie sich hier entscheiden?

Kommentieren Sie kurz, wie Sie sich hier entscheiden.

Entscheidung!Wahl einer Option:

Entscheiden Sie nun auf Grundlage Ihrer selbstgewählten Strategie: Was tun Sie?

- Ich entscheide mich für Option A: umziehen.
- Ich entscheide mich für Option B: nicht umziehen.

Principle

Umzug für den Studienplatz

Sie haben die Möglichkeit, entweder auf eine Hochschule in einer anderen Stadt zu gehen oder aber bei Ihren Eltern wohnen zu bleiben und eine Hochschule in Heimatnähe zu besuchen.

Attribute	Optionen	
	A: umziehen (Hochschule in anderer Stadt)	B: nicht umziehen (Hochschule in Heimatnähe)
Qualität/ Ruf der Hochschule	sehr gut	schlecht
Bezugspersonen	keine	viele
Fahrweg zur Hochschule	10-20 min (Wohnen in Hochschulnähe möglich)	1,5h (Pendelzeit pro einfache Strecke)
Kosten	hoch (Miete)	keine (bei den Eltern wohnend)
Selbstständigkeit erlernen und Freiheit genießen	gut möglich	kaum möglich

Entscheidungsstrategie: ein Prinzip eines Lebenspaar anwenden

Überlegen Sie sich bitte ein nur geschildertem Situation passendes Prinzip bzw. eine Lebens-Regel, der Sie persönlich zustimmen und das Ihnen auch wichtig ist. Wählen Sie dann bitte noch diesem Prinzip bzw. dieser Regel.

Welches Prinzip bzw. welche Lebens-Regel würden Sie persönlich zustimmen, könnte in dieser Situation angewendet werden? Bitte nennen Sie unter diesem Prinzip bzw. dieser Regel.

Entscheidung!Wahl einer Option:

Entscheiden Sie nun auf Grundlage des obigen Prinzips: Was tun Sie?

- Ich entscheide mich für Option A: umziehen.
- Ich entscheide mich für Option B: nicht umziehen.

Reasons

Umzug für den Studienplatz

Sie haben die Möglichkeit, entweder auf eine Hochschule in einer anderen Stadt zu gehen oder aber bei Ihren Eltern wohnen zu bleiben und eine Hochschule in Heimatnähe zu besuchen.

Attribute	Optionen	
	A: umziehen (Hochschule in anderer Stadt)	B: nicht umziehen (Hochschule in Heimatnähe)
Qualität/ Ruf der Hochschule	sehr gut	schlecht
Bezugspersonen	keine	viele
Fahrweg zur Hochschule	10-20 min (Wohnen in Hochschulnähe möglich)	1,5h (Pendelzeit pro einfache Strecke)
Kosten	hoch (Miete)	keine (bei den Eltern wohnend)
Selbstständigkeit erlernen und Freiheit genießen	gut möglich	kaum möglich

Entscheidungsstrategie: Gründe abwägen

Welche Gründe sprechen jeweils für und gegen die beiden Optionen? Bitte nutzen Sie unten die Gründe dafür und dagegen im Vorfeldfenster.

	Option A:	Option B:
dafür		
dagegen		

Entscheidung!Wahl einer Option:

Entscheiden Sie nun auf Grundlage der obigen Gründe: Was tun Sie?

- Ich entscheide mich für Option A: umziehen.
- Ich entscheide mich für Option B: nicht umziehen.

Jump to Contents

Additional Documentation

Preliminaries

Technical and Style Properties

Hyperlinks

This pdf entails hyperlinks to facilitate navigation. Hyperlinks referring to places within this document (pages, sections, tables, figures, and bibliographical references) are red, whereas urls and dois in the bibliography (referring to places outside this document) are blue.

Main Table of Contents All red page numbers are clickable. Chapter level headings are printed in bold font. Lower level headings are referenced only up to the first level (two digits).

Chapter Tables of Contents Clicking on a bold chapter level heading page number, you will be led to this chapter's *Chapter Table of Contents*. It references headings up to the fifth and last level.[603]

"Jump to Contents" On the right hand bottom of each page (that is not a title page) there is a link "Jump to Contents" which brings you to the *Main Table of Contents*. From there you may proceed to the respective *Chapter Table of Contents*.

***Original Materials* in the Appendix** A third type of table of contents (not entitled) is to be found in the Appendix, which provides a simple, unnumbered list of the upcoming screenshots per online study.

Bibliography All bibliographical references within the manuscript are hyperlinks to the bibliography. In the bibliography there are red clickable page numbers below each bibliographical entry referring back to the citation in the manuscript.

The Appendix In the *Empirical Appendix*, there are two types of hyperlinks: "Jump back to main" referring to the highest level heading within the main text that included the reference to the Appendix (most often the *Results* section) and (quite small) red upward arrows at each sub-level heading referring back to the according sub-level heading within the main text.

[603] Note that the fourth and fifth level are not enumerated by adding further digits, because a number such as 3.2.2.1.5.1 is illegible.

Style

Numbering The three parts (*Theoretical*, *Empirical*, and *Concluding*) hold Roman numbers. From chapter level (1 digit) through the third level (4 digits), sections are numbered with Arabic numerals. Forth and fifth level sections are numbered alphabetically.

References to Sections All text passages will be called "sections" when they are referenced; there will be made no difference between section levels. References to the forth and fifth level (which are numbered alphabetically) will be complemented by an additional reference to the respective level three section. The same holds for references to footnotes, tables, and figures.

Typographical and Layout Decisions When referring to sections the word "section" is not capitalized, referring to specific figures and tables, the word "Figure" or "Table" however is capitalized. References to chapters are abbreviated "chap.", and references to parts are capitalized. Footnote 280 on page 170 from the introduction to the *Pilot Study* (chap. 8) details my chosen conventions regarding the capitalization and italicization of independent and dependent variables. All headings are written in *title case* as required by APA (all words capitalized unless they have three letters or less). However, in case a heading is a full sentence, e.g. a question, it is written in sentence case. Captions of tables and figures are written in title case for Part I and Part III, but in sentence case for Part II, *Empirical*, because there captions often involve reference to independent and dependent variables, and in sentence case these are easier to distinguish (cf. footnote 280 on page 170). Captions of tables are above the table, captions of figures are below the figure. Notes are always below the object. Two of the 10 questionnaires introduced within this manuscript have received acronyms, but these acronyms will not be used by themselves. In general, acronyms will rather not be used.

Synonyms and Slashes There should be no hidden synonyms whose use as such I have not pointed out. Whenever I use a slash ("/"), it either indicates rough synonymy or it simply signifies "or". This use often is very close to rough synonymy, in other instances it really does provide a non-synonymous alternative, adding a further aspect to the then twofold term.

List of Known Mistakes and Inconsistencies I have tried to use title case where I should (headings and captions), but I am sure there are a few mistakes. My use of simple present and simple past is not entirely consistent. My goal was to write legibly, and I do find that the occasional switch in tense does not hurt legibility. Some LaTeX functions I only encountered along the go (e.g. the function "vref" providing page numbers to hyperlink references), such that – in spite of attempts at unification – there will likely be inconsistencies. For the statistics I decided to always use the "0" with decimal numbers (e.g. $p = 0.003$), but when citing Cronbach's alpha I reverted to the convention of leaving out the zero (e.g. $\alpha = .7$). Last, hyphenation is a tricky topic, since often both versions (follow up/follow-up, repeated measures/repeated-measures, decision making/decision-making) are correct and look good. I decided globally against hyphenation where possible, but I am sure I overlooked various instances.

Writing Style I decided against an impersonal writing style, and I will refer to myself as "I" and not as "the author". Furthermore, in the craze of writing this thesis there was the

occasional moment of silliness which I usually gave into. Therefore you might find one or the other silly sentence – mostly within footnotes. And now, let's begin.

Original Research Proposal

I originally wrote this proposal for an application at the CEREB, Erfurt. However, at the time I received the acceptance letter, I had already accepted another job offer. Later on, I also used this proposal for my application at Luenelab, Leuphana University.

I integrated some fragments of the proposal into the theoretical part of this work. These fragments are marked accordingly.

To what extent does principled vs. particularistic decision-making make for 'the good life'?

Decision-making strategy and 'the good life' – an investigation between decision sciences and happiness research.

Christina Botros

July 15, 2014

The University of Erfurt
Center for Empirical Research in Economics and Behavioral Sciences (CEREB)
Ph.D. Project Proposal (Exposé)

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1 Introduction & Research Question

Frequently there are deliberative, 'medium-sized' decisions in people's lives where a choice has to be made between two or more incompatible options. Consider the following example of someone asking themselves: "Should I go meet my US friends in Paris this weekend or rather stay at home and work on my Ph.D. proposal?". It is this kind of 'naturalistic', personal – and as I shall call them: 'medium-sized' – decisions I am interested in.

How should we make such decisions, how do we actually make them, and what lessons follow from both? Among the wealth of normative models and analyses in decision theory, the abundance of empirical work providing descriptive accounts and lists of psychological principles influencing decision-making, and not least the flood of practical guides for professional decision-makers and interested laymen, my purpose, too, is threefold – descriptive, normative and practical – but simple in its focus, and inspired by philosophy.

The relatively recent philosophical debate between generalists and particularists (cf. e.g. Dancy, 2013, for a review) has asked whether adherence to (moral) principles or rather focusing on the (moral) reasons present in individual situations makes for better (moral) decisions. This is the focus I would like to set. The question I want to ask and investigate in a series of experiments is thus:

> When (i.e., under which circumstances) and for whom (i.e., under which character traits) is it better to decide by a strategy of principle application or by one of particularistic reasoning?

This *descriptive* inquiry should also yield a *normative* result. That is, it will be seen in which cases which people *should* better have a principle ready to use or rather not abide by the principles they might have. This in turn will straightforwardly lead to *practical* advice as to who might when want to be able to draw on a principle to determine a decision, as to how to generate subjectively satisfying personal principles, and as to how to test them. These goals might seem ambitious, but are actually rather simple, as I will show soon.

In order to make the above question suitable for empirical research, several points have to be addressed: What is meant by 'better'; i.e.: what is the criterion, what gets evaluated, and what empirical results exist so far? What is meant by principles and particularistic reasoning, and what is the state of research regarding these decision strategies?

How can circumstances and character be taxonomized and/or measured? And what, more precisely, will be the method used? In the following sections I will turn to each of these points.

2 Explication and discussion of the research question & literature review

2.1 Evaluating decision-making

In this section I will explicate the evaluative relation; i.e., which sense of 'better' will be used and whose evaluation will be concerned. The sense of 'better' I am interested in pertains to a notion of happiness or well-being[1] – which might not seem to be straightforwardly the purpose of decision theory or research. Thus, I will first of all elucidate the connections between theories of utility and theories of happiness/well-being and end with a commitment as to my use of 'better' (subsection 2.1.1). Hereafter, I will look into some relevant empirical results as well as specify what part exactly in the decision-making process shall be evaluated (subsection 2.1.2).

2.1.1 Accounts of utility and accounts of happiness & definition of 'better'

Utility. Decision theory is about choosing the best option (cf. e.g. Baron, 2004) or, in other words, maximizing utility (cf. e.g. Weirich, 2012). Two major conceptions of utility have been put forward. The first, the standard in neoclassic economic theory (cf. e.g. Hsee, Hastie, & Chen, 2008), understands utility as preference (or desire) satisfaction, where people's choices reveal their preferences (due to the *principle of revealed preferences*, sometimes traced back to Samuelson, 1947) and thus their utility functions (cf. e.g. LeBoeuf & Shafir, 2005). The second explication of utility, Bentham's (2009 [1789]) original one, sees utility concerned with pleasure and pain. This idea was much later revived by Kahneman and colleagues (Kahneman, Wakker, & Sarin, 1997), who termed this type *experienced utility*. Upon this latter conception utility is "logically separate from what choices are actually made", as Read (2007) correctly puts it.

Happiness. Philosophical theories about happiness or well-being broadly fall into three categories: hedonism or mental state theories, desire theories and eudaimonia or objec-

[1] I will use these terms interchangeably.

tive-list theories (cf. e.g. Crisp, 2013; Haybron, 2011; Adler & Posner, 2008). Interestingly, the previously mentioned first conception of utility corresponds to hedonism/mental state theories, and the second conception corresponds to desire theories of happiness/well-being. In that light, upon both major conceptions of utility, decision theory is *directly* concerned with happiness/well-being as its (maximizing) goal. Note, however, that only the latter conception allows for the idea that what people choose is not necessarily what makes them happy (cf. also Hsee et al., 2008).

Aristotle. Turning to the third strand, it is safe to say that in the past few decades interest in virtue ethics or (neo-)Aristotelian ethics and its according conception of happiness/well-being in philosophy as well as psychology and happiness research has soared (cf. e.g. Ryan & Deci, 2001; Veenhoven, 2013). On Aristotle's account happiness – i.e.: *eudaimonia*, often translated as *flourishing*[2] – is men's highest good and final end (cf. Aristotle, transl. Dirlmeier, 2003, e.g. 1097a26, 1097b1, 1097b20), and the highest good is taken to be an "activity of soul in accordance with virtue" (1098a17); 'the good life' is the virtuous life (cf. e.g. Hursthouse, 2013). Interestingly however, while the virtues of character ('ethical virtues') can and must be built by training (1103a14-18), virtue alone is not sufficient for eudaimonia, high virtue is not even attainable without some *luck* in life (e.g. 1099a31-b8, 1153b17–19): 'external goods' (namely: friends, wealth, power and good birth, good children, beauty) and the lack of bad strokes of fate/misfortunes are important for flourishing.[3] Eudaimonia's lack of immunity to luck is one reason why contemporary accounts of flourishing are also called objective-*list* accounts:[4] they list goods deemed necessary for human flourishing.[5]

My use of 'better'. In my research, I want to commit to an Aristotelian view of happiness, and thus, the goal of decision-making to me is to lead 'the good life'. Where the evaluative term 'better' is concerned it will be taken to mean 'more conducive to the good life'.[6] Why this conception of happiness? Simply, I do believe it is the best one (the

[2] I will use the terms 'eudaimonia' and 'flourishing' exclusively to refer to Aristotle's notion of happiness.
[3] Cf. e.g. in book I: 1099a30 f., 1100b24 f., 1101a10 f.; in book X: 1178b1 f., 1178b30 f.; and the passages on torture in book VII: 1153b18 f.
[4] They are called *objective*, because according to Aristotle, virtuous activity is the 'human function' (1098a14), which means that virtuous activity is everyone's purpose, an all-human nature, and what is needed for it is needed by everyone.
[5] Most well-known is probably Martha Nussbaum's list (cf. e.g. Nussbaum, 2000); as a related strand of theorizing see the so-called *capability approach* (e.g. Sen, 1993).
[6] This theoretical commitment does not say anything yet about operationalization, which is a matter to be tackled soon.

other two run into philosophical difficulties quite quickly, cf. e.g. Crisp, 2013), especially when medium-sized and big life decisions are concerned, which are the ones that I am interested in.

2.1.2 Research on decision-making and happiness & location of 'better'

Most research on decision-making and happiness is concerned with an evaluation of the choice(s) made in the sense of an outcome[7] evaluation by the chooser ('Am I satisfied/happy with what I chose?'); many of them focusing on post-choice dissonance (reduction) and feelings of conflict or regret. Among it, two extensive strands of research deal with consumer satisfaction[8] and medical decision-making. In the former domain there are also a few studies taking into account the decision-making process, and in the latter domain there are also studies to be found on shared decision-making and group decision processes. Furthermore, there are some scattered and more recent studies examining the antecedents of post-decision/post-choice satisfaction, focusing on such diverse matters such as choice-goal compatibility (e.g. Shao & Shao, 2011) or maximizing versus satisficing and commitment (e.g. Sparks, Ehrlinger, & Eibach, 2012), reversibility of decisions (e.g. Bullens, van Harreveld, Förster, & van der Pligt, 2013); best known in this category are probably the studies on the satisfaction-decreasing effect of too many or additional options (cf. e.g. LeBoeuf & Shafir, 2005, p. 250 f. for some examples) or option characteristics more generally.[9]

Lastly, quite a few studies are concerned with interindividual decision-making *styles*, and according instruments have been developed (cf. e.g. Scott & Bruce, 1995; Leykin & DeRubeis, 2010).[10]

[7] With 'outcome' I simply mean the point in time where the choice has been made (the 'choice outcome'), *not* any wider (least of all unforeseen) consequences of that choice.

[8] I will treat the variable 'satisfaction' naively for now, exemplified by a question such as "How satisfied are you with...?" However, cf. e.g. the following two articles for conceptual and empirical clarification: Parker and Mathews (2001), Clinton and Wellington (2013).

[9] Note that some of these latter studies are also concerned with what might be called peri-choice or peri-decision-making satisfaction.

[10] It seems in place to make some preliminary theoretical distinctions. I will take 'decision style' to refer to interindividual measures that focus on habitual ways in personal decision-making, such as avoidance/procrastination etc. (cf. e.g. Scott & Bruce, 1995). Decision-making strategies are a subset of decision-making processes. I will to use 'process' in a loose and theoretically non-committal sense, simply referring (a) to the time during which a decision is made and (b) all decision-relevant happenings (cognitive and otherwise), not all of which need to be conscious. A decision strategy on the other hand should be a specific distinguishable, describable and potentially ordered process, not necessarily fully conscious, but closer to a personal than a sub-personal level (cf. Dennett, 1969, for that distinction). The term 'information-processing strategy' (cf. e.g. Payne, Bettman, & Johnson, 1993) exemplifies such a usage, but I do not wish to commit to an information-processing approach,

In their (2008) article entitled *Hedonomics – Bridging Decision Research With Happiness Research* Hsee, Hastie, and Chen gather findings as to "the relationship between presentation (how outcomes are arranged among themselves or relative to other outcomes) and happiness, and the relationship between choices and happiness" (p. 225). From my perspective, the former focus, while part of the behavioral-decision literature, is not strictly about *decision-making* and happiness. The second part then falls in with the heuristics and biases approach, which is exactly what the authors state: "We will report on a series of systematic biases that prevent individuals from making experientially optimal choices."[11] (p. 231). They order their presentation along decision-making 'strategies', grouping these into impulses, predictions of future experiences with prospective outcomes, memory-based evaluations, and decision rules and heuristics (cf. p. 231). While their collection certainly makes for an interesting read, in this research project I am not interested in a heuristics and biases perspective nor, more broadly, in an evaluation of choices made. As my research question states, I am interested in a happiness-based evaluation of decision *strategy* rather than decision outcome.

However, before I will review research more specific to my focus, I will add a paragraph on the distinction between experienced and remembered utility. On the one hand this distinction can explain much of the research presented in Hsee et al. (2008), and on the other it is very important when considering methods of happiness/satisfaction measurement.

Two selves. In his 2011 (review) book "Thinking, Fast and Slow" Kahneman dedicates four chapters to questions of happiness/well-being. The research he presents attests to quite astonishing judgments and preferences of participants when compared, much in the same line as his heuristics and biases program. The explanation of the reviewed research relies crucially on the distinction between *two selves*, the 'experiencing self' and the 'remembering self' (note that this analogous to his distinction between experienced and remembered utility, e.g. Kahneman et al., 1997; Kahneman, 2011, p. 377). According to Kahneman (2011) the remembering self evaluates past experiences and makes decisions upon these evaluations (cf. e.g. p. 408 f.). However, the evaluation of the remembering

which I find too narrow. Heuristics and more normative models (such as WADD) are commonly called decision-making strategies (cf. Payne & Bettman, 2004).

[11] 'Experientially optimal choices' means choices that maximize hedonic experiences, i.e., happiness in the pleasure/state-of-mind sense. Regarding their terminology they state: "In this article, we treat the concept of happiness as a psychological term that describes the positive or negative aspects of hedonic experience. We will use the words *happiness* and *experience* interchangeably because we mean to refer to the positive or negative quality of experiences in the present context." (Hsee et al., 2008, p. 225).

self is not based on a "duration weighted" (p. 409) perspective on past experiences, on the contrary, its evaluation is governed by two very specific principles – the 'peak-end rule' and 'duration neglect' (p. 380) – and thus "the memory that the remembering self keeps [...] is a representative moment, strongly influenced by the peak and the end" (p. 383). In a nutshell, this differentiation can account for found discrepancies between our preferences and our decisions.[12] The differentiation is also important to keep in mind when considering measures of happiness/well-being, because measures of overall satisfaction only speak to the remembering self (cf. p. 391).

Decision-making *strategy* and happiness/satisfaction. While there is ample literature on decision strategies (cf. also fn. 10), "[t]he question of *how* [my italics] people arrive at satisfying decisions has not been given much attention in psychology or economics" and "previous research examining satisfaction with choice has largely been focused on satisfaction with outcomes [...]. In reality, however, one could report being satisfied with an entire decision-making process and yet be disappointed by an outcome. In such a case, one may evaluate decision quality as low, not because the decision was bad, but rather because of chance or bad luck affecting the outcome" (Crossley & Highhouse, 2005, p. 256, p. 258).[13] Not counting in studies concerned with decision-making *style*, there is really almost no research on strategy and satisfaction.[14] The only three studies I found investigating satisfaction with decision strategy rely on self-reports. In their experimental study in the domain of consumer satisfaction Zhang & Fitzsimons (1999) had participants fill out a questionnaire after they made their choice (their research interest was in option limitation and option information which provided the experimental factors).[15] In the domain of job search Crossley & Highhouse (2005), too, simply asked

[12] "The neglect of duration combined with the peak-end rule causes a bias that favors a short period of intense joy over a long period of moderate happiness. The mirror image of the same bias makes us fear a short period of intense but tolerable suffering more than we fear a much longer period of moderate pain. Duration neglect also makes us prone to accept a long period of of mild unpleasantness because the end will be better, and it favors giving up an opportunity for a long happy period if it is likely to have a poor ending." (Kahneman, 2011, p. 409).

[13] This does not seem to have changed much over the years, cf. also Zhang & Fitzsimons (1999): "The issue of decision satisfaction is an important topic that has received scant attention in psychology and decision research. [...] Satisfaction [...] is associated only with the decision about the outcome choice." (p. 193).

[14] Note that research concerned with principled/rule-based or reason-based decision strategy will be referred to in the next section.

[15] "These items were as follows (all items have endpoints 1 = strongly agree, 10 = strongly disagree, unless otherwise noted): (1) I found the process of deciding which product to buy frustrating; (2) Several good options were available for me to choose between; (3) How satisfied or dissatisfied are you with your experience of deciding which product option to choose? (endpoints 1 = extremely

their participants to evaluate the decision-making process.[16] Being interested in the importance of 'true self-knowledge' in a preliminary survey study Schlegel, Hicks, Davis, Hirsch, & Smith (2013) simply asked participants to rate 36 potential decision-making strategies "how important they thought each was for making satisfying decisions" (p. 545). In spite of the reliance on retrospective self-reports, all three studies find effects of decision-making strategy on satisfaction.

In sum, while these studies cannot serve as a methodological role model for my research project, it becomes obvious that on the one hand studying satisfaction/happiness as due to various decision-making strategies is a research desideratum, and on the other that prospects to find effects are good.

What gets evaluated – the location of 'better'. As I already elaborated throughout this section, I am interested in evaluating decision-making strategies – not outcomes – as to their effect on the decision-makers satisfaction, happiness or well-being.

2.2 Principles versus particularism

The philosophical debate regarding principled versus particularistic (moral) decision-making is concerned with questions such as whether there are defensible moral principles, whether moral thought consists in the application of moral principles to cases, and whether the moral person should be conceived as the person of principle (cf. Dancy, 2013, para. 0). While – at least on a philosophically superficial level – the idea of a principle is quite clear (e.g. "Don't break a promise!"), particularism as a theory in normative ethics is not as well-known. In very broad brush strokes, the idea is here – without principled preconceptions – to evaluate the reasons present in each individual case, because "what is a reason in one case may be no reason at all in another, or even a reason on the other side" (Dancy, 2013, para. 3).

In the next paragraph, I will translate the difference into psychological thinking and review relevant empirical research. As my research question in the introduction states, I will understand principled versus particularistic reasoning as decision strategies. Since I am interested in their effect on satisfaction/happiness, I want to model these two

satisfied, 10 = extremely dissatisfied); (4) I thought the choice selection was good; (5) I would be happy to choose from the same set of product options on my next purchase occasion; and (6) I found the process of deciding which product to buy interesting." (Zhang and Fitzsimons, 1999, p. 199).

[16] "Satisfaction with the decision-making process was measured with the following items: (1) I am happy with the way I went about finding this job, (2) I would look for another job using the same techniques that I used to find this one, (3) I am satisfied with the process I used to find jobs to apply for, and (4) I am satisfied with how I decided upon which job to take." (Crossley and Highhouse, 2005, p. 263).

strategies as *independent* variables (in an experimental setting), whereas in decision-making research decision strategies are mostly treated as dependent variables. Due to this shift in focus, I will pay special attention to previous research that might prove helpful for the task of operationalizing and inducing the one or the other decision-making strategy in experiments.

2.2.1 The idea of 'principled' versus 'particularistic' reasoning in previous research in decision-making

Principled versus particularistic reasoning in psychological thinking First, for my purposes it is not necessary to understand 'principle' or 'principled thinking' in a strictly philosophical way. On the contrary, it seems appropriate to widen the scope in order to depict psychological reality. This specifically means that there does not need to be made a difference between principled thinking and rule-based thinking. As long as deciding is based on some (personal) commitment to a generalized action-guiding, conscious and verbalizable maxim, this way of thinking/reasoning is well represented.[17] Second, particularistic thinking will in part be defined in negation to the former: it does *not* involve reliance on a maxim, but instead a careful weighing of the reasons present in every individual situation. Here, if 'reasons' are understood in a loose sense, most of classical decision research, normative as well as descriptive models, will fall into this category. Yet, this category is even wider: considerations from domains classically separated from a pure information-processing perspective (e.g. emotion and motivation) can and should enter the calculations as reasons (e.g. "My gut feeling speaks against this option."). However, since I am interested in 'medium-sized' decisions, deliberation and conscious weighing will have to be involved; here I am not interested in quick and spontaneous, 'intuitive' decision-making.[18]

Research on principled and particularistic decision-making and satisfaction/happiness Assimilating principled decision-making to rule-based decision-making, and reason-based decision-making to much of the rest of decision-making research affords a more yielding outlook on previous findings. It has been shown that there are some practical

[17] I herewith do *not* mean normative decision rules of rational choice nor classic heuristics, but personal, pragmatic maxims. More on that below.

[18] I do not exclude the possibility, though, to enrich the presently envisioned research project later on with a comparison of the above conditions (principled versus particularistic reasoning) to satisfaction with a decision-making process involving a 'medium-sized' decision when conscious thought is avoided; cf. e.g. *Unconscious Thought Theory* (Dijksterhuis & Nordgren, 2006).

rules people tend to adhere to, e.g. 'seek variety', 'waste not', 'don't pay for delays', and 'more options are better' (cf. Hsee et al., 2008, p. 236). Especially the first rule has been studied as to its effect on satisfaction. It was found quite consistently that in simultaneous choice situations "individuals [also] choose [...] less-preferred options even though they enjoy those items less than they would have enjoyed repeating a more-preferred option (Ratner, Kahn, & Kahneman, 1999, p. 1)".[19] The other above mentioned rules – in appropriate decision tasks – seem to operate much to the same effect: the rule can be more important than actual, concurrent enjoyment or even anticipated satisfaction (cf. e.g. Arkes, & Blumer, 1985, for the latter point, and Hsee et al., 2008, for a short review on rule-based decisions and happiness). However, again it must be stressed that none of these studies examined satisfaction with the decision-making *strategy* (the 'following the rule'), and, what is even less in line with my research project, it did not matter in these studies whether participants were aware at all of their adherence to these rules; I however want to be concerned with personal maxims.

Research on reason-based, deliberative decision-making and satisfaction has produced opposing results. For example, in Wilson and colleagues' (1993) famous 'poster study' making participants give reasons why they liked or disliked various posters lead to them being less satisfied with their later choice than participants who did not have to think about their reasons.[20] On the other hand, several studies have shown that deliberative, careful analysis in the decision process leads to greater satisfaction and less regret (cf. e.g. Crossley & Highhouse, 2005, for examples and a short review). However, all of these studies, of course, are restricted to specific domains (e.g. choosing a college, cf. e.g. Kmett, Arkes, & Jones, 1999), and again focus on satisfaction with the choice, not the process/strategy.

In sum, this section showed two things: first, the idea of principled versus particularistic decision-making can be translated into psychological thinking and connected to previous research, and second, there is virtually no research considering satisfaction as due to the strategy used as opposed to satisfaction with the choice made. In the next section I will describe the design of my envisioned research project.

[19] In the case of 'seek variety', of course, one must be reminded of Kahneman's (2011) distinction between the experiencing and the remembering self. It might be that just as in the forecast, in the retrospect, too, variety is judged to be a good thing – and which self is supposed to be the criterion? Interestingly, this latter thought is exactly what was shown in the same study: antecedent and retrospect judgment were consistently in favor of variety (Ratner et al., 1999).

[20] Of course, a thorough analysis of this study would prove most useful. For example, one might wonder whether taste-based or aesthetic choices are just a specific domain where reason-based judgments are simply misplaced.

3 Methods

In this project I want to test two strategies of decision-making in 'medium-sized' situations regarding their effect on the decision-makers happiness or satisfaction with them as a decision-making strategy. Using a vignette design, in a second step outcome information could be given to participants and satisfaction/happiness measured again. This would allow to test for interaction effects of strategy x outcome as well as relative effect sizes. I will split the project into several smaller parts.

3.1 Groundwork

Since this project cannot rely on any one previous research path in particular, there are several components that need to be established first. Regarding the conceptual and empirical preparatory work the objectives are (a) to invent well-balanced 'medium-sized' decision situations, (b) create and pretest a reliable method to induce rule-based versus reason-based deciding, and (c) settle on a method to measure happiness/satisfaction with the decision-making process.

Invention of decision situations. I will to go about this task as follows: First, I want to conduct a simple qualitative study *or* a semi-qualitative study using open ended questions designed to gather examples of 'medium-sized' decision situations and, if possible, a first glimpse as to how people tend to go about them, or think they do. This study should include a personality questionnaire (whose focus still needs to be determined). Second, the gathered sample situations should be analyzed with the goal of categorization, or even taxonomization. While (semi-)qualitative work can prove very useful in determining relevant dimensions (cf. e.g. Lipshitz & Strauss, 1997, for an example), it seems wise to peruse the existing literature with this focus, too. The result should be a set of 'medium-sized' decision-situations that many people can relate to, and that are clearly categorizable along relevant dimensions, as well as their value on these. As a variation to this first-person vignette design one might consider a third-person version.

Manipulate rule-based versus reason-based deciding. One way, of course, would be to simply instruct people to decide by rules or by reasons. In the reasons case people could simply be told to make a list plus maybe weigh it (which would require the situation to decide about to be rich enough in content), while in the rule case one might try to have people list relevant practical rules they have and then ask them to decide

on the basis of the one they adhere to most strongly. In both cases it seems sensible to control for values, life goals and practical maxims. More interesting, I think, it would be to more indirectly induce reasoning and deciding by rules or reasons. This might be done by some intelligent form of priming. The best way, however, I believe would be to be able to describe the *same* situation in a way that either encourages rule-based or reason-based deciding. It might be worthwhile to look more closely into the moral judgment literature to accomplish that task.

Measure satisfaction/happiness with the decision-making process/strategy. Previous research has measures satisfaction with the decision-making process with self-reports by questionnaire after the choice. This is certainly one way. However, I would like to look into the possibility of measuring happiness/satisfaction with the decision strategy both less obvious and more directly. One possibility would maybe consist in the idea to use a proxy for satisfaction/happiness that does not obviously relate to the task for the participants. For example, one might use a mood questionnaire (maybe the Self-Assessment Manikin (SAM); cf. Lang, 1980; Hodes, Cook, & Lang, 1985) before and after the decision-making task. Another possibility might be a physiological measure tracking something like tension which could be translated into dissatisfaction. A thorough literature review might reveal further options.

3.2 Main study

Design, materials, and procedure Assuming all measurement issues have been solved or decided, the design of the main study would be as follows. The study would use a vignette design presenting 'medium-sized' decision situations. At best, a taxonomy has been established which would allow to systematically vary attributes of the situation presented. Each participant should solve several decision-situations (within-factor). The main independent variable, decision strategy, should be applied as a between-factor.[21] In this case, participants would solve all scenarios using one of the two strategies under investigation (rule-based versus reason-based). Satisfaction should be measured in the beginning as a baseline and then after each solved scenario. In case the study is expanded to also provide outcome information, satisfaction would also be measured after the outcome information was presented. Outcome information would vary between good,

[21] Although it should also be interesting to investigate this factor as a (counterbalanced) within-factor, presenting participants twice with the same or very parallel situation.

bad and neutral. The last part of the study would consist in scales measuring relevant aspects of participants' character, to allow for interindividual differences.

Hypotheses Specific hypotheses will still have to be sharpened upon thorough literature reviews. However, I expect that – in the case of personal, 'medium-sized' decisions – while people might be generally more satisfied with a reason-based decision strategy, they might be less dissatisfied with a bad outcome when their decision strategy was rule-based. The idea behind this prediction is that outcomes in situations like the one I described in the introduction are not completely under our control. Thus, when the outcome is bad one might blame oneself more easily in case one decided particularistically (maybe one weighed the reasons incorrectly, one might think) than by principle. In the latter case, at least, one decided upon a maxim in whose general usefulness one still believes. This expected pattern might be especially pronounced in moral cases.

Of course, this is only the basic idea. I believe that in the research process further questions would come up, leading to further expansions of this study, or the need for empirical clarifications of certain points.

4 Conclusion

In this study I would like to investigate the effects of two decision *strategies* on satisfaction/happiness, which seems to be quite a research desideratum to date. At best, results could show in which situational circumstances and for what kinds of people which strategy leads to greater satisfaction/happiness. These should be results of interest to anyone.

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Working Schedule and Projected Date of Completion

Groundwork

1. General literature review
   – 2–3 months
2. Semi-qualitative study to gather decision situations & analysis
   – 2 months (parallel to literature review)
3. Categorization of decision situations, and empirical test of categorization plausibility
   – 1 month
4. Invent and test various methods of manipulating rule-based versus reason-based deciding
   – 4 months
5. Review and test ways to measure satisfaction with the decision-making process
   – 3 months (in parts parallel to 4.)
6. Buffer time & conference presentations
   – 1 month

Output: 1–2 small articles: one review and one report on points 4. or 5.

– 3–4 months

Main Study

7. Test and analyze main idea
   – 6-8 months
8. Test follow up questions
   – 4 months
9. Conference presentations
   – 1 month

Output: 2–3 articles

– 4–6 months

Total Time Needed

- Phase 1: 16–18 months
- Phase 2: 15–19 months

List of all Studies, Time Line, and Page Count

List of all Studies

The following two tables list all the studies I conducted during my funded dissertation phase (2015-2017).

The first table (Table Ad.1) contains all studies on the thesis topic presented here: "Reasons or Principles". The studies are sorted by type: Pilot, Questionnaires, Taxonomies, Experiments, Exploration. Not all studies have found their way into this manuscript, cf. the table note for the details. The topic *Taxonomies*, using the methodology of multi-dimensional scaling, had to be completely omitted for reasons of volume and time.

The second table (Table Ad.2) includes several studies on "Moral Luck": At a time when I was very dissatisfied with the results from "Reasons or Principles", I pushed this second subject matter with the thought of maybe changing my dissertation topic. Efficient programming and data collection was possible, because (i) I had already conceptualized these studies during the work on my master's thesis in 2011 on the same topic, and (ii) I was able to use these readily designed studies as course material for two practical courses I taught at FOM University of Applied Sciences Hamburg, such that the students did a lot of the programming which I supervised. Big thanks to everyone! Together, the eight selected studies (cf. the respective table note) would have been sufficient for a(nother) monographic dissertation – and in fact a not at all small manuscript on this alternative topic already exists.

Why did I go back to write a dissertation on the original topic? After my PhD grant expired and I did not get an extension, it was clear that completing the thesis would be massively delayed. So, I decided to return to the topic that interests me more: Do decision making strategies make a difference to satisfaction? Reasons or Principles?

Tabelle Ad.1 List of all Studies: "Reasons or Principles".

#	Ref.	Content / Name	Type of Study	Sample Origin	Allocation / Function of Study	Conference Presentation
Pilot						
1	E0	Pilot Study Reasons vs. Principles	Experiment	Leuphana	**Chapter 7 + 8** (Pilot Study)	Summer School Nürnberg, 2015
Questionnaires						
2	Q1	Strategy Satisfaction Questionnaire	Questionnaire Construction	Leuphana	**Chapter 7 + 9.1** (SSQ)	
3	Q2	Decision Style Questionnaire	Questionnaire Construction	Leuphana	**Chapter 7 + 9.2** (DSQ)	Summer School Nürnberg, 2015; FGSP Ulm, 2017
4	Q3	Characterizations of Decisions (Decision Categorization Scales)	Questionnaire Construction	Leuphana	**Chapter 9.3** (DCSs)	
5	Q4a	Modes of Decision Making: How to decide important things?	Questionnaire Construction	Leuphana	Pilot Questionnaire	
6	Q4b	Modes of Decision Making (Modified replication)	Questionnaire Construction	FOM	Replication	16. Tagung der Fachgruppe Sozialpsychologie, Ulm, 2017
Taxonomies						
7	S1	Collection of "Collegiate Decision Situations"	Qualitative Study, incl. Coding	Leuphana	**Chapter 9.3** (DCSs)	
8	MDS1	MDS on "Collegiate Decision Situations"	Multi-dimensional Scaling (MDS)	Leuphana	Taxonomization	
9	S2	Collection of "Principles"	Qualitative Study, incl. Coding	Leuphana	Collection for Taxonomization	
10	MDS2	MDS on "Principles"	Multi-dimensional Scaling (MDS)	FOM	Taxonomization	Not included
11	S3	Collection of "Domains of Life"	Qualitative Study, incl. Coding	Leuphana	Collection for Taxonomization	
12	MDS3	MDS on "Domains of Life"	Multi-dimensional Scaling (MDS)	FOM	Taxonomization	
Experiments						
13	E1a	Reasons vs. Principles in the Trolley Paradigm, Pilot 1 (agent vs. patient)	Experiment	Leuphana	Pilot Experiment	
14	E1b	Reasons vs. Principles in the Trolley Paradigm, Pilot 2 (runaway vs. footbridge)	Experiment	Leuphana	Pilot Experiment	
15	E1c	Reasons vs. Principles in the Trolley Paradigm (Modified replication)	Experiment	Leuphana, FOM, external participants	**Chapter 10.1**	TAPMI Winter School, Manipal, India, 2017; TeaP Dresden, 2017
16	E2	Reasons vs. Principles in the MADM Paradigm	Experiment	FOM	**Chapter 10.2**	
17	E3	Reasons vs. Principles in a Field Experiment	Field Experiment	FOM, Leuphana	**Chapter 10.3**	SPUDM26 (The 26th Subjective Probability, Utility, and Decision Making Conference), Haifa, 2017
18	E4a	Reasons vs. Principles in the Value Circle Paradigm	Experiment	Leuphana	Pilot Experiment	
19	E4b	Reasons vs. Principles in the Value Circle Paradigm (Replication)	Experiment	FOM	Reasons vs. Principles, Not included	
20	E5	Reasons vs. Principles in moral vs. prudential situations (Young Paradigm)	Experiment	FOM	Reasons vs. Principles, Not included	
21	E6	Reasons vs. Principles in the Haidt Paradigm	Experiment	Leuphana	Reasons vs. Principles, Not included	Experimental Philosophy Conference, Osnabrück, 2017
Exploration						
22	Expl.	Reflections on a past decision	Explorative Study	FOM	Exploration	

Note: Studies highlighted in grey are included in the dissertation or could be included. Pilot studies and exploratory studies were not intended for inclusion. Studies that were suitable for inclusion but were excluded for reasons of overall scope are marked with "not included". None of the taxonomization studies were included since that would have introduced yet another methodologically distinct field. "Young Paradigm" refers to Young et al. (2010) whose material was used in Experiment Ref. E5 (Study #20).

Tabelle Ad.2 List of all Studies: "Moral Luck".

#	Ref.	Content / Name (English/German)	Type of Study	Sample Origin	Allocation	Conference Presentation
1	ML1	Resultant Moral Luck / Der Einfluss von Erwartungshaltungen auf die moralische Bewertung von Personen im Straßenverkehr	Experiment; Supervised BA Thesis	Leuphana		
2	ML2	Constitutive Luck / Der Einfluss sozial unerwünschter Persönlichkeitsmerkmale auf moralische Bewertungen	Experiment; Supervised BA Thesis	Leuphana		
3	ML3	"Outcome Bias or Justified Belief" / Outcome Bias oder gerechtfertigte Meinung? Der Einfluss von Rechtfertigung auf die moralische Bewertung einer intentionalen Handlung im Kontext von Moral Luck	Experiment; Supervised BA Thesis, My study design	Leuphana	Diss 2, Study III	
4	ML4	The Influence of Counterfactual Thinking about Uncontrolled Factors on Moral Judgment	Experiment; Replication #1 of my Master's Thesis	Göttingen, Leuphana		DGPs Leipzig, 2016
5a	ML5a	Post hoc decision evaluation as dependent on belief truth, belief justification, and outcome in moral and prudential situations	Experiment	Göttingen		Symposium Konstanz, 2014
5b	ML5b	Resultant (Moral) Luck in Moral and Prudential Situations (Replication of Young et al., 2010)	Experiment	Göttingen		TeaP Heidelberg, 2016
6	ML6	"Moral Luck and Counterfactual Thinking"	Experiment; Replication #2 of my Master's Thesis, Ref. ML4	FOM	Diss 2, Study I	
7	ML7	"Moral Luck and Mental State", Replication of Young et al., 2010	Experiment; Ref. ML5	FOM	Diss 2, Study II	
8	ML8	"A Causal Model of Moral Luck"	Experiment	FOM	Diss 2, Study IV	
9	ML9	"Moral Luck, Intention, and Motive"	Experiment	FOM	Diss 2, Study V	
10	ML10	"Decision under Uncertainty (Gauguin)"	Experiment	FOM	Diss 2, Study VI	
11	ML11	"Circumstantial Luck and Control"	Experiment	FOM	Diss 2, Study VII	
12	ML12	"Circumstantial vs. Constitutive Moral Luck"	Experiment	FOM	Diss 2, Study VIII	

Note: The topic of "Moral Luckïs an alternative dissertation topic for which there is also sufficient material. This topic was pursued after the experiments on "Reasons or Principles" did not yield strong results.

Time Line

Tabelle Ad.3 Time Line: This Manuscript

Time Frame	#	Worked on What
04/2015-03/2017	24	Conduction of studies for first dissertation topic (Reasons, Principles).
04/2017-12/2017	9	Studies and write-up on second dissertation topic (Moral Luck).
01/2018-12/2020	36	All work, no play (i.e.: no work on dissertation).
01/2021-02/2021	2	Find and sort data, prepare LaTeX
03/2021-06/2021	4	Pilot Experiment, Part A
07/2021-09/2021	2	Strategy Satisfaction Questionnaire (SSQ), Pilot Part B
09/2021-10/2021	2	Decision Style Questionnaire (DSQ), Pilot Part C
10/2021-11/2021	1	Repeated Measures Pilot Study, Part A-C
11/2021-01/2022	2	Trolley Experiment
01/2022-07/2022	6	%%% [sick leave]
07/2022-08/2022	1	MADM Experiment
09/2022-05/2023	8	Eight Decision Categorization Scales
04/2023	1	Original Materials
06/2023-02/2024	8	Theory
02/2024	-	Field Experiment
05/2023, 02/2024	-	Additional Documentation
02/2024-03/2024	2	Discussion
03/2024	-	Submission
Σ Dissertation 1	**57**	**= 4.75 years --> 2 years (2015-17) + 2.75 years (2021-24)**

Page Count

Tabelle Ad.4 Page Count: This Manuscript

	Main Text	Appendix	Conducted	Statistical Re-Analyses & Main Write-Up
Theory				
Theory	156 pages	12 pages	--	June 2023 - Feb. 2024
Experimental Studies				
Pilot Study	48 pages	15 pages	06/2015-07/2015	March - June 2021, Oct. - Nov. 2021
Trolley Experiment	40 pages	3 pages	11/2016-02/2017	Nov. 2021 - Jan. 2022
MADM Experiment	32 pages	2 pages	05/2017-06/2017	July - Aug. 2022
Field Experiment	11 pages	2 pages	2017	Feb. 2024
Consolidation: The Results	11 pages	--	--	Feb.- March 2024
Questionnaires				
Strategy Satisfaction Questionnaire	11 pages	7 pages	with Pilot	July - Sept. 2021
Decision Style Questionnaire	19 pages	0 pages	with Pilot	Sept. - Oct. 2021
Eight Decision Categorization Scales	113 pages	23 pages	07/2015-09/2015	Sept. 2022 - Mai 2023
Discussion				
Discussion	54 pages	16 pages	--	Feb.- March 2024
Appendix				
Bibliography	--	58 pages	--	--
Original Materials	--	85 pages	--	April 2023
Additional Documentation	--	29 pages	--	Mai 2023, Feb. 2024

Acknowledgments

It is three days before my printing date and I just received my first test print – and I will admit, it is a bit heavy. How could that happen?

Well, I am a lengthy person (in writing), with an exploratory temperament, and a fondness for detail both in conceptual as well as statistical analysis. No way to deny that. But there were external factors as well, like the fact that about half of the time I worked on this project I did so without funding, from home, in my free time, increasingly remote from an academic context. The most pervasive effect of these circumstances was that I tried to hurry. And, as strange as that may sound, as the lengthy person I am, the quickest way to get something done for me is to just be lengthy. It's not a virtue, and I truly am sorry for the reader.

Now let's get to the happy things:

First and foremost I am grateful to my supervisor, Prof. Hans-Rüdiger Pfister, for never giving up on me and this project, always being interesting and helpful to talk to, and letting me do my thing. Even when it became apparent that this manuscript would not turn out to have a conventional format you knew better than to discourage me with substantive demands for changes in style, or setting a dreaded maximum amount of pages acceptable. So thank you for your continuing support, the ease of communication, and your open-mindedness.

I am also grateful to my further reviewers, Prof. Michael Waldmann (Göttingen) and Prof. Ali Teymoori (Bergen). Both of you agreed to read this brick of a dissertation and I am very happy and thankful that you did.

This project not only in terms of pages, but also in terms of time from conception to print, was a very lengthy endeavor that even when I did not work on it for a couple of years really did determine a lot of my choices and my general being. Thus my thanks go out to the people closest to me: my man, Michael Matzky-Eilers, my parents, Hanna Marek-Botros and Gamal Botros, and my sister, Elisabeth Botros – for being patient, understanding, and encouraging, for supporting me in every way they could, and for always covering my back. And Michael: $- \circ \circ - . \infty$.

This thesis, written in a lengthy hurry, was not dispatched for proofreading, but there is one specific helper I wish to thank: the basic preamble for my LaTeX script is still based on the one Tim Kraft wrote for my master's thesis. Thank you for introducing

me to it, I would have lost my mind with 800 pages in Word!

Another endeavor that has cost me a lot of thought and talk during the past few years is the psychotherapist training program I am attending. Three special people have emerged from that: Klaus Semmler, Heike Platow, and Carolin Sauerbier – it is always interesting, challenging, educational, and comforting to talk to you, thank you.

I also wish to send out a thank you to my further friends, my Hamburg-era friends from work and from the psychotherapist training program, my old friends from university, and my even older friends from school. Over the past couple of years I have made some effort to reconnect – and now just wait how much time for reconnection I will have after finishing this!

The work on the philosophical part of this thesis brought back a lot of memories from studying philosophy at Göttingen, Berkeley and Edinburgh. Fond times these were, Californian sun and Scottish rain. I have spent time at other universities since. But I realized that Göttingen University and the crew of philosophers I hung out with at the time still feels like the heart of my university days. Thanks, guys.

And now I am really happy that this is over! :-)

Hamburg, March 2024

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