

Balancing Care and Control –
An Ethnographic Study on Self-Tracking Relations.

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TABLE OF CONTENTS

TABLE OF CONTENTS	I
INTRODUCTION	1
PART I	7
– SELF-TRACKING AS TECHNOLOGY AND PRACTICE	7
1 SELF-TRACKING IN SOCIETY AND CULTURE	7
1.1 BRIEF DESCRIPTION AND EXPLICATION OF TERMS	8
1.2 HISTORY OF SELF-TRACKING AND SELF-OBSERVATION	13
1.2.1 REFLECTIVE WRITING, SELF-EXAMINATION, AND OTHER FORMS OF SELF-THEMATIZATIONS AS EARLY ANTECEDENTS OF ST	13
1.2.2 LIFELOGGING AND THE DIGITAL ARCHIVING OF PERSONAL ARTIFACTS	15
1.2.3 SELF-EXPERIMENTATION IN SCIENTIFIC AND MEDICAL ENVIRONMENTS	17
1.3 THE ST-ASSEMBLAGE: TECHNOLOGY, PRACTICE AND SELF	18
1.3.1 THE ST TECHNOLOGY: DEVICES, SENSORS, ALGORITHMS AND APPS	19
1.3.2 THE ST PRACTICE: OBJECTS OF MEASUREMENT	23
1.3.3 THE ST SELF: SUBJECT-EXPERT AND OBJECT IN COEXISTENCE	24
1.4 RISE OF PUBLIC AND ACADEMIC INTEREST	26
PART II	28
– STATE OF RESEARCH AND STUDY DESIGN	28
2 SELF-TRACKING IN ACADEMIA – MAPPING THE FIELD	28
2.1 THE DISCOURSE OF ST AS SELF-OPTIMIZATION	29
2.1.1 ST PRACTICE AS A METHOD OF EMPOWERMENT	30
2.1.2 ST PRACTICE AS SELF- AND DATA-EXPLOITATION	31
2.1.3 SHORT ANALYSIS OF THE SELF-OPTIMIZATION DISCOURSE	32
The Quest for Improvement – a Socio-Cultural Paradigm	33
Optimization and the Logic of Efficiency	35
Self-Optimization as Enhancement and Empowerment	37
2.2 CRITICAL EXAMINATIONS OF ST	39
2.2.1 SELF-GOVERNANCE AND THE NEOLIBERAL DISPOSITIF	39
2.2.2 VOLUNTARY SURVEILLANCE AND DATA EXPLOITATION	41
2.2.3 VALORIZATION OF DATA AND SELF-OBJECTIFICATION	43
2.2.4 CLOSING REFLECTIONS REGARDING THE CRITICAL PERSPECTIVES	44
2.3 EMPIRICAL INVESTIGATIONS OF ST	47

2.3.1 STUDIES OF USAGE AND FUNCTIONALITY OF ST TECHNOLOGIES	47
2.3.2 TYPOLOGIES OF USERS AND THEIR MOTIVATIONS	49
2.3.3 MODES OF ST PRACTICES AND OF NON-USE	51
Negative Experiences and Emotions in the ST Practice	52
2.4 THE “SELF” IN “SELF”-TRACKING	54
2.4.1 THE SELF AND ITS RELATIONSHIPS	55
The Self as Entity, Process, Model or Relation?	56
The Self and its Social Conditioning	57
Technological Self-Concepts	58
The Self as a Cybernetic and Manageable (Feedback-) System	59
2.4.2 SELF- AND WORLD-RELATIONALITY	61
The Human Experience of Having and Being a Body	61
Technologically Mediated Relations to the World	63
2.4.3 THE SELF AS SUBJECT	64
Foucault’s ‘Technologies of the Self’ as Practices of Self-Care	66
Co-Construction of the Self with and through Technology	67
2.4.4 NEW CONCEPTIONS FOR NEW SELVES?	68
Framing the Self in new Concepts and Coinages	68
First studies about the Co-Construction of the Self in/with ST	70
3 RESEARCH DESIGN	73
3.1 RESEARCH QUESTIONS AND CONTRIBUTION	73
3.2 METHOD: AUTOETHNOGRAPHY, ETHNOGRAPHY, AND MEDIA ANALYSIS	74
Reflections on Ethnography as a Method	76
3.3 ENTERING THE FIELD AND COLLECTING DATA	78
The field	78
Collecting the empirical data	80
3.4 ANALYSIS	84
Ground Assumptions concerning the Ethnography	84
The Analytical Process	85
3.5 THEORETICAL FRAMING – HTR IN STS	87
PART III	88
– FINDINGS	88
4 ETHNOGRAPHICAL ENCOUNTERS IN THE FIELD OF ST AND QS, AND OTHER SELF-IMPROVERS	89
4.1 THIS STUDY’S ETHNOGRAPHY AND AUTO-ETHNOGRAPHY	89
4.2 INTENTIONS FOR STARTING WITH ST	92

4.2.1 DIAGNOSIS OF AN ILLNESS	94
4.2.2 DISCONTENT WITH A PARTICULAR CONDITION/ WISH FOR A BEHAVIORAL OR BODILY CHANGE	100
4.2.3 USE OF TOOLS TO MANAGE PERFORMANCE-BASED ACTIVITIES AND TO “PLAY” WITH DEVICES	107
4.2.4 SEARCHING FOR SOMETHING MAGICAL - CURIOSITY, EXPLORATION, TREASURE HUNTING, MAGIC HAND	113
4.3 NON-TRACKERS AND WORLD-IMPROVERS	120
4.3.1 NON-TECHNOLOGY GROUP	120
4.3.2 SILICON VALLEY’S TECHNOLOGY AFFINE GROUP	127
5 TECHNOLOGICALLY MEDIATED MODES OF SELF-RELATIONS IN ST	131
5.1 MODE 1: SELF-CONTROL RELATION	136
5.1.1 COGNITIVE/MENTAL MODE: AWARENESS, REFLECTION, COMPLEXITY REDUCTION AND ORIENTATION IN LIFE	140
“It is important to see how much I was doing here” - “I need written proof”	141
“It creates awareness... It is like a reminder”	142
“It gives me validation that I should...”	145
“The app helps me face north” – Orientation through ST Data	148
Simplified Decisions through Information and Visualization	151
“It is about a more or less equal co-existence of different sources: hard facts, subjective feelings and experience”	153
“Sharing and comparing with friends is just more fun” – Data as Narratives	154
“This relaxed consciousness: I know (now) how it works, and if it annoys me significantly, then I change it”	155
5.1.2 ACTION-ORIENTED MODE: ALGORITHMIC RECOMMENDATIONS, MOTIVATION AND SELF-CHALLENGE, REGULATION AND NON-REGULATION	156
How to set goals and whose are they anyway?	156
“How can one work any better?”	158
“I think the challenge is not to win against others, but to challenge yourself” – Motivation is ... when you challenge yourself.	160
Algorithmic Recommendations: Alleviate the Burden of Decision-Making or Delegate to Technology?	165
“What, for me, is a normal relationship of...” – Self-Regulation is ... when you Maintain Yourself to Achieve Balance	172
“Because then I am ‘only’ human” - Non-Regulation	178
5.1.3 LOSING CONTROL - TOO BUSY WITH THE NUMBERS/ PROCESS - IN NUMBERS WE TRUST - AMBIVALENCE	180
5.1.4 MODE 1 SUMMARY – TECHNOLOGICALLY MEDIATED SELF-CONTROL: ORIENTATION, MOTIVATION, LIMITS, AND ILLUSION OF CONTROL	187
5.2 MODE 2: SELF-CARE RELATION	189

5.2.1 ATTENTION AND PRESERVATION MODE: SELF-REFLECTION/ INTROSPECTION, SELF-THEMATIZATION, ARCHIVING	191
“ It’s really exciting to discover how something is for me - I am someone who breathes faster than the average ”	191
“ That may be true for most, but is that really the case for me? ”	195
“ Can it help me grow beyond myself? ”	198
Self-trackers do not see themselves as average human beings	199
“ Well, I have actually copies of everything still somewhere... ”	202
The Body (Data) Diary - New Forms of Self-thematization and Archiving	205
5.2.2 CONFIRMATION AND AFFECTIVE MODE: SELF-AFFIRMATION AND SELF (RE-)CONSTRUCTION MODE, EMOTIONAL RELEASE AND ESCAPE FROM ROUTINES	209
“ I feel cheated... a false image of me is created ”	210
“ I want to see what I've accomplished... I feel like I've done something ”	212
“ I feel more comfortable taking this into my own hands ”	213
Creating and Evoking Affects with and through ST Technology	216
5.2.3 CARE ON THE WRONG TRACK: SELF-DOUBT, SELF-DECEPTION, AND SELF-DISTRACTION	221
“ Am I somehow not ok? ”	222
Self-Deception, Narcissism	225
Being in the Zone – Self-Distracted	227
5.2.4 MODE 2 SUMMARY – TECHNOLOGICALLY MEDIATED SELF-CARE: SELF-ATTENTION, SELF-CONFIRMATION, BODY-DIARY, AND MISGUIDED CARE	230
5.3 SELF-RELATIONS SUMMARY:	233
The Polar and Ambivalent Self-Relations of Control and Care	233
ST is Becoming an Integral Part of a Non-Completable Life-Maintenance Process	235
<u>6 MODES OF TECHNOLOGY-RELATIONS IN SELF-TRACKING / SELF-QUANTIFICATION</u>	<u>239</u>
6.1 TECHNOLOGY AS MEANS	239
6.1.1 ST AS MEANS TO MAINTAIN BUT ALSO TO ENHANCE THE SELF AND LIFE	239
“ These are values...that I can improve ”	241
“ My body...In the end, it's a machine ”	245
“ What I am doing here is sharpening my senses ”	248
“ If one could manage to intervene in these deep evolutionary mechanisms... ”	252
6.1.2 REVISITING SELF-OPTIMIZATION AS SELF-ENHANCEMENT BETWEEN SELF-CONTROL AND SELF-CARE	254
Self-Enhancement Potentialities - Generating Sixth Senses, Producing Datasenses	255
Self-Enhancement Perils – Reductionism, the Question of Authenticity	258
6.2 TECHNOLOGY AS COUNTERPART	262

6.2.1 INTIMATE RELATIONSHIPS AND PERSONIFICATION OF ST DEVICES	262
“He learns by watching what you pay attention to”	262
“As long as my watch is here, he will notice everything”	263
“Like a nanny saying, ‘Hey, watch out!’”	266
When technology support is missing	269
6.2.2 RETHINKING THE HUMAN - TECHNOLOGY RELATION AS COEVOLUTION	272
6.3 TECHNOLOGY AS PROMISE	275
6.3.1 ST TECHNOLOGY AS PROMISE OF SALVATION	275
“It is like a Heilsversprechen”	276
6.3.2 TECHNOLOGICAL MESSAGES - PROMISES IN MARKETING COMMUNICATION OF ST DEVICES	279
6.3.3 REVISITING MOTIVATIONS AS ANSWERS TO AND REFLECTIONS OF PROMISES – OVERCOMING ONESELF AND TREASURE HUNTING	281
6.3.4 RECONCEIVING PERFORMATIVITY OF TECHNOLOGY AND DATA IN TRACKING THE SELF	283
6.4 SUMMARY – TECHNOLOGY RELATIONS IN ST	288
New Conditions for New Selves?	289
7 CONCLUSION	291
<hr/>	
PART IV	297
<hr/>	
REFERENCES	297
<hr/>	
APPENDICES	VII
<hr/>	
LIST OF ABBREVIATIONS	VII
LIST OF FIGURES	VII
LIST OF TABLES	VIII
<hr/>	
ACKNOWLEDGMENTS	VIII

Introduction

'You are your data' is something one can read in quite a few places. I would rather say: We are with our data. From the moment of birth, we are measured. The doctor measures our height, weight, head circumference, time, and location of birth. Through these data we are identified, they belong to us like a second skin. It is checked if our development as babies and children is in the normal range. When we grow up, these measurements are continued by medical professionals or our parents (as when we mark our height on a door frame). This attaches sentimental aspects to recording the child's growth and keeping it in the family archive. Later, as a preventive measure or part of medical treatment, other body values, such as blood, heart, lung, and movement values, are added to our self-measurement; school grades, credit points, and google scholar metrics determine our performance. They help to check whether these values are within the normal range and the body therefore in balance, help to observe the healing process and show us by grading where we stand on a scale from best to worst performance. Digital tracking as the tracking of our movements on the web has been known to us for a long time and promises us a personalized user experience adapted to our interests and needs. For the providers, the collected data means an economically exploitable resource. These days, public health departments worldwide recommend tracking our movements and social contacts using a corona-tracking app for the good of our health, i.e., to protect ourselves and our contacts from infection. This should enable us and health departments to better monitor infection trends (places or people) and help uncover chains of infection. Meanwhile, in China, the Social Credit System is turning measurement and monitoring by metrics from feet on its head.

Self-tracking (ST) is now a form of measuring, monitoring, and recording that is practiced by oneself, voluntarily (to an indeterminable degree). If practiced, then regularly and in a particular, intimate kind of way, i.e., shared only with the app or gadget and not with family or friends. Thereby the self-tracked personal data stored predominantly in clouds is exposed to the same dangers of exploitation as digital tracking on the web. If we were to continue the history of human measurement outlined above, ST would contribute to our identification, provide orientation to actual and target values, monitor progress toward a self-selected goal, and document recorded accomplishments.

What other meanings and meaning surpluses ST holds for individuals – actors and agents of their own lives – is explored in this work. How does the application of a technology

so close to oneself change and shape the relations to oneself, as well as to the applied technology? What is the role of the tracking app/device, the analyzing and recommending algorithms, and the data that is presented and reflected back to us? Sociological literature in the ST field first addressed the perils posed by a self-optimization it saw manifested in ST. ST is diagnosed as a further instance of a neoliberally imposed world of thinking and living, in which individuals submit to voluntary performance- and competitiveness-increasing self-optimization, and what was once a collective responsibility they now – abandoned to their own devices – take over themselves. The prioritization of numbers and data over emotions and intuition also harbors the (as yet little researched) danger of increasingly outsourcing the given self-responsibility to technology and of following algorithmically generated recommendations for action rather than one's own inner sensations – which are often seen as fleeting and deceptive, especially in ST. Research has begun to focus on the user and his or her autonomy and agency and considered a co-development with the technology. These are attempts to take a more nuanced approach to the popularity of ST applications (measured by sales figures and public interest) and to elaborate autonomous development implications for the user.

In this work, the actor perspective (the self in ST) is consistently applied without quidem rejecting the critical socio-cultural concerns. The attractiveness as well as the criticisms of ST technologies outlined above are addressed with a relational notion of subject or self that strives to discover its own creative potential and to affirm its own life forces, and to maintain them as if they were a valuable asset. Based on this study's ethnographical and auto-ethnographical material, a particular gestalt, a duality of self-control and self-care exerted with and existent in ST, could be revealed. I argue that the complex dynamic between self-control and self-care pursues a state of balanced life maintenance, where control and care are two sides of one coin and geared towards diminishing tenses of daily decision making. However, the self-responsibility assumed for this is divided in certain parts between the device and the user in ST. This is due to the performativity of the technology, i.e., the exertion of a certain power of persuasion on the users on the one hand, and also the promises with which these technologies are equipped. And it is facilitated by a more intimate, partially humanized relationship with the technology, whereby its measurement results (the data), the device, and the ST-users (with all implicit sensations, intuition, and experiences) build a life-maintenance-sensorium. Self-data and one's own sensations merge to form an assemblage that, analogous to Floridi's (2015) phrase "onlife", becomes a 'life-sensing' – that is neither entirely numerical nor only physical – and that provides information, orientation, and confirmation in the daily decision jungle. The assistance of

the ST technologies took, beyond its obvious usage as tools to self-measure and self-observe, a particular meaning. The relation to ST technology gained very intimate characteristics through exclusive sharing of data, personalized recommendations, and an anthropomorphized address, suggesting ST tech as a counterpart and in some cases as a promise of salvation. The work is structured as follows.

In Part I, Chapter 1, the terms used in the context of self-tracking and quantified self are firstly explained and distinguished from lifelogging, personal informatics, and biohacking to define the field of investigation (1.1). The next section gives a brief overview of the history of (technologically aided and unaided) self-tracking and self-monitoring and contextualizes it to self-thematization and self-experimentation (1.2) that are both important factors in self-tracking. Finally, the ST assemblage consisting of technology, practice, and the user is briefly introduced (1.3) to clarify and explain the terms used in this field.

In Part II, the second chapter engages with the existing literature in the ST field to acknowledge already known results and to point out what is still little explored. First, I describe and analyze the dominant discourse in the press and online media and the metaphor of self-(imposed-)optimization in self-tracking (2.1). This is followed by the academic treatment of the ST phenomenon based on three identified dominant strands in the critical treatment of the topic (2.2) and empirical-ethnographic research on ST consolidated into three themes (2.3). The critical literature (2.2) expresses concerns, especially about neoliberally induced self-exploitation and shifts from collective responsibility to individual responsibility. An expansion in self-data utilized by third parties for surveillance and economic exploitation, as well as the overvaluation of numbers and misconceived objectivity, point to many dangers to which individuals are increasingly exposed in technologized and datafied societies. Empirical studies (2.3) offer first classifications and typologies of users, motives, and usage procedures and furthermore reveal first interesting implications, e.g., emotionality in ST. The last chapter in this literature section is dedicated to the self in self-tracking, which this work focuses on in more extensive detail (2.4). In order to clarify the terminology of the addressed self in ST, some distinct disciplinary paradigms about the "self", such as the social self, the performed self or the no-self, are briefly outlined. Finally, the utilization of "self-relations" in distinction to the "subject" and by considering the notion of "technologies of the self" (Foucault, 1988) is elaborated.

Chapter 3 presents the research design with the research questions and the contribution this study attempts to make to the existing discussion of ST and from a wider angle human-technology relations (3.1). Ethnography as a method is briefly reflected, the

field is described, and the analytical process explained (3.2, 3.3, 3.4). Although this dissertation argues strongly from the empirical material and aims to analyze and interpret it as open and unbiased as possible according to the ethnographic tradition, a theoretical framing to position this work in the academic discussion is summarily outlined in the end. The primary discussion/engagement with academic concepts takes place throughout the individual results chapters.

The results chapters are presented in PART III. They are structured according to the order in which the research questions were explored and addressed: Intentions (Chapter 4) to start with ST, technologically mediated or amplified self-relations (Chapter 5), and the technology-relations (further) developed in ST (Chapter 6).

Chapter 4 offers a classification of starting points, intentions, and motivations to begin ST that may be structured differently elsewhere in the ST literature but emerged from the study data in 4 categories. In this chapter, the people I spoke with, interviewed, and observed are presented in the form of vignettes. They are described in the most appropriate of the four categories, although these are not mutually exclusive, and it frequently happens for a person to be pursuing multiple intentions, such as 1 (curing a disease) and 3 (use tools to manage activities), for example.

Chapters 5 and 6 represent the central part of this study's findings, the explication of the technologically mediated, aided, and addressed relations to oneself (5) and to the applied technology (6) in ST. In both results chapters 5 and 6, the ethnographic and auto-ethnographic data are comprehensively presented in verbatim quotes with the interviewees' names in capital letters in order to be able to find certain passages or persons better. The data will be analyzed and discussed right there with the existing literature/theory.

Chapter 5 elaborates the gestalt of self-relations as they become observable in the ST. It demonstrates the complex intertwining or duality (later the term dialectical intertwining is proposed for this) of control (5.1) and care (5.2) towards oneself that emerge or become possible in and through the application of ST technologies. These two seemingly opposed yet concurrently existing self-relations reflect the dynamic between today's demands for self-responsibility (in health and performance terms) and the need for self-care and guidance for the many relevant, sometimes daily, decisions. They balance possibly existing tensions and ambiguities between the modes of self-relations that at first glance seem to be opposed and yet ultimately are jointly oriented towards the same goal, namely to master one's life (life maintenance) and to be in balance. The search for this balance, however, can also get out of control through the loss of data to third parties, through uncontrolled, compulsive

use, or the surrender of control to technology (5.1.3). Aiming at one's well-being guided and reflected by data can furthermore lead to self-harming or self-deceptive behavior (5.2.3), which makes the self-care practiced in this way appear doubtful. Both modes of self-relations, self-control and self-care, are summarized again at the end of each chapter (5.1.4 and 5.2.4).

The self-relations described in this thesis are supported, reinforced, or enabled by ST technology (and practice). Thus, Chapter 6 describes three different roles that ST technology can take in the context of self-controlling and self-caring. First, in a conventional sense, ST technology is intended as a tool, a means to an end. It is a tool for measuring and representing one's own data, and, especially in its function as a kind of compass and thermostat, it offers a tool to maintain and enhance oneself (6.1.).

However, our relationship with technology seems to intensify in and through the ST experience, in the sense that it takes on or is assigned a partner-like relationship with us. Thus, in chapter 6.2, the role of technology as a counterpart - a partner, trainer, coach, or nanny - is explained and discussed. The intimacy of this relationship is demonstrated by the exclusive sharing and "exchange" of data between the technology and the user, the user's reaction to personalized feedback from the ST app, and especially by the personalized way the tools are addressed using personal pronouns. The latter was practiced primarily by the female participants in this study and revealed through the descriptions and word choices a type of relationship that would otherwise be more expected between life partners or good friends. Particularly this anthropomorphizing and the next finding, have been addressed little to not at all in the ST literature to date. Finally, chapter 6.3 reveals an attitude towards technology, significantly often towards new technologies, which is not unknown in the philosophy of technology, as it was and is expressed, for example, towards AI. It is the approach to and addressing technology as a promise of salvation (Heilsversprechen). Mainly the participants of this study who approached this technology with physical, sometimes chronic complaints, can be found here with their expectations and hopes.

Finally, chapter 7 summarizes all results again, connects them to each other, and suggests further treatment of the found results and their further research in the field of human-technology relations and Science and Technology Studies. With the control-care duality, the scientific field is provided a model that expands the discussion about meaning, benefits, dangers, and corresponding ethical precautions in ST. I see ST as a tacit agreement between the user who does the work, the ST device that assists with measuring, and recording and the ST data, as a kind of a quantified selfie that confirms, reminds, and advises

the user regarding his or her goals. Revealing the new intimacy and familiarity placed on technology in ST provides ground for, first, scientific deepening of the topic and, second, in practice - tool design, health care, schools, universities, and workplaces - for the development of e-health programs or relevant precautions in their adaptation and implementation on a large scale. The perspective on ST as a technology of Heilsversprechen expands discussions around myths and magic of technology in the philosophy of technology and at the same time offers further input for possible ethical regulations, which in the technological field (as also in the field of AI), are increasingly requested as well as significantly necessary.

PART I

– SELF-TRACKING AS TECHNOLOGY AND PRACTICE

Technology is neither good nor bad; nor is it neutral, technology's interaction with the social ecology is such that technical developments frequently have environmental, social, and human consequences that go far beyond the immediate purposes of the technical devices and practices themselves (Kranzberg 1986, p. 545)

1 SELF-TRACKING IN SOCIETY AND CULTURE

Lupton (2016) estimates the number of self-tracking apps in app stores to be over 160,000. Statistics about the market volume of wearables worldwide estimated revenue of around \$26 billion with 172 million global shipments in 2018 (Statista, 2018). Gathering, assembling, and analyzing tracked user data on online platforms is a widespread practice for political and corporate consumer advertising activities since it has proven to result in profits. In the health sector no efforts are spared to advance marketable innovations for “measuring individual health metrics through self-tracking gadgets, clinical remote monitoring, wearable sensor patches, Wi-Fi scales, and a myriad of other biosensing applications” (Swan, 2012, p 2018). Swan estimated a \$21 billion market for constant remote patient monitoring in 2012, \$12 billion more than a year before.¹ Various professional areas, including healthcare, sports and recreation, academia and research, technology start-ups, media and marketing, and urban planning (see Nafus, 2014; Nafus and Sherman, 2014; OECD, 2013; Swan, 2012, 2013) participate in the construction of that billion-dollar market. For markets do not exist as stable formations, but rather reveal themselves in the very act of their making (e.g., Andrejevic, 2015; Araujo et al., 2008; Knorr, Cetina & Preda, 2007) – it is important to investigate the emerging attraction those self-tracking technologies exert

¹ The technology pundit reports about IT companies such as Qualcomm and Nokia, which designed high profile prizes for those developments. There is a “\$10 million Qualcomm Tricorder X Prize for the development of a handheld device to non-invasively monitor and diagnose health conditions in real-time, and the \$2.25 million Nokia X Challenge for sensor technology that can bring about new ways to monitor, access, and improve consumer health” (Swan, 2012, p. 2018).

on individuals. How do these self-tracking technologies affect the self² and what role do they play?

Discussions about the relation between humans, society and technology in various academic disciplines often reflect attempts to understand how social change is linked to technological development. Concepts of information society (Bell, 1973), control society (Deleuze, 1992), network society (Castells, 1996) or algorithmic society (Krzysztofek, 2007) all refer to a problematization of the technological development in reference to society and social change. Technologies are both the product of human creativity and productivity and “active” artifacts that in turn shape human perception, experience, and interrelations to a considerable amount. In that sense they are “determinative of human experience, though not deterministic” (Sharon, 2014, p. 79). Centering on human experience and acclimation in the datafied and digitized contexts discussion focuses on the relation between humans and technology and its onto-epistemological condition on the individual as the agent in society. Before looking more profound at these dimensions, an explication of terms used in this work is provided.

1.1 Brief Description and Explication of Terms

Self-tracking can be described initially as measuring and recording data about certain aspects of one's life. In the second step these data can get subjected to observation over time, including inspection, visualization, and analysis. Finally, a third step can derive decisions about consecutive actions from the data or the given (algorithmic) advice. The ST practice can comprise measuring and monitoring factors such as bodily states (blood pressure, blood glucose, or heart rate), emotional states (mood or experience of certain feelings like happiness), behavior (e.g., sleep, sex, food intake, posture, productivity, social contacts, smartphone usage) or performance (daily steps, running distances or number of exercises over a specific time period, brain exercise). “While some die-hards still use pen and paper, most self-tracking today is done using an electronic device” (Symantec, 2014). These different measurements are being recorded primarily in form of numbers, or sometimes manual text entries which are later available to multiple operations like archiving for later use, representation and visualization, time-series analysis, and interpretation as well as

² The term “self” will be problematized in the chapter 2.4 “The Self in Self-Tracking” below.

comparison and sharing with others – may this be voluntary, undeliberate, or even unwitting. As a result, a comparison of behavior or performance on an intrasubjective, intersubjective and interobjective basis (Latour, 1996) can yield behavior change and performance improvement (Kristensen & Ruckenstein, 2018).

However, self-tracking has been taken up under different terms in different disciplines. The first contextualization was to equate it with the Quantified Self (QS) movement / network / phenomenon, as it was differently referred to. Gary Wolf (2009) himself uses the notion of movement: “The excitement in the self-tracking movement right now comes not just from the lure of learning things from one’s own numbers but also from the promise of contributing to a new type of knowledge” (Wolf, 2009, para. 4). Most media reporting on self-tracking refers to the QS founding figures from the Bay Area, Kevin Kelly and Gary Wolf who were editors of the WIRED magazine – a techno-optimistic main media organ for computer and computer related developments with a strong interest in the so-called new economy³. They reportedly observed growing attention to tracking and monitoring values about oneself over a period of time, launched a website with the title “Quantified Self” and found a fitting and memorable caption to describe what they meant by it: “self-knowledge through numbers”. The attempt was to understand the individual regularities and make numbers based - often understood as evidence based – conclusions and decisions on the next actions to improve certain desired aspects in life. They started to conduct informal meetings (so-called QS meetups) with interested and practicing people in the Bay Area and organized the first conference for a broader audience there in May 2011 in Mountain View. The invitation was announced via the website as: “If you are an advanced user, designer, tech inventor, entrepreneur, journalist, scientist, or health professional, please join us for a weekend of collaboration and inspiration”⁴ In many other cities around the world similar meetups were being held and the number of groups devoted to the self-tracking phenomenon grew steadily. Currently (in May 2018) there are 130 quantified-self groups in 34 countries around the world, many of which hold regular show-and-tell presentations and discussions about the self-tracking projects among their members. In addition, the number of downloads of apps with ST functions (often in the area of health but also lifestyle) in both Apple and Google app stores was enormous – over 165,000 (Aitken & Lyle, 2015). According to Gartner Group, sales in the relative gadgets market of around \$60

³ For extensive accounts of the technology friendly culture and ethos in California and especially the Bay Area see for example: Barbrook and Cameron, 1996; Bardini 2000; Fred Turner 2006.

⁴ The former conference website <http://quantifiedself.com/conference/Mountain-View-2011/> last accessed on 5.9.2018 is no longer available.

billion in 2017, with an estimated increase in 40% of large health systems, will shift from digital health pilot programs to full-scale rollouts by the end of 2020, up from less than 5% in 2017. According to Statista (2018), more than 78% of US adults had used at least one fitness app in 2018. These numbers reveal a huge public interest in these technologies. Especially tools which allow for catching a glimpse on inner goings-on, like getting knowledge of one's sleep patterns, previously only accessible in sleep laboratories or watching one's heart rate and oxygen saturation over a prolonged period, previously only accessible at a physician or hospital, deliver insights not only to sick people but those just curious about themselves, too. On the example of self-tracking and the quantified self, one can observe a new interest in the self, which is no longer exerted in so called esoteric (which means understood only by the initiated) circles, understood as parts of the New Age movement, but increasingly in public and on a larger scale, and based on numeric data. The basic idea of gaining knowledge about oneself, reflecting on one's habits, or monitoring (ethical) behavior is not new, however. From the Epicureans to Augustinus, William James, Martin Heidegger and Michel Foucault there is much consideration on self-knowledge and the "care of the self" in science. The means of reflection were diaries and notes to reflect on the conduct of life (for example Marcus Aurelius' and Augustinus' confessions) to introspect and intensely contemplate personal experiences (e.g., William James' *The Varieties of Religious Experience* (1902);⁵ Michel Leris' *Phantom Africa* (1934)) or genealogic observations and reflections on the personal life (Foucault, 1988).

Life logging (also life-logging, lifelogging) is a second frequently used term in the context of self-tracking (e.g. Kelly, 2007; Selke 2016). Kelly (2007) had written about it initially in a blog article called "Lifelogging, An Inevitability" where he set the purpose of lifelogging as to "record and archive all information in one's life. This includes all text, all visual information, all audio, all media activity, as well as all biological data from sensors on one's body. The information would be archived for the benefit of the lifelogger and shared with others in various degrees as controlled by him/her" (Kelly, 2007, para 1). Lifelogging⁶ is thus an ideally lifelong activity primarily in order to enhance memory or to archive personal information for future use (Lupton, 2016a). It means passively capturing, recording, and archiving nearly all aspects of the personal life: location, activities, time usage, social

⁵ In "Principles of Psychology" (1890) James introduces the empirical method to psychology as both experimental and phenomenological.

⁶ For an extensive explanation, description and analysis of the life logging phenomenon see e.g.: Selke 2014, Rooksby 2014, Selke 2016, Duttweiler et al. 2016

encounters, visual and auditive perceptions, and, if applicable, bodily values and other data from self-tracking projects, using wearable devices equipped with sensors and cameras.

Additional terms, like personal analytics, introduced by Stephen Wolfram (2012), or personal informatics (PI) a term often used in the human-computer interaction (HCI) area, also used to refer to the interest in and activity of measuring and analyzing personal data. The definition of PI corresponds with the claim of the QS movement “self-knowledge through numbers” and encompasses tools and activities “where people collect and reflect on personal data to gain a better understanding of their own behavior” (Li et al., 2011) and to change behaviors, habits or thoughts for the better (Choe et al., 2014; Li et al., 2010; Ruckenstein, 2014). Other terms, such as personal health and digital health, focus more specifically on tracking health variables and autonomously improving conditions (bodily or mental) based on the collected personal data.

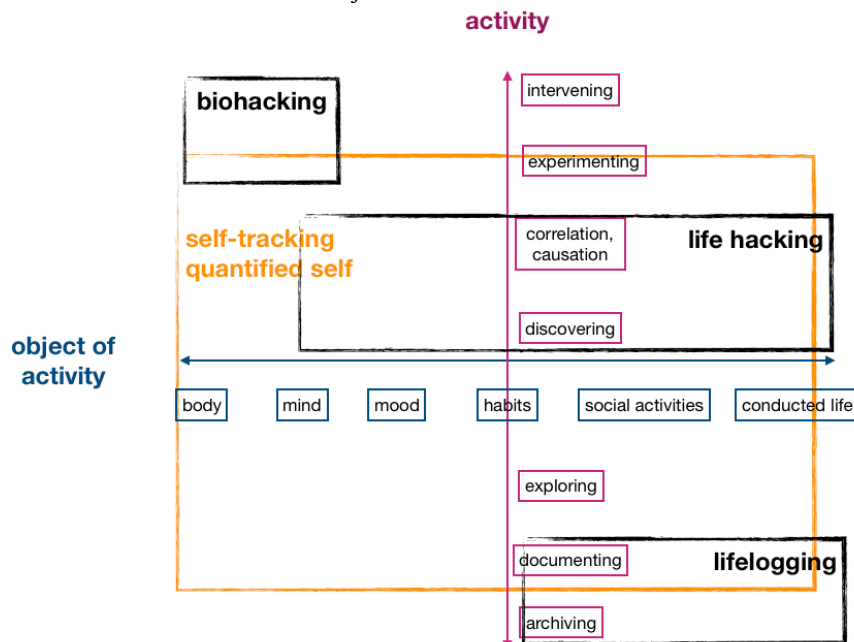
Another term used for projects that apply and experiment with technology on or in one’s body and biology at a more intervening level: biohacking. It involves biochemical and biotechnological self-exerted operations. Biohacking is often understood in terms of hacker ethics or punk attitude in the sense of Do-it-yourself enhancement operations on oneself that often do not correspond to the usual and mass compliant understanding of the body, its parts, and capabilities. Magnets, sensors, or chips are implanted under the skin or on top of fingers or arms. For example, the artist Stelarc was one of the first who, in a drastic experiment, implanted an ear on his forearm. The idea was not to get a third ear with which he could listen even more but to allow external audiences in other places to “remotely access the ear and remotely listen in to what the ear is hearing...so we’ve sort of replicated a bodily structure, we’ve relocated it to the arm and now we’re sort of rewiring it for additional capabilities. So one can imagine that body’ is becoming increasingly accessible as portals on the internet”, he explains (Science, Technology & the Future, 2012, 05:15–06:21). He was describing the idea of distributed agency and an experience of the world that is not restricted to a body in a particular location. Biohacking can therefore be found in the same category of technology implementation on oneself but focusing on the body, biology, neurology, and DNA and a much higher degree of intervention than with self-tracking, QS, lifelogging, or life hacking⁷. The different terms can be represented in a coordinate system by the objects of investigation, starting with the concrete material unit of the body, through brain and

⁷ Life hacking is widely understood as generating ideas and sharing advice on different small challenges, shortcuts or time saving methods in everyday life, such as how to wind up cables so that they do not get tangled, how to establish a morning routine in the shortest possible time or how to fold t-shirts so they do not need to be ironed after a trip.

thoughts, feelings, and habits up to social orientation and life as such on the one axis, and the exerted activities from descriptive to intervening on the other.

Figure 1

Matrix of ST related terms in relation to activities - sorted along the degree of intervention in oneself – and objects of the activities



Note: own representation

In sum, self-tracking can be seen as an umbrella term for technologies and practices of monitoring, measuring, recording, and experimenting with a broad range of self-related values. Quantified self is, to some extent, a synonym but is more related to the group and network of people who, besides tracking as such, meet in QS-groups and conferences and share their results and ideas. These ideas may include business and engineering ideas for yet unfulfilled needs as well as shortcomings noticed on the product side. Lifelogging relates more to gathering and archiving data over the course of one's life, which entails a larger size or amount of data. Life hacking, however, basically relates to tips and advice about everyday life challenges. Finally, biohacking could be seen as a continuation of the close engagement with one's bodily and mental patterns in order to experiment and intervene in these areas at a deeper level, including implants, surgeries, enhancement medication pills and the like.

1.2 History of Self-Tracking and Self-Observation

Self-tracking firstly involves three forms of self-related activities: reflection, self-archiving, and self-experimentation, which have long been practiced, with the private diary becoming popular in the late 18th- century (Lupton, 2014a; Neff & Nafus, 2016; Rettberg, 2014). To exemplify the nature of systematic self-observation (with or without designated digital tools) these three factors will be briefly described in this chapter.

1.2.1 Reflective Writing, Self-Examination, and other Forms of Self-Thematizations as early Antecedents of ST

Thinking about oneself, exploring inner values as well as guiding oneself through life has always also been a matter of the media technology used, writes Fröhlich (2018). To express what one thinks or values, is always linked to the used medium differently, whether it is a letter, a diary, a table with bodily values, a box with artifacts or an accumulated list of the runs accomplished in a month. As one of the central “media of self-exploration in modernity” (Schroer, 2006, pp. 51-52), the diary is a form self-thematization that became an integral part of today’s life (Burkart, 2004; Fröhlich, 2018; Unternährer, 2016). Former types of diaries were driven by ethical considerations about the personal conduct of life and comprised reflective and confessional writings. They were known as Hypomnema⁸ and were used for self-observation and introspection, and also as memory support and guidelines for a good ethical life (Foucault, 2005). For example, the 18th-century statesman and one of the founding figures of the United States, Benjamin Franklin, the mid-twentieth century inventor and entrepreneur, Buckminster Fuller⁹, or 20th-century artist Andy Warhol¹⁰ collected their thoughts and reflections, health related metrics and everyday objects (such

⁸ See Marc Aurel’s *Meditations*, Augustinus’ *Confessions*, or Jean Jacques Rousseau’s *Confessions* as prominent examples of self-examination in personal hypomnematas.

⁹ The whole archive of Fuller’s manuscripts, drawings and audio-visual materials relating to his career as an architect, mathematician, inventor and social critic, called Dymaxion Chronofile, is accessible at the Stanford University Library, see: https://oac.cdlib.org/findaid/ark:/13030/tf109n9832/entire_text/

¹⁰ Andy Warhol’s experiment with *Time Capsules*: a collection of 612 cardboard boxes containing all sorts of personal items which he systematically filed, sealed and stored for over a decade until his death in 1987. This collection takes up approximately 2,500 square meters and currently resides at The Andy Warhol Museum, Pittsburgh: <http://www.warhol.org/collection/archives/>. It is also possible to explore the content of one of the boxes online through an interactive application on the museum’s website.

as entry tickets) in various written forms, such as journals, tables, or boxes. For example, Franklin proceeded with a regular self-examination¹¹ to achieve moral perfection and live without committing any fault at any time (Passig, 2012; Rettberg, 2014). For this, he established a catalog of 13 moral virtues (e.g., frugality, sincerity, or moderation) and examined every day whether he had violated any of them. He was one of the first who used a table for his notes instead of a usual text form for a diary. In Germany, the wider public was encouraged to write diaries about their goals and needs and keep track of progress while not omitting mood, happiness, and health by psychologist and economist Gustav Grosmann in his book “Sich selbst rationalisieren. Lebenserfolg ist erlernbar” (1927) (How to rationalize oneself. Success in life can be learned), which is still available, currently as a 28th edition (Friedrichs, 2013). A case of extensive numerical everyday documentation was described by Szczygiel, (2006) and titled “Reality”. He reported on the Polish housewife Janina Turek who counted and documented her encounters, people seen in passing, media consumption, phone calls, gifts received (a tangerine had the same quantitative value as a 12-piece porcelain service), visits to the theater, how often and to whom she said “hello”, and much more for 57 years in 728 notebooks and 71412 entries. Only during the last years, did she include occasional short notes on her feelings or thoughts on postcards she never sent.

The definition of a person’s identity is composed of a plethora of feelings, beliefs, and actions and may change throughout life. Certain aspects can be chosen and highlighted, others forgotten or omitted – and expressed in different media, whether for oneself or for others. Alois Hahn’s (1987, p. 11) concept of a “biographical generator” exemplifies these selective procedures in psychoanalysis and confession as forms of self-thematization. “Analogous to the function of mass media to enable society to observe itself (Luhmann, 1996), media artifacts thus enable subjective self-observation” concludes similar Fröhlich (2018, p. 45). As a consequence, media can elicit self-thematization through their affordance (Gibson, 1977), which means through the ways they suggest their use. Accordingly, appropriate (and emerging) technologies can stimulate further self-related activities, such as archiving, self-exploration and scientific like self-experimentation, as will be briefly illustrated below.

¹¹ Franklin’s autobiography is accessible online:
<http://www.ushistory.org/franklin/autobiography/page38.htm>

1.2.2 Lifelogging and the Digital Archiving of Personal Artifacts

Documentation and archiving have been both cultural techniques and support for the progress of scientific knowledge. Documentation can take different forms (e.g., photos, documents, spoken or written artifacts, an animal, a stone) and be stored in different technical possibilities (e.g., in a book, film, box). Wearable devices, capable of recording data automatically, and with huge storage capacities, build a new category of archiving regarding the accuracy, abundance, and frequency of stored data. In this sense, self-tracking could be subsumed under a practice of scientific documentation or home archiving¹² of cherished or sentimental personal time series data. Training progress, body values when trying to achieve a goal, such as to heal from an illness or to lose weight, retention of success experiences, such as learning meditation, or regular practice of a musical instrument, can be stored in abundance and, in principle for an infinite amount of time. The first attempts at a comprehensive recording of daily life were made in the 1980s, when Steve Mann, a Canadian computer scientist and inventor¹³, began experimenting with wearable computers to record his daily activities. From 1993 he broadcasted a continuous live feed of his webcam (which he wore around his neck) recordings, sharing a lot of details of his personal life. Mann suggested the Veillance Theory and coined the word “Sousveillance” as the opposite to surveillance by cameras installed on buildings by companies and governmental agencies (Mann et al., 2003; Monahan, 2006). “Not only will authorities and shops be watching us and recording our comings and goings (surveillance as we know it today), but we will also be watching and recording them (sousveillance) through small wearable computers like Digital Eye Glass. This affects secrecy, not just privacy” (Mann, 2012, para. 2). Researchers and artists Rob Spence and Hasan Elahi used this digital exhibitionism too with their total transparency projects, bringing attention to Sousveillance’s protection-giving possibilities (Selke, 2016). Lifelogging in the sense of sousveillance could be applied for legal protection

¹² Most people archive meaningful artifacts of their life, be it physical, like letters, a diploma, gifts, entry tickets etc. or digital, like vacation photos, videos from events, emails or working documents as a sign of achievement - see Kirk & Selen, 2010.

¹³ In the 1990s Mann founded the Wearable Computing project at the MIT media lab; in 1999, he designed a digital eye glass of sorts, an early computer vision system to improve people’s optic capabilities, and an antecedent of Google glass. He also invented other useful digital helpers in the HCI area, for example a natural user interface, using touches, swipes or speech for the interaction with the computer. Mann is now one of the founders of InteraXon, that invented a consumer EEG-headband to measure brain activity while meditating (Muse), which was used in the autoethnographical part of this study.

for people subjected to surveillance or in community-based reporting¹⁴ from the first-person perspective on topics of concern, such as the local traffic situation, and pollution for example.

A project to create an e-memory, a complete digital record of sorts of a person's life, was conducted from 1998 for 20 years by the Microsoft engineers Gordon Bell¹⁵ and Jim Gemmell. Biometrics, work habits, computer activities, leisure habits, emotional response patterns in various situations, and many other things one cares to know about oneself should be "chronicled, condensed, cross-correlated and plotted out in useful and illuminating ways" (Bell & Gemmell, 2010, p.6). In 2006, the project was expanded with a camera input that captured visual (1000 - 2000 photos a day) and auditive data in real time, as well as applications for health and wellness.¹⁶ "Few aspire to be remembered along with history's great characters, but by recording your life digitally you have the opportunity to bequeath your own ideas, deeds, and personality to posterity in a way never before possible. With such a body of information it will be possible to generate a virtual you even after your death" (Bell & Gemmell, 2010, p. 6). MylifeBits, the corresponding Microsoft's project that has been running since 2001, seeks to fulfill Vannevar Bush's Memex vision in his seminal "As we may think" from 1945. Bush, like other technology pioneers of his time (e.g., Norbert Wiener, John von Neuman, Doug Engelbart or Gregory Bateson)¹⁷ believed in the isomorphism of the human brain structure and the structure of computer technology functions and thus in the enhancement of human memory by computer technology. Bush's memory augmentation idea inspired, for example, Mark Carranza in the 1980s to do a thinking diary project for which he has logged more than 1 million ideas since 1984 in a connected and easily accessible manner, and where tool and user have become inextricably linked in the process of co-creating reality as Swan (2012) reported.

¹⁴ On community reporting in terms of citizen science, environmental activism initiatives and citizen sensing see Gabrys (2014).

¹⁵ Bell comments on this project: "As usual, I was being pragmatic and looking for things to make my own life better" in their book "Your Life Uploaded", earlier called "Total Recall" (2010, p. 50). He started with digitizing his own books and articles for the company's digital library project and became very attracted to the idea of digitizing everything, which in his life meant songs, health reports, movies, conversations, diplomas, warranties, purchase orders, greeting cards, childhood drawings, stock certificates and the like.

¹⁶ For examples for self-tracking people who developed apps and tools themselves, see Robin Barooah - <http://www.sublime.org> - meditation tools, mindful browsing; Nell Watson - 3D scan of the body to keep a record of weight, girth, etc. <http://www.poikos.com/mision/>; Stan James - LifeSlice that captures a screenshot and a foto of the computer user every few minutes - <http://wanderingstan.github.io/Lifeslice/>.

¹⁷ For a seminal documentation of the mindset of this time see the documentations of the Macy conferences that took place between 1941-1960 see Pias & von Foerster (2003).

1.2.3 Self-Experimentation in Scientific and Medical Environments

Today, it is not unusual to have formerly exclusive medical equipment,¹⁸ such as scales, thermometers, glucose meters, and blood pressure monitors, at home. The attempt to discover own regularities with a scientific-like approach has a long history as well. One of the earliest examples of experimental self-measurement is physician Sanctorius of Padua, who in the 16th century, studied energy expenditure in living organisms by tracking his own weight before and after meals, and his food ingestion and excrements, for 30 years (Neuringer, 1981). In the QS community, Neuringer (1981) is celebrated for his comprehensive collection of peculiar self-experiments that substantiate his argument for a scientific recognition of self-experimentation. Especially in medicine there is a long history of self-experimentation with some of them resulting in significant discoveries, and some in involuntary suicide. For example, in 1805, Friedrich Sertürner, after isolating morphine from opium, the dried latex obtained from the opium poppy, swallowed a large dose and made the significant observation that his toothache was relieved. In 1786, John Hunter, attempting to determine whether syphilis and gonorrhoea were one and the same disease, injected his penis with matter obtained from the penis of one of his patients¹⁹. In the area of experimental psychology, Edwin Boring, who is widely known for the so called Boring-figures with ambiguous meanings, the figure-ground-phenomena,²⁰ placed feeding tubes into his mouth, stomach or anus and reported on the sensations caused by different temperatures or electric shocks. And Hermann Ebbinghaus (1885, 1913) studied his own memory in an exhaustive series of experiments lasting more than two years which led to the discovery and still valid description of the learning curve, the forgetting curve, and the spacing effect. Experiments with one's own pain sensation, with the use of drugs such as

¹⁸ Philipp Felsch (2007) traces the history of graphical methods in the laboratory. For example, Hermann von Helmholtz's invention of the Myograph to study the velocity and power of muscle contraction. The obtained graphics are then called myogram. In 1854, Karl Vierordt invented the Sphygmograph used to study blood pressure without taking a blood sample. Étienne-Jules Marey's Pneumograph was invented to measure velocity and force of respiration in chest movements. These instruments as well as other newly invented measuring techniques such as the Kymograph allowed for the representation of bodily functions in curves and trend lines and as such become interpretable – in some form also for non-professionals.

¹⁹ He believed to have proven his theory in the self-experiment but overlooked that his patient suffered from both diseases at the same time. The theory was not disproven until 51 years later by French physician Philippe Ricord.

²⁰ One of the most well-known Boring figures is an illustration showing either a young woman looking back behind her right shoulder or an old woman with a big nose inside profile interpenetrating one another with no formal dividing sign. This illustration was published by Boring in 1930 but has its origins with British cartoonist William Ely Hill, published 1915 in a humor magazine.

LSD or cocaine, the insertion of a catheter through one's own arm to the heart, or the one with yellow fever, in which the researcher unfortunately died, all contributed to scientific knowledge.

However, self-experiments raise questions about valid knowledge production, as do claims of ST-based knowledge gain. (Swan, 2012). On the one hand, self-experiments may be set up more realistically than laboratory settings with biased cohorts (such as students), and they facilitate longitudinal examination rather than frequently time-limited lab-based surveys. On the other hand, since the experimenter is both the research object and analyst of the obtained data, they can only be insufficiently able to remove their prejudices (bias). However, accusations of biases should be rethought carefully because knowledge in the sense of scientific paradigms is not only an effect of more evidence but also a justified (or changed) belief and the effect of scientific practice, which in turn is a workaday translation of scientific rules and methods and not just their pure application (Latour & Woolgar, 1979). As evidenced by a review of QS show-and-tell videos and in-person conversations at QS Meetups and conferences, most Quantified-Selfers (QSers) along with the self-trackers (STers) in the present study are convinced of the knowledge gained for themselves through self-tracking and self-experimentation, and advocate sharing insights from individual cases for the benefit of others (or everyone).

1.3 The ST-Assemblage: Technology, Practice and Self

Self-tracking unfolds in a triad of the digital technologies used, the practice exerted and the self as a subject-object duality with regards to the double existence of the user who is measured, observed, and analyzed and is the one who observes and analyzes. This entanglement could be referred to as an assemblage (Deleuze & Guattari²¹, 1987) to capture the compound of human and non-human factors, whose body does not stay stable but is in a dynamic and continuous process of adaptation. Other authors in the ST field used the term

²¹ In the past "assemblage" was used predominantly in a socio-material-exteriority-related context inspired by Deleuze & Guattari (1987), whereby interiority is what is going on in the mind of your character: thoughts, memories, ideas, daydreams. Interiority is what is "inside" versus what is external, with exteriority meaning: action, gesture, setting, description. Deleuze and Guattari's formulation of the term implies not only accumulation as such, but also fluidity and interchangeability of their entities, which then determine their common connectivity. However, they both spoke of "Agencement" in the original, which only through translation has become assemblage, a term that both authors hardly used.

likewise (e.g., Lupton, 2013; Ruckenstein & Schüll, 2017) to refer to the variety of engaged objects, their materiality, human stakeholders, and their interests that compose ST. The meaningful and versatile connection between people, bodies and artifacts is a recurring theme across anthropological and ethnographic accounts (Appadurai, 1986; Miller, 1987), ranging from art (Gell, 1998) and agency (Strathern, 1999) to material culture (Bennett, 2004; Haraway, 1988). “The person is not isomorphic with the spatio-temporal coordinates of the body, on this view, but is effectively made up of ‘a spread of biographical events and memories of events, and a dispersed category of material objects, traces, and leavings, which can be attributed to a person and which, in aggregate, testify to agency’” (Gell, 1998, p. 222 as cited in Viseu & Suchman, 2010, p. 161). Not least with the emergence of computer technology practical / further ideas for a symbiosis of human and computer (Licklider, 1960) emerged. With this in mind, this work examines the self in self-tracking, not primarily in a psychodynamic sense, but primarily illuminated in its interaction with and implications for technology and practice.

1.3.1 The ST Technology: Devices, Sensors, Algorithms and Apps

The integration of formerly professional medical measurement technologies into the home practice can be easily understood with the help of the scale (Crawford et. al., 2015). Over the years the meaning and location of the scale shifted from a medical device at the doctor’s office, to a public space (the streets) and then to homes, where the scale became part of domestic features and habits. The devices ostensibly convey the imagination of control and easier and better achievement of goals as they “become the substitute for diet and exercise, transforming the body through a daily interaction with data about the body”, Crawford et. al. argue (2015, p. 490). Given the popularity (as indicated by the above-mentioned sales figures) of fitness trackers, it can be anticipated that they, like thermometers, glucose meters, and blood pressure monitors, will be used frequently or even daily in the private sphere (and probably also in schools and corporations).

The fitness-tracker as a step meter is the prototype and example of a ST technology. Ajana (2017) hints that the first vision of a pedometer can be ascribed to Leonardo da Vinci’s sketch of a wheeled device designed to count the daily steps taken by marching Roman soldiers. The first mechanical pedometer was created by Swiss watchmaker Abraham-Louis

Perrelet in 1780 and could measure steps and distance while walking (MacManus, 2015). He derived his idea from having originally used movement to wind a watch that could then run for eight days, MacManus reports. One of the first consumer-level pedometers with the included recommendation of getting in 10,000 steps daily was the Manpo-kei, released in 1965 by Japanese watch manufacturer Yamasa Tokei.

The Manpo-kei was built upon research by Yoshiro Hatano in the 1960s who observed that Japanese people were walking, on average, between 3,500 and 5,000 steps a day and were becoming obese. He thus defined the 10,000 steps metric, which could burn up to 20% of daily calorie intake, even though it has not been proven whether 10,000 steps are

Figure 2

Manpo-kei advertisement in 1965 in Japan



Note: Source: <http://10kstepsdaily.com/10000-steps-history-dr-yoshiro-hatano/>, reproduced with permission

appropriate for everyone²². The Japanese word for the device, “Manpo-kei”, translates to “10,000 steps measure” and there have been speculations whether the 10,000 step myth was born out of the Japanese sign, the Kanji, for the number 10,000 (万) - which looks like a little man walking. The early pedometers became very popular in Japan, every family got

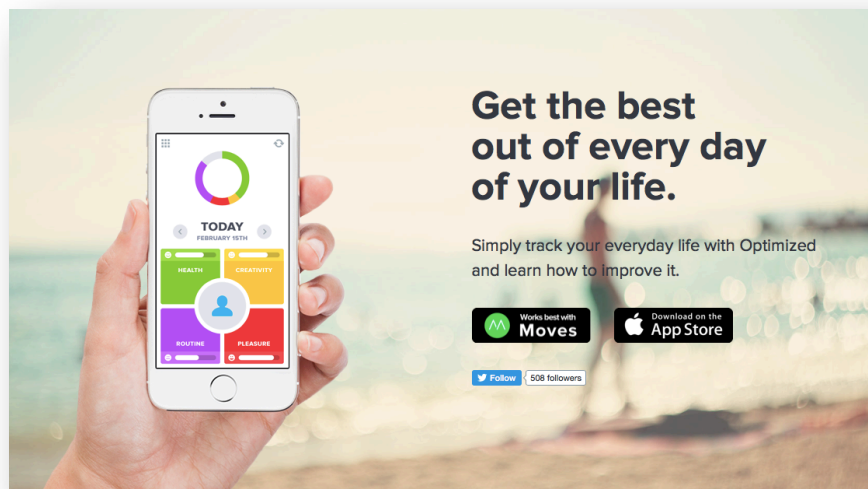
²² “10,000 steps equate to approximately 300 to 400 kcal per day (depending on speed and body size). Now of course over achievers are going to blow by the 10,000 mark and set goals of 15,000 or more” (Crandall, 2015, para 4). Nevertheless, as Tudor-Locke et al. report (2008, 2011), Hitano continues to research evidence-based indices for the steps-per-day advice and examines appropriate measures for different groups of the population, like children or the elderly.

at least 3 of them. Many organizations such as the World Health Organization (WHO), US Center for Disease Control (CDC), American Heart Foundation or the US Department of Health and Human Services, as well as device providers like Strava, Whittings, or Fitbit also recommend a daily activity of 10,000 steps.

The current advances in sensor technology and its miniaturization have facilitated technology-based data collection for the general public. The ubiquitous use of connected mobile devices (according to Statista (2020) there are over 3,5 billion people using smartphones worldwide), improved human biometric sensors, a growing range of online platforms, digital devices and services specifically designed for monitoring and tracking purposes, and enhanced online data storage solutions became more accessible to the general public (e.g., Li, 2010; Wolf, 2009). ST devices promise a better, healthier, and happier life through convenient measurement, accessibility, and data storage.

Figure 3

Example of the ST app 'Optimized' and slogan



Source: Website screenshot <http://optimized-app.com>

Mobile sensor technology built into most smartphones today is capable of capturing various indices that can be attributed to a person's location or movement, as well as their physical or mental state. Hagen (2017) compiled a list of 19 environment sensors included in a generic smartphone today, from one of the first sensors built into the iPhone in 2007, the "proximity sensor" and the "attitude sensor" to detect in which position the smartphone is held: vertical, overhead and the like, to sensors relevant for self-tracking purposes such as gyroscopes for orientation and guidance systems, accelerometers that detect rapid changes in the position of the device, altimeters for the measurement of atmospheric

pressure and deduction of the altitude position, and GPS (global positioning sensors) that provide spatial location and allow to roughly and immediately quantify movements. They were followed by more sense-like sensors, like humidity, temperature and moisture sensors, fingerprint sensors and much more which, combined with the timer-chip, detects speed, heart rate and other quantities pertinent to self-tracking. These sensors play a significant part in the ST-assemblage and can be considered a supplementary or enhancing nervous system capable of providing useful, if not vital, information and orientation. This idea will be discussed by looking at the concept of a *datasense*, used by scholars (Hansen, 2015; Hong, 2016; Lupton, 2016; Schüll, 2016) against the backdrop of this study's findings in chapter 6.1, which addresses the relationship to technology as a means to self-enhance.

Most ST apps provide data visualization in curves and trajectories, that represent past courses, support recognizing patterns of causalities and interrelations in bodily responses to treatments, in physical behavior, emotional reactions, or certain environments and spot future trends (Ruckenstein, 2014). Additionally, they analyze the data and often give feedback with respect to the given goal or the measured value through algorithms. Algorithms calculate in the background and deliver comparisons to the norm or the target value. They provide forecasts of the estimated weight, if current eating habits are maintained, advise on time to fall asleep, or remind of the next training session. To some extent the embedded algorithms seem to replace individual experts and the economic advantage of a comparatively affordable ST device over often expensive expert advice may have contributed to the popularity and acceptance of the devices. However, they have been developed by software developers who have incorporated their own value systems and world views, as well as ideas about the problem to be solved and the added values into the algorithms (Akrich, 1997; Beer, 2009; see also Cheney-Lippold, 2011; Hogle, 2016; Striphas, 2015). "If most of the choices made by designers take the form of decisions about what should be delegated to whom or what, this means that technical objects contain and produce a specific geography of responsibilities, or more generally, of cause" (Akrich, 1997, p. 207). The users' autonomy is threatened, for they are increasingly tempted or even encouraged to delegate certain life choices and decisions to the algorithms (Mittelstadt et al., 2016; Ruckenstein & Schüll, 2017; Schüll, 2016). "More and more often, algorithms mediate social processes, business transactions, governmental decisions, and how we perceive, understand, and interact among ourselves and with the environment" state Mittelstadt and colleagues (2016, p.1) in their attempt to map and clarify the epistemic and normative kinds of concerns such as the generation of unreliable or uncertain knowledge or unfair outcomes by

algorithms²³. The trust placed in them raises questions about the individual's agency and the power through the algorithm (Beer, 2009; Lash, 2007). If and how this power to act is redistributed between the actors and the algorithms or devices is discussed against the backdrop of this study's findings in chapter 5.1. on the self-controlling relation.

1.3.2 The ST Practice: Objects of Measurement

Patients, athletes, and their coaches often observe and record physical functions and values. Detailed notes on training sessions, sleep or nutrition, health metrics, or emotional states are being collected on a daily basis to observe the progress of either the disease and healing or training performance in correlation to attendant circumstances. In self-tracking various objects of interest can be recorded, as Table 1 shows.

Table 1
Quantified Self Tracking Categories and Variables

ST CATEGORIES	ST VARIABLES
Physical Activities:	Miles, Steps, Calories, Repetitions, Sets, Mets (Metabolic Equivalents)
Diet:	Calories Consumed, Carbs, Fat, Protein, Specific Ingredients, Glycemic Index, Satiety, Portions, Supplement Doses, Tastiness, Cost, Location
Psychological States and Traits:	Mood, Happiness, Irritation, Emotions, Anxiety, Self-Esteem, Depression, Confidence
Mental and Cognitive States And Traits:	IQ, Alertness, Focus, Selective/Sustained/Divided Attention, Reaction, Memory, Verbal Fluency, Patience, Creativity, Reasoning, Psychomotor Vigilance
Environmental Variables:	Location, Architecture, Weather, Noise, Pollution, Clutter, Light, Season
Situational Variables:	Context, Situation, Gratification of Situation, Time Of Day, Day Of Week
Social Variables:	Influence, Trust, Charisma, Karma, Current Role/Status in The Group or Social Network

Source: K. Augemberg (2012).

²³ Galloway counters to this problem by emphasizing the “de-politicization of algorithms” and appeals (inter alia) for programs for “the creation and development of alternative, or ‘progressive’ algorithms” (Galloway, 2006a, p. 319).

There are plenty of further possibilities to measure and record self-data using smartphones, ST apps or online platforms, or wearables like wristbands, headbands, and rings. Data is being recorded automatically via sensors which can detect acceleration, distance, place, temperature, humidity, and heartbeat, or it has been entered manually, for example in the case of mood, persons met or ad hoc issues like allergic sneezes or headaches. For a lot of these purposes there is a plethora of commercial products available, but also medical prescriptions, self-build dashboards in programs like Excel, paper and pencil or sometimes also photographic documentation. A comprehensive overview may be found at GitHub (Markwk (alias), n.d.) as a so-called awesome list. This list of resources and tools for ST/QS comprises apps and online platforms (such as Runtastic for fitness or moodpanda for mood, Rescue Time for time usage), devices and wearables (such as Fitbit, Oura ring, or Spire breath tracker), data aggregators and dashboards (such as Gyroscope), research and analysis platforms (such as 23andMe or uBiome for genetic analyses), as well as articles, books and talks, research institutes and open-source projects around the topic QS and ST.

1.3.3 The ST Self: Subject-Expert and Object in Coexistence

One of the most striking aspects of the cultural innovation we encounter here is that this “small big data” is not being analyzed and interpreted by established authorities like physicians or other discipline’s experts, but the app’s algorithms that are apparently trusted and by the non-expert individual herself. This indicates a shift from tasks and responsibilities formerly performed professionally and politically by designated experts to the individual and self-performed tasks. For example, branding activities, i.e., building and marketing a brand, service or political figures and programs, while formerly being conducted through marketing and public relations agencies, are now being increasingly performed by individuals themselves for example as influencers or life coaches on Instagram, YouTube or via podcasts (Banet-Weiser, 2012). Intensive reporting, communication and public relations focused on themselves and their activities, the public selves invest time and money to establish themselves as a brand or expert with an individual profile, readapting an aura of long-term experience and expertise in their fields, be it as a fashion “expert”, a brand ambassador, a restaurant inspector, or recently rising personal, financial, fitness or business coaches. In both social media and the ST phenomenon, I argue

there is a more substantial interest in, if not to say a turn to, the single (preferably unique and authentic) person, the visible self, although performed differently.

The third part in the ST assemblage, the STers, perform a lot of duties themselves in their personal data mining process: they chose the values to monitor, analyze and interpret the data often supported by algorithms and consider next steps to take. Neuringer expresses exactly what most QSers think: “if experimental [...] [investigators] applied the scientific method to their own lives, they would learn more of importance to everyone, and assist more in the solution of problems [...] [whereby] the area of inquiry would be relevant to the experimenter’s ongoing life, the subject would be the experimenter, and the dependent variable some aspect of the experimenter’s behavior, overt or covert” (Neuringer, 1981, p. 79). He also encouraged undergraduate students in his university course to draft and conduct self-experiments, which, reading about it now, sound a lot like many of the ST projects reported and presented at QS meetups and conferences these days. For example, students sought to prove or deny correlations, such as the number of people smiling at a person when she wore contact lenses or when she wore glasses. Another experiment tried to find a correlation between the frequency of urination and stress levels, and the corresponding amount of water. Neuringer himself extensively examined whether his, perceived or attested by friends, creative production of interesting ideas, reading speed and comprehension of articles and solving math problems were better while sitting at his desk or shortly after moving. In most cases, he (subjectively) concluded that moving brought significantly more effective and better ideas than sitting.

Besides Alexandra Carmichael (2008, 2010), who is reported on in the empirical part of this study, three other current experimenters, known or present in the QS/ST field, will be briefly described to substantiate the scientific like discovering part in many STers. Larry Smarr discovered through continuous tracking of his vital signs and frequent blood and stool tests he conducted that he had Crohn’s disease before his physician did. One cannot trust how one feels, he asserts, because he thought he felt well, but certainty lies rather in what can be measured. Seth Roberts (2010) was searching for ways to generate new plausible scientific ideas through self-experimentation and presented his (from the scientific community for the lack of scientific rigor criticized) findings in two journal articles (Roberts, 2004, 2010). Over the course of 12 years, he observed changes in mood after watching TV in the morning, the effects of standing for long hours during the day on sleep quality and tried to experiment with the effects of butter consumption on his brain function, with the result of improving sleep, mood, health, and weight. “When you gather data, you sample

from a power-law-like distribution of progress. Most data help a little; a tiny fraction of data helps a lot” Roberts (2010, p.482) concludes. Finally, Kevin Warwick experimented with direct neural interfaces between the human nervous system and computers to upgrade and expand his memory or extra senses, such as sensing ultrasonics, which bats can sense but the human brain is not able to sense yet. He implanted an RFID chip into his left arm (to be recognized by door key systems) in 1998, being the first person known to do this (Warwick et al., 2003). Next, he implanted a silicon chip transponder into his arm and connected it to his nervous system, becoming the world’s first cyborg: a man-machine hybrid, and finally connected him to his wife’s nervous system, so he was able to sense her movements in his brain, a kind of telepathic communication.

1.4 Rise of Public and Academic Interest

At the latest since the initial conferences held in Mountain View (home of Google, Mozilla, 23and me, LinkedIn and many other digital businesses) in 2011 and later that year in Amsterdam, the QS movement gained increased attention in the public media and academia. While in 2009 only two English-language media articles appeared mentioning the term quantified self,²⁴ media attention grew significantly from 33 articles in 2011, 148 in 2012 and 466 in 2013 to 564 in 2015 (Lupton, 2016a).²⁵ At about the same time, research interest in academia arose. A multitude of collections of papers and introductory books has been published, including but not limited to Neff and Nafus’s “Self-Tracking” (2016), Ajana’s “Metric Culture: Ontologies of Self-tracking Practices” (2018), Selke’s “Lifelogging” (2016), Duttweiler et al.’s “Living by numbers” (2016), Lupton’s “The Quantified Self” (2016) and Nafus’s “Quantified” (2016).

Meanwhile, a growing body of literature is investigating self-tracking practices within both the pioneering community of the QS network and among mundane users who only track their calorie intake and try to lose weight, for example. Initially, literature mainly focused on the persuasive computing aspects, i.e., individual usage descriptions and behavioral explanation, and user experiences with personal informatics systems. Then,

²⁴ One was published in the US based *Life Science Weekly* and one in the Canadian *Globe and Mail*

²⁵ For a more thorough review of the appearance of Quantified Self and self-tracking related articles in media, including years, key topics and changes in reporting tenor and scope, see Lupton, 2016, pp.14ff

sociological perspectives followed and started to contribute to developing an understanding of the wider social, cultural and political dimensions of what Deborah Lupton (2014) referred to as “self-tracking cultures”. The next chapter attempts to depict the different research interests and outcomes in the ST field.

PART II

– STATE OF RESEARCH AND STUDY DESIGN

2 SELF-TRACKING IN ACADEMIA – MAPPING THE FIELD

Different aspects of the self-tracking phenomenon were researched in various academic disciplines, particularly in the science of human-computer-interaction (HCI) (e.g., Li et al., 2010, 2011; Rooksby et al. 2014; Swan, 2012), but also in medicine (e.g., Hoy, 2016), cognitive science (e.g., Attig & Franke, 2020), business administration (Jahn et al., 2020), sociology (e.g. Lupton, 2016, Selke, 2016), cultural studies (e.g., Bernard, 2017; Sanders, 2017), philosophy (Buongiorno, 2019), sport science (e.g., Duttweiler et al., 2016), gamification studies (e.g., Abend & Fuchs, 2016; Whitson, 2013), literature studies (Danter et al., 2016), and led into a growing body of research. The first investigations began with an interest in the design of self-tracking respectively quantified-self apps and wearables, in order to review functionality, user interface and guidance in the sense of an app walkthrough,²⁶ as well as the affordances of those apps and effects on behavior change (Li et al., 2010, 2011; Swan, 2012).

At first attempt both popular media and academic reports adopted the movement from a self-improvement or self-optimization perspective – a circumstance that led to the initial research interests in this work. Consequently, the first topic in the literature review will outline and analyze the current discourse on self-optimization in/through ST. The results of the comprehensive review of literature in the ST field, will follow, presenting four critical approaches and three kinds of empirical investigations with regard to technology and user that could be identified.

²⁶ Light, Burges and Duguay elsewhere describe a method for critically analyzing apps, which they named App Walkthrough “identifying and describing its vision, operating model and modes of governance” in order to shed light on the app’s “intended purpose, embedded cultural meanings and implied ideal users and uses” (2016, p. 1)

2.1 The Discourse of ST as Self-Optimization

According to Foucault, we live in an a priori dispositif of omnipresent power, in which truth and objectivity have become obsolete and the validity of something found in the world is the content of the dominant discourse. Following Foucault's genealogy as a critical examination of the historicity of subjectification, respectively in the given question about the self-quantifying subject/self, dominant discourses about certain meanings and social constructions become visible. Ever since the first quantified-self conference was held in the Bay Area, and one year later in Europe, public media attention began. Keywords like self-responsibility, self-optimization and self-knowledge through numbers characterize the quantified-self discourse and are also affirmatively adopted by many actors in the QA movement. However, the print and online press primarily employed the narrative of (self-)optimization and the subsequent questions of control and power relations to depict the burgeoning interest in it as well as the questions being raised. Early statements by self-tracking personalities who gained popularity reporting on themselves in their online presentations serve as an example par excellence or pars pro toto for the media attention. For example, Bob Troia, an enthusiastic US self-tracker fearing an elevated risk for type 2 diabetes who measures his sleep patterns, pulse, blood pressure, blood glucose level, cognitive performance, heartrate, sweat levels, skin temperature and stress levels using a range of devices including his iPhone and wearable computing technologies, described himself in a radio interview as follows: "Personally, like, my goal is to basically be an optimal human being in every aspect of my life" (PBS NewsHour, 2013, as cited in Lupton, 2016a, pp.64-65). The self-optimization discourse present in the ST field was both echoed and addressed by scientists. In a video produced by students at Hannover University of Applied Sciences and Arts on the subject of self-optimization, it is stated: "Today S-O has become a lifestyle, everything and everyone is optimized, compared and evaluated. Behind this are two human desires, the desire for perfection and the urge to compete with others. Especially when it comes to your own body...doing sports and healthy nutrition are just as important in times of burn-out and other illnesses as relaxation and rest" (Hochschule Hannover, 2019, 17:20-17:40). A psychotherapist comments in that video, that S-O can lead to boundaries not being recognized and acknowledged anymore, expressing caution and skepticism. Also, many informal talks revealed that self-tracking is often being equaled with self-optimization per se. A few academic studies addressing this topic appeared (Meißner, 2016; Nieland, 2016; Ruckenstein & Pantzar, 2017). While Meißner and Nieland scrutinized and discussed prevailing press and blog coverage under the notion of (self-)optimization, Ruckenstein and

Pantzar (2017) analyzed the coverage (and promotion) of the Quantified Self as a metaphor in the initiating medium, WIRED magazine (whose editors are QS inventors Kelly and Wolf). Their results will be briefly presented and analyzed below. Albeit the association between ST and self-optimization dominated reporting in press, the author of this study, who conducted an autoethnography of using ST for approximately 4 years did not explicitly shared this association (nor did the other participants in this study), what led to light being shed on the notion of optimization as such and in the context of ST.

2.1.1 ST Practice as a Method of Empowerment

QS technologies and practices have often been portrayed and promoted in the leading technology magazine WIRED as disrupting technology innovations. Known as the “propaganda organ of the digital age” (Duguid, 2007, p.2), WIRED also sought and pointed to the creative possibilities on a promising data-driven market. Thus, particularly passionate self-tracking practitioners highlight the ST technique and technology as empowering and liberating, both in physical and economic sense. ST personalities such as Chris Dancy, Dave Asprey or Nicholas Felton used extensive ST for personal health and well-being goals, and also economic advantages. For example, Felton was able to improve his professional position after collecting and publishing his personal body and habits data in his blog between 2006 and 2013, and Dancy established a career as a consultant and speaker in the realm of digital health, after promoting and publicly communicating his experimentation as “the most connected man in the world” (Pullar-Strecker, 2014) with 700 gadgets, sensors, apps and other software to collect real time data about his body habits. What they have in common is an optimistic belief in ST technology, where looking into a digital mirror enables insights into oneself that one would otherwise not be able to perceive with one's five senses. Using this detailed time series data allows the idea of self-transformation to become more tangible for them. The valorization of self-data in the self-knowledge process is “formative in defining a new numerical self and promoting a dataist paradigm” (Ruckenstein and Pantzar, 2017, p. 401). In an often-cited article in the New York Times, WIRED's editor and QS co-inventor Gary Wolf (2010) defines the first three types of motivation to self-track: #self-reflection (via self-discovery), #empowerment (via self-knowledge) and #life-improvement (via motivation, reaching goals and feeling better), thus providing the main keywords for the adaptation and discussion of QS from a positive point of view. Ruckenstein and Pantzar

(2017) have analyzed the coverage about QS in WIRED and identified four interrelated themes that chronicle the quantified-self idea: transparency, feedback loops²⁷ for successful behavior change, biohacking²⁸ as a means to discover even more about oneself, and optimization of health, performance and more. “The message of transparency is replicated in relation to a plethora of topics including exercise, popularity, female orgasm, political unrest, “poop bugs”, the customer’s mind, and gene sequences; all these, claims WIRED, can be followed and understood better when quantified”, Ruckenstein and Pantzar (2017, p. 408) state. Unsurprisingly transparency is not discussed there as a loss of privacy or data exploitation by platform service providers (e.g.: Lupton, 2016a; Till, 2014; Van Dijck, 2014,), what will be addressed next. While transparency and feedback could be found in this study’s participants’ accounts, biohacking was not mentioned explicitly and optimization was mentioned very rarely and certainly not to the extent that it has been taken up and emphasized by popular media, which will be discussed in more detail in the findings.

2.1.2 ST Practice as Self- and Data-Exploitation

“The purpose of data-driven health innovation should be “to make the consumer the CEO of his own health”, says Vonod Khosala, a healthcare venture capitalist (as cit. in Neff and Nafus, 2016, p. 141). Such tech company goals and promises indicate the early blending of the idea of good health and wellbeing with the slogan “data is the new oil” and thus economic interests. The first academic reactions to QS / ST are critical, and the discourse goes along with the often observed spreading of the capitalistic idea from markets into lives and bodies of individuals (Boltanski and Chiapello, 2005; Bröckling, 2002; Martin, 2000). Thus, the appearance of the entrepreneurial self (Bröckling, 2002, 2007) seems unsurprising, since it builds on of the visible changes in the individual perception and duty of self-responsibility, lifelong learning and competition, which in turn requires an amount of mental and physical fitness as well as emotional resistance. Appropriately enough, print and

²⁷ The mechanism of feedback loops appears in all areas in which data is generated, collected and analyzed and then modifies the following actions (behavior, reactions) which in turn generate data to be analyzed etc. In marketing activities this process comes in the guise of personalization based on individual needs and traits to serve customers’ longing for convenience.

²⁸ With biohacking, the authors refer to examples of users who self-track in an experimental way, by altering the functionality, method, frequency, or combination of tools. The biohacking notion entails and revitalizes a reminiscence of hacker ethics (Himanen, 2001) from the early times of personal computer usage at home and may address readers with a countercultural background.

online media adopt the ST movement as self-optimization. For example, in the German speaking *Manager Magazin*, Klaus Werle (2014) writes: “Thanks to smart technology and continuous data gathering the whole life can be optimized. That fascinates many. The goal is self-optimization, ego improvement through more conscious living in all areas: Job, family, sport, leisure, sex.” Werle employs a play on words for the title “Mess-Diener” which, written without the hyphen, means altar-server, but here is supposed to mean: measure servant. In *Spiegel Online*, Boytchev (2013) writes in an article titled “Measure yourself!”: “Heartbeat during meditation, the mental performance after a cup of coffee: Self trackers constantly measure their body values - and try to optimize their self”. *DIE ZEIT* in 2013 reports on quantified self under the hashtag “self-optimization” and the title “the greater me” (Friedrichs, 2013). In the Swiss *Tagesanzeiger*, German novelist Juli Zeh (2012) writes: “The self-measurers are all about optimization. They want to use the collected data to raise their health, fitness and performance as much as possible. The enemy is not excess weight and being unfit, but disorder, loss of control, lack of discipline”. She compares this compulsive behavior to female anorexia but attributes it to men using technology in the effort to achieve their ideal self-image. “The ego as a research object: The self-measuring person hopes to recognize himself in the data mirror, to iron out mistakes and to achieve a better life. As if happiness were a calculation result, achievable through the correct application of a formula. Self-empowerment through self-slavery: Just like the anorexic, the self-measurer fights against his own body”, Zeh concludes. These examples indicate that the self-optimization metaphor for ST is being widely used in the sense of a self-exploitative that is obedient to external constraints. Nevertheless, it cannot be dismissed as a simple sensational term striving to get attention from the medium’s audience. Therefore, self-optimization will be analyzed and differentiated in the logic of efficiency, and self-enhancement.

2.1.3 Short Analysis of the Self-Optimization Discourse

A body of scientific literature about ST and QS refers as well to the aspect of self-optimization (e.g. Bode and Kristensen, 2015; Duttweiler et al., 2016; Klauser and Albrechtslund, 2010; Lupton, 2014a, 2016; Ruckenstein, 2014; Ruckenstein and Pantzar, 2017; Selke, 2016; Williamson, 2015). Literature hereby often draws on Foucault’s (1988, 1991) notion of the technologies of the self and self-governance, which enable and at the

same time require individuals to morally engage in practices through which they can achieve happiness, health, and wellbeing. Certain expectations of normality, health and self-optimization are immanent in self-tracking technologies (Ruckenstein, 2014). Moreover, ST technologies are seen to be germane to the contemporary disposition of self-optimization framed in terms of healthy living, increased efficiency, and wellbeing as part of the “individual management agenda” (Klauser & Albrechtslund, 2014, p. 282), which create new forms and formats of subjectivity. ST could be assessed a “part of the panoply of strategies for the government of the self” (Lupton, 2014a, p. 80). Self-tracking practices then appear as partly voluntary – for example in a playful and pleasurable mode (Lupton, 2014b; Nafus & Sherman, 2014; Ruckenstein, 2014; Whitson, 2013) – and partly obligatory.

The Quest for Improvement – a Socio-Cultural Paradigm

To improve the quality of life and be able to regulate oneself is an old human quest. The improvement of well-being is widely linked to financial well-being, while in former times it was often related to an ethic-moralistic attitude. Recently improvement endeavors accessed the territory of the body (Nettleton and Watson, 2005; Turner, 1996), health in general (Lupton, 1994; Mol, 2002) and most recently extended the territory to mind and brain enhancement – mainly discussed as drugs, neuronal non-invasive and invasive treatment and cognitive training, (e.g., Gazzaniga, 2005; Taya et al., 2015; Wagner, 2017). Three sociologically informed explanations for the contemporary quest for improvement have been identified: the postmodern loss of anchors and the turn to the body, self-governance and biological control, and substitution of religious belief with belief in technology.

Firstly, the social change with its cultural fragmentation and disorientation that characterize the postmodern²⁹ landscape (Chrysanthou, 2002) inspired sociological research in the last few decades into the “bodily turn” (Gugutzer, 2006; Nettleton and Watson, 2005; Synnott, 1993; Turner, 2008). The “bodily turn” refers to and analyzes the countless body practices that are increasingly being addressed by technologies, as well as their everyday thematizations (Gugutzer, 2006). New technologies lead to a shift in the boundaries between our physical and “technological bodies”, reconceptualizing the body as subject to “an

²⁹ According to Giddens (1991) we are not living in a postmodern era but rather in late modern times because the values and customs of modernity are deeply ingrained in the values and way of living of western societies. In order to not dig deeper into this discussion, both expressions will be used simultaneously in this work.

ideological tug-of-war between competing systems of meaning (Balsamo, 1995, p. 225, as cited in Nettleton and Watson, 2005, p.5). As Giddens (1991) argues, high modernity brings about an ontological insecurity as increasingly individualized self-identities are detached from the traditional moorings of religion and community, or from a stable sense of location in gender, class or age. The postmodern loss of anchors implicates an increase in freedom of personal choice but is also reflected in the absence of comprehensive prospects. This “creates a disorientating ontological insecurity that predisposes the postmodern self to take uneasy refuge in the most basic shelter of all: his or her own body”, forming at least one possible outlook, the “perfect, imperishable body” (Chrysanthou, 2002, p. 470). A response to the decay of community, to the valorization of efficiency and technological innovation, and the subsequent standardization in work processes, mass markets, and globalization led to efforts to re-center the self, utilizing individual and creative potentiality through technological means, tools, and processes. Both sides of the postmodern coin may result in the urge to build one’s best possible individual lifestyle (Giddens, 1991; Taylor, 1989). The popularity and affirmation of ST could in this sense be interpreted as the expression of a distinctively postmodern “utopian” impulse towards perfection, which however may culminate in a “narcissistic quest for uniqueness and exceptionalism”, ponders Morozov (2013, p. 233).

Secondly, the quest for improvement can also be seen as expressions of self-governance (Foucault, 1991) and the “biological citizenship” (Rose, 2007). Drawing on Foucault, Rose (2007) identifies the biological subjectification, when individuals, as well as collectives, define themselves more and more through their biological attributes and conditions, which he refers to as “biological citizenship”³⁰ with much greater responsibility in the realms of the biological. These biomedical “technologies of optimization” (2007, p.15) do not merely seek to cure diseases but also to be involved in vital processes of the human body and mind, establishing “biological control”³¹ and the “biological re-engineering of vitality” (2007, p.16) he argues. The availability of smart digital technologies capable of gathering sensor data, analyzing and visualizing that data quickly, while often giving feedback to the recorded values, can consequently impose or nudge (Thaler & Sunstein, 2009) biological citizens to strive for health improvement relying on predefined choices regarding good nutrition, fitness, preventive medical and pharmaceutical treatments, and

³⁰ Weiß (2014) points out that this notion was already used by Paul Rabinow (1996), Adriana Petryna (2002) and Deborah Heath (2004) among others.

³¹ Franklin (2003) refers to the term from the creator of Dolly, Ian Wilmut, characterizing this achievement as the entering of the age of “biological control”.

even genetic engineering (Dumit, 2012; Lupton, 2012). There will no longer be limits on human ambition, rather, a “wholly contingent condition” of sorts (Franklin, 2003, p. 100) is emerging. At the same time, this contingent condition puts a greater responsibility on humans also in the territory of their biology and regarding their future. While this may look beneficial it implies, however, the peril of losing autonomy and becoming technodeterministic.

Thirdly the strive for self-regulation and self-improvement are both core tenets in a range of world religions, and both have become important themes in the development of technology and its undercurrent of Gnosticism (Noble 1997; Davis 2015)³². Furthermore, for “perfectibility is displaced from the political sphere to the personal” (Chrysanthou 2002, p. 471), promising “pseudo-religious” messages used in advertising new technologies, where you can have a perfect body and a happy life, as long as you diet, jog and workout, raise hopes. Given the loss of moral guidance, which is at the core of a religious mooring, (Giddens 1991), belief in higher forces may bring relief and happiness in life. In the face of the (one day) forthcoming death, the search for purpose in life and for a possibility to overcome one’s finiteness can lead to hope for technology.

Optimization and the Logic of Efficiency

Albeit the medial reception of ST technologies and practices employ the term self-optimization, none of these reports provide a definition of what is meant when talking about optimization. Etymologically, optimization as a word stems from the Latin word “optimus”, which means the best or the most outstanding and from which the noun optimum was derived, meaning: the optimum value, greatest measure, the maximum, upper limit. In applied Mathematics it is used, for example, in data mining, climate research or in corporate operations research - the use of quantitative models for rational decision-making in a corporate context. In this context, optimization means the best possible achievement (maximization or minimization) of a given goal: “Minimize/Maximize $f(x)$ under the condition $x \in X$ ”. The mathematical perspective is concerned with the function of reaching a goal by either minimizing the inputs (resources) or maximizing the outcomes by given inputs. From a biological point of view, it is an iterative cycle of adjustment-evaluation-readjustment until the optimum is reached, whereby the optimum means to achieve the best

³² I am indebted to thank an anonymous reviewer for this hint.

result in the trade-off between different parameters in regard to a defined goal. In companies of the early 20th century, the scientific management method (Taylorism) became popular and Peter Drucker (1964) inscribed the principle "If you can't measure it, you can't improve it" into management literature, that became popular also in non-economic questions.³³ Possibly, here, a known logical error is made: $\neg A \rightarrow \neg B \not\Rightarrow A \rightarrow B$ (if $\neg A$ then $\neg B$ does not follow if A then B) which means just because you can measure it, it does not follow that you can improve it. Since then, it has been impossible to imagine the world of work without key figure-based decisions.

The QS/ST idea appears to transfer this scheme to the realm of body and mind-related decisions. It relies first on measuring what is of interest (sometimes however it is measuring first and then deciding what will be of interest) and after that deciding what to do next with the data. As is known from research on operational accounting, quantified data offers the advantages of tangibility, recognition of patterns and trends, comparability, decontextualization and thus de-emotionalization and, finally, to a certain extent, constitution of reality (Vollmer, 2004). Since rationality is often associated with efficiency, it has been sometimes equaled with it. Today, it seems advisable to plan for the future, to rationalize and optimize one's personal way of living in order to obtain professional positions, social status and social recognition. However, when conceiving optimization as an anthropological universal one must assert historical, cultural and social relations as well as gender-specific and not least interindividual differentiations (Balandis & Straub, 2019). The modern individual feels required to increase his or her efficiency and productivity as part of the imperative to optimize own resources, Rosa (2013, 2016) argues. "In all these respects, human life appears to be optimizable and improvable, and even quantifiable: The movement of the quantified self, which is currently rapidly gaining in attractiveness, offers an extremely eloquent example of this. It suggests, indeed it thrives on the idea that one can measure the quality of one's own life in this way" (Rosa, 2016, p. 47). In the QS discourse this notion of optimization is very value-laden but the empirical data shows that it has to be defined what optimum and success means for the individual in question. As Vollmer has shown, one cannot optimize in just one way or only in one area: "Regulatory ambitions [...] are therefore always struggling with the problem of their interchangeability with other alternative claims" (Vollmer, 2004, p. 460). As the empirical data will show, STers in many

³³ The slogan was originally created by W.E. Deming in the 1950s but is sometimes also ascribed to Lord Kelvin (Morozov, 2013, p. 408)

circumstances weigh up their competing goals and decide against the backdrop of different factors (such as location, day, social).

Self-Optimization as Enhancement and Empowerment

Self-optimization is the result of a technical relationship with oneself, states Michael Makropoulos, “not only a mere unfolding and realization of a natural and with-it inalterable potential of human possibilities, but a construction, an invention of new capabilities of human.” (2002, p. 6). Self-optimization with new technologies may mean to aspire to undetermined, unrestricted or even fictional possibilities of selfhood. It is rather a gradually move into the range of indefinite goals, of goals which will manifest themselves possibly only in the future. Not every self-tracker has his or her goals already set up when starting a self-tracking project and can be rather searching for opportunities for personal and physical development.

Stefan Meißner (2016) argues that although STers were mostly described in print and online media as self-optimizing in terms of maximizing self-efficiency and effectiveness – often as a result of societal or cultural obligations – STers themselves disclose another picture. They often reveal attempts to self-enhance in terms of undetermined or even unrestricted goals in a rather explorative and playful manner. This perspective allows to grasp self-enhancement as not necessarily bound to a logic of growth. QS “enables completely new experiences of the self and other self-relations [...and] establishes a technically enabled self-relation, which does not result in self-optimization that maximizes the benefit”, he argues (Meißner 2015, p.139). Measuring and tracking certain outcomes can lead to deliberate self-limitation. For example, when self-tracking revealed that a lower number of working hours (for example 6) is better than a greater amount, STers can decide to limit their working hours. In contrast to the often proclaimed normalizing and standardizing effects of self-tracking (e.g., Moore & Piwek, 2017), it can rather reveal an effect of emancipating from socially established norms. A self-tracker who experimented with different patterns of light and deep sleep phases indicated that, despite only a small increase in the amount of sleep, he felt much better on the polyphasic sleep schedule than the monophasic (Meißner, 2016b). Some self-trackers even use this practice deliberately to find spots of resistance, of delineation from well-established societal values (Rooksby et al., 2014; Sharon and Zandbergen, 2017). Hence one’s own feelings are set against economically motivated self-tracking endeavors.

To summarize, there are two important distinctions in the notion of optimization that have been ignored. First is the understanding of optimization as a logic of maximization with regard to efficiency and productivity of known target functions. The second is the discovery of potential abilities and as such the enhancement of the range of capabilities and possibilities within one's life. It is a small but significant difference. It is about optimizing in terms of quicker, higher, stronger - to borrow terms from the Olympic games³⁴ - versus improving in terms of balancing, matching or reassessing values and needs. In what way optimization is understood in the context of ST (and beyond) is a question still lacking an answer, and one that this work also attempts to answer.

However, the strong will to improve in order to reach an optimal goal not of general attribute value, paradoxically may yield some unintended consequences like normalization / standardization of values and norms, an obligation to collect and share data about one's health and performance (Moore & Piwek, 2017; Selke, 2014; Wright, 2014) or even an increase in insecurity. "If the late modern self has become a platform for the endless perfectibility of the self, surely intimacy is the best site to verify that claim as it demands the ongoing monitoring of one's own and another's subjectivity. The question is [...] whether such self-monitoring toward perfectibility generates ontological security or [...] whether, it generates uncertainty and lack of trust" as Eva Illouz puts her finger in the wound of techno optimists (2015). In a student seminar, a number of students expressed their worry about losing a feeling for their senses and with them their intuition and trust in their decisions in life. However, one may ask if these steps towards standardization really happen unintentionally. The establishment of standards and norms may bring new degrees of freedom, as they provide criteria against which a certain quality or quantity can be measured and compared. This would counteract the above-mentioned lack of orientation. "Within social totality, [however,] there are zones of the normal and the abnormal. In between, there are broad transition zones in which the degrees of productivity, health and thus the possibilities of participation are continuously redefined." (Harrasser, 2016, p.68) The encountered norms thus become content for reflexive analysis and conscious negotiation. As analyzed by Lupton (1995), the health promotion hype expresses knowledge and practices embodying the belief that individuals can assess, manage, and control risks to their health, thereby "taming uncertainty". Accepted norms and values provide orientation and easier decision making that bring more alleviation into the complexity of life for many practicing self-trackers. The interviewee Phil expresses his wish for orientation, to get to

³⁴ Citius, altius, fortius

know where to head in life, several times partly indirectly when he summarizes his comprehensive self-tracking practice in this sentence: “It helps me to face north”. This has often been mentioned in this study’s interviews and the auto-ethnography as well and will be presented in the findings chapter.

2.2 Critical Examinations of ST

A large number of accounts are analyzing the usage of ST technologies critically, trying to emphasize its sociopolitical and ideological involvements (e.g., Lupton, 2013, 2014; Moore, 2018; Ruckenstein, 2014; Schüll, 2016; Till, 2014). In particular in social sciences and media studies, critical theorists draw on three central developments in modernity: the loss of traditional anchors, biopolitics, and the valorization of rationality and numbers with respect to the fast-growing popularity of ST practice (e.g., Beer & Burrows; 2013; Lupton, 2013, Vormbusch, 2016) and express concerns regarding its implications. Three main, intertwined strands in those theoretical/ critical debates have been identified: Self-governance and the dissolution of state and collective responsibility for citizens’ health and wellbeing under the pretext of improved health; super-surveillance and data exploitation in exchange for motivation and self-discipline; and valorizing data and data-based decisions in lifestyle choices for the sake of decision making support.

2.2.1 Self-Governance and the Neoliberal Dispositif

Foucault’s main merits are seen in his analysis of subjectivation processes as a result of mutual power relations and discipline, and his further concepts of governmentality, biopolitics and genealogy, that still nurture fruitful discussions about the historicity and contextualization of self-care. While Biopolitics refer to interventions of governances in the realm of biological life, governmentality points to structures, agendas and techniques that provide a framework for the range of possible and societally acceptable and esteemed practices and actions. These shall guide citizens and foster a specific conduct of life that conform to the state's interest, such as to be a person with a neoliberal mindset, entrepreneurial, self-responsible and fit. Quite a few ST-literature (e.g., Ajana, 2018;

Lupton, 2016a; Ruckenstein & Pantzar, 2017; Schüll, 2016; Sharon, 2016) discusses ST against the backdrop of the entrepreneurial-self (Bröckling, 2015; Martin, 2000), the neoliberal demand for self-responsibility³⁵, and self-governmentality (Foucault, 1991; Rose, 2007) and the immanent handing over of collective responsibility to the individual. ST users are diagnosed to voluntary subordinate or undeliberately and unconsciously subject themselves, in the above sense: to self-govern. Drawing on Foucault's early studies of power relations and the subjectivation of the individual, STers and QSelfers are often deemed as another instance of a heteronomous response to the omnipresent power relations (e.g., Beer & Burrows, 2013; Lupton, 2014b; Rosa, 2011; Selke, 2016, Schüll, 2016), and from some authors pictured as a capitalist-cybernetic, non-trivial machine (Schaupp, 2016). In a capitalist-cybernetic system, neoliberalism merges with cybernetics, where information is circulated through communication, capital accumulation and control (Quellet, 2010). While Lupton (2014b) argues that the powers acting on the ST individual – in the course of subjectivation – become effective, as it were, from within the individual themselves, Schüll (2016) put greater emphasis on the powers coming from the industry and the ways ST product providers conceptualize their customers to keep them in the customer lifecycle as effectively and long as possible. She investigated ST product claims and promises and, drawing on Rose (2007) and Dumit (2012), pointed to how markets entice and urge users, preying on their feelings of insecurity, to use their ST products through smart designs and affordances of their technological applications. Neoliberal values such as efficiency, competitiveness and discipline serve as ideals for self-government and the making of optimal choices (Marwick, 2010; Ong, 2006). Ong calls these regulative “technologies of subjectivity”. From that point of view, ST understood as a technology of self-optimization could be interpreted as a further technology of subjectivity with the goal to persist on competitive markets and increase one’s economic and social capital in Bourdieu’s (1982) sense. However, this results to align one’s thinking and acting in both private and professional lives in terms of market success (Bauman, 1999). Competition for and achievement of money, power, fitness, and youth requires considerable effort in order to improve at least some parts of one’s life. Not achieving some of them is therefore often considered a personal failure and may result in contradictory experiences of the self in the world and a loss of autonomy, and the fear of economic and social decline and incompatibility with the world around us, Rosa (2010) criticizes.

³⁵ These arguments align with observations of Zygmunt Bauman (2001), Richard Sennett (1998), Nikolas Rose (2007), or Emily Martin (2000) who argued that “the individual becomes a project that must continually be invested in, nurtured, developed and managed” (Martin, 2000, p. 514).

The critical analyses of ST situate the subject in an environment of rather unconscious or minor, or deliberate but careless, and even voluntary subjection to the requirements of neoliberal markets of work, marriage, health and wealth. What is missing in the debate of the neoliberally driven self-tracking practice is a more precise consideration of the perspective of the self (the agent or actor) and of self-control. On the one hand, self-control, self-regulation and self-optimization could be performed in obedience to the ruling primate of neoliberalism. On the other hand, it could be a deep desire for orientation in life, given the already much discussed uncertainties of our conduct of life and the urge or constraint to make a lot of good choices not only for important, life-shaping decisions but also in everyday life. Even though the self-responsibility idea entails the idea of taking control of and by oneself, the quality of the control actually exerted over one's body and mind is not clear yet. There have been multiple attempts to evaluate this based on the amounts of successfully accomplished behavior change or achievement in work or fitness projects (Rapp & Tirassa, 2017; Swan, 2012). However, there is no consistent result. While in some studies participants have been able to reach goals (e.g., Choe et. al., 2014), in other studies they were not (e.g., Rooksby et al., 2014) or gave up after initially trying and facing technical or discipline related problems (e.g., Attig & Franke, 2020). Another facet of self-control in ST that was encountered (and will be substantiated by the results of this study) is not being able to control and in fact being addicted or feeling compelled to use these tools even though the circumstances might be dramatic or tragic (Foss, 2014). It would be important to discriminate between having control and having the feeling of control - a subject which is attempted to be explored over the course of this work as well.

2.2.2 Voluntary Surveillance and Data Exploitation

Surveillance and data exploitation is the second main concern about the self-tracking phenomenon (Bernard, 2017; Klauser & Albrechtslund, 2014; Rieger, 2018). The voluntary generation of big amounts of personal data and, in some cases, deliberately sharing it in online communities like "Patients like me" or social networks like Facebook or Instagram, recalls the panoptical surveillance scenario. Literature focuses in this regard on biopolitics, where health and bodily care become an issue of national interest (Foucault, 1997), and ST devices are considered as means of surveillance, and users as subjects of self-regulation and adaptation of new norms of healthiness, productivity and happiness (e.g., Lupton, 2014a).

STers voluntarily take up practices of monitoring and regulating their bodies in order to serve their welfare and self-interest on the one hand and conform to state objectives on the other, and thus contribute to a new level of surveillance (Kappler, 2017).

Scholars who explore self-tracking in relation to the world of work, emphasize undeliberate data contribution from users in terms of immaterial labor (Till, 2014) which allow companies to exploit and use these data for their own profit-making purposes (Moore, 2016). The free, possibly unwitting, inadvertent and even unwanted availability of personal data to ST devices companies and their third parties is to be seen as exploitation of free digital labor (Terranova, 2000), pursuing a “thermodynamic model of the exploitation of potential” as Till (2014 p. 446) argues. These data can be financially utilized and mined, and hold a value as a biocapital (Birch & Tyfield, 2013) that multinational corporations or government-funded researchers can harness and exploit (Lupton, 2014c; Schüll, 2016, Till, 2014). How personal data serve as sales commodity was revealed in a study of twelve mobile health and fitness apps from the U.S. Federal Trade Commission³⁶ in 2013 that found that “user data were disseminated to seventy-six third parties, and one app in particular sent data to eighteen other entities” (Till, 2014, p. 449). This scenario is already known in the social media, where companies like Facebook or Youtube financially benefit immensely from the immaterial labor done by the user’s profiles and their generated content on those platforms. In exchange, users get the functionalities of the provided platforms, which are mostly connection, support, and entertainment (Helmond, 2015³⁷; Marwick, 2010).

The number of decisions about public and private life that are made by computer systems and their underlying software programs - now mainly debated under the notion of algorithms – prompted many authors to proclaim new kinds of powers such as the “metric power” (Beer, 2017) or “metric culture” (Ajana, 2018) and “algorithmic culture” (Galloway, 2006b) or “algorithmic power” (Beer, 2016; Bucher, 2017; Striphas, 2015), that condition cultural practices and social perceptions and as such potentially diminish and threaten the autonomy of users through the entailed values and characteristics. Consequently, a discussion of data analysis technologies is needed as they make up a techno-economic construct “whose operations have important implications for the management of

³⁶ Federal Trade Commission. Internet of Things—Privacy and Security in a Connected World. Available online: <http://www.ftc.gov/news-events/events-calendar/2013/11/internet-things-privacy-security-connected-world> (accessed on 12 June 2019)

³⁷ In her dissertation about the “Web as Platform”, Helmond shows how social buttons, i.e., those interfaces on the platform through which users can express their social activities, such as liking, sharing or commenting on content from other users, are built into the technical infrastructures of those platforms to generate valuable data for the company providing these platforms.

populations and the formation of subjects” (Andrejevic et al., 2015, p. 380). Other positions emphasize that surveillance can be seen not only as external but also as “participatory surveillance” (Whitson, 2013, p. 171), for example when being spurred by a running community while running and sharing the actual activity live, which points to a rather playful (gamifictional) aspect to the ST.

These positions are currently beginning to draw attention to the performativity of ST technology and how the user’s agency is co-produced with and by technological materiality, and which implications such coevolution (e.g., Bollmer, 2015) have. This performativity of ST technology will be discussed in the technology-relations-chapter in this study – as an attempt to contribute to the discussion on the human-technology coevolution, and to shed light on how we form and reassure self-understanding as humans in an ecology that is constantly and increasingly affected by technology and intertwined with nature.

2.2.3 Valorization of Data and Self-Objectification

The theme of reification and alienation with simultaneous valorization of data and new power relations through data forms a third major line of discussion of the ST phenomenon (King, 2013; Lupton, 2014a, 2016; Selke, 2016; Straub, 2016, 2018). At present an upvaluation and obsession with data in society can be observed, where data is being viewed as more accurate than human perceptions and judgments (Beer & Burrows, 2013; Boyd & Crawford, 2012; Feiler, 2014; Wolf, 2010) and as “neutral, apolitical and unbiased” (Lupton, 2013, p. 27). The belief that “human perception is prone to bias and that subjective experience, intuition, and haptic senses are somehow lacking in comparison to the arithmetic precision of quantification” (Sharon, 2017, p. 103), lies at the core of the QS movement. Numbers overtrump uncertainties based on emotions and gut feelings and provide a contingency reduction in a world of abundant options in late modern western societies (Vormbusch & Kappler, 2014). We stand to lose our trust in intuitive and embodied knowledge as our trust in numbers-based self-knowledge advances, it is feared. “It’s this imperialistic streak of quantification—its propensity to displace other meaningful and possibly intangible ways of talking about a phenomenon”, Morozov (2013, p. 253) points out. He identifies a “Taylorism within” (p. 228) the self-tracker and proclaims a new and digital equivalent to the metrosexual, the urban male concerned with his personal appearance, the “datasexual” (p. 226) – an individual equipped with a “datasexual mind-set” (p. 227).

ST practices can lead to normalization and standardization of values, such as productivity levels, exercise, or weight, which then entail a commitment to collect and share data about one's health and performance, to make one's data accessible to others, and establish patterns of shared behavior (Moore & Piwak, 2015; Selke, 2014; Wright, 2014). These commitments seen from the perspective of governmentality studies that explain the entanglement of external governance and self-governance, make them appear not as an effect of discipline and control, but rather of feedback and gratification (Whitson, 2015, p.353). Similarly to the policy of nudges, which is presented as a liberty-preserving approach to steer/entice people into a wishful direction while allowing them to choose their own ways to behave³⁸ (Sunstein, 2014), the points of critique are obvious: such triggers and pointers come in the disguise of encouragement but serve as normalizing forces that may cause inequalities in comparison and assessment values, and lead to a biased standardization. The neoliberal values of profit maximization, growth and competitiveness are present in so many aspects of our daily lives, not only in business but also in art, religion and science, and recently embarked human conduct of life, which from there might almost naturally spread to the human body and mind.

2.2.4 Closing Reflections Regarding the Critical Perspectives

Although it is vital, to explicitly point to and name the effects of individualized and capitalistic societies, and to point out different (power) interests of different ST stakeholders, i.e., to reveal unequal power relations, manipulation spaces and unconsidered risks for the future, it is important to employ the actors/agent's perspective as well to get the whole picture. Similar to other authors (Kristensen & Ruckenstein, 2018; Sharon & Zandbergen,

³⁸ Sunstein lists many known examples of nudges in daily life: “a GPS is an example of a nudge; so is an ‘app’ that tells people how many calories they ate during the previous day; so is a text message, informing customers that a bill is due or that a doctor’s appointment is scheduled for the next day; so is an alarm clock; so is automatic enrolment in a pension plan; so are the default settings on computers and cell phones; so is a system for automatic payment of credit card bills and mortgages. In government, nudges include graphic warnings for cigarettes; labels for energy efficiency or fuel economy; ‘nutrition facts’ panels on food; the ‘Food Plate’, which provides a simple guide for healthy eating (see choosemyplate.gov); default rules for public assistance programs (as in ‘direct certification’ of the eligibility of poor children for free school meals); a website like data.gov or data.gov.uk, which makes a large number of data sets available to the public; and even the design of government websites, which list certain items first and in large fonts” (2014, pp.1-2).

2017; Schüll, 2018), this work takes subjectivation as a practice of deliberate and reflexive confrontation and interaction with the ST technology based on sensors and algorithmic recommendations into account. Seeking meaning and making sense of the data generated “is too often unrecognized by the critical literature on the QS movement, a neglect which facilitates a portrayal of QSers as passive, uncritical reproducers of neoliberal tropes of citizen activation and entrepreneurialism who have bought into the promises of Big Data”, Sharon and Zandbergen (2017, p. 1706) aptly remark. Self-trackers perceive themselves in rather different ways and there certainly may be arguments to assume that they just hide or are unaware of those obscured and deeply internalized neoliberal values. For example, in this study’s sample nobody except in two occurrences spoke about their practice in terms of self-optimization and many of them expressed a reluctance in using the word control. Qualitative studies face the problem that the veracity of the statements cannot be verified. Subjects do not necessarily say what they think and do not think about what they feel. The question remains why they were not using these expressions, despite many commentators and, seemingly, the public discourse on that topic do so, as could be asked with Girtler (2001). The self-trackers’ arguments build on an increase of self-knowledge, self-reflection and self-awareness with a possible, although not always applied, improvement in some form.

For Max Weber, the founder of Action Theory³⁹, an important task of socio-cultural studies is the attempt of “interpretive understanding” of the meaning of actions and the underlying motives of actors, in order to achieve a “causal explanation of its course and effects” (Weber, 1922, p.19) for society as a whole. Also, in Bourdieu’s teachings society and its actors impact and produce each other, therefore individuals neither “act like machines, performing simply in the manner they are expected to act” (Bührmann, 2010, p.20) nor do they act autonomously. In ST the feared self-alienation would either be mitigated or counteracted by the possibility of reflecting on oneself using the data obtained. This might in fact be called self-optimization but with a positive sign, understood rather as self-enhancement. This could in turn be countered by Rosa’s argument: “As a consequence, the self-design of a subject can no longer be experienced and affirmed as true or authentic in the structures of (late) modern society, contrary to any compulsion for self-thematization and authenticity. This gives rise to an immediate sense of lack, strangeness and emptiness” (Rosa, 2005, p. 247, cit after Noji & Vormbusch 2018, p. 19). However these sociological

³⁹ Under the term “action”, Weber understands “all human behavior when and insofar as the acting individual attaches a subjective meaning to it” (Weber, 1922, p.19) and is as such based on subjective meanings and autonomous decisions.

approaches may appear oversimplified and generalized from the perspective of actor/agent. Being anchored in traditions and social affiliations is seen as providing meaning and stabilizing, but it neglects the individual experience of this condition. Rather, it argues from the position of a stable identity and (decision-making) security and postulates that a diversity of options is to be equated with a lack of orientation and responsibility with regard to one's own identity formation and life design.

The aim of this work is not to argue for one view or the other but to ask what is obscured by the plausibility and usage of the self-optimization metaphor, both by proponents and opponents. With the notion of "Illusio", Bourdieu (1998) offers an interesting explanation possibility for the coexistence of such seemingly opposite perceptions of one and the same phenomenon. "Illusio is the fact of being caught up in and by the game of believing the game is "worth the candle" (Bourdieu 1988, p. 76-77). Following Bourdieu this would mean that those engaged in ST believe in its contribution to their well-being (broadly speaking), and their own self-responsible and deliberate use of them. For those who are not, this engagement may appear as illusional.⁴⁰ Already since the antiquity different practices of the self and thus also identity formation (today worded as personal development) were recommended and exercised by those who had access to it and whose personal circumstances made it possible for them. For example, the metaphysics, grammar, gymnastics / athletics, art of reflection (Socrates, Aristotle) taught in Greece by Plato in the Academy all served to form and develop the human being and his potential. Later, rhetoric courses served to train speaking and argumentation skills. In all these cases, the aim was to work on the unpolished, uninformed, unknowing "nature" of human in order to direct it in the desired direction. The use of digital technology for the purpose of self-reflection, self-care or self-challenge could also be framed in this tradition. The self-improvements now become more nuanced (e.g. self-help, coaching, meditation, yoga, biohacking) and are used, for example, to "sharpen the senses" as PHIL has said in reference to his ST practice, which will be explained later in the results chapters.

⁴⁰ At some point of my analysis I have pursued to apply and discuss Bourdieu's notion of "Illusio" in context of both intense ST practice on the one side and their disdain outside the group of self-trackers, but due to the limited scope of this work I have to postpone this endeavour.

2.3 Empirical Investigations of ST

From the beginning of this work in 2015 and throughout the process of writing this dissertation a regular search was conducted for articles with the keywords “self-tracking”, “self-monitoring”, “Quantified Self”, “self-optimization”, “self-observation”, “self AND technology”, and “self AND digital Media”. The research interests in empirical studies found to date cover: typologies of ST users and motivations (e.g., Choe et al., 2014; Crisostomo, 2013; Nißen, 2013) modes of ST practices (Li et. al., 2010, 2011; Ledger, 2017; Lupton, 2014b), behavior change (Pharabod et al., 2013; Rooksby et al., 2014), gamification aspects (e.g., Hamari et al., 2014; Lister et al., 2014; Whitson, 2013), health management (Lucht et al., 2015; MacLeod et al., 2013), and self-optimization (Bode & Kristensen, 2015; Lupton, 2016a; Makropoulos, 2002; Meissner, 2016; Ruckenstein & Pantzar, 2017; Sharon & Zandbergen, 2016). Since then, a variety of studies has been published on an ongoing basis.

In the following chapter, we will briefly describe some empirical studies that (in addition to the critical studies presented above) have inspired the present work in three categories: functionality and effectiveness of ST devices, user typologies and modes of practices in ST.

2.3.1 Studies of Usage and Functionality of ST Technologies

The first empirical investigations appeared in the Human-Computer Interaction (HCI) area, where studies sought to review the effectiveness of the ST app design for the purpose of personal and behavior change. Contributors to this literature examined the benefits and advantages of self-tracking practices, the ways in which people use such systems (Consolvo et al., 2009; Li et al., 2010; MacLeod et al., 2013), how they access the preciseness of the tracking devices and react to visualization styles (Choe et al., 2014; Li et al., 2011) and what obstacles they come across (Choe et al., 2014; Rapp & Cena, 2016). Furthermore motivational affordances through gamification functions such as points, leaderboards, badges, levels, story, clear goals, feedback, rewards, progress and challenge (Hamari et al., 2014) were examined and seemed to positively affect health behavior (Lister et. al, 2014). Li et al. (2010) developed a five-stage model of PI / ST device usage for behavior change and in 2011 refined it: preparation (motivation to collect), collection (of data), integration (information in processes), reflection (discovery and maintenance) and action (choosing

what to do with the information). As expected, users first decide what they want to track and how, then they measure and collect the required values which are then processed for a visually or otherwise more comprehensible representation ready for reflection, upon which an action plan to the desired outcome can be built. In the reflection stage some users may be using PI to first identify and determine what behaviors to change in the discovery phase, while other users may have already realized behavior changes and then strived to maintain them. While these kinds of models provide insights for the app's design, they do not explain the background motives and drives, for example why the app is discarded (Ledger, 2017) or cheated (Dudhwala, 2017).

In comparison, in their rich study Rooksby et al. (2014) unexpectedly discovered emotionality and future directedness⁴¹ in the ST practice. "People here do not aspire to do dispassionate data analysis about their bodies, but on the contrary, are doing something deeply emotional and often passionately focused on a future" (2014, p. 1171), the authors observed. Participants were manifestly more entangled with their lived lives where they repeatedly struggled with continuity of use, with technical difficulties or dependencies in relation to their devices and as the situations changed they heavily relied on their gut feelings or intuitions. Self-esteem, pride of achievements, body image issues, aging or broken relationships, mental health, all of which ST projects tried to tackle. Interestingly, study participants used their data almost as gratification or vindication: "they were aggrieved by the amount of activity they were doing and somehow wanted to underline their effort" (Rooksby et al., 2014, p. 1168). ST might be better understood "as prospective rather than retrospective...[it] is about where you are heading in life" (2014, p.1171), they concluded arguing for a lived informatics perspective.

Other scholars report similar observations of affective responses to the ST practice but emphasize their ambivalent nature (Lupton, 2017a; Ruckenstein & Schüll, 2017). People can experience both guilt and pride, disappointment and enthusiasm, obsession and satisfaction about the practice and their data. What McCarthy and Wright (2004) suggested in "Technology as Experience" seems evident in ST: "We don't just use or admire technology; we live with it" (2004, p.2). Personal experience with technology entails emotionality,

⁴¹ The draw on Tim Ingold's (2011) notions to suggest an active orientation towards one's future: "We are reminded of Ingold's notion of 'dwelling'" (2014, p. 7). When people track their activities (when they dwell on data) they are not building a description of their lives but are wayfaring through information. To know ourselves is not to look at the past or even the present, but to the future. Ingold uses the term "wayfaring" specifically to suggest that one is not following a set path to one's imagined future but is navigating using a variety of information, cues, and intuitions as best as one can. Knowing oneself may involve collecting and reflecting on information about oneself but is for the purposes of a life being lived.

intentions, aspirations, values, and ideal imaginations bound to those technologies – what will be discussed in the technology-relations chapter 6 against the backdrop of the empirical material. According to Hansen (2004) the paradox of contemporary subjectivity lies in the “fact that technical expansion of self-affection allows for a fuller and more intense experience of subjectivity, that, in short, technology allows for a closer relationship to ourselves, for a more intimate experience of the very vitality that forms the core of our being, our constitutive incompleteness, our mortal finitude” (Hansen, 2004, p. 589). Morozov jeers cynically, but maybe to the point: “one hidden hope behind self-tracking is that numbers might eventually reveal some deeper inner truth about who we really are, what we really want, and where we really ought to be” (2013, p. 232). As will be demonstrated and discussed in the results chapter 6, while ST technologies address users’ promises – to know oneself completely, to shape oneself into the desired form of being productive, focused, and happy etc. – concurrently, users’ corresponding hopes and expectations are addressed to this technology in turn.

2.3.2 Typologies of Users and their Motivations

The second types of studies, that informed the present work, sought to find a typology of ST users, the types of data they collect, and triggers and purposes for self-tracking (Choe et al., 2014; Crisostomo, 2013; Kappler et al., 2018; Neff & Nafus, 2016; Nißen 2013; Swan, 2013). Reviewing literature as well as the empirical material in this study shows there is no ultimate goal that is inscribed into the practice, except to become self-aware, weather in terms of traits, habits, performance, or mood states, on a numerical basis. Specific individual insights into how certain behavior influences life outcomes may open up possibilities and give ideas to improve desired aspects in life. Self-understanding and self-knowledge, besides the fact that it is written as a slogan on the *quantifiedself.com* website, build a main motor to start with the practice. To see trajectories, progress, trends and correlations assists to perceive possible patterns and to understand certain behaviors a little better.

Throughout the reviewed empirical studies from 2010 until 2018 the following primary motivations were identified: to achieve self-awareness / self-knowledge (Choe et al., 2014; De Maeyer & Jacobs, 2013; Epstein et al., 2014), to improve life / self-help (Ruckenstein, 2014; Sharon & Zandbergen, 2017; Whooley et al., 2014), to reach a specific goal (Choe et al., 2014; Rooksby et al., 2014), to boost self-esteem and discover new possibilities (Consolvo

et al., 2009, Rooksby et al., 2014). For example, Choe and colleagues (2014) examined 83 videos from QS meetups, that were uploaded to the QS blog, out of a total of 205 by mid-2013. They found that people predominantly tracked activity, food and weight for mainly three reasons: improving health (including managing a condition, achieving a goal, making better health decisions or finding balance), improving other aspects of life (like performance or meditation) or finding new life experiences (for example to explore new things and learn something interesting). Based on an early standardized survey with 150 students, Nißen (2013) clustered the main reason for self-tracking practices as follows: playful curiosity with technology, gaining discipline and motivation, medical reasons, the possibility to compare and share results with others, and to self-design (set goals, improve and optimize). Other empirical studies suggest (among others) technical enthusiasm, curiosity and a playful attitude in dealing with self-tracking sensors and applications (e.g., Consolvo et al., 2009; Crisostomo, 2013; Li et al., 2010, 2011; Lupton, 2014b; MacLeod et al., 2013; Nißen, 2013).

Another important motivation (and a finding in the present study) is people's readiness towards maintaining their existing beliefs, known as confirmation bias (Klayman, 1995), i.e., searching for information that confirms their beliefs or interprets the data in a way that suits their beliefs. Being confronted with evidence in the form of numbers often leads to rethink their assumptions. Furthermore, monitoring and recording one's behavior may as such already lead to an improvement as former studies in workplace endorsements suggest.⁴² "Factories perhaps were the first place where people's activities were quantified at scale", Neff and Nafus observe, "with workers clocking in and out and management practices that measured minute details of time and motion to optimize the productivity of workers' every gesture" (Neff & Nafus, 2016, p. 70). A well-known example is Frederick Taylor, who invented the so-called scientific management method (Taylorism) by suggesting a process oriented, detailed, planned workflow (in terms of planned time per performed piece of work) in order to increase productivity and economic efficiency. The same mechanisms could also apply in ST (self-monitoring) projects. As David Pogue, a technology columnist for the New York Times and host of NOVA ScienceNOW diagnoses "...just that awareness that you're being watched and your activity level is being monitored leads you to get more activity. You take more stairs; you get off a subway stop earlier because they reward you with little lights and graphs for doing well" (PBS NewsHour, 2013).

⁴² The Hawthorne Effect describes a phenomenon where participants changed their behavior when or rather because they are being observed. This effect has been controversially disputed though, claiming for example that the conclusion shown here were not precise as the workers may have changed their behavior (i.e., worked harder) because of other reasons and effects such as the experimenter or demand effect. The review and validation of the Hawthorne effect continues today.

Other results suggested that many people did not engage deeply with the gathered data and their meaning (Swan, 2013) and rather needed a pragmatic approach to get problems solved.

While classifications such as user types and reasons behind usage are useful as a first step that can be involved in designing self-tracking applications, they are limited in their capability to providing specific information about the interplay of the actual and the ideal self-image. Studies in this section have often shortcomings, most prominently a potential sampling bias (either students from the researcher's university or QS members) and a lack of replication, and long-term insight but nevertheless provide rich insights that will be described below. User typologies derived from the reasons to track named in (online) surveys may not uncover hidden or competing goals and desires, the mechanisms and role of feedback to them all may stay unvoiced. Many authors conclude that more work is needed to investigate the self-improvement hypothesis and provide a set of recommendations for future work (e.g. Kersten-van Dijk et al., 2017). Recently, and thanks to the popularized usage of self-tracking in the mainstream, those studies not only encompass the early users and technologically savvy and interested so called quantified-selfers (e.g., Bode & Kristensen, 2015; Nafus & Sherman, 2014) but also ordinary users tracking their weight or daily steps (e.g., Kappler, 2018; Nafus & Sherman, 2016; Rooksby et al., 2014; Swan, 2013). Some of these have shown that there are these mundane users who, after all, do not care a lot about the gadgets (or for long) and abandon usage after experiencing technical difficulties (like maintenance issues for example) or only little success (e.g., Didziokaite et al., 2017).

2.3.3 Modes of ST Practices and of Non-Use

Self-tracking cannot be seen as a merely individual and separated practice regarding those who have decided to track the calories they consume or steps they walked through the day. There are several more modes of self-tracking which refer to other actors in the self-tracker's direct surrounding. As Deborah Lupton conceptualized (2015), there are at least five modes of self-tracking to consider beside the private mode, which she ascribes to people who want to achieve self-awareness and improve their life, often with a narcissistic attitude and in a self-experimenting mode, keeping their data private or sharing it with only a few chosen people, like their spouse for instance. However, the other modes were all initiated by others for different reasons: pushed (initiated by the spouse or via the promise of lowered

insurance premiums or reward points), imposed (in workspaces or in enforced geo-location tracking for criminal justice steps), exploited (as in the reaping of data for commercial purposes, like customer loyalty programs) and communal (as in “citizen sensing” (Gabrys, 2014) initiatives for the use of data from personal monitoring devices to track pollution). Oral Roberts University, for example, has required entering students to purchase and wear a Fitbit tracker since 2016 (Frischman & Selinger 2018, pp. 17–18), allegedly for health reasons.

This categorization points to the fact that in some contexts, people are “encouraged, ‘nudged’, obliged, or coerced into using digital devices to produce personal data which are then used by others”, as Lupton (2014b, p.2) argues, often without noticing or being aware of the amounts of data people deliberately deliver for any kind of data science purposes. This typology illuminates the indispensable interactions and recursive effects between those seemingly different modes of tracking, pointing to the fact of “back roads and connector paths that crisscross among self-quantification discourse, data-tracking technologies and practices, bodies, selves, and politics” (Schüll, 2017, para. 16). The individual and social consequences of the widespread usage of self-monitoring systems therefore need new and more long term, designed research approaches to cope with this complexity, which may shed light on the metaphors and imaginaries of these technologies to be examined (e.g., Viseu & Suchmann, 2010).

Neff and Nafus identify “five common styles or purposes” of tracking: (1) monitoring and evaluating, (2) eliciting sensations, (3) fulfilling aesthetic curiosity, (4) debugging a problem and (5) cultivating a habit (Neff & Nafus, 2016, p. 70). Such usage classifications also help to circle the motives behind them. They give a good overview and allow further research in detail but can never be completely comprehensive and clearly separated from each other.

Negative Experiences and Emotions in the ST Practice

Self-trackers sometimes point to negative emotions they experienced while or after being confronted with the tracked data (e.g., Choe et al., 2014, Rooksby et al., 2014). For example, disappointments with the usage of apps lead to frustrations and finally to people ceasing to use them, as Lupton (2018) reports. The apps were unable to recognize specific contexts, or they demand users to regularly and manually enter their calorie intake, which means an additional burden during a day full of tasks. According to an often-cited survey

(n = 6223) from the consulting firm Endeavor Partners in 2014, more than half of individuals in the US who purchased a wearable device abandon it and, of these, one-third did so within six months of receiving it (Ledger, 2017, 2014). The interviewees in this study often criticized that the apps did not cover those functions and features that would have been helpful to them. A well-known example stems from Alexandra Carmichael (2010), founder of the *curetogether.com* patients' community and one of the pioneers of digital self-tracking in the medical area. In her 1.5 years of 40 measurements a day, she experienced fear, hate and self-punishment and became afraid of losing her intuition, even instincts, and eventually stopping to trust herself. Passig (2012) points to reports from self-trackers who, for example, question themselves rather than the technology when there is a discrepancy between their measured sleep data and their personal perception. Further experiences were reported about being obsessed by numbers, for example by tracking calorie consumption or every mile they have run (Bergroth, 2018; Mopas & Huybregts, 2020; Pols et al., 2019). An observation made by a Strava (a step and fitness tracking app and community) user offers another example. He reported in the October 2014 issue of the *Wired* magazine how he caught himself being obsessed and somehow addicted to the urge of running the Strava App while on a rescue mission in the mountains:

“A few weeks later I hit rock bottom. I was on a mountain bike trip in Southern Colorado with friends, and one of the guys decided to climb Mt. Harvard (one of Colorado's most unforgiving 14,000' peaks) the day before our ride—by himself, in shorts and a windbreaker. Naturally he ran into bad weather and got lost. The next morning, as we geared up for an emergency ascent with the local search and rescue team, I had to resist the urge to use Strava. On a rescue mission! Thankfully he stumbled out of the woods about five minutes later, freaked out but okay. I was freaked out too—how had I become so obsessed with tracking?”

Schüll (2016) attempts to point out in her work that providers of ST devices can design them in such a way that people are enticed to use them. She draws on her ethnography about slot machines in Las Vegas which are designed in a way that allure users to gamble game after game, where they are rather about losing themselves in that activity (in the zone), than about winning the game (Schüll, 2012). These alluring elements encompass the choice and adjustment of colors, sounds of control instruments, the shape of the seats, screens and the like. Similar conclusions could be considered about ST gadget providers and their

strategies to maximize the customer-lifetime value. All of the above topics are discussed in more detail in the results section of this study against the backdrop of the empirical findings.

2.4 The “Self” in “Self”-Tracking

At the beginning of the QS/ ST reporting, around 2010, however, little attention was paid to the ways in which ST technologies and practices “draw on, reproduce, and in some cases reconfigure concepts of selfhood”, as Lupton (2014a) remarked. Recently in numerous disciplines researchers pointed to the increased importance of “the self” in general (e.g., Eitler & Elberfeld, 2015) and claimed a turn to the self in human-technology relationship studies (Kou et al., 2019). Also in the context of ST/QS scholars started to reflect on the self (e.g., Buongiorno, 2019; Dudhwala, 2017; Rapp & Tirassa, 2016; Schüll, 2018). For example, Dudhwala concludes that “people are using these technologies to get a better sense of their ‘health’, their ‘mood’, their ‘fitness’ and their ‘behavior’—people are using these technologies to get a better sense of their ‘self’” (2017, p. 98). The formation of the Quantified Self movement can therefore be seen as an exemplification of a renewed or new form of interest in the self. One of the guiding research interests in this study, that will be explained in the next chapter, was: in which ways the “self-part” in self-tracking, i.e., the selfhood/identity⁴³ is affected by the ST practice and ST technologies, i.e., devices and data?

For at least 500 years individualism (as the appreciation of individual, subjective values) has been growing into a central element of western culture.⁴⁴ Modernity transformed “identity from the matter of ascription into the achievement [*sic*] – thus making it an individual task and the individual’s responsibility” to create a stable foundation for life, observes Bauman (1997, p. 20). “We are now, I believe, in another phase of this series of transformations of the self, again in ways that go back and forth between how we see the self and the technology that surrounds us”, argues Galison (2018, para. 9). He refers to the anticipatory function of AI technologies (as in algorithmic recommendations) in contrast to earlier forms of trying to understand the human self via cybernetics. “Instead of

⁴³ In technical and legal discourses, the term identity is often employed to refer to a collection of information that uniquely reference a person or an individual body (Solove, 2006) and as such it is used synonymously with the self (e.g., Taylor, 1989).

⁴⁴ Some authors would even date it much earlier, even before the classical antiquity. See Macfarlane (1978) for a discussion about the durance of the individualization process.

thinking of the self as some abstract mental category floating in a vacuum” (Galison, 2018, para. 8) it is worth the effort, to look at concrete responses, appropriations, and internalizations of ST technologies onto and into oneself, to shed light on this phase of transformations of the self. We lack an understanding of the mechanisms, meaning surpluses and imaginations, emotional values and affects, which are being developed beyond the utilitarian use of ST technologies, and how they contribute to the constitution of the self, and to the relation to itself and the applied technology.

In this work three dimensions of individuality are considered in particular, which appear as aspects in ST. Firstly autonomy, in terms of self-determination and autonomy of action, secondly uniqueness, comprehended as striving for distinction (Bourdieu, 1982), the valuation of singularity (Reckwitz, 2018) or escape from mediocrity, and thirdly self-reflection through media, techniques and institutions of self-thematization. The orientation towards the individual present and future becomes more important than family history and tradition. Additionally, self-tracking seems to attract users just as strongly as technology developers and markets – which also raises questions concerning the self being imagined, conceptualized, addressed, and enacted by technology providers (Schüll, 2016). Before going deeper into these topics, it is required to determine how the notion of “the self” is to be tackled for the further course of this study.

2.4.1 The Self and its Relationships

The self is a delicate category. In western philosophy the self has been discussed in terms of self-determination and individual identity since Plato’s Dialogues *Alkibiades I*, *Apologie*, *Gorgias*, *Symposion* and *Politeia* (Karl, 2010). Before that we can find considerations about the self, reflexive consciousness and identity in the Indian Upanishads, written in the 6th century BC, in the *Tao te Ching* in China, written around 500 BC and in Gautama Buddha’s philosophy, written around 4th century BC (Leary & Tangney, 2012). In the following section, singular philosophic, sociologic, and psychologic paradigms important for the analysis process in this work are briefly depicted.

The Self as Entity, Process, Model or Relation?

Since the 1970s the term has been divided into many subordinated categories, such as self-image, self-concept, self-understanding, self-model, self-identity in psychology, or selfhood, subjectivity, agency, or authenticity in sociology (see e.g., the nearly 1000 pages encompassing “Encyclopedia of Identity” (2010)). A range of scholars have attempted to establish a catalogue of components that comprise the construction of a self (e.g., James, 1890). Some have revealed and discussed parts of the self as the unconscious part (Freud, 1991; Lacan, 1991). Others discussed if there could be one interior, stable and enduring self (e.g., Erikson, 1973), or rather multiple selves (Gergen, 1982) that make their own claims and demands, that are attributed to technological and environmental changes. Or that there was no self in the sense of a unity or interiority (Butler, 2013; Zirfass, 2010), and rather it has to be considered as a dynamic process (e.g., Baumeister, 1998; Buckingham 2007; Jenkins, 2004; Klein 2011), as performed (Buttler, 1990; Turkle 1995), or a mere model (Metzinger, 2010) where the “view of the self has by and large been abandoned” (Zahavi, 2011, p. 322). Other researchers, such as physicians, psychiatrists or at sleep laboratories, enclosed the self in apparatuses in expert chambers for scientific materialistic approaches to research.

Since there is no evidence for the existence of an entity or substance which equals the self, and moreover “the self is not really a single topic at all, but rather an aggregate of loosely related subtopics” (Baumeister, 1998, p. 681) premises are necessary. “To avoid being paralyzed by the task of articulating the infinite nuances and wrinkles that exist within” (Powell, 1996, p. 1483) this work assumes a multiplicity of the self and at the same time consistency of the perceived self as entity. Accordingly, this work is not primarily concerned with ontological attributions to the self/identity/subject, nor with elucidating the nature of mental, self-related states. It rather examines thematizing, explicating, and interpreting the self-related attitudes and behaviors of individuals applying digital technologies on themselves – their imaginations, assumptions, perceptions and expectations about the present self, thoughts and remembering the past self, as well as desires in regard to the future self. These attitudes and behaviors in turn impact values, and norms in societies, which can ultimately take on planetary proportions (Gabrys, 2017). This work also sympathizes with Gonzales’s emphasis of “an emotional matrix that is held in the mind of one person in relation to all the other institutional, linguistic, and cultural contexts of definition that make that person identifiable. [...] Yet it has a kind of local position, a point from which it radiates outward. This local position provides the ground of agency that is neither entirely singular

nor evenly distributed within the political environment” (Gonzales, 1995, p 148). This local position is relational per se, as human beings perceive themselves in relation to their past, envisioned future, and in relation to the various contexts they are living in, experiencing and dealing with.

The Self and its Social Conditioning

The advent of academic preoccupation with the Self and identity is often ascribed to the US-American philosopher and psychologist William James (1890). James tackled the self ontologically and differentiated between two categories: the “I”, the thinking and experiencing self as the subject, and the “Me”, the experienced or empirical self as the object of thought. In ST the user experiences these two modes of existence and operation, too, which on the one hand gives him or her greater autonomy, and at the same time greater self and process responsibility. Building on that differentiation of I and Me, social theory scholars like Mead and Goffman had built the concepts further. Mead (1934), for example, explained transformations of the self through social interaction and elaborated the “Me”-part as the aspect of the self that perceives itself from the outside, i.e., learns to self-objectify itself. He then introduced another part in addition to the two parts of Self, the I and Me, the “Mind”, pointing to the essential self-consciousness of becoming a self. This perspective is also present in ST, due to the frequently mentioned and aspired self-reflection of STers (what will be demonstrated in the findings chapters). Goffman emphasized performative social enactment and developed the social self further in the theory of the “Presentation of Self in Everyday Life” (1956), where our selves are conceived as performing many different roles in interactions with others. Self-representation in social roles plays a minor role in the present study, as neither the QS community nor any other clearly framed ST grouping was specifically investigated, but individual cases according to the grounded theory approach explained in the next chapter. Mauss (1985) elaborated how the human as a person is embedded in its social context and thus socially mediated, but at the end it is the result of individual consciousness and as such modifiable in the course of time and space. This perspective substantiated this study’s focus on the individual, the actor and agent. Further social theorists such as Giddens (1991) and Bauman (1999) theorized the self against the backdrop of modernity and postmodernity as self-reflective, self-responsible, and inevitably integrated in ongoing choices and modulations (Deleuze, 1992) in the course of life. Giddens was intrigued by the growing amounts of reflexivity in all aspects of society, from formal government at one end of the scale to intimate sexual relationships at the other “which let

society appear” as Gauntlett formulates (2002, n.p.) “not only reflexive but also aware of ‘its own precariously constructed state’”. Subsequently the historicity of the social construction of the self, by Foucault (1990) or Adorno (1966) was emphasized. Besides their historical analyses they thought about possibilities and practices of self-determination and self-liberation amid of the socio-historical realities and conditions of the self. Continuous technical progress, the differentiation of societies, and the constant competition between humans, lead to the social coercion of self-control and discipline in the western civilization process, Elias (1939) has observed. As will be shown in the course of this study, the next determinative variable of the self is currently technology.

Technological Self-Concepts

Bodies in ST are to some extent treated like machine-like-bodies and data-like-bodies (Kappler, 2017; Lupton, 2013), functioning input-output entities that can be managed by numbers. Different ages had different concepts about the self and body, often following the current state of technology. Accounts of automated people and androids existed in China as far back as the 3rd century BC (Spreen, 2015). They instead served as sources of moral teachings than models for the situatedness of humans in the world order (Spreen, 2015). Human self-images were and still are influenced by the tools and machines constructed and built at the current time, building a rich source of technical metaphors for the human body. In the 15th century, people believed that the human body was a mechanism in the same way as a clockwork⁴⁵. Today increasingly science-fiction literature contributes to self-images, such as the figure of the cyborg. Machine aided manufacturing originated in the 18th century, led Julian Offray de La Mettrie (1748), among others of his time, to anthropomechanistic viewpoints and to conceive of a machinistic/mechanistic functioning human. The metaphor of a machine, which La Mettrie had used, describes however a “specifically materialist form of embodiment, in which the body is not reduced to an

⁴⁵ Descartes (1641/2008) assumed that everything about human beings can be fully explained in mechanical terms. “I should like you to consider that these functions (including passion, memory, and imagination) follow from the mere arrangement of the machine’s organs every bit as naturally as the movements of a clock or other automaton follow from the arrangement of its counter-weights and wheels” (Descartes, 1641, p. 108). Before him, Johannes Kepler writes in a letter to Herwart von Hohenburg in February 1605 that he aims to show that the whole universe is not a divine creature/ entity but a quasi-clockwork. Before him, in the 14th century, French bishop, scientist and philosopher Nicolas Oresme made similar considerations regarding the regular movements and circuits of the surrounded nature. Comparisons also arose to a machine-like state system and society with Thomas Hobbes’s *Leviathan* (1651). The inner life was first seen functioning after mechanical rules by David Hume in 1738. With Taylorism, the performance of work activities in factories was first timed with a stopwatch.

inanimate machine, but is conceived as an affective, flesh-and-blood entity” (Hunemann & Wolfe, 2017), and anticipated neuro-cybernetic metaphors of a bio-machine. The invention of the steam engine and the subsequent innovations during the industrial revolution, from the second half of the 18th and beginning of the 19th century, stimulated mindsets for the self-interpretation of the human being. Sigmund Freud, for example, used the functional principles of a steam engine to formulate his ideas of a “psychic apparatus” (1958), functioning mechanically with instinctual drive (Triebdynamik), desire congestion, instinctual voltage (Triebspannung) and repression or redirection of energies. The invention of the telegraph and telephone immediately evoked viewing the human being as a relay station for the transmission of communicational data, like suggested by the pioneers of information theory Claude Shannon and Warren Weaver (1948). The development of electronic calculating machines, led to models of brains as information processing, bio-electrical machines and minds reproducible in neural networks. Not only are the human body and mind often seen as machine-like entities, but these analogies also dominate or undermine our thinking and feeling to a not inconsiderable extent. Since the emergence of computer technology in the 1960s, we became accustomed to think, speak and act in its terms and procedural processes. Not only is everyday life planned in to-do lists and flow charts, and our language is biased by computational expressions (such as “I have this on the screen”⁴⁶, “I saved this”), but our self-image is also affected. This may lead to believe that through ST technologies external senses and formerly impossible abilities can be acquired. For example, a sense for the current blood pressure or the calorie count of a meal, to control dreams, and even an inner data-based “concept for oneself” (Isgler) are examples that will be explained in the results chapters.

The Self as a Cybernetic and Manageable (Feedback-) System

Regarding the feedback loops in ST, i.e., the actual measured data and the forecasts, predictive analyses, and guidance obtained from the underlying algorithms, ST technologies can be viewed as cybernetic mechanisms. With the advent of cybernetics as a “science of control and communication in the animal and the machine” (Wiener, 1947), a figure of seeing the self and the body as entrenched in technological development emerged. Wiener, drawing on Shannon’s information theory (1948), suggested seeing the body in terms of inputs and outputs, like incoming and outgoing messages in information systems. He

⁴⁶ German saying “auf dem Schirm haben”, equivalent to the english: “have / be on the radar”.

designed a feedback-based learning model to anticipate the behavior and decisions a bomber pilot would make about his flight route⁴⁷. Intentions became characterized as predictable, goal-directed processes by observing external actions. Even in the absence of a concrete understanding of the interior mental processes, one expected to be able to anticipate future actions. The first wave of cybernetics was therefore all about control phantasms⁴⁸.

From the perspective of a cybernetic epistemology of self-regulation through feedback, ST may appear as an expression of the cybernetic control idea. The latter, in fact, may be applicable to virtually every somehow recurring process, nevertheless it can also be considered in the circular and, as will be shown, in principle incompletable, process of ST. Schaupp (2016) approached ST as self-optimization, in the sense of cybernetic control, whereby the controlled system was constructed so that seemingly purposeless evolution becomes self-optimization in terms of control objectives. "Against this background, self-tracking can be understood as cybernetic self-technology that helps users meet the demands of the post-Fordist economy, which no longer relate only to the world of work, but to all areas of life" (Schaupp, 2016, p. 79). By optimizing itself, a self-organizing system acts in terms of evolution, adapting better and better to its tasks and functions and becoming less dependent on external (confounding) factors – which corresponds to the self-image and perspective of some STers in this study. From the very beginning of the discussion about ST praxis, there has been an undecided dispute, about whether this control is based on autonomy or heteronomy, which is not resolved in this work either, however is acknowledged. While the former proponents point to self-data that is firstly generated and secondly autonomously and reflexively reconsidered in a “continuous process of identity construction” (Sharon & Zandbergen, 2017, p. 1705), representatives of the counter- opinion point to governmental mechanisms. “The specifically cybernetic-biopolitical about self-measurement practices is the moment in which the increase in productivity increases the improvement of life as a whole, of the whole bios, of man as such” argues Hille (2016, p. 103). Cybernetics blossomed to become the most invasive principle to describe the emerging

⁴⁷ Similar cybernetic processes can be observed and applied in the daily life, for example while playing and trying to catch a frisbee or a ball.

⁴⁸ Further developments of cybernetics were engaged in thinking about the observation of the observation and the control of the control (Von Förster & Abramowitz, 1995) as well as self-organizing systems and autopoiesis (Varela et al., 1974). According to Dirk Baecker, Heinz von Förster did not write his own monographs but instead mostly journals and conference articles. This publication is based on an original edition prepared by the students enrolled in the “Cybernetics of Cybernetics” course taught by von Foerster during the fall semester of 1973 and spring semester of 1974 at the University of Illinois. For a comprehensive contemporary document on the cybernetics debates, see Pias, C. (2003): *The Macy-Conferences 1946-1953*.

and evolving feedback loops among digital media and culture and the individual self-concept. Now we encounter many more technologies and techniques from various areas like artificial intelligence (AI) and machine learning (ML), bioengineering and neurosciences, virtual and computer mediated communications, which will disrupt, adjust, or renew and lead us to rethink the concept of the self in our technologically mediated and imbued world.

The exploration of some of the constraints and responses to those constraints, which go into the constitution of the technologically mediated self – that dissipated, fractured, dynamic, limitedly contingent and problematized subjectivity which appears as the product of its own increasingly ubiquitous cybernetic technologies, leads to approaching the self in self-relations specifically.

2.4.2 Self- and World-Relationality

The Human Experience of Having and Being a Body

The dichotomy between the objectified body and subjective sensation of the ST user already mentioned suggests a consideration of self-relations. The self-tracking practice as a practice and medium/technology of self-mediality⁴⁹, is involved in the individual's construction and maintenance of self-relations. The natural human existence not only lives and experiences the world but is also experiencing oneself not only in intellectual aspects, but also the sensual, emotional, imaginative, and valuational aspects of that experience. Plessner (1975) pointed to the relationality or double aspect of the human existence, in world and self-relations, when she or he is capable of reflection on themselves, and "not only lives and experiences, but experiences his or her experience" (Plessner, 1975, p. 292)⁵⁰. This is what Plessner calls stages of positionality and he attributes an "excentric positionality" to

⁴⁹ Drawing on Hubig (2006), the term mediality describes an instrument for an exploration and understanding of the world, which, depending on the medium used, opens but also constraints possibilities to act or perceive the world.

⁵⁰ In contrast, an animal or plant, to which "its own being is hidden" (Plessner, 1975, p. 288) acts from the center but has no relation to it, it does not live as a center. Plessner conceptualizes this reference as reflexive, i.e., not necessarily permanent, it can only take place in the one moment, and refers to the ability to experience oneself outside of one's center from which a being (human, animal) is acting as well as experiencing the world. In that sense he admits that animals are able to have memories of their past but are not able to see, think and relate to themselves in a present, past or future moment.

humans, which means that he or she can step out of (=ex) the center, thereby gaining a distance that enables him or her the "total reflexivity of the life system" (1975, p. 290). Following Plessner, the knowledge of "having a body" (Körper haben) and "being a body" (Leib sein) induces people to relate to themselves.

Digital technologies in general and reflexive self-tracking in particular have transformed the ways people attend to themselves. It has "created new ways of knowing and imagining the self, new ways of seeing and assessing the self" (Brubaker, 2020, p. 772), i.e., constructing the self from the inside. The tensions, reflections and negotiations that many STers experience in their practice, demonstrate that the "relationship between so-called objective data and so-called subjective experience is hardly a zero-sum game", Sharon and Zandbergen (2017, p. 114) argue. Experiencing technology as providing information on bodily functions such as, for example, blood sugar being in a normal range, can deploy this technology not only for the mere information but also to calm down because of it, or to get motivated, feel proud or rewarded because of an achievement. Thus, technology triggers one's emotional states and in sum collaborates in the formation and establishment of technologically mediated self-relations. One can already see here how a sense of self is conveyed by technology which is thus (co-)responsible for its emergence. Other authors have also referred to changes in relationships with the body and with oneself in self-tracking and life logging practices (Bergroth, 2018; Duttweiler & Passoth, 2016; King, 2013; Pantzar & Ruckenstein, 2017; Straub, 2019). That often-observed insight leads some authors to speak rather of a qualified self than a mere quantified self (Belliger & Krieger, 2016; Davis, 2013; Swan, 2013) that oscillates between numbers and subjective interpretations. According to Belliger and Krieger, real self-knowledge can only consist of both and they integrate these "into networks of identity, society, and meaning" (2016, p. 25). In the increasingly digital and networked environment in which we live, ways are additionally opened to shape, configure and represent the self through these digital technologies from the outside. For example, predictive models transform digital records of human behavior on social media (which is in the same way also possible for ST data) in valuable information about personality traits, political views, intelligence, or the use of addictive substance and many more (Kosinski et al. 2013) for the benefit of third parties like insurance companies, employers or schools. "Knowing the self through numbers is therefore not only a reflexive practice, a way in which the self is known from within; it is a computational process, a way in which the self is known from without" Brubaker (2020, p. 784) likewise reminds us.

Technologically Mediated Relations to the World

The technological mediation of the human experience (perceptions, interpretations, and actions) in relation to the world has been discussed in post-phenomenology as introduced by Ihde (1990) and continued by Verbeek (2005). Because ST studies have also arisen that have chosen this reference (Kristensen & Prigge, 2018; Wiedemann, 2019), it is useful to briefly introduce it here. Postphenomenology does not see technology in the realm of the objects of the world, as opposed to the human subject; rather, technology mediates the relationship between humans and their "lifeworld." Ihde identified four relational qualities in the human-technology-world relationship: embodiment, hermeneutics, alterity, and background. In the embodiment relation, people experience the world through the artifact/technology, such as using a microscope or glasses, a hammer, a phone, or a walking stick. Technology is experienced as an extension that enhances or amplifies interaction with the world. "I take the technologies into my experiencing in a particular way by way of perceiving through such technologies and through the reflexive transformation of my perceptual and body sense", argues Ihde (1990, p. 72). These kinds of bodily extensions provide an experience of a malleable "body image", which is extendable or reducible in terms of the "material or technological mediations that may be embodied" (Ihde, 1990, p. 74). The embodiment and the hermeneutic relation seem most applicable to the ST practice, as for example with seeing (in the sense of monitoring) continuously or over a certain period and interpreting inner bodily values (e.g., heart rate, glucose value) or the outputs of the daily performance, either in the job (e.g., 6 hours of focused work) or in sports situations (e.g., 10 km running daily), can mediate the way we perceive and experience – ourselves. ST technology, such as heart rate or sleep sensors, can build a "partial symbiosis" (Ihde, 1990, p. 99) with the inner senses, conveying the perception about being stressed or feeling well-rested. Additionally, we could perceive and imagine our bodies as healthier and better good-looking and productive forces good enough to make us feel satisfied with our expectations and social demands. Social psychology calls this kind of motivational drive to reach such a state of mind self-enhancement. It describes the human desire (interest) to enhance the self-concept's positivity by advancing one or more self-components (Alicke & Sedikides, 2009). This theme frequently recurs among the STers in this study and will be demonstrated in chapter 5.2.

Nevertheless, these relations do not stay exclusive but can change⁵¹ in time and context, and this system can furthermore be expanded. Drawing on Ihde’s four human-technology-world relations, Kristensen and Prigge (2018) developed a typology of four “self/technology/world associations” that emerge with and through ST. These associations encompass enactment (to address a data-self that can be reflected on), experience (to address the broadening of one’s sensual experience via the data retrieved by a sensor), entanglement (to address users’ negotiations with the data and technology) and integration (as a kind of background usage, primarily to record and store the data without further engagement). Wiedemann (2019) applies Ihde’s system by showing how self-trackers make the data credible and significant for themselves through self-effects, understood as repeatedly produced resonances on themselves using ST technology. In her study on ST diabetes patients, she classifies four socially imprinted affects - technology relations that comprise: the sense of a competent self-healthcare, the sense of mindfulness (opportunity to reflect on oneself), the sense of order (in the sense of objectified and stored information) and the sense of modifiability in the sense of behavioral and bodily change. These classifications open and emphasize new perspectives from which to discuss the ST phenomenon's numerous facets further. However, since the approach to self-technology relations in this work, the results of which are discussed in Chapter 6, focuses on the self and self-experience rather than on human experiences in and of the world, it differs as such from the post-phenomenological approach.

2.4.3 The Self as Subject

In addition to the considerations of how to approach the self in self-tracking in the research process reflective self-tracking, is both the subject and simultaneously its object, the term "subject" will be considered next. It stems etymologically from the Latin term *subject* and oscillates between two hard to reconcile poles. On the one hand, there is that autonomous and epistemological unity (used primarily in philosophy and in that context interchangeably with the self), and on the other, something that is subordinated to or at least deeply interwoven with external powers and constraints of society (Elias, 1996), and the

⁵¹ For example, electricity as a background relation can alter into a hermeneutic relation if we want to determine the exact amperage and it might change into an alterity relation when we use home assistant systems to adjust the brightness in the room.

prevailing discourses (Foucault, 1981). Sociological analyses of the subject in its historical and contextual embeddedness (e.g., Bourdieu, 2002, Bröckling et al., 2011; Bührmann, 2012; Foucault, 1991; Reckwitz, 2008) unveil “subjectivation processes [...] as ‘biographical illusions’”, (Bührmann, 2012, p. 21). The question that is often asked but will probably never be answered unambiguously is: Is the subject a normatively given form (in the above sense) of being and acting in the world or is it a mode of becoming a subject through perceiving, experiencing, and interpreting oneself and others in an empirical, lived world? Accordingly, discussions about the self/subject in ST in many cases operate in this field of discussion, asking questions about how (in-)dependent the ST practice really was, to what extent free will or neoliberalism determined what to track, and to what extent hidden power relations (i.e., market economies or governmental interests) behind technological affordances and algorithmic calculations decide. As we can witness in these days of the COVID-19 pandemic, “public health is an intensely political issue” (Braidotti, 2020, p.466). Governments, some more, some less, demand or recommend their citizens wear masks, practice social distancing, work from a home office, install an app which records and transmits encounters with and movements of potentially or actually ill people and follow many other measures to lower the risk of the COVID-19 disease. The question of voluntariness, voluntary or forced submission to these protective measures also leads to many undecided controversies.

In his later phase of thinking and writing Foucault disclosed that he, in fact, was continuously concerned with the self in his writings. “When I began to study the rules, duties, and prohibitions of sexuality, the interdictions and restrictions associated with it, I was concerned not simply with the acts that were permitted and forbidden but with the feelings represented, the thoughts, the desires one might experience, the drives to seek within the self any hidden feeling, any movement of the soul, any desire disguised under illusory forms” (Foucault, 1988, p. 16). In search of the subject beyond discourse, he found a kind of principle “not of the body but of the soul” (1997, p. 230) that was able to use tools or clothing and act upon possessions as self-care, thereby constituting itself. This work follows Foucault’s thoughts in that respect and assumes a subject that can answer to external subjection constraints and constitute him or herself by applying techniques of self-care to profess and acknowledge his or her own subjectivity. However, forms of subjectivity continually change (Reckwitz, 2015) in relation to current societal changes, such as economization of life and global developments, for example information technology as well as medicine with bio, neuro and genetic engineering. Accordingly, when theorizing post-humanist agency within the QS movement, Danter and colleagues point to the analytical

difference that “the concept of ‘subjectivity’ becomes a central reference point, as it emphasizes the dimension of approaching and experiencing the world as a thinking, acting, and feeling subject” (Danter et al., 2016, p. 55). Although essential in the social fabric, the subject is often a sideshow and is discussed more as an epistemological variable specific to the context of power and therefore does not fit the focus of this thesis well. The subject in this sense will therefore not be further examined here.

Foucault’s ‘Technologies of the Self’ as Practices of Self-Care

The often-employed reference to Foucault in ST studies (e.g., Fröhlich, 2018; Lupton, 2013; Rich & Miah, 2017; Viseu & Suchman, 2010) deploys, besides governmentality and biopolitics, his conceptualization of the Technologies of the Self. According to Foucault technologies are not to be seen as opposite to the self, but as ways to shape oneself in a desired way in interaction with the environment. Foucault determined four types of technologies – which he understood as techniques of engaging with ourselves to “reveal” the truth of who we are and what our desires are – involved in this process. Besides the much discussed technologies of power, “which determine the conduct of individuals and submit them to certain ends or domination” with the result of “objectivizing of the subject”, he devised the “technologies of the self, which permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and ways of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality” (Foucault, 1988, p. 18).⁵² The threat to individual autonomy can be countered through self-creation via creative self-care practices. Pursuing hermeneutics of the self in such a way means to look at “different ways in our culture [such as economics, biology, psychiatry, medicine, and penology] that humans develop knowledge about themselves” (Foucault, 1988, p.18). Developing self-knowledge through numbers via ST can be seen as a further self-creative practice in this series of technologies of the self in which “oneself takes the self as an object of knowledge and realm of action, for the sake of reshaping, improving, reforming, creating his or her own salvation” (Foucault, 1986, p. 59). Many of the by Foucault recommended practices, such as exercise, meditation, reflection, nutrition, and cosmetics, as well as thinking and talking about one’s beliefs, thoughts, and emotions (Foucault, 1989, 1998), are

⁵² The other two are: “(1) technologies of production, which permit us to produce, transform, or manipulate things. (2) technologies of sign systems, which permit us to use signs, meanings, symbols, or signification”.

objects of measurement and reflection in ST practices. As will be shown, these new digital technologies of the self contribute to shaping, extending, and intensifying relations to the self and to technology.

Co-Construction of the Self with and through Technology

It is uncontested that self-understanding and thoughts, affects, and actions based on it, are not only impacted but also co-constructed temporally (Heidegger, 1927), socially (Goffman, 1956), culturally (Hall, 1990), and increasingly technologically (e.g., Miller, 2011; Turkle, 1984, 1995). Early ethnographical investigations on the culture of individuals working or playing with personal computers (PCs) like Sherry Turkle's "The Second Self"⁵³ (1984) and "Life on the Screen" (1995), or Miller and Slater's (2000) study on the effects of internet on a society, have already demonstrated the technologies' significant impact on the individuals' self-conception and their interwovenness with technology. In the relationship with computers, users thought about identity as multiplicity and explored forms of self-presentation, experimenting with idealized, new, or never expressed parts of their identity and built "new aesthetic values, new rituals, new philosophy, new cultural forms...[and thus] a self by cycling through many selves" (Turkle, 1984, p. 156). "I feel very different online...I would say I feel more like myself. But that's a contradiction I feel more like who I wish I was", she quotes a person she interviewed (Turkle, 1995, p. 195). In and through the relationship with computer technology, numbers were no longer abstract, "they became concrete, practical, and playful", Turkle (1984, p. 158) argues. We now face virtually 40 years of experience with PCs, since Turkle's research, and everybody knows how profoundly communication culture, symbolic and linguistic expressions, working conditions, shopping habits, and many other aspects of our daily lives have changed under the technological influence. Similar or more pervasive impacts can be expected with technologies that can be applied to oneself and one's own body, technologies that help with daily decisions, provide advice and knowledge and serve as collaborative partners in our personal development.

⁵³ Turkle investigated here the role computers played for first generation users to an extensive scale with children, employers, engaged hackers, and artificial intelligence developers. She found a "shared quality of relationship with the computer, an aesthetic of using the computer for transparent understanding" that users in that culture shared and diagnosed the PC as a "catalyst of culture formation" (1984, p. 156). PCs moreover influenced their self-concepts, their jobs, relationships with others, and their thinking about social processes.

While Turkle took the perspective of French poststructuralists and postmodernists and had focused on creative human approaches and multiple appropriations of computer technology, other authors recently took the opposite materialistic perspective and investigated the human-technology relationship by focusing on the materialistic powers and mutual interferences of the involved parties. The idea of technology influencing and being effective on humans, shaping them to a certain extent (and not only the other way around) in their individual self-understanding and socio-cultural embeddedness has been taken by a number of scholars who work on the HTR and explore their manifestations, and interrelations and demonstrate both, agentic-shaping (Barad, 2007; Bennett, 2004) and social shaping-the-world (Haraway, 1991; Ihde, 2002) technological powers.

ST devices generally encompass not only the possibility of measuring, keeping track, and storing recorded self-data, they mostly also offer the possibility of sharing and comparing that data either within the brand’s community (such as its discussion forums) or on social media. Despite the affordance of many self-tracking applications to share one’s tracked data on social media, it was barely exerted in my research sample or in the majority of empirical studies that were analyzed, nor was it a topic in the over 400 videos from show & tell presentations in QS meet-ups – except those showing one’s data in the presentation itself. The present study hence omits the aspects of public data sharing, for example on social media. Instead, it focuses on the data’s relevance for the tracking individual and its impact on self-relations based on the exertion of the ST practice as such, the interaction with the ST technology, and, if applicable, the intraindividual comparison with one’s own historical data.

2.4.4 New Conceptions for New Selves?

Framing the Self in new Concepts and Coinages

Fundamental social, demographic, and economic changes of the 21st century have triggered fundamental transformations of subjectivity, with respect to self-regulation, self-management, and self-governance (Bühmann & Ernst, 2010). These transformations of the self have been captured in vivid academic discussions in various neologisms. For example the reflexive self (Giddens, 1991), saturated self (Gergen, 1991), fractured liquid self (Baumann, 2000, 2005), or the networked self (Papacharissi, 2010) reflect power relations of

the selves as subjects and objects of fragmentation and aggregation and continue today in relation to technologies and data. Deleuze's (1991) notion of the *dividual*⁵⁴ as a compilation of bits of data about a person from different sources, such as position, transaction data, address, and the subsequent assembly of discontinuous data points⁵⁵ is an apt anticipation of the later conceptualized data selves and algorithmic selves in ST and AI research (e.g., Cheney-Lippold, 2011; Lupton, 2016).

In the context of social media, Horning (2015) described the 'data self', which is being represented via social network profiles and actions. Further concepts with a similar representational function of data, think of the self as represented by data to a certain degree and thus inevitably reduced. These concepts include a data proxy (Smith, 2016), pixelated person (Greenfield, 2016), algorithmic identities (Cheney-Lippold, 2011) and algorithmic selves (Pasquale, 2015). Lupton (2019) refers to the volume of data generated and collected by digital ST technologies as "Data Selves". Buongiorno (2019) considers the 'digitally extended self' as one that represents "our *ideal* selves, our *possible* selves, *aspirational* selves, or *alternative* selves" (p.64). Further intriguing concepts about the self in ST studies appeared.

The 'digital doppelgänger' is a figure of thought for Bode and Kristensen, who conceptualize "the process of self-tracking subjectivation" on behalf of the "metaphor of the digital doppelgänger: a digital version of the self that is perceived as 'more you than you are yourself'" (Bode & Kristensen, 2015, p. 119). The outcome is not a result of that process, rather it is a "relational actant in a performative process" (Bode & Kristensen, 2015, p. 119). The self, reflected in the data, is given a kind of vitality of its own and reacts to the ST-user. The figure of a data double was formulated by Hagerty and Ericson (2000), to describe an assemblage of numerical data about a person that is being collected by numerous data collection points on the street, in shops and online in daily life - giving it a quality of its own. These neologisms offer useful to formulate succinct descriptions, point to manifold aspects, and apprehend emerging transformations of the self in digital environments. Schüll conceptualizes the tracking selves, "whose truth lies in scattered points, associations and dynamic accretions" (Schüll, 2016, p.9), as 'database selves', "the ideal subject[s] of

⁵⁴ Dividuals as infinitely sub-dividable collections of data points are no longer stated in the institutionally and architecturally enclosed laws of behaviors and discourses in Foucault's disciplinary society (1977), but rather in its transition, the "societies of control". Deleuze thinks of control with reference to William Burroughs "Limits of Control" (1978) and Paul Virilio's "ultrarapid forms of free-floating control" (Deleuze, 1990, p.4).

⁵⁵ Harcourt (2015) develops this notion further to a duodividual in the context of surveillance studies.

continuous tracking and its technologies” (Schüll, 2016p. 8) that have been designed and planned as permanent consumers of self-tracking devices. The uncertain phenomenological self, physically located in time and space, experiences new sources of senses and truth that create a “sort of fourth-person perspective” (Swan, 2013, p.95, as cited in Schüll, 2016, p. 9) for enhanced and meaningful epistemologies.

ST devices used in workplaces “provide personal analytics that allow people to explore various aspects of ‘autonomic selves’ or selves that would not otherwise be knowable except through such intimate data generation techniques” as Moore and Piwek, (2017, p. 311) argue. Productive periods of the day can be identified by analyzing detailed activity reports and provide employees with individual recommendations into how to manage time. Under-articulated risks of broader data collection technologies in “surveillance capitalism” (Zuboff, 2019) are however implied, since constructing an authentic and distinctive self could shift from being self-reflexive and socially shaped to algorithmically driven and attested. “The “personalization” that is promised on every front—personalized recommendation engines of all sorts, personalized shopping (along with personalized prices), personalized health, personalized news, personalized advertisements, personalized learning, personalized music—depends on the ever-more-refined algorithmic constructions of individuality” as Brubaker (2020, p. 788) aptly points to.

First studies about the Co-Construction of the Self in/with ST

In their empirical ST-study, Kristensen and Ruckenstein (2018) conceptualize “a laboratory of the self” (p.1), where the self is being formed and reformed and thereby co-evolves with the ST technology. STers use metrics and technologies as “resources and collaborative possibilities in the course of self-making and self-improvement” and creatively self-transform when they “take the self apart, to highlight certain ‘authentic’ aspects of it or to intensify human agencies or senses” (Kristensen & Ruckenstein, 2018, pp. 2-3, 12). As such, the laboratory of the self offers an environment to experiment with aspects of one's self-image and desired personality in a self-determined way, and in turn to set impulses for further development of ST devices. With the “self in the loop” Schüll contributes to attempts to describe “the fragmented, alienated and exploited selves of the datafied world” (Schüll, 2018, p. 35) that make sense of their data through quantitative autobiography and self-portraying. Digital models of ourselves with numbers and patterns eliminate uncertainty and “make us feel more solid as selves in the world” (Schüll, 2018, p.32), revealing liberation

and gained agency caused by ST practice One of the QS founding figures, Kevin Kelly, puts it this way:

“Identity is our mystery. We have no idea who we are – what humans are, and what humans are good for. [...] Are we machines or something spiritual, or even supernatural, something unmeasurable? Self-tracking and the quantified-self movement are contemporary probes into this mystery, part of our feeble attempt to figure out who we are – as individuals and a collective. Quantifying your self is an act of self-assertion. All this attention is not a narcissist adoration of the self, but a self-definition in an age of great uncertainty about who we are” (Kelly, 2011, para. 14)

These observations recall the earlier discussed diagnosed uncertainty in the liquid modernity (Bauman, 1999), which places new duties of responsibility on the individual, where self-chosen ones replace traditional patterns, and one’s existential creation is becoming a normative mindset. While earlier societies with a social order based rigidly on tradition had provided clearly defined roles, individuals must work out their roles for themselves in post-traditional societies. The reflexive self-identities answer the central questions – “What to do? How to act? Who to be?” (Giddens, 1991, p. 70) – either cognitively or through day-to-day practical and social behavior. A psychodynamic case study (King et al., 2014) examined a STer’s account of his interests and usage of self-tracking and analyzed this person’s biographical details, such as relationship with his family, professional situation, and symbolic expressions in his accounts. Psychodynamic research focusses on stabilizing psycho-dynamic factors in life. These factors may influence and reflect a socio-cultural identification or identity formation, for example how “in dynamic, growth-oriented, accelerated societies, continuous performance improvement and self-improvement is considered necessary to keep up” King et al., 2014, p. 283), the authors conclude.

From a phenomenological and constructivist perspective, Rapp and Tirassa (2017) propose a shift from discussing the self in terms of a cognitive-behavioral approach in personal informatics and refer to a view from within⁵⁶. They refer to the three modes of the

⁵⁶ They began their study with a wrap up of different psychological positions about the mind, that they set equal with nature and used as synonyms drawing back on Bruner (1990), Guidano (1987, 1991), and Maturana and Varela (1980). Their overview of different psychological positions lists the self as: “a flow of subjective experience (which is our position as well); that it is a software program or set of programs; that it just does not exist; that it might as well exist but, being unobservable from the outside, is not a worthy object of study; that it is completely reducible to the material functioning of the brain; and others” (2017, p 342).

temporal self, and a fourth entailing social interactions of presenting and comparing one’s data with others and recommend to PI designers on how to support best the needs of the particular self. For example, to support the needs of the past self, appropriate memory support and archiving functions with a proper presentation function according to the user’s present needs were required (Rapp & Tirassa, 2017). Motivational and nudging functions in form of incentives for behavior change of the future self, support current goal setting. AI and machine learning techniques could provide PI systems with “features for predicting and simulating the future evolution of the data collected, not only as tools for decision making or to suggest courses of actions but primarily to provide users with additional contexts of meaning for interpreting their present self”, Rapp and Tirassa (2017, p. 359) argue. The prompted users’ wished and unwished future projections of themselves could thus be materialized into visible representations that substantiate their intentions and motivate them to achieve them. The temporality and volatility of the self is considered in a study by Bergroth (2019) who, drawing on Stiegler’s (1998) concept of temporal flux and cinematic time, discusses the coincidence of the self as “spectator and assessor of itself” (Bergroth, 2019, p. 195) in the ST practice, in and through which “the self is produced and lived as perpetually ‘unfolding’” (Bergroth, 2019, p.190). In the ST practice, the self as a temporal object becomes an ongoing process of knowledge production that can never be fully completed, no matter how much data is being collected or for how long. The incompleteness of the ST process will be discussed in more detail and with respect to self-optimization against the backdrop of the empirical results.

As a result of above considerations, the research object is not the ontological or the epistemological self in ST, but rather the relational. Instead of focusing on the self or the subject, this work will investigate the self-relations in ST. The analysis searches for meaningful, life-stabilizing, or newly emerged relations to oneself as well as to the applied technology through and with ST technology and practice. Taking the frequently diagnosed optimization hypothesis in ST as a starting point, further nuances of this meaning for STers are sought, for example those of affirmative optimization or a balancing one. The specific research questions will be derived from this next.

3 RESEARCH DESIGN

3.1 Research questions and contribution

Based on the initial interest and trigger for this work, the initial question relates to the meaning of self-optimization for individuals using ST technologies, against the background of the socio-economic reality they are living in. This part was not surveyed directly empirically but was analyzed from the discourse analysis, the media analysis, and the interpretations of the statements of the study participants (see especially chapters 2.1, 2.4, 6.1 and the conclusion).

The central part of this dissertation is devoted to illuminating two research topics: how does the on-self-application of ST technologies impact, enable, and co-construct the relations to ourselves and the applied technologies? (Chapter 5 and 6). The aim is to shed light on the "self-part" in digital ST and the self-and technology relations in and with the ST practice its technologies (apps, gadgets) and results (data) by interweaving theoretical analysis, hypothetical construction, and empirical demonstration. The practice of ST is thereby considered an individual technique of self-monitoring and self-measurement/self-quantification and as a (social) symptom in which current investigations of / entanglements in the search for self are reflected. In what dimensions/modes is the ST practice subjectively meaningful? Which relations to the self become evident through ST practice and technology? Are they distinct, competing, complementary, or coincident? How do these relations manifest themselves, and do they stabilize or hinder us in conducting our lives to contentment? Do they affirm, mediate, or balance the experience of intertwined structural and agential dynamics, or all together? How do they relate to the discursively stated self-optimization hypothesis? Furthermore, no less critical: What role does ST technology play in this, and what significance and relation do it have for us? Does our relationship with technology solely continue as a means-purpose relationship, or is there evidence of new (or a new dimension of) ways of seeing and dealing with technologies?

This work makes three contributions to the discussion of the complexity of the relationship between digital technology and humans with its impacts on relations with oneself and technology. Firstly, the intentions and motivations to engage with ST technology are presented. Secondly two technologically mediated self-relations of self-control and self-care, that became apparent in the application of self-data generating

technologies onto oneself, will be presented and discussed. Thirdly, three distinct relations to technology that became visible in ST, and may become more significant in the future (also in socio-cultural and political sense) will be presented and discussed. Such an inquiry allows for a richer understanding of datafication processes, their dynamics, and the complexity of the human-digital technology relationship. It provides a better comprehension and addresses of the accompanying industry's promises and metaphors and the underlying users' imaginations and needs, deficits, and 'Gretchenfragen' (questions that involve unpleasant self-revelations). Furthermore, attempts are pursued to shed light on possible illusions/delusions, addictions, and dependencies in relation to digital technologies. Which affirmative scenarios arise when using digital technology for one's appropriate purposes, such as self-reflection and enhancement of the experience radius? In doing so, this work attempts to address and elaborate further on both "critical and affirmative propositions for moving forward" to use Rosi Braidotti's expression (2020, p. 465) in the field of technologically supported self-improvement. Finally, I hope to contribute to discussions about how technologies applied to oneself and the resulting relations to them will shape our future selves and, as such, our future generations, and societies.

3.2 Method: Autoethnography, Ethnography, and Media Analysis

Ethnographic research is often characterized by participant observation. The researcher searches and selects the field where he or she adopts the double role of simultaneously being an active participator in the field's activities and observer of those activities. Every action, interaction and experience constitute data to be interpreted. It is recommended to suspend a priori assumptions in order to discover the perspective the field's members take on and to try to interpret their experience in an inductive reasoning process. However, since I started my immersion in the field not only by talking to people who used self-tracking in some way but also attending their meetups, I also wanted to experience these technologies myself. The purpose of self-application and self-experimentation with ST technologies was to get direct access to the feelings and emotions that they triggered but also to detect my own expectations and responses to the practice, whether they were consciously or unconsciously motivated, wanted or feared, hidden, embarrassing or jubilant.

The ethnography in this work draws on three conceptual structures⁵⁷ that shaped my field site: myself using digital self-tracking, people using digital self-tracking, and supplementing or contrasting both perspectives with people trying to improve their wellbeing and applying other techniques for that. The autoethnography consists of self-observation, self-experimentation and a written research diary while using ST devices and apps for running, productivity, mood, sleep, heart rate, and meditation state. Preliminary initial categories of self-awareness and self-reflection imagined self-improvement fantasies/possibilities, behavioral and attitudinal changes through and with the technological tools were synthesized. The ethnography-part builds upon participant observations, ethnographic “interviews” or talks, and where appropriate field descriptions. Instead of asking about the ‘use’ or the ‘effects’ of the new medium on the user, rather it will be a looking at how STers make sense of a technology application to monitor and keep track of themselves and the data it feeds back, and how they accommodate themselves and the ST technology in this assemblage.

Since the ST practice is highly individual and not spatially organized (in fitness studios or exerted in QS meetups⁵⁸, for example), participant observation was only possible during our talks. It was possible in the moments when they showed me their gadgets (e.g., Andre, Karolina, Tabea), their tracking routine (Phil, Florian), and tracked data (every participant). Once I completed a training session with Arne, I observed him, for example, how often he looks at the smartwatch, how detailed he examines his training results, etc. They form the background basis, it could be said, against which I have also interpreted the statements. I attempt to reflect these observations in the detailed description of the study participants in Chapter 4. With reference to Haraway’s (1988) „Situated knowledges“: There is no other way as to take a partial perspective and look at the individual practice, the individual expectations, and the individual experience and, in a later step, inductively attempt to aggregate observations to a characterization of partial objectivity of the whole phenomenon.

My research process got enriched and complemented by a media analysis in the form of content analyses of tool provider claims and their promotional material, a discourse

⁵⁷ This approach could be called multisited ethnography (Marcus, 1995), which entails approaching several sites of research at the same time, but although increasingly common there is no unitary framework for relating different sites to each other (Boyd, 2008).

⁵⁸ Attending QS Meetups, which I did several times initially, turned out to provide the same sort of information that was talking with participants directly. People talk about their ST-projects at these QS-Meetups, following a given structure: What did I do? How did I do it? What did I learn? Whereas in my ethnographic conversations, I had the opportunity to ask further questions that differed from these three questions and related to the participants’ opinions, beliefs, and expectations in the study.

(blogs, media) and artefact analysis. Furthermore, insights from personal or virtual visits at Quantified-Self Meetups and other self-improvement groups like meditation centers or consciousness hacker meet ups in California were reflected in the analysis.

It is inevitable that the researcher's own values will always flow into this process since cultures or lifeworlds are understood through subjective interpretation. I am aware of the peril of blurring the gaze within the ethnographic process, which Emerson (2011) alerts to, but having first insights based on my own experiences, assessment and inquiry will open the possibility of space for further investigation with self-tracking experts. Since I spent a considerable amount of time on my reflections, the auto-ethnography data represents the largest percentage of material. However, during the analytical process following at a later stage, I attempted not to consider it in the first place, rather using it to complement or strengthen observations I had made about the study participants. In addition to the openness, the, by definition, flexible, explorative and inductive approach makes sense if new and theoretically still unstructured subject areas are to be investigated (Lamnek, 2010). It allows the building of a theories (hypotheses), as suggested by Glaser & Strauss (1967) together with Strauss & Corbin's (1990) widely adopted Grounded Theory approach. While the later analysis and hypothesizing is conducted along the stepwise procedure of analyzing the empirical material suggested in their theory, the concrete data gathering approach is ethnographic.

Reflections on Ethnography as a Method

Like Boyd I see "ethnography as a descriptive account of cultural practices, grounded in data attained through ethnographic fieldwork and situated in conversation with broader theoretical frameworks" (2008, p. 46). The application of ethnography has changed since its origins in the beginning of the 20th century with Malinowski's "Argonauts in the Pacific" (1922), where he argued for spending longer periods of time in fieldwork to learn about current functions in cultural practices directly on site. With Leiris (1934/2017 and 1939/1992) self-reflections, such as the researchers' mental states, impressions, anxieties, dreams, and erotic fantasies entered the ethnographic. These were the first steps towards the later much discussed auto-ethnography (also autoethnography) and its relevance, premises, difficulties and adoption as a scientific method for knowledge generation (cf. Anderson, 2006; Chang, 2008; Ellis, 2004). Anderson (2006) suggests using autoethnography as part of the analytical tradition of anthropological enquiry, tying the reflexivity of the autoethnographic method to the broader social context of the researcher as a participant-

observer and utilizing it in order to advance theoretical knowledge rather than to only explore emergent personal narratives. Later, Latour and Woolgar (1979) developed a new scientific branch of investigation - the Science and Technology Studies - by applying the ethnographic method of participant observation in the field of scientific work in laboratories.

Apart from the Turkle's ethnographical study about early digital media communication in online communities (IRC), online games (MUDS), and computer learning in schools, where she identified multiple self-perceptions among users, there is also Nancy Baym's (1994) research about the early form of discussion forums in Usenet newsgroups, where she illustrates how Usenet discourses and participant practices can operate as a culture-creating power. Tom Boelstorff (2008) placed his fieldwork wholly inside the virtual online community "Second Life", arguing that it is critical to scrutinize virtual places in their own contexts while challenging the assumption that unmediated practices inform mediated ones, and rather trying to understand how experiences in mediated environments shape cultural practice (Boyd, 2008). And more recently, Olli T. Leino (2009) examined himself while playing video games, in order to understand desire in Deleuzian terms and to demonstrate the convergence from body to the machine while playing. What these studies have in common is the creative and converging adoption of digital technologies to build and pursue own understandings and wishful states of culture, community, and the self. Ethnography as a method is being steadily evolving and widely adopted for the qualitative research of cultural practices and their meanings for individuals, cultures and societies.

The advantage of using the ethnographic way of researching self-tracking practices is that it offers a deeper level of investigation, moving beyond conventional and face value analyses of that phenomenon (see Mol, 2002; Sharon & Zandbergen, 2017; Viseu & Suchman, 2010) towards a more nuanced understanding of humans intertwining with their artifacts. Especially with questions about making sense of the data, ethnographical work that includes auto-ethnography and self-experimentation and takes a deeper dive into the topic through narrative talks (i.e., open and less-structured interviews), can provide rich insights about how technology impinges on our self-understanding and how human-technology relations are evolving.

3.3 Entering the field and collecting data

The field

To get connected with STers in the field I firstly participated in a QS Hamburg Meetup. The Meetup was organized in the rooms of a fairly new, Hamburg-based startup occupied with the digitalization of physician-patient related communication, such as transferring diagnostic documents between the physicians in charge. The interior fittings were, of course, modern, clean, techie-style. There was a Mac on every desk, lots of different cables for other Apple products and not a lot of analogue things. As is common, the host also sponsors some drinks and the like. There was Club Mate (a stimulating, mate tee-based lemonade), Viva con Aqua water (a social company concerned with highlighting places on earth which suffer from water deficiency and generating money to help them) and beer. At this meetup, I met many self-tracking people with different backgrounds and initial reasons for starting to track something in their lives – all of whom felt innovative, morally correct, and open-minded, as I observed. Another growing part of attendees were people who were writing about them, either for mass media or for academia. The atmosphere was casual in terms of people talking about their self-monitoring without getting too intimate. At the QS Meetups I observed show & tell presentations from participants who shared their specific experiences with ST applications and had informal talks with the presenters and other attendees. I talked to a fair number of people and recruited two for interviews and observation who were willing to share their experiences and thoughts, and also to meet several times.

The two of them were the initial QS meetup organizers in Munich, Berlin and Hamburg and brought this idea to Germany. I visited two more meetups and soon started to co-organize the following meet ups in Hamburg. The meetups were held in a friendly atmosphere consisting of 20-30 attendees, of which 60-70% were men. Speakers shared personal stories about a variety of issues, such as problems falling asleep, allergies, heart rate irregularities, how to delay the ageing processes and the concomitant bodily changes, how to archive virtually everything they did – from daily steps, the amount of coffee, water, or alcohol they consumed, the media they consumed, feelings they had, how many people they met, how often they had sex, the places they visited and much more. Finally, I wound up being the sole organizer of QS Hamburg because Arne, the previous organizer, lost interest in the activities of the group and in his own self tracking and moved on to further themes

he was then more interested in, such as keto-vegan⁵⁹ nutrition. As years went by, there was a remarkable loss of participants as they were losing interest in sharing and listening to self-trackers' stories. The QS idea had its peak in 2012/2013 as it was still very new to most people, and the ones who participated felt very ahead of the mainstream even within the technology-savvy environment. Beside this, I also participated in and presented at the global Quantified Self conference in Amsterdam where I had a lot of informal talks with the QS community. Myself, I felt very comfortable in these surroundings from the beginning. I have always been interested in computer technology, had my first points of contact as a child with the programming languages Basic and Pascal, which my farther had shown and explained to me, and later learned programming in Pearl among other duties as a student. I also liked upgrading my first computers by myself with RAM sticks and hard discs, even exchanging better processors on the motherboard, thus I still like to check out technical gadgets, such as Apple's Newton PDA, smartphones, tablets and of course wearables.

To broaden the spectrum of interlocutors, I conducted a self-tracking workshop at the Re:publica TEN conference in 2016 in order to meet STers who are not necessarily bound to or organized in QS meetups specifically and to ask them for interviews. The Re:publica annual conference, which started in 2006 as a small blogger conference, has grown over the years and became the come together of technology oriented digitization proponents at the beginnings of their professional careers as well as people responsible for tech related topics in companies, as well as academics. The conference is known for its innovative as well as critical approach to the repercussions of digitization processes and the accompanying societal change. After 1 year of local field research (Hamburg, Berlin), I conceptually augmented my research material and went to the origin of most new digital technologies, such as internet, web 2.0, smartphone technology, many apps people worldwide are using, and the QS – to the Silicon Valley / San Francisco. Firstly, the “Silicon Valley culture values quantitative, measurable status metrics, the incorporation of business ethics into social life” (Marwick, 2010, p.10). In combination with the historically ingrained mindset of counterculture⁶⁰ based in the Bay Area (Barbrook & Cameron, 1996; Turner, 2006) it obviously builds a specific breeding ground for developing and spreading, burgeoning, digital technologies and at the same time self-improvement concepts – such as the

⁵⁹ Which is a fat-based diet with no animal products, consisting of 75% fat, 20% proteins with as few carbohydrates as possible.

⁶⁰ Beginning with the endeavor for a free internet (webbrowser developer Sir Barners-Lee), open source software such as the BSD operating system to copyleft activist, as the opposite of copyright meant to freely distribute content on the internet

Consciousness Hacking Group, or the various meditation centers. People in SV often pioneer in drafting the concepts for and developing (among others) the concrete digital technologies for self-tracking purposes as well as being early adopters of such technologies themselves. It has been proven in history that inventions from this region indeed tend to spread all over the world sooner or later and therefore can be seen as hinting at future uses (e.g., Marwick 2010). Secondly, through the increasingly widespread adoption of social media and its principles, people additionally got familiar with using personal metrics, such as number of followers on Twitter or Instagram, number of likes and shares of one's postings and the like, to determine their success in something. The higher the number, the more people are giving us their attention, the bigger one's perceived value is. Marwick argues "that Web 2.0 discourse as instantiated in software inculcates a neoliberal subjectivity which encourages people to see themselves as users, products, and packaged commodities" (2010, p. 427). The significance of numbers in our society and in self-tracking will be discussed in higher detail later, in chapter 5.1.

Collecting the empirical data

From 2015 to 2018 I conducted an intensive auto-ethnography on using self-tracking apps and gadgets for mainly five objects of observation: bodily values, productivity, running, meditation, and mood. I wrote a ST diary over the course of almost four years which, at the end, contained around 100 pages. I included detailed descriptions of me using the tools, the reflective processes that accompanied them as well as the considerations and emotions that arose during and after use. In the years 2015 - 2019, I conducted 22 partly recurring semi-structured interviews and around 30 informal talks with self-tracking people from different backgrounds, gender, profession, and nationality as well as other people looking for self-improvement with other means and in other areas. I selected respondents sequentially, starting with frequent self-trackers and then moving to vary and supplement in terms of gender, age, and occupations. The duration was between one and three hours, with follow-up interviews with some of them a few months later. The interviews were problem-focused, semi-structured and "ethnographic" in the sense of allowing space for broader narrations of biographical accounts and everything that seemed important to the participants. I took great care to give the interviewees as much space as possible for their own narrative, even though I did not always succeed. For example, in my effort to shed light on the optimization and later the control dimension in subsequent interviews, I sometimes needed to introduce them roughly to my ideas about it or at least name the terms I was interested in and so could not

exclude the possibility that this influenced them in one way or another. These interviews were recorded and transcribed verbatim. The interview material was supplemented by observing participants, taking field notes, and having informal talks with self-trackers, as well as people who do not explicitly use digital technology for their daily goals and aims but whose actions are also grounded in the desire to sort of self-improve and take care of their wellbeing and try to approach the phenomenon from their individual, self-involved, not norm-bounded perspective (Foster, 1995).

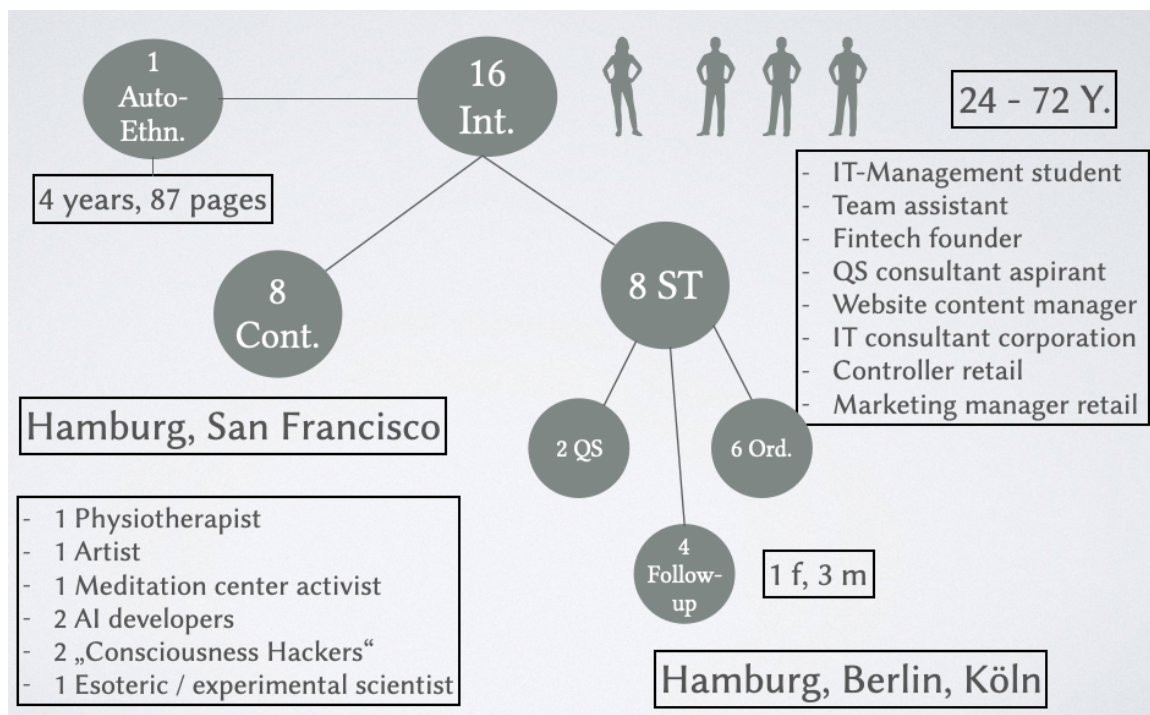
Furthermore, I conducted a research stay in the Bay Area. Firstly, I visited, observed, and spoke formally and informally to attendees of other groups like the Consciousness Hacking Group in San Francisco, and talked to its founder Mikey Sigel, the LessWrong Group⁶¹ and one of its group leaders Scott Alexander in a private home in Berkeley, and in meditation centers in Redwood City⁶² and Spirit Rock. Subsequently, I talked to engineers/developers trying to make self-improvement apps for mindfulness and self-awareness purposes, meditation centers and to spiritual investigators of sorts, like people researching the power of the gaze and trying to develop an idea of a longer life through this. This research stay resulted in five further interviews with people involved in software development or personal and business consulting who were interested in digitally assisted self-care. To supplement my understanding of the field of taking care of one's wellbeing and health, I conducted two contrasting interviews with a physiotherapist in Hamburg and an active meditation practitioner and meditation center volunteer in the Bay Area. Aside from letting interlocutors talk about ST, I asked them for example, what they believe they could achieve with this technology, what the practice was giving them, biographical questions, how they were determining their goals, how they try to gain control over their lives, what does success mean to them, if they pursue realization of indwelling potential, how they respond to the collected data, how deep they rely on the apps feedbacks, how they calculate an improvement and how they envision themselves in 10 years.

⁶¹ LessWrong is devoted to “the art of human rationality”, as they describe it themselves in the about section of their website <https://www.lesswrong.com/about>

⁶² Known for the Buddhist teacher Jack Kornfield who brought Buddhist ideas to western readers in lots of publications and talks.

Figure 4

Schematic overview of the main data sources used for this study, the participants demographics, professions, and interview places.



Note: Autoethnography over 4 years, 8 self-trackers, of whom 2 were QS-members and 6 were mundane users; 2nd Interview with 4 of them (Arne, Karolina, Ragnar, and Flo) around 2 years later.

I quote my interviewees / interlocutors directly, where recordings are available, or draw on field notes. For all above-mentioned interviews exist audio recordings, transcriptions, and field notes. The empirical material will be partly presented in the form of vignettes drawn from the interviews and field observations to provide detailed insights into the biographical background and the experiences with the applied techniques and serves to address issues of (co-)forming the different modes of self-relations with ST, which I will develop in this work.

In few cases, I use interview passages from other authors' empirical accounts and interviews, citing from their published journal articles. Occasionally, material posted online in blog articles or video accounts as well as discussion forums or mailing lists relevant to my topic are used. An artefact analysis of the apps and wearables used within my own experimentation, supplemented the investigation part.

Table 2

Data sources and elicitation data

Discourse and artefact analysis	<ul style="list-style-type: none"> • Media reporting about ST/ QS • Video recordings from show & tell talks at other QS events worldwide • Blog articles from devoted self-trackers (Alexandra Carmichael, Bob Troia, Nicoals Feltron) • Walkthrough (cf. Light, Burges & Dugway, 2016) the ST apps used 	2014 - 2017
Interviews	<ul style="list-style-type: none"> • Regular self-trackers – using digital tools for tracking • QS members and intensive & experimental self-trackers • Occasional STers, interested in using smartphone apps for tracking • Contrasting sample: people concerned with self-improving their body and mind, but without digital tracking tools 	<ul style="list-style-type: none"> • 2015 - 2018 • age: 24 - 72 yrs • 25% women • 50% self-employed and 50% employees
Field notes / observations	<ul style="list-style-type: none"> • QS Meetups in Hamburg • QS global conference in Amsterdam • Research stay in Bay Area 	<ul style="list-style-type: none"> • 2016 - 2018 • 2016 • 2017
Auto ethnography	<ul style="list-style-type: none"> • ST wristband (Fitbit, Whittings, Xiaomi) • Runtastic App for running, situps, squats • Diverse Meditation apps (Breathe, Calm, Insight Timer, Headspace) • Meditation headband (Muse) and app with biofeedback • Diverse mood apps (iFlow, Happy, You) • Productivity with Pomodoro technique apps 	2014 - 2019
experimental / additional	<ul style="list-style-type: none"> • Talks with a governmental startup initiative about me possibly founding a startup in the eHealth/ eWellbeing field • Informal talks at startup events 	2017 - 2018

3.4 Analysis

Ground Assumptions concerning the Ethnography

The first basic assumption is that the interviewed people are agents with the ability to reflexively monitor their actions (Giddens, 1991), i.e., they possess the ability to observe their actions and their contexts and are able to explain their intentions, thoughts and experiences regarding their actions.⁶³ I therefore pay close attention to their own interpretations and concepts without presuming existing theories or constructs, for example about their subjectivity or subjectivation processes (Foucault, 1991), and in such a way imposing a priori explanation for their lived experiences. In accordance with Gioia and colleagues' (2012) emphasis on achieving qualitative rigor in inductive research I aim to "give voice to the informants in the early stages of data gathering and analysis and also to represent their voices prominently in the reporting of the research, which creates rich opportunities for discovery of new concepts rather than affirmation of existing concepts" (2012, p. 17). In theorizing the relation of ST technologies and practices and the practicing self I attempted to avoid using the much-reported category of self-optimization (see chapter 2.1). I was amazed to find that the informants themselves seldom if ever have used this term in their accounts. They instead used terms of "transparency" and "becoming aware" to name their primary motivation or interest behind collecting data about their actions and states. By applying established categories of motives, I would have missed aspects of them making sense of their actions.

The second major assumption is about me as a researcher. I assume that I am a knowledgeable agent in the field who can detect patterns in the data, enabling me to formulate concepts and shed light on aspects and relationships that might sidle off the awareness of the interviewees. To ensure the criterion of scientific evidence I attempt to present my findings and conclusions systematically, by demonstrating the connections among the data, the analytical codings, and the resulting assertions, themes and concepts.

⁶³ I would like to add that people capable of monitoring and explaining their actions are noted in the structuration theory literature as "knowledgable agents" - see Stones, R. (2005) *Structuration theory*. New York, NY: Palgrave Macmillan. The structuration theory itself claims that both structure and agency need to be analyzed in their interaction to be able to explain social systems. Since this notion relates more to routinized social practices and activities, assuming that, for example, tasks in organizations are done by "skilled accomplishments of knowledgable agents" (p.26) rather than pure intuition or contingency, I am not pursuing it further in this work.

Furthermore: While personal data tracking may result from diverse daily routines involving digital technology (as for example with chronically ill or competitive athletes), this study focuses on mundane, self-initiated, deliberate and digitally supported self-monitoring/self-tracking exertion⁶⁴, without focusing on QS community members.

The Analytical Process

The material's analysis relies on a process of abductive theorizing (Peirce 1878). Peirce's "logic of abduction" goes beyond usual alternatives of deduction from self-evident truths (rationalism) or induction from experiential phenomena (empiricism). Abductive inference entails considering all possible theoretical explanations for the data, forming hypotheses for each probable cause, checking them empirically by examining data, and pursuing the most plausible explanation. This process follows the researchers' initial inductive hunch or recognition from the empirical data, which is then coded, classified, and brought to a higher abstraction level (Gioia et al., 2013; Mantere & Ketokivi, 2013; Smets et al., 2015). "The analytic progression was a reflective process of engaging with multiple theories that might address or explain the empirical puzzle and generating new theoretical insights iteratively from the interplay between the increasingly refined coding schema and the literature" explain Smets and colleagues (2015, p.939) in their ethnographical study about reinsurance trading, its institutional complexity and individuals dealing with coexisting logics within it. Without drawing explicitly on the post-phenomenological hermeneutics (Ihde, 1990), which states that technologies not only facilitate but also mediate experience and actions, through which they condition the human life and even existence (Verbeek, 2005, 2008) in the same way as ideas and other artifacts do, I appropriate this idea mainly in its call to be flexible in approaching the phenomenon in question and to attempt to identify tentative manifestations reflexively throughout the whole analysis process.⁶⁵

In the first steps of the analysis, I therefore reflected on my own experiences in using ST applications as recorded within the auto-ethnography and treat them equal to the interview data. Further research was guided by an intertwining of ethnographical research

⁶⁴ Lupton (2016) distinguished between different modes of executing self-tracking, such as deliberate, encouraged, nudged, obliged or coerced. In this work I will consider deliberate and lightly encouraged modes of self-tracking, for example caused by a chronic disease.

⁶⁵ To not exceed the scope of this work, meanings, problems, or repercussions of this method cannot be discussed here. Interested readers are referred to the essay collection of Rosenberger and Verbeek (2015) and Smith (2015) *Rewriting the Constitution: A Critique of "Postphenomenology"*.

method with an analysis based on the Grounded Theory method. This included a stepwise widening of the range of interviewees with respect to gender, age, profession, location, and finally turning to non-STers and the generation of insights / categories based on open and axial codings and their aggregation. Following the guidelines of the Grounded Theory method, I started with five expert interviews (Krotz, 2005). The structure of the interviews was semi-structured, problem focused and narrative, meaning I had a set of prepared questions but let interviewees talk about themselves, their biographies, activities, and attitudes as much as they wanted. Hereby, I followed the instructions from Truschkat (2011) and Helfferich (2005), evaluated them against the backdrop of first insights and continued with adjusted and sometimes more specific questions in further interviews, as the interview questions inevitably changed with the progression of research. The process that Glaser and Strauss (1967) named “theoretical sampling” led to the formulation of tentative presumptions/ assumptions/ hypotheses about the relationships emerging from the empirical data to date and, in consequence, to a modulation of the interview questions. I audio-recorded the interviews, which were either in German or English, and had them transcribed by native speakers via an online service. I proofread the transcriptions by listening to the interview recordings and coded them iteratively. The main part of the analysis is how to progress from raw data to themes and concepts in conducting the analysis. A valid objection to keep in mind, is that ‘raw data’, according to Lisa Gitelman (2013), are never raw, they were chosen, collected, and set in relation not in a totally independent manner by the researcher. Following Strauss and Corbin’s (1998) suggestion of open coding, which means extracting terms from the accounts without condensation, I got 165 codes in the first round of reviewing the transcripts and field notes – and, not surprisingly, felt a bit overwhelmed. In the following step I searched for similarities and differences between those codes in order to conduct what Strauss and Corbin (1998) named the axial coding. I used MaxQDA to code and rearrange and consolidated the codes into higher state mutual themes (selective coding). Some of the categories that were formed acted as accompanying and supporting variables. For example, career information was more likely to provide supplementary information about the personality, motives and value structures of the person interviewed and was not included in the further axial coding steps but rather in the narration/ narrative thread. After finding distinctive categories, I reviewed the material again and searched the interviews for keywords that match the mechanisms and relations I found. The following selective coding built the final part, consisting of formulating or proposing hypotheses and explanatory linkages, as well as observed continuities and discontinuities in the HTRs, as I was able to synthesize them from the ST analysis.

3.5 Theoretical framing – HTR in STS

In this work, a strong intertwining and intensification of the relationship with technology and the technologically mediated or induced relationship with oneself is postulated. With this perspective, the work joins the investigation and discussion of HTR in the broader context of the science and technology studies (STS). Not only since the turn to technology declared 3 decades ago (Woolgar, 1991), STS-scholars have been understanding human-technology relations as much more profound and interfering. For example, the actor-network theory (Latour, 2005) constitutes meaning in the world as jointly produced by human and non-human agents (actants), the sociotechnical imaginaries⁶⁶ reveal visions of desirable futures, and shape their development as technological progress advances (Jasanoff, 2015), while the post-phenomenological approach illuminates the technological mediation of the world's perception for the individual (Ihde, 1990; Verbeek, 2008). STS ask for the ontological nature of the human-technology relationships, explore the pathways of borders and distinctions between humans and technologies, investigate the ways in which technologies are embedded in, extend, or enhance concepts of selfhood and how social relations are configured with and through technologies. From this perspective with the specifically designed research method, an attempt is made to answer the question of the human self-understanding and his or her self-relations with and through the progress and increasing application of technologies to the human life and the self.

The media study's perspective considers the conditions and impacts of materiality in general, and of artifacts, like art and technology, on the formation of cultures, norms, and beliefs and vice versa from the societal up to the planetary level (e.g., Anders, 1980; Gabrys, 2014; Haraway, 1995, 2003; Hayles, 1999, 2006; Kittler, 1986, 1999; McLuhan 1964). Media theory and the philosophy of technology conceptualize how our self-perception and self-organization are to be grasped under the current human-technology-nature intertwining under the term "technological condition" and attempt to formulate a new philosophy of nature (Hörl, 2011; Scharff & Dusek, 2013)⁶⁷. The second major question of this work follows in this tradition, namely to shed light on the development of the HTR through the application ST technologies onto oneself.

⁶⁶ The socio-technical imaginaries are understood as "collectively held and performed visions of desirable futures...animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff 2015, p. 28)

⁶⁷ Other writers who deserve to be named in this context but cannot be considered further in this work are George Simondon, 1958, Jean Baudrillard, 1991, Vilém Flusser, 1998.

PART III

– FINDINGS

This chapter is structured along with the three main contributions of this work. Firstly, I synthesized four intentions / starting points for engaging with ST technologies (chapter 4). Secondly, I identified two at first glance apparently ambivalent and yet simultaneously present balancing mechanisms - that I label: self-controlling and self-caring. These relations result from the analysis and consecutive synthesis during an iterative coding and interpreting process within my research design that I described in Part II.3. My reflections were augmented and strengthened by a dialogue and engagement with the critical and empirical literature in the field. Through initial open coding followed by axial coding and finally theory-supporting selective coding I synthesized and concretized the findings into the main self-related relations of self-caring and self-controlling, which I will explicate below (chapter 5). I suggest that both of these self-related relations allow individuals to maintain their lives amid the structural conditions and demands they face as well as individual (agential) claims and desires in balance with the help of self-applied technology. Thirdly, I contextualize these balancing self-relationships with human-technology-relations that have been evolving in our technologized world since the advent and burgeoning of computers for personal use in the 1960s. They impact, stimulate, and shape human thinking, acting and feeling. This explains how individuals make sense of involving self(-tracking)-technologies in the process of living and making themselves a(t) home - to borrow an expression from Miller and Slater (2000) - a state that they call their own and can identify with, to maintain coexisting logics in an ubiquitous, computer mediated world that turns everything into data. I will describe these human-technology relations - technology as a means, as a counterpart, and as Heilsversprechen (promise of salvation) - in the final findings chapter (6).

4 ETHNOGRAPHICAL ENCOUNTERS IN THE FIELD OF ST AND QS, AND OTHER SELF-IMPROVERS

4.1 This Study's Ethnography and Auto-Ethnography

This chapter presents my findings and draws on all data. To recap shortly: I spoke to 16 different people, four of whom were women and 12 men, ranging in age from 24 to 72. With four of them I conducted follow up interviews about 1-2 years later. Two of the 16 were active QS meetup members who were also involved in trying to establish a business related to self-tracking, either consulting on self-tracking in the workplace, patient-doctor collaborations or providing self-tracking devices. Eight of the 16 were active STers of whom six can be described as ordinary users since they were not attending any QS related meetings. In order to get a broader spectrum of insights from people who were engaged in some form in self-monitoring related to self-improvement or self-optimization I spoke to eight other people with no ST-QS background. Four of them were engaged in some form of self-improvement, self-optimization or self-enhancement without any technology. One was a bodyworker (physiotherapist) and one was an artist who conducted a long-term experiment on himself in order to explore self-improvement from an artistic perspective in Hamburg. The other six could be described as representatives of the characteristic Bay Area spirit, where technology has been meeting spirituality ever since the 1960s, and people are creative in finding technology-oriented market ripe solutions for personal yet global issues. Despite those people neither affecting the ST technology nor the ST market directly, they participated in the creation of the self-optimization discourse in this field. In the bay area, I spoke with two people who did not use any technology for their purposes: one active member of a famous meditation center (that operates on a charity work and donation basis), and one man who is difficult to put into a category but could be described as a representative of the old hippiesque era, who used experiments and scientific writing to prove spiritual or esoteric occurrences, such as the detection of an unseen gaze.⁶⁸ The other four interviewees were two AI/ computer

⁶⁸ As he explains to me during the interview we had at his hut (reminding me of Henry David Thoreau) in Berkeley, he published two articles in the peer review *Journal of Parapsychology* in 1993: Braud, W., Shafer, D., & Andrews, S. (1993). Reactions to an unseen gaze (remote attention): A review, with new data on autonomic staring detection. *Journal of Parapsychology*, 57(4), 373-390 and Braud, W., Shafer, D., & Andrews, S. (1993). Further studies of autonomic detection of remote staring: Replication, new control procedures, and personality correlates. *Journal of Parapsychology*, 57(4), 391-409.

technology engineers pursuing the use of computer technology to improve mindfulness and self-awareness, and two members of a popular Meetup running in San Francisco called “Consciousness Hacking”.⁶⁹ One of them was the founder of this group and the other a member. I also had some informal talks with members of the Rationalist Group⁷⁰ at Berkeley. None of them did self-tracking, but all of them appreciated self-responsibility, self-improvement and, above all, a rational approach to conducting life. It appeared to me that they did not experience characteristic triggers, which I will list in the next chapter about the motivation to start self-tracking. This may be grounded in the fact that the vast majority of them were young (students at Berkeley university), approximately in their 20s, and as such probably had not yet experienced physical or motivational issues or other kinds of adversities in life. Their curiosity and the search for a superior, explanatory principle of good or correct behavior and decisions in life (point 4 in the below starting points) is grounded in rationality, as they see personal development as a purely technical (if not purely mathematical) problem. The largest amount of material stems from the auto-ethnography, which I wrote down in a research diary. However, I attempt to use this material to complement existing utterances and quotes from the other participants in my study in order to minimize the subjectivity bias which I discussed in the method chapter above. Verbatim quotes are reproduced as spoken by interviewees, interlocutors, and participants in the field, that were translated into English where necessary. While the STers will, in the first place, be examined with regard to their motives, desires and hopes in ST and the enacted self-relations with technology – all cases will be considered in order to compare or contrast them with each other.

The issues raised and the results obtained are structured as follows. In chapter 4: What starting points do self-monitoring people have to start self-tracking? What are the triggers that lead to beginning to self-track? In some cases, people were already tracking in some form, either their training or time spent working, but were now using a whole spectrum of digital tools and devices. In this “introducing results” chapter short vignettes about the people

⁶⁹ CH is a non-profit global community organizing monthly meetups in SF with around 5,600 members and subsidiaries in 50 other countries. For more information see: <https://www.cohack.org/> (last acc. 10 October 2019)

⁷⁰ In a Harper's Magazine Article (<https://harpers.org/archive/2015/01/come-with-us-if-you-want-to-live/>), the author, Sam Frank, describes his encounters with these young coders, startup-founders, idealists, self-made-billionaires and libertarians - all in one person, as those who believe “that math, perfect information, and market mechanisms would solve the problem of politics”. They come together offline, discuss and write long essays on the power of timeless decision theory (MIRI, Yudkowsky) and spend a lot of money on courses on how to self-optimize (CFAR Workshops). They rely on rationality, mathematics, and the power of free markets. Many of them were young, male and, according to a survey LessWrong (the organ of the Rationalists movement) conducted in 2013, some of them were reactionaries, ethnonationalists, pickup artists, Social Darwinists, scientific racists and patriarchists, Frank reports.

will be provided. The second empirical results chapter (5) addresses the central questions of this dissertation. In the “Modes of self-relations”-chapter, I will present and explicate the two technologically mediated self-relations that I found most outstanding and characteristic when analyzing my material along the following questions. How are these starting points processed and harnessed in conjunction with the use of ST technology applied to oneself in everyday life? What self-relationships are developed, encouraged, or maintained by these technologies? How does the application of digital self-tracking technology to oneself affect, change, reinforce or weaken aspects of these self-relations? In the third empirical results chapter (6.), I will particularly shed light on the role of technology and its relations to the users. How does technology perform and what role does it play for the user? Which relations are specific to ST technology and which to the practice? Which technology relations correspond stronger and in which way with which self-relations?

When talking about starting points for actions one can talk about the related terms motives and motivations, which have been distinguished since the middle of the 20th century. However, they are mostly used in a complementary way. A motive is a driving psychological background and cause for human actions, whereas motivation is a process of getting active or at least experiencing the willingness to act.⁷¹ When a motive is stimulated, for example by perceiving a particular need, they enable the experience of a positive state of arousal that can trigger behavior and lead them to act in a certain manner. The intensity of a motive is comprised of the prospects of success and the subjective value of the goal (Stangl, 2018). A motive provides a reason to act while motivation expresses the force of taking action. Motives as foci of research have been used in psychology, but also in sociology and anthropology. For example, Max Weber (1922) emphasizes that sociologists should attempt an “interpretive understanding” of the motives of actors in order to discern the subjective meanings of actions, which all together build social actions. Bourdieu’s habitus theory describes not only the societally determined scope of action for individuals but also a space for subjectively motivated actions that reveals the interdependent nature of society and individuals. Elias’s (1939, 1997) introduction of psychogenesis as a research approach to describe long-term processes related to the formation of conscience and habitus in the process of civilization could also be used to clarify the causes behind using these technologies. However, as I do not intend to examine the deepest meanings of those motivations because there exist already

⁷¹ There are further differentiations: Volition, in contrast to motivation (see Narziss Ach), is a process of self-direction as the conscious, deliberate realization of goals and motives to results through goal-oriented action. In contrast to controlling, the term regulation describes adaptive systems that adapt to changing conditions through feedback and can achieve their (self-set) goal despite these disturbances (target/actual deviations).

great studies about them, as depicted in the literature review section (e.g., Choe et al., 2013), I will talk about my findings on starting points (to name them as neutrally as possible) for self-tracking, which appeared prevalently in my sample, in the first part.

4.2 Intentions for Starting with ST

In this paragraph I will describe what I learned about the points of departure with self-tracking practice. What were the personal reasons for beginning to use these digital self-monitoring and self-tracking devices? It is a slightly different question than asking about the benefits they derive from using those devices, as it explicitly seeks to highlight very personal motivations and urges participants to reflect on, rather than evaluate, what activity or situation they used these devices in. As described above in the literature review section, there have been a range of different motivations for self-tracking. In survey-based studies, people claim to be tracking in order to get to know something about themselves, to try out new gadgets, because they find it motivating to do certain activities (see literature review chapter). In an early and often-cited article Boesel (2013) analyzed the quantified-self movement at an early and a non-famous stage. She observes that QSers are being depicted as “either (a) brave pioneers who are both resisting the tyranny of institutional knowledge and revolutionizing the future of health-care through their data-driven self-empowerment, or (b) fiendish, delusional narcissists obsessed with numerical navel-gazing to the detriment of their ability to accept “the facts” or to experience “the real world” as she argues in hype-generating media coverage seeking to attract readers. But “most QSers resemble neither” (2013, para. 5), they just want to feel better or even good, she claims. While this goal as such is by no means new, what distinguishes QSers were their technology exaltation, she argues. As depicted in the chapter “Self-optimization as a metaphor for self-tracking”, most media reporting and a range of academic writing on this topic approaches self-optimization critically. My personal starting point for researching ST technologies and practices, and the aspect I was most curious about, was to look closer and behind this plausible but little differentiated assessment and analyze this practice at a more nuanced and detailed level.

Since there were no self-trackers in my sample who shared their data on social media, I focus on the engagement of self-trackers with the self-tracking process and technology, its meanings, appropriations, and imaginations, rather than social interactions since they compare themselves to their own (historical) data, if at all. Although most self-tracking tools

and applications include the opportunity to share data on social media it does not seem to me that this function is the focus of my interviewees as well as other observed sources, such as QS meetup videos or accounts in other empirical studies. For this reason, in this work the discourse of unrestricted competition through constant comparison with others is being omitted.

When I asked my respondents what self-tracking meant to them, they largely stated that they have become aware of things in their lives, which is also confirmed by other reports and studies (Ruckenstein, 2014; Sharon & Zandbergen, 2017; Viseu & Suchman, 2010). Some of the questions that went through their minds during experimentations were how and how often they did things, such as drink water or move over the course of the day, what triggers they reacted to, and even what they were able to achieve physically or even mentally as the brain enhancement market promises for example. This search for something is chosen deliberately because many self-tracking projects are carried out in a state of open-minded curiosity toward unknown aspects of oneself, something new one does not know but hopes to discover in one's life. With self-tracking devices a technology showed up that firstly could be suitable for this purpose, secondly affordable and thirdly self-applicable – with no need to involve test subjects and the accompanying time-consuming management procedures, ethical applications, external money soliciting and the like. People who have any reason and questions will give it a try. What reasons and points of departure could this be?

Although my interviewees regularly referred to personal traits, like being curious or being movers and shakers, it seems unlikely that cognitive models alone can explain their tracking. Personality is only one part of a thick description in the sense of Clifford Geertz (1973), besides personal circumstances, current interests and goals, body images, professional and family situations, etc. While searching for an answer to the underlying causes and intentions for engaging in ST among my interviewees, patterns began to emerge. The point of origin for many self-tracking users can be compressed into four principal rudiments.

Table 3

Initial Intentions to engage with ST

Trigger / Starting Points	Looking / Longing for
(Chronic) Disease	Healing, Alleviation
Discontent (e.g. weight, stress)	Help, Guidance, Motivation (get rid of sth / acquire a new habit),
Improve performance (sport, work)	Tools, techniques, support
Treasure hunting (curiosity)	“Superpowers”, discovery, adventure, surprise, st magic

Note: own representation

In the following section, I introduce the four starting points for adopting the practice of self-tracking: diagnosis of an illness, discontent with a certain condition, using digital tools, and searching for something not yet concretized. I discuss each of these reasons in greater detail by providing vignettes of the eight self-tracking study participants. My account in this regard is based mostly on my observations jotted down in field notes. Sometimes I use verbatim quotes where it seems appropriate to use the participants' own language and to give the reader the possibility to build their own impression of that person. Using thick descriptions in the sense of Geertz (1973), I describe, among other aspects, participants' prior experiences, values, and, more specifically, their personal reasons for adopting the practice of self-tracking. I will introduce them in the section I deem the most profound for them.

4.2.1 Diagnosis of an Illness

ANDRE, FLORIAN

Two of the participants started self-monitoring, self-tracking, and self-experimenting because they had been diagnosed with an illness at some point in their past. This starting point has also been discussed in literature. For example, Gina Neff (Neff & Nafus, 2016) started because she broke her kneecap and wanted to monitor her medication plan and healing progress. Other people suffered from chronic medical conditions, for example diabetes, arthritis, asthma, autoimmune diseases, insomnia, or other bodily dysfunctions (e.g., Choe et al., 2014; Nißen, 2013; Rooksby et. al., 2014). Individuals often start tracking their

medication intake and its consequences, continue by conducting research on their lifestyles and the possible impact on their condition, and develop/derive different hypotheses about themselves. They then engage in self-experimentation, particularly in case of insufficient improvement after a regime of traditional medical prescriptions and examinations, to find their own way of healing themselves. In the last stage in particular, self-tracking is adopted as individuals attempt to take matters into their own hands, hoping to heal themselves by using the right technology. In other cases, tracking is often prescribed or recommended by physicians, for example to monitor someone's heart rate while doing sports in the case of someone with heart problems.

After initial informal talks with friends about their smartphone usage and possible tracking experiences in 2014, Andre was the first person I talked to with a semi-structured interview guide, i.e., with some questions I prepared beforehand to ensure that I would not forget important things to ask, although I wanted to keep the talk as open as possible and let the people talk about themselves and their practice.

ANDRE:

I expect Andre for an interview in my flat. It is located on his way to the co-working space he commutes to every day from a small town near Hamburg. Andre arrives at my home office after a mutual friend connected us via Facebook. I asked my around 700 Facebook "friends" if there were people out there self-tracking in late 2014. The reactions were manageable, and I decided to talk to people who lived around my town, Hamburg, first and then reach out to other acquaintances, like my former colleague Uwe from Regensburg, an extremely active athlete, running marathons and the like.

It is early in the morning. On my desk I placed different kinds of sandwiches - a fish roll, some with cheese, avocado or marmalade - since I did not know what kind of nutrition Andre consumes and I wanted to offer him something in exchange for his effort to come to my place before work. In addition, it was also meant as a nice gesture to conjure a comfortable atmosphere and hide any clean laboratory or scientific touch associations which might emerge and hinder him from opening up to my questions. I also thought that he might think he was being rewarded for the time he invested, which he did not have in abundance as the CEO of a startup in the FinTech sector, so I decided to provide breakfast to show my appreciation in that way, since I did not intend to pay him. All the more happy was I that he wanted to talk about his self-tracking experiences before going to work. This topic must have been of importance to him.

As it turns out, Andre is a nerdy sports fan, as he describes himself while introducing himself. 43 years old, married, he has 2 children and, since his wife got her own medical practice in a small town not far away from Hamburg, they moved there. Andre left his law degree to work in online businesses and, for the last few years, has been the CEO of a young FinTech startup. Andre is of average height, slim, well-groomed, sporty and appears dynamic and competent.

He does not believe in God or any higher principles, nor is he a declared rationalist. He says he mainly makes gut decisions and likes to discuss them, as well as open questions and issues with others – like his team or his wife. He seems to be a sociable person, likeable. He patiently explains to me which tools he uses and how and what else they can do.

Andre has been a sports enthusiast ever since he can remember and used to play team sports. However, after knee injuries he quit and started running, cycling and doing triathlons. He describes himself as goal oriented. He loves sports, especially running and cycling, and completes at least 10,000 steps every day. He goes running up to twice daily and tracks all his walks, runs, bicycle rides and also his sleep. During his studies he went running twice a day and also prepared for a marathon in 1997. He wanted "to get some more structure" into it and started noting his times and other measures on paper and recorded them in Excel spreadsheets because the only tools available back then were stop watches. Since he also wanted to know and keep track of distance, he measured the routes before or after his run by riding them on his bicycle, watching the tachometer and becoming aware of the distance and, somehow, his training level.

“...what I started then is a bit nerdy... I started making markers in the forest to see how long I was running... that's when it started that I began to track and also kept a record of it...For me, it was important though to see how much I was doing here. So that simply motivated me or it still does.”

This additional information about the duration of his frequent runs served as feedback on his performance and motivated him to formulate goals. He then tried to achieve these monthly goals - they were his personal challenges. As a goal-oriented person, self-tracking helped him observe his progress and adjust his efforts to achieve these goals. His running protocols served him as a framework and apparently fitted in his running routine. Since his running was a stable part of his life, I would not deem his actions a project, which as such is defined as a temporary procedure with a time limit. For Andre, self-tracking techniques support him in sticking with his routines and provide evidence by having them recorded and archived – which is what he did. As he drinks the latte I made for us, he does not take any of

the bread rolls since he had already had breakfast with his family earlier in the morning before setting out on his way, as he explains. Many people would have tried one since they looked really appetizing, at least I would have, but Andre did not want one. Either he is disciplined, or he was just very full.

He exhibits a not inconsiderable amount of discipline in his ST practice. For example, when he notices that he did not reach his 10,000 steps one day, he would rather get off the metro a station early and walk the rest to get this done. He is able to control himself and self-regulate and throughout the whole interview I could not detect any insecurities nor replacement/ substitute actions hiding the motives behind his practice. In my view, Andre could serve as the prototype of someone in the technology friendly category, appreciating supporting tools in his efforts to live out his sports enthusiasm in the first place. Another aspect of his life he was tracking was his sleep quality - I will report on this in the later chapter on "Self-control".

Coming back to Andre's history, sometime in the early 2000s he got endocarditis after an untreated cold and had to undergo heart surgery. After that he was obliged to measure his heart rate while doing higher intensity exercise, such as running and other sports. This incident did not stop him from doing extensive sport and so he started tracking meticulously using digital aids, such as tracking devices and wristbands. He put on a Polar chest strap to monitor his heartbeat continuously and began to watch his sleep. This was in 2004. Today, he uses continuous heart rate monitoring via specialized earphones able to sense his HRV through the pressure in his ears. He also uses activity trackers such as the Fitbit and Strava web application for his bicycle rides.

FLORIAN (Flo):

I learn about Florian while attending my first QS meetup at the stylish rooms of "Connected Health", a startup based in Hamburg concerned with applications for communication and exchange of documents between doctors and patients. Florian has prepared a good-looking presentation about his tracking projects that extends the usual show & tell talk which is supposed to last around 5-10 minutes. He shows his objects of scrutiny, the tools he uses and, of course, tells us about him being a health consultant working freelance for a health consulting company in Munich. He is also trying to establish himself as a speaker at conferences around digital health and tools. Florian has connections to numerous makers of self-tracking apps, smartwatches, and other wearables. As a result, he occasionally gets

products to test or gets a remarkable discount to test them and write about them in his blog.⁷² One can tell Florian likes experimenting with and trying out new gadgets, tools and apps on the market. He tried almost everything from the obligatory steps, running and cycling apps, to heart rate meters, skin resistance meters, apps for financial expenditures, calorie counting, mood assessment, smart home apps measuring carbon footprint and so on. He captures everything manually in an excel sheet while always looking for good solutions available on the market. With Gyrosco.pe, he finally found one. This kind of dashboard collects all the data gathered by other devices and apps and produces a digital image of the bodily and behavioral data which can then be embedded on the website or blog and thus make it visible to the public, as Florian did.⁷³

Coming back to the day of his QS presentation, he is wearing fitness apparel that measures electric activity generated by his muscles, heart rate and respiration in real time and promises to optimize performance and encourage you to take control of your training with the help of online training programs available to the wearers of the suit.⁷⁴ Florian also occasionally writes blog articles about new ST gadgets, is invited to speak at conferences about them as well as to companies who are thinking about implementing an employee health monitoring program. Right now, he has signed a contract with a company that offers such services and is trying to establish himself as an expert in this field.

I talk with Florian after a QS meetup I organized in Hamburg which he attended as well. He had a contract for a workshop at an Internet agency in Hamburg and used the long journey from the south of Germany to attend our meetup, where he would also present something on his current self-tracking projects. We had been in touch since our first encounter at another QS meetup in Hamburg and I had planned to interview him long ago. So, I was happy that finally, in August of 2017, we could meet in person to have a talk about it. The place we meet is a maker space of friends who run a FabLab there sponsored by the city of Hamburg. Lots of laser cutters, 3D printers, computers, wood pallets, screws and other things lying around give a somewhat cluttered but busy impression. It is a hall with a maker space atmosphere where self-determined and future oriented people linger. This makes the room somewhat different from the usual QS-Meetup rooms, which are usually sponsored by young companies and startups. In those surroundings I feel more at home than in the former.

⁷² igrowdigital.com

⁷³ <https://gyrosco.pe/igrowdigital/helix/mind/> last accessed April 11th, 2019

⁷⁴ <https://www.liveathos.com> last accessed April 19th, 2019

It is later in the evening and we had already had a beer when I started to record our conversation.

Florian seems to feel comfortable and relaxed. Florian is in his thirties, a very likeable, friendly, open-minded, and engaged person. He always has a smile on his face - a type of sunny personality with a positive but not exaggerated view of the world. He is a bit over average height for men and may have a little too much weight on him but appears very sporty and active.

“Actually, I do everything for fun. At most I try to get into the habit of things that are good for me, to make me enjoy them”

As a young man at the age of 20 he got a diagnosis of sensory inadequacy, accompanied by pains, which he asked me not to explain in greater detail. Many visits to doctors and alternative practitioners followed, but no one could find a clear cause and recommend appropriate treatment.

“Nevertheless, I have tried a lot to change that somehow, the symptoms. I've seen a lot of doctors, alternative practitioners. I was 20, I also received money from my parents for alternative therapies. Tried all kinds of things. And the doctors, the orthodox doctors, they said ‘There's nothing we can do’, sort of. And it's a pretty gnarly experience. Especially as a young person.”

So, he was left helpless and bewildered – a frightening experience, especially when before you were just like: “The Sky is the Limit”, he laughs. Thus sensitized, he started using self-tracking as an instrument to do exercises that he thought could help. But this was not the case. Nevertheless, he stuck with it and then began to collect bodily data about himself, such as continuous pulse, movement data or sleep, and has investigated how these values affect his condition through supplements and different diets. Later, he continued his self-experiments and dealt with working hours, activity tracking of all kinds, sleep rhythms and genetic analyses.

“And then there is another reason why I find this so incredibly exciting now. My family, they were very, very religious.” Florian recounts. They were in a free church, with strict rules and dogmas. Already at a young age, as a teenager he began to question them. This led him on a long search for the truth, as he tells me, for what is true and false in the world.

“Then I thought and looked, how could the world work? [laughs] I also studied religions, spirituality, for a long time. I also took many other things as a faith phase. And it has dissolved more and more today. I have no idea what there is after death if there is anything. And it is not important to know. But, so to speak, this search, it is also so that today I somehow say: ‘I find a book that somehow argues totally credibly that there is rebirth’. And I find a scientific book that says: ‘That cannot be at all’. So, it's super difficult ...”

This search for a kind of definitive knowledge also seemed to be one of the reasons for dealing with QS. As for now, he does not believe anybody, he says, he does need the answers from outside, and thinks that they may come from data. To “learn something about myself that I don't know myself” is a main drive for Florian to apply self-monitoring and self-tracking technologies to himself. This last passage also makes Florian suitable for the fourth category of reasons to start self-tracking if you are on the lookout for something (see III.1.4).

OTHERS

RAGNAR: did not name any medical issues as his springboard to try out these technologies, but his speech impediment indicates that he probably would have been, to some extent, preoccupied with himself and his body at some point in his life. I will describe Ragnar in the last “search for something” section below, although he, like the other participants, also partially fits into other categories as well. I have tried to assign the participants to the categories that are most pronounced in them.

4.2.2 Discontent with a Particular Condition/ Wish for a Behavioral or Bodily Change

ARNE, KAROLINA

Secondly, for another large number of self-tracking people there is some kind of dissatisfaction about their body weight, work output, mood swings and stress, the quantity and repercussions of social contacts, or other life circumstances at the beginning. The vendors of ST technology promise an easier way to reach goals, an increase in wellbeing and ultimately self-satisfaction. People triggered by these promises enjoy the motivational part

and getting some form of transparency and control over themselves through self-tracking. People from this category try to improve some behavioral or habitual aspects of their lives and find a temporary coach or assistant who tells them what to do, when and how. They seek orientation. This kind of technology-assisted self-help is a combination of the will to change a specific behavior – such as working hours or the environment, taking care of the calories or kinds of food one takes in regularly, people or places surrounding them and causing unease – which through enough information gathered in a reasonable amount of time and detail, becomes either avoidable or changeable by oneself or with the help of the technology used. Useful functions of mobile apps pertinent to self-tracking wearables, sensors or other gadgets for this purpose are regular reminders, daily or weekly reports with associated graphs showing progress as well as motivational cheering and rewarding gamification badges when achieving a milestone in the behavioral change project. Behind this kind of starting point for a self-tracking project lies insecurity about one's worth or one's position in comparison to the theoretically doable and the thinkable, and a wish for self-affirmation. To overcome discontent about oneself there is either the possibility of changing the behavior in question to a better or wishful state or to change the way of thinking about (and judging) this behavior. In both cases self-tracking can help either make one's own behaviors or one's misjudgments of an issue transparent. Not surprisingly, there are reports in media and academia about self-trackers like Carmichael (2010) who was a leading figure of the quantified-self idea and network, who started enthusiastically self-tracking everything but eventually stopped because they uncovered their hidden compulsive and extrinsically ingrained beliefs in their traits and personality and the proper conduct of life.

ARNE:

Arne gives the impression of having experience giving interviews. As one of the first “QSers” or self-trackers, he enjoyed a high media presence in traditional media in 2013. He likes to tell stories in detail and is willing to participate in my research long term. Friendly, respectful behavior, a calm manner, and a hip, bearded look. Apparently, Arne values entrepreneurial dynamism and willingness to take risks. Start-up-crazy, he, although still employed, founded a UG – a limited liability entrepreneurial company. Currently, he runs the Quantified Self Meetup Group Hamburg and is also active on Facebook on this topic. But he is also interested in other topics: SEO, veganism, monetization of online ideas. Why did he even start tracking?

“Reason of the whole was simply the dissatisfaction about the weight...the weight increases through vegan nutrition, which I would not have expected so. But ...yes, one cannot generalize that vegan nutrition would have been to blame for it. Because I don't have the time to do everything nice at home, but rather have to resort to...convenient things. Which then again are mostly rich in carbohydrates and fats...In the context I tracked and documented and weighed explicitly to see how many carbohydrates I have gained to the gram....And then at the same time somehow examined the weight and checked whether it is developing in the right direction.”

However, after this period he did not stick to the diet at all and over time changed back to a mixed diet because of the inconvenience and lack of availability of vegan groceries and dishes. Nevertheless, he is satisfied with the attained knowledge and the theoretical possibility of being able to accept this diet and even teach others about preparation, ingredients, and other specifics of that diet. This knowledge is saved in his virtual drawer, as he was explaining to me elsewhere, as a kind of stored tool in a toolbox.

I meet Arne at my first visit to a QS meetup in Hamburg in 2015, which was, at the time, organized by him. I learn that he was the second person in Germany, right after Florian, to introduce the QS idea in Germany and make it popular. There is a bit of a pride in his voice while telling me this. Like Florian, he got so inspired by the tracking practice, technologies and techniques that he got very much interested in that practice. Not only was he trying out diverse trackers for diverse purposes, he also got inspired by ST for professional reasons and tried to establish himself as a health and food consultant. At the time we met the first time, he had finished a fitness trainer qualification and was looking for a method to make his efforts scalable, as he explains: for now, he can only work one-to-one with a person, but it would be much more reasonable to sort of multiply himself, i.e., to find a way that he could teach or train other people simultaneously. At this time, online offerings for digital coaching in diverse domains just started to spread and become popular. For example, Freelethics.com turned out to have an attractive business model as they offered parts of their knowledge for free in the form of short explanatory videos or written How-Tos. They also offered elaborate, so called individual, plans for workouts with specific aims, such as losing weight or gaining muscle. While Florian stayed in this area throughout the years, I was writing this dissertation, Arne changed his occupation a couple of times. Arne often changed his professional education, wanted more and to move in the direction of management. He sees and tries to make the red thread clear in his story. He tells his story as a sequence of interrelated events in which he discovers something for himself and then jumps at it with zeal. His search is a search for perspectives, he switches from studying electrical engineering, to sports and nutritional

science, then to a qualification as a fitness trainer, then from those studies to a qualification as a fitness manager in order to be able to open his own studio. But somehow, he ends up in the online business and takes a social media job with a large food retail group. In addition, he gives webinars and is temporarily self-employed with a buddy. He is addicted to innovation, has something against routine work - just loves to do, do, do. The main theme is “doing and making”.

He is an active self-tracker in many areas, and first and foremost tracks weight, food intake, running and his social media stats, such as likes, comments and shares on Youtube. He tells me about when he was trying to establish a video channel on self-tracking. He has had (and certainly still has) a lot of ideas about what to try and turn into a successful business related to his current goals, either bodily or professionally and financially.

Entrepreneurial thinking is deeply ingrained in Arne's mindset. He is one of those QSers who try to make a business out of it because they believe in the idea and that it might help others. After trying different tools and quantifying procedures on himself he immediately thought:

“How would it be possible with my mindset, with my view of things, of which I am firmly convinced that it also helps others, how can I bring it on board, how can I create a product or a service from it, where it is in turn easily possible for me to do it remotely somewhere, as a digital nomad, something like that still hangs in my head, how would I be able to build a business with it?”

He loves beginning things, brainstorming ideas, quickly setting up first prototypes or drafts of prototypes, just because they are new.

“Because it's kind of *new* ... Because the attraction is just this ‘I have an idea’ up to ‘I'm creating a base from where it could theoretically start’, but until then, suddenly there are topics that are just much more attractive, where we go from there.”

After a while and some lessons learned he switches from reselling self-tracking devices in a self-made online shop to the next project, becoming a nutrition expert for keto-vegan nutrition.

For our second interview we meet on a sunny afternoon in June 2016 at the Aussenalster, already in jogging clothes. I ask him a few questions in advance, then we jog

around the Alster together. I know that he knows that I will be observing him. However, it is impossible to avoid the observer effect while simultaneously following research ethics and informing the interlocutor of my intentions. Arne makes a fit impression, runs fast and can still talk easily. Always friendly, optimistically looking ahead. Sometimes he looks at his new Garmin tracker to check his heartbeat. He is not interested in speed or the like. He always gives the impression of a thoroughly active young man (although in my opinion he has a few kilos too many on his hips). Currently, he is more interested in nutrition, vegan and ketogenic food. Tracking increasingly bores him, he says. Later, Arne seems to have discovered camping journeys and has started an online business for campervan extensions. Recently, when I looked up his website, he had finally united all his interests in one place and offers coaching in health and sports, finance and investment as well as a craftsman for camper van refurbishments and consulting.

KAROLINA

I got to know Karolina at an event organized by her through her work at the Polish embassy. Since then, we have remained in sporadic contact. When I told her that I was doing research on self-tracking she showed an interest and, as it turned out, she used some of these apps. Karolina is tall, has a little bit of excess weight, is in her thirties, and is as she tells me very active, sporty, self-determined, curious, and impatient. She seems very lively and positive to me. After her temporary job at the embassy, she then worked as a translator and web designer in a small company where jobs are given rather ad hoc to those who can do them, rather than after extensive applicant selection processes. She seems to me altogether unagitated and not that enthusiastic, compared to Arne, for example. She seems rather pragmatic in using her time for useful things without any buzz.

"...I am very practical...and I want, now when I have a free minute, to use my time now to ...to discover something new, to read, and not just to ...because I am bored, then I will play, that is not like that. That's why on the bus or something or when I'm standing in a queue, I read because it's important to me. I have so many things I want to discover, where I want to educate myself, what I'm interested in, time is really ... these 24 hours are too short."

Karolina is one of my first interviewees in February of 2015. She is a sociologist, and she mentions that her interest in those apps is, beside the pragmatic approach, also somehow driven by reflecting on smartphone usage in society as such. Sometimes, when she is taking

the bus to go to work, she puts her smartphone aside to watch the other passengers, 90% of whom are staring at their smartphones. It is an interesting observation for her, although she does not do anything productive with this insight, just absorbs it for her understanding of the world she is living in. She uses a range of apps for both private and professional reasons.

“My problem is that I'm interested in too many things and I sometimes feel like I'm doing something all the time. And not really accomplishing anything. Such as learning languages, then my company - where I also spend a lot of time creating some projects, new sites. Or I also read about it. Or, for example, because I have learned it myself. How to build web pages – then I just look at YouTube how to do that if I want to do something. If I want to achieve something, then I have to google a lot. And so I learn. That interests me and is fun.

And every project is a new challenge. And I am a person who does not say ‘I can't do this’. I say ‘I'm trying’. If it doesn't work out, I can give it up, but if someone asks me if you can do it... I'm afraid to say, ‘No, I can't...’”

Although she stays positive – the type that does not give up and does not go down – at the same time she seems unsatisfied with her professional and personal achievements. Personally, she would like to start a family, and therefore trains and takes care of her calorie intake to lose weight. Currently, she works in the social media department of her company but is also a promoter for a weight loss app, which she does on the side. And sometimes she appears as though she does not really know what the right path might be because she is interested in so many things, but obviously does not pursue a single one to the fullest. Her curiosity as well as the requirements of the job she was doing at the time led her to acquire knowledge in graphic design and learn a bit about InDesign. She also learned a bit about Illustrator, but not at a professional level, as she states. I think that she might be too critical of herself, too demanding. Either, it is a realistic assessment of her skills, or she sets requirements that are too high, or it is the overall discontent with her life that rubs off on the assessment of her abilities (stands as a substitute).

"many things interest me. That's actually also a problem, because I should have concentrated on one or two things, but I'm so ... um ... stingy that I absolutely have to discover everything (emphasized!) now. That's also my problem."

Q: Why stingy?

"...because I could really concentrate on one thing and finish it, but I really want more (!)...That's why I think I'm so stingy, because this one thing is not enough."

As an example, she tells me she reads five books at the same time, i.e., she does not finish them, but is quick to buy a new one when she is inspired by a review she read or a recommendation she got. Like Arne, she is interested in many things and in her imagination wants to dive deeper to be able to do something by herself if she needs it. The focus is not on one occupation or path, they are both looking for something. They seem like treasure hunters to me. They both think that self-tracking technology might help them feel better, no matter in what sense. As such they both fit into the treasure hunter category of technologically mediated self-relations, which I will describe below (see III. 1.4).

She tells me how addicted she is to her smartphone and how, when there is an interesting app, she tries it. And there are many different ones. She especially appreciates the usefulness of the various apps she uses and admits that her smartphone is ruled by chaos, expressing that her "place is a mess" - does she mean that she is a mess? I ask myself.

"...therefore I could never live without my smartphone...there used to be this time when I was bored, now there is no longer this time...I always find something to do"

She tells me that she uses Runkeeper to track her jogging, i-Biker for cycling, she has her Withings scale connected via Bluetooth to her iPhone and the Runkeeper app, she measures her daily steps, physical activity, and weight. Her overall goal is to lose weight by exercising. She prescribed herself at least four workouts per week and a diet where she only eats carbohydrates in the morning to boost her metabolism, and none after noon. But as all the other people tested, she does not stick to it rigidly. She also counts her steps and sets herself a goal of 7,000 steps per day, because otherwise (i.e., sticking to the common 10,000 steps rule) she "would have to have a job as a waitress to get there." She wants to have quick results with larger reductions in weight, so she says she wants to lose 8-10kg until the end of that year, which was about two months away. I feel slightly uncomfortable interrogating people I hardly know about partially personal topics like weight loss and weight. It is not always easy for me to make further inquiries for fear of embarrassing situations. However, her goal sounds a bit unrealistic to me, but she refers to Facebook communities where people report such large weight losses, so she thinks this should be possible for her as well. She seems to me a rather head-driven person and when we talked about places she could imagine living,

like for example a town in her country of birth where parts of her family live, she says that she decided that she “is going to be happy here”.

OTHERS

ISGER works as a freelance programmer and was discontent with his work-life-balance. He discovered that coders could sit there for ages and improve a bit here and there, but he wants to find proof, i.e., data-based advice for a good balance between working hours and spare time.

RAGNAR realized, after tracking his encounters and accompanying feelings at work, that he felt particularly stressed at meetings where certain people were in attendance. Then he applied strategies to change those situations either by participating remotely via phone or online or shortening the meeting time. Besides this important issue for him he started using self-tracking gadgets to see if he could lose some weight, as he tells me.

PHIL is my “6 million apps man”. He tracks almost everything in his life. One of his reasons was dissatisfaction with his financial spending. At the end of each month, he was clueless where his budget had gone and so decided to track his expenses.

MYSELF, I started self-tracking for different personal reasons, beside the fact that I was doing research on this. There was discontent with my productivity outputs, i.e., written pages per day. The other reasons fit well into the next category. I wanted to establish a regular running practice and, for this reason, document my weekly runs together with a yearly goal of 800 km. Ultimately, I wanted to “look inside” my emotional world - when and where did I feel good, when bad? With whom? How severely?

4.2.3 Use of Tools to Manage Performance-Based Activities and to “Play” with Devices

PHIL, TABEA (but also ANDRE, FLORIAN, ISGER, RAGNAR, KAROLINA)

The third type of cause of self-tracking is maybe one of the oldest drives as it refers to improving performance. Things like work productivity, learning new skills or habits, and mental or physical training performance, such as brain training, running, cycling, and other kinds of preparatory intensive sports, fall into this category. These undertakings can either

be carried out competitively, for fun in a group of friends where progress is made visible to each other, or just for personal wellbeing and the documentation of efforts exclusively for oneself. The latter was being named often among my interviewees and was an important point for me as well, to have a kind of diary about the time spent doing sports or caring about oneself in other kinds of self-thematization. In fact, these kinds of actions led to greater satisfaction with one's current conduct of life and maybe even served as a kind of gratification, as well as permission or justification to feel good about certain aspects in life and, as such, increase the amount or intensity or resonance of a, in such a way perceived, good life. To put it in the words of Hartmut Rosa (2016): "If acceleration is the problem, then perhaps resonance is the solution".⁷⁵

PHILIPP (Phil)

Philipp loves to attend diverse meetups and conferences. For example, on SEO (Search Engine Optimization), podcasting, Quantified Self and many, many others. He was recommended to me by Florian and I invited him to give a talk at a QS meetup in Hamburg in August 2018. I expected a rather classic show & tell presentation, which usually lasts between five and 10 minutes, but his presentation was 40 minutes long. Not surprisingly, as it turned out that he was tracking virtually everything in his life. He is very energetic and a type of dashing entrepreneur. He seems technologically savvy. Phil considers himself to be very conscious compared to average people on the street. Talking about data privacy and ownership as one of the main constraints in self-tracking, he explains that since we are living in a ratified world, it is inevitable to lose partial control over one's data. However, people are getting tracked unwittingly most of the time, not only by digital technology (website usage tracking, location, search terms and the like) but also by loyalty cards from consumer goods vendors and transportation providers. He says that he pays a lot of attention to protecting his data, for example by using an ad blocker and switching his WiFi off when he goes outside. On the other side, he deliberately shares his location on social media as he leverages the benefits versus drawbacks of tracking case by case, he says.

Phil is a respondent of whom I have three different sources of material: The first was the show & tell presentation he gave at the QS meetup I organized. The second was an

⁷⁵ Rosa developed a hypothesis about the good life, according to which the good life is not a matter of single or accumulated skills (resources as he calls it) or instances of happiness, it is rather the quality of our connections to the world. These stable and long-lasting connections in different spheres of life (such as family, friends, politics, employment, religion, or hobbies) inform the individual as well as the collective perception of a satisfying quality of a good life.

interview I asked him for some months later. The third was a video report on “self-trackers” and one about “self-optimization” made by students at the University of Applied Sciences and Arts in Hanover, where he participated.⁷⁶

Phil, tall and fit, late thirties, and a nerd as he describes himself, giving the example that he runs 400km in January alone. Compared with myself it is half of my yearly goal, accomplished in only one month. Phil works for a German food manufacturer and manages their small digital department, working a lot with a small team and particularly with external agencies and service providers. It is a well-paid middle management position many people would dream of, but he considers getting a fitness coach certification. He appears well organized, rational, he speaks in a considered and calm way. Sometimes during the interview, I think that he appears a bit sad to me, maybe a little bit timid, which was not the case during his presentation. There, he was very engaging, involving, and also fun. But maybe it was just a matter of his form on the day.

His presentation is organized around his objects and activities of measurement and recording. He presents apps that he considers useful, e.g., Headspace for learning to meditate and sticking to the practice of meditating, Swarm, formerly Foursquare, a location sharing service of which he likes the gamification elements, such as badges for the number of times one visits a place and where one can rise to become “mayor”. He used MyFitnessPal to track his physical activities and calorie intake and after he learned “what he should eat to get the best out of cross-training”, he stopped. He uses Strava as a platform for professional athletes and illustrates all data with diagrams, showing his engagement with running, biking and the like. For these different data and values, he appreciates using a kind of dashboard (one that Florian is using as well) Gyroscope <https://gyrosco.pe>. which gathers the data from other apps and designs them clearly in one view.

“For me, social media is also a form of self-tracking. I photograph my food every day - I do that because it's a diary for me.” He goes on: “I am a very big fan of podcasts - also track podcasts with the ‘my podcasts’ app”, he was beaming into the audience. In a similar way, he tracks what he reads in Goodreads, what music he listens to in Spotify and which movies he watched in IMDB. “It's terrifying what the app knows about me”, he says about the Spotify suggestions and is amazed how good the suggestions are. “This is a little nerdy now... I track what I own”, he says about himself on the next slide showing his collection in

⁷⁶ <https://mediathek-f3.hs-hannover.de/mediathek/kategorie/exporter/video/reportage-self-tracker/> last accessed February 12th, 2020

the Home Inventory App. When someone from the audience made comments on this, he replies “I’m just a nerd, a techie”. It appears that the whole tracking procedure is part of what makes up his identity. Identity is defined, beside the demographics, as a collection of different personal characterizations and traits. Self-tracking is, at least for Phil, but I assume also for Florian and Arne, a significant part of their self-definition and desired self-image. A few months later, in August 2018, I meet Phil again in a cafe in his residential area for a dedicated interview after work. He comes equipped with a modern backpack with many pockets for storing different electronic devices. He is greeted as if he were a regular at this cafe and orders a hot tea with ginger and lemon although it is pretty hot on this afternoon, while I order an ice-cold orange lemonade. A short talk with the waitress reveals he seems to order it every time. On the one side, he appears devoted to that practice, on the other he does not take it too seriously either. “With the numbers I get here during the training, I don’t stick to them ruthlessly, it just helps me to make the training more efficient” - he says several times throughout the interview.

In the above-mentioned video documentation one can see him in his flat, sitting on the couch browsing the “Business Punk” magazine. He asks aloud: “Computer, what will the weather be like in Ottensen?” A computer voice answers. He begins his narrative in the video about “a typical day of a self-optimizer, a self-tracker”, which sounds like a novel for me (“Aus dem Leben eines Taugenichts”...I think). First thing in the morning he listens to the news via Alexa, checks his tracked sleep data and brushes his teeth with a toothbrush that measures movement and is connected to his phone via Bluetooth. It is more of a gimmick, he says, but it tracks his “tooth brushing behavior”. The brush gives him instructions on how to brush his teeth and he can then see which segments he has brushed for how long – which he considers helpful. His connected scale measures, beside his weight and percentage of fat and muscle, the CO₂ concentration in the room - “to promote health”, he explains.

Phil paints the picture of a man who is used to using tools to improve something in his life, be it finances, weight or training, or various other aspects, because he spends a lot of time evaluating them. Later on, I will describe how this practice affects him.

TABEA

Tabea is a mother of two. After graduating with a degree in business administration she landed just out of interest, as she states, in the marketing area, with a focus on web marketing, search engine optimization and the like. Her current job requires flexible and diverse skills since she is also occupied with organizational support and management

assistance, a bit of a criss-cross, as she admits in an attempt to describe a coherent identity. She has always had contacts with developers but does not code herself. Nevertheless, she tries to convey her interest in coding to her boys though:

“to use IT - mobile phones, laptops, tablets - to become creative yourself or to find a career start or even to found a company. That would be really... that would be great if they did that...and not only to gamble, to consume, but also to really start something useful with it.”

She seems to me to be an uncomplicated person, open to new things, curious about technology, and generally content with her life. She is a doer, in her job and in her private and family life. She likes trying things out and checking what the results will bring. So, she might be described not as a control-oriented and strategic person, but rather an impatient, courageous and entrepreneurial character who likes to engage in new technological things to stay on the ball, as she says, to learn something new, to get ideas and realize them, try them out without asking much about the how, why and what for, without studying the instruction manual beforehand. When she comes across something she wants to do, she does not hesitate to work her way through it on her own by reading blog articles about it and the like (she is similar to Karolina here) and implement it as quickly as possible (she is similar to Arne here). To have a routine job would be boring for her, she tells me, she seems really interested in and inspired by what she is doing right now. For her, it is a piece of freedom although, on the other side, she also misses the stability offered by fixed working hours and locations. She is very happy with the structure of her family and her partnership, which allows her and her partner to take time out for themselves, with phases where there might be less income contribution from one side, for example, while they learn something new, take a course or embark on new education. That might explain the positive attitude to life that she radiates, and her unconcerned and constructive approach to new technologies.

In reference to her self-tracking, she describes herself as someone who is used to going jogging on a regular basis and eating a healthy diet. Not as a regime or urge, she emphasizes, it is rather a natural way of living for her. She is doing it for herself and enjoys progress and improvements but without any pressure.

“...some people have a goal, where they train for it, and it's not really that for me. I have noticed that I find it exciting to increase my performance, or to move in a direction, which is not necessarily linked to such a competition... So just to get fitter or just, I don't know, to cover a longer

distance, e.g., ...um... to run a half marathon or ...um... also just...um... to get better in the distance you usually run. It was more like that for me, or to see what goes on there...if you can do it”.

In around 2013 she got a Jawbone fitness and sleep tracker, after she heard about these tools from friends who started sharing their data insights, such as what their pulse and sleep was like. Tabea also wanted to get some insights into herself and was surprised by the information she got, while she has been thinking that she would actually know herself enough. Tabea got to see how much she moves and does not move, and this awareness fascinated her. The daily little things that people barely notice are now a fact, a number, a diagram, or a trend curve, on which you could now reflect. Although she was already a person who cared for her health, she appreciated this additional opportunity to think about oneself and to notice the previously concealed facts and circumstances.

“when I sat at my desk a lot and was not outside much, through the home office for example, that I thought in the evening - Oh, God, it said you sat still for 5.3 hours in a row today. Oh God, that's bad (laughs) I don't think you notice it at all. Or I mean, you'll probably pay attention to it, but if you see it like that in an app it's like - wow, really? I didn't move that long today? That's weird. To see it that way, I think, and that's when I noticed that by seeing it or being more conscious of it, I just, really read from this part, that I then ...um ... rather put on a running unit again ... or even in the morning, I don't know, walk to the bakery by foot.”

Looking at her data gives her information and makes her aware that she sat at her desk for hours without moving. It motivates her to go for a run or a walk at the end of the day. She starts noticing her level of activity and non-activity throughout the day and reacts to this information in a way that suits her best by going jogging or at least walking. Tabea gets the feeling that she is taking care of herself in a way that she already anticipates as a good way of conducting her life: being active. The analysis of her data supports her and affirms her lifestyle. In the above passage she also describes a clear affective reaction to her data: she is not only surprised but also somehow frightened by this information. One could argue that she is frightened in the sense that she classifies her behavior as wrong or incorrect against the backdrop of these data, which indicates that she has given the electronic device more authority to interpret correct behavior than herself. But she explains this in a rather playful manner: first, she discovers that she did not move for over five hours, this insight astonishes her, she feels that this is not a good thing - because the app says so or because she thinks so?

She appears to tackle that rather as a challenge, as a kind of physical challenge, a playful approach by which she thinks: I will show you!

“the stimulus is I want to get this done or I want to show it to this gadget - that's totally stupid, this stupid (laughs) app, of course I can do that. What you're showing me here...what I've actually set myself as a goal. Sure I can do that and that ...um... funny thing is, the thing that praises you for it..”

And she enjoys and appreciates this. She shows a clear affective response to this tool and enjoys getting praised by it, even if she realizes that this might be a bit strange. Even though she is a little embarrassed and does not quite understand it herself, she experiences positive affective responses.

I would like to conclude this passage with a reflection about myself during this interview situation: With a woman I feel myself more or less on a similar level. I become more personal, ask more things in the direction of relationships and family, with men I hardly do that, there I talk more about their job. The woman I asked less about goals, more about discipline... We both felt comfortable, I think, and I told her that I wished she would be open and expressive - I didn't do that with men. I probably also expected her to be more reflective - that is, to think more about herself - and also to answer more reflectively.

4.2.4 Searching for Something Magical - Curiosity, Exploration, Treasure Hunting, Magic Hand

RAGNAR, ISGER (also MYSELF, FLORIAN)

Finally, the fourth category is a group of reasons that has not been examined much so far. It concerns drives, triggers, or motives with regard to meaning surpluses and imaginaries about the forces inherent in technologies, which can show their effect in self-application. This group relates to self-trackers who are in search of something which might help them discover, redefine, or set new boundaries for themselves or what they think and imagine about themselves.

While this group, although very interesting as such, might be a bit underrepresented amongst self-trackers, all of them get the same attention in this dissertation and contribute to the synthezation of the results to be discussed in the following section of the self-related

findings. Another group I investigated during my research stay in the Bay Area, the consciousness hackers, are represented more strongly in this category of seekers. Even though they do not explicitly use any particular self-tracking technology, those are people who are interested in combining technology with reflexive (some call it spiritual) self-techniques and aims, to become more aware and mindful about themselves and their lifestyle. Their goals are to reveal and reinforce their individual potential, though often stated to be for the good of the whole world. While talking to those people, my impression was that these thoughts were not megalomaniac dreams and ideas but simple extrapolation. The more individual people start working on themselves to become more positive about themselves and towards the world around them, the more it might exponentiate and probably inspire their surroundings and may culminate in a better life for everyone at some point in the future.

RAGNAR

Our first talk is in rather special circumstances. Ragnar is on holiday in southern Spain, south of Barcelona. During the interview he tells me that his company allows employees to work from anywhere and whenever they want. So, he was ready to start the interview at 9pm.

The atmosphere is relaxed, although a bit loud in the background because Ragnar is sitting in an outdoor bar with his Bluetooth headset and laptop. He enjoys drinking one or two glasses of wine or beer during the interview. Sometimes people pass by in the background. Later, chairs are placed on tables when it is time to clear the bar/cafe and close it. Ragnar has no inhibitions talking about his issues, it seems to be loud enough that he speaks freely about himself. Over the course of the interview, however, he reveals that the reason for his interest in self-tracking technologies is largely professional and performance based. How can you be more relaxed in meetings, how can you achieve your goals more effectively? In addition to the fact that the interview was conducted via Skype for Business, I wonder if he was really free in his answers or whether he had a working consultant attitude. It seemed to me he would have liked to continue talking if the cafe had not closed and more or less kicked him out. He repeated that he would gladly be available for further interviews. So, his interest appears to be very intrinsic.

He comes across as a person who is passionate about the topic and therefore looks at the interview kind of like a conversation. He really likes doing it and was also immediately willing to meet again when I suggested the next appointment. He believes in technology, in goals - especially those agreed upon professionally - those mean a lot to him and so does

achieving goals. He mentions the topics self-optimization, change management, self-improvement - these are important topics for him.

Ragnar is a technology consultant working for a big and well-known IT company. Part of his job is to search for new solutions and product development possibilities for customers. This is the reason for part of his interest in self-tracking and the Quantified Self, as he refers to it. We met at the re:publica conference in 2016 when he came to my talk and experiment station and we had a chat about a meditation headband I wore that day to demonstrate EEG tracking and how it differed in a busy versus calm state of mind. Technically savvy, open and interested in new things, Ragnar has enough contacts and resources to search and test new things in this area. Tracking and gathering data about the Self is interesting for him not primarily for business reasons, but in the first place because of his spiritual interests, he explains to me when we have our first interview via Skype. Nevertheless, he shares his personal tracked data with his clients when demonstrating his employer's data analysis solutions. He combines a spiritual interest with technological means that are still present in the Bay Area, where I am on a 6-week research stay when we have our second interview.

When I talk to him six months after our first interview, when he was very much interested in productivity tracking, but also stress monitoring (via breath tracking), he now shows a bigger interest in mood tracking. He told me that a friend of his was working on a bot that could parse the text you used in a Skype chat or call and could then – via machine learning – derive which emotional situation one was in.

“There have been diary trends for quite some time now and the digital diaries have of course been around for 20 years. But digital diaries always have this maintenance effort. You always have to go there and really produce content yourself. And then there's the idea that you read it all out via machines and bots and artificial intelligence. And don't have to use this active diary anymore, which you never maintain like other things like calorie counters that you only maintain every two weeks..... The main crux of the whole Quantified Self is that the maintenance effort is so high that you only do it for two weeks. And the fitness trackers that constantly track all day long, they are just much easier than data entry.... And that is of course also exciting, when it is classified by such a machine. And then you can see ‘Is that right?’”

He is interested in the semantics of such tools – how well can they interpret the stuff I am writing and, on the other side, correlate them with other circumstances like places, activities (such as sitting in meetings) and the like to see what will come out. His problem

with his feelings in meetings seemed to remain the same as this was also an important question for him in our first interview about six months earlier. He is also using his own tracked data to present and sell his employer's visualization software (Microsoft Power BI) to potential customers. He emphasizes though that his intention behind starting to self-track was definitively private, but that he wants to harness his efforts and utilize his data gathering in a professional context, too. But if he did not do this, there would be no disadvantages, so his engagement is totally private, he says.

Between the two talks we had contact via social media, mainly Twitter and the Facebook Quantified Self groups (there are two of them in Germany). Sometimes we even exchanged emails to point each other to a new gadget or an interesting article. Maybe due to this status of almost-friends, Ragnar told me about his more private and maybe a bit unconventional reasons for using technology. One of these reasons is his interest in diving consciously and deliberately into his dreams via lucid dreaming. He had once had such an experience and now wants to intensify this experience and find out if it is possible to control one's dreams. He has a lot of further ideas that go beyond current problem-solving solutions and may be called visionary and future oriented. This attitude resonates with me. It might be due to his profession as a technology consultant with a big tech company that he is curious and open to the capabilities of new digital technologies. Ragnar expressed his curiosity about and implicit expectations of ST technologies several times, their repercussions, and yet unknown possibilities to appropriate it for own goals and subsequently his customers' needs.

ISGER

We sit in a cafe at the Schulterblatt in Hamburg, a lively, young, and hip district in Hamburg, where I asked him to meet. In the back there are two big tables which look a bit like conference tables made of thick, rustic wood. I decide to move there after we first sit at a table closer to the front, near the windows and mothers with children who seemed loud to me. The swap turns out to not be so lucky, because at the back table are three young men holding a kind of start-up meeting and discussing their topics in an excited and enthusiastic manner. The volume disturbs my concentration. Isger, on the other hand, is fully involved. He is in the mood for the interview and the meeting with me. Afterwards, I think I should have asked more here and there: what else, how else, are there any other reasons? etc. but I somehow felt uncomfortable because of the distraction and my choice of place. Isger appears consistently friendly, concentrated and willing to provide information. It virtually seems to

me as if he would have liked to talk more and is a bit disappointed when I finish the interview after a good hour.

Isger is 26 years old and a student of IT management and consulting (business informatics and administration). Isger is generally very much interested in studying a lot of things. He seems very alert and, besides this, interested in diverse things such as working with wood, typology, complex systems and digitality in general. He first studied psychology and informatics, but was also interested in cultural studies, typography or journalism, then he decided on studying IT management. He explains his love for handicraft, for doing things himself, and that computer science would offer the "equivalent of woodwork, whereby one can realize complex ideas in the digital 1,000 times better than anything that can be done by hand". Like Arne, he is fascinated by the scalability of ideas, business processes, programs, something that is not easily possible in the analog world. He proceeds immediately to our topic without me having to ask explicitly. I think he does not want to spend more time explaining his professional choices. Actually, he is surprised at the beginning and does not know where to start when I ask him to tell me something about himself. In a Turkish context, he says, he would explain where he was from and then tell me that he stems from the suburbs of Hamburg and has lived in Hamburg for the past six years. After losing himself a bit in the explanation of his fascination with complex systems, he moves on to self-tracking. He does self-tracking because he is interested in discovering something new or hidden within himself, as he explains. It is an experimental, somehow scientific activity for him, and the discovery process and possible outcomes excite him very much.

“Why self-tracking? ...Because I find it interesting with regard to my own decisions, my own actions... to ...um... to change them or the other way round, to look at them differently, on things you might not put the focus on yourself, that is, on something I haven't noticed myself...One just knows that there is so much information that cannot be captured by your senses,so the technique is just a little bit of a helper, to capture things or the bigger picture, which is perhaps not possible for myself (*emphasized*), what I cannot capture, because I have a bias, I think: that is how I am. But maybe I am not like that...”

He clearly tries to find his own position and opinion regarding the potential of information technology, regardless of whether at knowledge level or concrete level of action. For example, he says he might think of himself as being sporty, but when he realizes, based on his tracked data, that he spends one hour a week doing sports, it means he is not sporty. Just like he has the feeling that he just spent half an hour on Facebook, and it turns out it was

half a day. “Do I just feel like I can do this or am I really doing this? Do I just feel that I was productive or was I really productive?” These are the questions that stimulate him. Apparently, an uncertainty shines through here and he seeks information and sometimes confirmation that he is doing the right thing.

“more self-reflective, not so much as control, but that maybe the ...um... I don't take it badly if I notice something that I have somehow assumed wrong, because I think (pause) that I am human enough to know that I cannot pay attention to everything”

It is a “positive insight” or “positive truth” for him to notice what something was actually like. Nevertheless, he is looking for ways to cope with this bias, as he called it, to notice more things and keep them in mind for longer.

“I still haven't found a way to get the things I forget quickly, that I can remember them longer”.

In a similar way, two other people with whom I had informal talks about their tracking practice, two women between 30 and 40 years old, both expressed it in a similar way, that they want to develop better senses with the help of self-tracking practices. “I want to get a feeling for how much I move, how much I eat or drink” - they said. The topic of developing new senses or sharpening the senses through technology will be discussed in greater detail in the third results chapter about technology-relations.

After trying it out, Isger abandoned using his FitBit tracker watch because he did not see the point of it. He considered himself in good shape, so he does not need to track his weight or physical activities. Furthermore, he did not see any reason in measuring something a system predetermines, he would rather use an app where he could specify the questions he wanted to be asked during the day.⁷⁷ Instead of predetermined questions and measurement goals he likes to keep track of his work in an individual manner. Several random times during the day the Reporter app asks him questions, that he defined, such as whether he is working right now, what the main thing is he is doing right now, what his focus is on, what else he is doing. He works very flexibly, with no fixed times or locations, which is why he wants to know if what he is actually doing is in balance with his plan, whether he is able to:

⁷⁷ on the Reporter App one can also specify the answers, frequency, intervals and the graphical representation.

“keep the balance between (pause) something I consider work and something I do not consider work...And I just want to see does this work order take up too much of my time or not or can I balance the scales. Because with all the love, in software development you learn that you can always improve something, and the art is actually to give yourself the basic conditions - not too much and not too little.”

Isger is searching for an answer to these questions within ST technology. To contrast this, I would like to briefly refer to Paul, a meditation center volunteer, and regular practitioner of daily meditations himself. For him, he can only find the truth about himself or other important people in his life in himself when sitting - as he calls that practice very often.

Isger hopes that through extensive and long-term collection of his own answers, he will be able to recognize a pattern, or the device would be able to show him that pattern or any other “truth” he did not know (for sure) about himself. As he explained it to me, he would rather not trust his own (gut) feelings, he prefers to question someone or something that has an answer for him, as he assumes. At this point, Isger’s endeavor may just be called a rational approach with huge trust in technology. I will discuss the topics of rationality and cognition in a later chapter, showing that the concept of objectivity has been questioned for a long time and that things that may appear rational and objective on the one hand – for example stock markets or firefighters – are based on complex, embodied and interwoven knowledge from different sources and, moreover, are renegotiated after a period of time.

OTHERS

Florian told me that already at a young age he was driven by finding answers to fundamental questions. How does the world work? “Is there a God? Is it an Indian god with a hundred arms or does he have a grey beard? (laughs) The search for one's own healing...” he says calmly and nearly reverently.

In this chapter, I introduced my main study participants as well as their individual starting points for becoming involved in ST technology. There are some overlaps and multiple substitutions, for example for Florian, one of the causes of starting with ST was his illness and the occupation with his body. But also, the search for something unknown, maybe enchanted, as well as a practical motivational aid were good reasons for him to use self-tracking techniques. One may find other categorizations in literature (see literature review chapter), but as I want to highlight, my focus in this section was not so much on the kinds of benefits of using self-tracking devices but rather on the starting points for doing this. I the

next chapter I will examine how the user's self-relations are being encouraged and enacted in exchange/ interplay with self-tracking technologies as an example of digital technologies that are applied onto oneself, and not like until now, as means and tools to perform tasks on external objects.

4.3 Non-Trackers and World-Improvers

When started this research on ST in the context of self-optimization discourse, not only self-trackers but for contrast and to learn from extreme examples two other groups of people concerned with self-improvement were considered in order to compare them analytically with each other. For one contrast group I was looking for people who demonstrably believed in the power of technology in the service of human self-elevation – these were people I met in the Bay Area in the US. For the other group I spoke to people who were engaged in the theme of self-improvement but without any or specific technology. I would like to introduce them briefly below.

4.3.1 Non-Technology Group

The implicit lifelong learner wants to become better at things that are in line with herself, but no technology, no goal orientation, no confirmation from outside needed.

JOHANNA is in her late thirties, very attractive and a physiotherapist living in Hamburg. When I asked her to tell me something about who she was, she stumbled a bit. The question was intentionally broad so that everyone could choose a suitable entry point, which in turn could be potentially interesting information for me, I thought. And in fact, she felt a bit overwhelmed and started with her sex “I am a woman - that's important for a start” and continued with her occupation as a physiotherapist, then she switched to the origin of her birth and upbringing in the old West German states, then stumbled again and did not know how to continue, what to reveal. She felt visibly confused by this question. So, I suggested to enter the field differently and asked her about the interests that led her to where she was now. Again, she felt uncomfortable with the notion of interest and told me that her becoming

aware of her capabilities was the reason she looked for something she could do with her hands.

She had different occupations in the past of which the last one was the most unusual one for me: being a croupier in a casino. “Pretty much the opposite of therapy” she laughed. But the manual work, the aesthetics of the movements with cards and chips, she was amazed by looking at people who could do this elegantly and felt challenged to do this as well as the other croupiers. “But, basically, you are like a drug dealer, because they are all addicts who go there and not people who want to have fun”. For years she worked nights and was serving guests in their games of roulette and blackjack, a job she enjoyed a lot until she could not watch the unhappy people anymore or do all the nasty things that keep people playing. What remained was her wish to balance out her karma – as she put it – and to work with her hands. With physiotherapy she could do “something positive”, could help people improve their health conditions and could be in motion all day and, as she impishly reveals to me, she could play a little trick on herself to be obliged to continue learning: “If you don't continue your skill education, then you will just be a garden-variety-physiotherapist”. Being somehow better, maybe exceptional, or unique is important for her self-image. Self-optimization reminded her of the character from the American Psycho movie “something smooth, straight, everything is perfect” she says with disgust, something negative. However, she is involved with the topic herself as she states but wants to make it better. For her, this is associated with learning, for example, to anticipate and master situations, such as in road traffic, for example. When she sees that two or three cars before her are about to turn left, she said she would “calculate in my head the optimal way for me” without being forced to brake or stop. This reveals that she has adopted the ideal of lifelong learning for herself and indicates with the characteristics found above that she wishes to be “somehow better” or exceptional. This will also be found within the self-tracker group, but by other means, namely with the help of technology. She is using similar termini to calculate procedures for her (i.e. in an optimized way), but it is framed in a, for her, healthy and positive context of manual body therapy. And there is another difference regarding goals compared to the self-tracking group. Johanna made her decisions in life without formulating goals beforehand: “Then sometimes I was at a crossroads or there was sometimes an offer and then I thought I want that, or I don't want that. So, there's no goal or anything.” She does not seem to be goal oriented at all and trusts her intuition at the given moment. Consequently, she does not need confirmation from technology or tools from outside, as some of my self-trackers do. She seems to follow her own philosophy of life, in which stagnation and boredom need not be fought and are just right when they are there, as they are part of life. She is not a very ambitious person, she said, but

likes to learn to implement things into her life that suit her. For Johanna, improving herself is an individual process mostly combined with her own intuition, to do good for others, like her patients, and not to need to pursue goals in life to have a satisfied and fulfilled life.

An artist looks at the “self-improvement-scene” by participating himself, carrying this wish to be exceptional and better than others to extremes and using it for his work.

MALTE is a Hamburg based artist using diverse formats like painting, video work and performances conceptualized for others or himself. In particular, he focuses on taking popular things and fashions to extremes, such as losing weight and making oneself more beautiful, which he finds especially among young people. He observed this with his 15-year-old daughter and his younger brother, who trains at a fitness studio with all his friends in order to grow muscles and so Malte wanted to use this for his work. On the Internet based show “I make you sexy” by casting show dance teacher Detlef D Soost⁷⁸ he found a format for self-improvement. It is a monthly paid subscription on the Internet (13 Euro/ month in 2017), which promises “that everything will become better when you lose weight and become sporty” - Malte wanted to somehow use this for his work. The offer consists of three parts. First, online video training sessions, which are pre-produced but address the viewer personally – “Detlef D Soost makes it really good”, Malte admits. Secondly, motivational slogans such as “...really, really creepy... you're the greatest, the best, you can do it! ... you are different from the others, you are a doer, you do sports now, you do it!” One is exposed to this kind of cheering all the time, Malte explains. Thirdly, the betterment program is accompanied by a tough diet: 6 days a week no sugar is allowed, only meat, protein and vegetables. “Hardcore”, Malte comments. You may reward yourself one day a week and eat whatever you want. Especially the so-called motivational tips Malte finds alienating, he “feels screwed when someone is constantly trying to persuade you that you are better than the others”. He thinks it is dumb, “it just bugs me”, he repeats. “I just can't take that kind of stuff from the guy who's supposed to tell me a pre-produced video like this, he doesn't even know me. Well, he has never seen me before, so he doesn't know what's going on and wants to tell me what a great guy I am. So, for me this is complete humbug.” Completing the training was not a problem, but he found it disturbing to listen to the motivational speeches – “you did great” - without the trainer knowing him personally. In the end, Malte did an artistic auto-ethnographers project and took part himself. He paid the fee and bought some products that Detlef D Soost sells concomitantly, such as nutrition supplements, yoga mats, some sports

⁷⁸ <https://www.imakeyousexy.com>

equipment such as dumbbells “and all that nonsense”. For a year he filmed himself watching the training videos and exercising as well as watching the motivational videos - the camera filmed Malte and he also went all the way with the diet plan. It was important for him to embrace it fully and not just snoop around, therefore the year-long project. In the video he is just himself, as he says, and does not try to look as happy and motivated as all the people in the advertising videos. He had a rather serious expression, sometimes bored or exerted. He took the approach of putting working on a sculpture in an atelier on the same level as working on the shape of his own body in his atelier.

Malte describes his perception of the self-improvement program as alienating, he feels uneasy about all this. He finds the motivational, individual looking address spooky, the program promotes the feeling that following the procedure is a heroic action and fosters a sense of being exceptional and a tough individual “other than others”. He could not take all of this seriously, considered the trainer and leader of the program to be a bit dumb and tried to dismantle the improvement-focused behavior by exposing himself, a person who is a bit overweight, with a rather non-athletic look, who decided to join the program for one year to experience it for artistic purposes rather than real results promoted by the program. Nevertheless, he shared his thoughts about the art scene which also portrays the image of people always trying to look successful and in a great mood, and by this submitting to societal desirability the same way as the makers of shows such as “I make you sexy”. People seem to have this urge to be exceptional, no matter which professional or personal domain they are in.

Malte lost 18 kg of weight “which is not magic because you don't eat sugar and do sports, which you did not do before”, he laughs. Nevertheless, he continues with the sugar free nutrition because he felt well with it. “Once you're in there, it's no problem to continue.” In conclusion he found “I do think that it does not do any harm, if I am dissatisfied with my body then I have to do something” – so it is good to bring oneself into the direction one wants. But one “should not be dissatisfied when the outside world suggests that. As long as I am happy the way I am I don't have to get the most out of myself... if I am satisfied with the measurements I have, then please let me keep it.” For Malte, self-improvement endeavors that culminate in exaggerated starving for optimization are socially (externally) imposed and as such do not allow the individual to decide freely about themselves and be the way they want to be. Self-improvement, yes, if one is dissatisfied, but in moderation and more self-determined. “With self-optimization, the problem for me is not that there are people who do it. It's that it is seen as a benchmark. So that's somehow placed in society as a headline.”

Everything is optimized, made smooth and pushed to the best possible level from a social point of view, which is something Malte considers to be untrue, “it’s like a mask”, he misses the edges and the dirt. Later in the interview he admits that while he feels repulsed by the Ego perspective pushed by these optimizations, he sees the ambivalence because he actually does not think that it is that wrong. So, we see a contradiction in the form of a concomitance of pursuing one’s own improvement, but not for everyone in society because not everyone is able to also think about others and it would be a huge maldevelopment for society as a whole to leave the weaker one behind. For Malte, improving oneself is a welcomed action if it is chosen by someone who is aware and making their own decision, and not if it is to the disadvantage of society, such as imbalances, because not everyone can or wants to self-improve respectively self-optimize.

Two participants of my study that belong to the non-technology group are people I met during my research stay in the Bay Area in May 2017. A meditation practitioner and volunteer in a meditation center tries to become the best version of himself.

The first was PAUL, a friendly, relaxed man in his late forties and a committed meditation practitioner as well as volunteer helper at the Spirit Rock Meditation center in Woodacre, around 40 kilometers from San Francisco. This center might be known by some readers because of Jack Cornfield, one of the better-known western Buddhist teachers who teaches there. I met him there for the first time as I wanted to visit the center and observe a community of voluntary donators and meditation practitioners who wanted to change and improve something in their lives, as I suspected, but with a solely spiritual and non-technological approach. After that initial encounter we arranged to meet at a cafe in Oakland where he was living. I introduced my research interest in improvement, optimization and enhancement of the Self and asked him first if he considers it necessary to use technology for that. Rather than answer my question directly, Paul starts to tell his story, which he calls a transition and transformation for him through self-reflection and investigation. He started a family very young, at 21, and found himself unskillful with that, rather selfish but not present with himself and not paying attention to the family that he was raising, which became a problem as five and a half years ago his wife asked to separate. “So, I decided to change my direction in life and try to make up for what it was I did in the past and what I was lacking ... to try to become the man that I actually could be proud of. So, I went on this, embarked on this journey of I would say asceticism, to where I went from the complete opposite of this person who sat in revelry and, and, and was very ego-based, to one who abandoned the ego and completely stopped drinking, stopped, stopped the revelry and partying, festivities that, the ones that made me that selfish person.” So, he came across meditation and found this

more appropriate for him than prayer, because prayer is asking God for something and meditation is listening to and understanding your own deeper origins of thoughts, Paul explains. “It’s just that, just kind of a thirst for knowledge...And for me, I was able to see myself clearly for the very first time.” We can see that Paul is also working to gain more knowledge about himself, more true knowledge that for him lies inside him in the stillness of meditation. He aims for the same things self-trackers do, which I will describe below, but by controlling his thoughts and immersing himself in a calm state of being. Improving, for Paul, is to get to know oneself from the inside, to overcome one’s Ego – i.e., not thinking about others, such as his family in his case. I asked him about his understanding of the Self. He struggled a lot thinking about the self and the not-self and finally pondered that the Self was something he created. People in different spheres of action, even in the spiritual domain, consider themselves, i.e., their identities, self-images and self-understandings, as something they (can) create and shape themselves, which is not necessarily a good thing because after all, everything is or should be about serving others, the community, and about doing good for the wealth of the world. But for him everything “starts from within, if, if you’re not in a good place yourself” you cannot “respond in a skillful way” to the challenges of the world, to improve the world. Paul’s way of self-improvement means, in summary, getting to know himself better by reflecting and becoming aware of his inner thoughts and, by this, to try to improve by serving others, such as his family and the community, rather than purely pursuing his own desires and wishes.

A vital life artist and independent/ amateur scientist in search of ways to overcome himself and human limitations is next. The last one from this group with whom I had a proper interview is SPERRY, a healthy-looking old man in his seventies. Sperry invited me to his home in Berkeley, which is kind of a small garden house on a friend’s property. It is comfortably and space-savily arranged, made from wood and other natural materials, and has great views into the rich flora of the garden. His house consists of a living room he uses to write as well as a small bedroom. Sperry appears very satisfied with his life. He is mentally very active and physically in shape, a very quiet type with bright eyes and an intense gaze. He participates in various meetups and events broadly connected to spirituality and happiness with new methods such as the Consciousness Hacking Meetup in San Francisco where I first met him. At that meetup, Sperry talked in a small group about how he strives for the expansion of consciousness without drugs or substances. For this purpose, he runs a laboratory in Berkeley where scientists are working on creating such states of happiness through the means of neuroscience. I was instantly thrilled and thought that I have to visit this laboratory! On a Saturday in May 2017, I met Sperry to go with him to the evening event

of the Psychedelic Science 2017 Conference in Oakland. As he tells me at the beginning of the interview, Sperry conducts research on the autonomic detection of unseen gazes - which he published two articles on in the peer reviewed Journal of Parapsychology in the 90s - as well as on extraterrestrial life and parapsychological procedures. He has a healthy lifestyle and shows me some products he uses in order to expand his health and performance, such as the Bulletproof⁷⁹ coffee and fats and other Bulletproof products that promise exactly this. He underpins his choices as founded “by 1,500 studies by conventional medicals as well as alternative doctors that try to understand what will support optimum health and wellbeing and what makes a big difference for clarity and strength and stamina”. His diet routine is “eating only for about 6 hours out of 24...like a fasting most of the day”, which he justifies very eloquently and well-read with human habits from the Stone Age, such as going hunting and not eating for long periods. He is doing this diet with the idea that “I will tune myself like an instrument, like piano”. Here we have a view of and an approach to handling oneself as an object - a way of thinking and acting that I have often observed in the Self-Tracker group, as I will explain below. Like the other three non-technological participants, Sperry too talks about serving not his desires, not his ego (same wording as Paul) but rather the universe. His scope is even larger. Apart from this, Sperry is engaged with extraterrestrial communication, in which he believes since he had an experience at a very young age. He follows a philosophy where “extraterrestrial life is communicating with us and trying to prevent or warn us from the eclipse of humanity by Artificial Intelligence and ending up enslaved”, which he could somehow understand because he believes he comes from another universe. He had lots of substantial content (such as in reference to the evolution biologist Elisabet Sahtouris) and narratives for his beliefs, which I cannot reproduce here because it would transcend the limits of the scope of work. In conclusion, Sperry, despite all the spirituality he was guided by, also followed the approach of improving his own mind and body of which he thought of in functional terms (“tune my body like an instrument”) i.e., in a self-objectification manner that I will discuss further in the findings of the self-trackers group. All the endeavors he named are geared towards the good of the whole world.

To summarize this group, it became obvious that all of them thought that they should work on themselves, i.e., to become more aware about oneself, to make their decisions based on their own judgements (and not externally given) and intuition. They all wanted to be

⁷⁹ Bulletproof is a Silicon Valley based company that sells food supplements based on a mixture of specific fats, such as yak butter, coconut oil, ghee and the like and was made famous by its founder and testimonial, Dave Asprey. Their slogan is: “HIGH PERFORMANCE FOOD, DRINKS AND SUPPLEMENTS TO POWER YOUR LIFE”.

better, either than their former selves and lifestyles or than the average. Additionally, they were oriented and wanted to serve for the good of others, the society, the world. Their methods were manual, i.e., they used their minds, hands and bodies without applying measuring or, in any form enhancing, technologies (such as drugs, implants or neurotech) to themselves. The only exception was Malte, who recorded his participation in the optimization program, but rather to produce artwork about it and not for his own improvement.

4.3.2 Silicon Valley's Technology Affine Group

The other group consists of Silicon Valley technology enthusiasts who try to self-improve maybe beyond the usual limits of human means known so far. I spoke with three people I met via the Consciousness Hacking meetups in San Francisco. The group has existed since 2014, founded in San Francisco it spread to many other cities in the US as well as some abroad. As I noted in my research diary in May 2017, the website says: "Consciousness Hacking is a hands-on approach toward creating new tools for self-exploration, in order to change the way we think, feel, and interact with the world around us."

MICKEY is an attractive man in his early forties with a sunny and attentive attitude. When I came to do research in the el dorado of technology startups, the Bay Area in California, I was already intending to attend some of those consciousness hacking meetups which I had come across two years earlier on the meetup.com platform on the Internet. The group was founded in San Francisco by Mickey,⁸⁰ with the aim to take an "inside out perspective on how technology can serve us by changing our relationship to the world, rather than the world itself... In the spirit of the Maker Movement or Quantified Self but with the pragmatic spiritual influence of Buddhist Geeks or Dharma Overground, the ultimate purpose

⁸⁰ After a first meetup in Santa Cruz, Mickey decided to create the group in San Francisco to reach more people interested in this topic. The first meetup was held on February 8th, 2014, the announcement says. "Consciousness Hacking is a hands-on approach to making new tools for self-exploration, in order to change the way we think, feel, and live. It is an inside out perspective of how technology can serve us by changing our relationship with the world, rather than the world itself. (note: This is NOT about unauthorized or forced influence over anyone or anything.) Meetings will focus more on sharing existing projects, and receiving community support for new ideas, and less on philosophy or theory. Have an idea for a cool EEG + meditation app? Maybe you are interested in a new way of creating sound to alter the way the brain works? This is the place to explore or present your idea. In the spirit of the Maker Movement or Quantified Self but with the pragmatic spiritual influence of Buddhist Geeks or Dharma Overground, the ultimate purpose of the group is to empower YOU to develop new tools for changing the way you feel and live. You do not need a technology background, and you are absolutely welcome to join if you have no interest in ever developing your own tools, but there will definitely be a heavy focus on modern technology as the hacking medium". Last accessed Oct, 14, 2016. <https://www.meetup.com/de-DE/Consciousness-Hacking-San-Francisco/events/156209472/>

of the group is to empower YOU to develop new tools for changing the way you feel and live.” As it turns out, Mickey has a background in engineering but as he began to discover meditation and spirituality he discovered “the importance of personal growth... of expanding our potential”, Mickey starts to explain his idea of combining these two areas. He realized how much of his own suffering was caused not by external causes but by his own internal experiences. In the same vein he explains his thoughts about suffering in the world: it was “almost all human generated”. For him, the relationship between who we are on the inside and what we create on the outside became obvious. And so, he saw the possibility that “if we could actually change the internal experience of people...if we could create more compassion, if we could create more connection, more peace, more internal harmony, then we could also create a better external world”. So, it is not surprising that he tries to bring together the two fields of engineering and consciousness transformation in a creative and productive way. Similar to the non-technology self-improvers, he sought to eradicate human suffering in the world. Mickey’s approach was based on his background and education and as such he began to explore how one can apply engineering to tackle those problems that traditional practices, religions and spiritual traditions have been doing for thousands of years. In his view there was no inherent contradiction between engineering and spiritual aims because they were not fundamentally different, they were just different, “... they were different in degree rather than different in kind” he explains his idea to use technologies, tools, whatever techniques available to create possibilities to change oneself and, in consequence, the world for the better. He is strongly convinced of this approach - and convincing - and the success of his group may provide confirmation for this. In the meantime, there are around 7,000 members in the Bay Area and some 28 groups worldwide (as of May 2017) and people interested in contributing in some form attend the biweekly to monthly meetups. This is where I meet some of my study participants, that were willing to talk with me about the topic in informal as well as interview situations. It seems that Mickey somehow fell into the role of facilitator and networker who brings people together who are interested in both the personal growth and technology tools for that. He tells me about a conference he was about to arrange where over 50 companies offer wearables for breathing, meditation in virtual reality, apps for stress reduction and similar technologies that “can help increase wellbeing in people”.

Even though Mickey seemed interested in self-related technologies he never consistently tracked anything. There have been short phases where he was excited about the idea but just for about two days and then he stopped. He considered the approaches to be too different “both culturally, but also in terms of the underlying intention or goals.”

ALIKI does not feel like hiding her name or profession. I met her at a Consciousness Hacking meetup in SF. Everybody there was very willing to talk about their habits related to trying to improve. Aliki is not using a tracking gadget as such, but does some journaling from time to time, which she appraises to be very “eye opening experiences” for her development. Without gadgets and tools she feels more free. She says that she can feel herself changing and growing from day to day. Despite her not being technology-oriented in her search for solutions for her personal development, I meet her at the Consciousness Hacking meetup. This group declares itself as looking for the betterment of humanity with technological tools and means, even though the initial and pronounced idea is about involving technology to support the solving of human suffering - to use the broader term that Mickey was also using - such as stress, distraction, aggression, and the like.

LUKE and NICK were both programmers in their thirties and were working in interesting AI projects in the Bay Area. Nick was working at a startup company in Palo Alto and Luke at an academic research center in San Francisco. In order not to exhaust the scope of this paper, I would like to briefly summarize some impressions from the interviews. Both software engineers were interested in developing technology that helps people cope with problems, be it of a physical or mental nature. They both believed in technology driven solutions to almost all problems in the world. These only had to be formulated in code and experimented within various improvements as the projects moved on. In my opinion, Luke and Nick represented the typical type of technology optimists that look for technical solutions rather than concerning themselves with risks and unwanted consequences. This may be due to their circumstances. It is possible that their professional orientation and the characteristics of the Bay Area, where they lived (along with the good earnings they both got) shaped their mindsets to some extent. Consistent with California's technologically-innovative spirit, the two were also convinced they were contributing to the world.

Compared with the non-technology group, the technology-oriented participants in the Bay Area emphasized even more that they could or should work towards the betterment of society and the whole world by improving their selves through each specific method they used – meditation, art, body therapy or applying computer engineering and software based coaching models to grow consciousness. Those people were concerned with their personal development and training themselves and furthermore, at the end, worked towards the betterment of others and in sum the world. That is what they said. Self-trackers, in comparison, were engaged with their own problems, like their weight, sports training, work performance, health issues, personal expenditures, work-leisure-ratio and the like. None of

them mentioned or talked about consequences for society. From this point of analysis, self-trackers appear more like navel-gazing narcissists than the contrast group. On the other side, especially people in the Bay Area follow – regardless of whether intentionally or not – the logics of combining economic prosperity with the way to self-fulfillment - a view that is common in the Californian hotbed of technology startups and also became popular in the whole western world.

5 TECHNOLOGICALLY MEDIATED MODES OF SELF-RELATIONS IN ST

“Doing science is just engaging in conversation [...] the end results of scientific research are persuasive metaphors rather than maximally true data or theories” (Bunge, 1996, p. 310)

Self-tracking as an entanglement of practices, devices, handling data, individual reasons, bio and market politics “does not straightforwardly produce a definitive truth, a one-to-one representation of their health, life, or identity (Sharon, 2017, p. 114). From the structural perspective on technology, looking at how people interact with technology in their ongoing practices reveals a concurrent enactment of structures that shape the emergent and situated use of that technology (Orlikowski, 2000). Self-tracking is, besides quantifying the self, its clearly technological embedment, and the production of numerical/objective data, also understood as a process “to reactivate for oneself the truths one needed”, to speak in Foucauldian terms (1988, p. 27), a process that helps people connect with inner beliefs, shared expectations, and former experiences to generate a “situated knowledge” (Haraway, 1988). So there is no other way as to take a partial perspective (Haraway, 1988) and look at the individual practice, the individual expectations and the individual experience and, in a later step, inductively attempt to aggregate observations to a characterization of partial objectivity of the whole phenomenon. Through the aggregation and evaluation of numbers, previous expectations and experiences, ST technologies contribute to forming a “situated objectivity” (Pantzar & Ruckenstein, 2017, p.3). They often serve as a means for “self-confirmation and actualization of one’s experienced state of being” (Bergroth, 2019, p. 7) and thereby accentuate their subjectivity. In self-tracking practices, individuals exert continuous self-examination, introspection and reflection. They do this either intuitively, or by following a given and inscribed functionality and workflow (Akrich, 1992) in the device or app, or often, in later stages, after some attempts, they experiment with individualistic bottom-up practices and negotiate their experiences with that technology (Kou, 2019). With digital ST as technology and practice it is therefore appropriate to examine the individual practice, which seems to be becoming a cultural practice in view of the market figures, as well as its effects

on the self-component, from the perspective of human-technology relations, while keeping the critical-sociological perspective in mind.⁸¹

As described in the Literature Review chapter there is a rich body of work on self-tracking following the sociological and anthropological perspective (e.g., Duttweiler et al., 2016; Kappler & Vormbusch, 2014; Lupton, 2014a; Selke 2016). Some tentative approaches to user-technology related to the user-data relationship have been picked up by scholars from the perspective of human-technology relations within self-tracking (e.g., Bode & Kristensen, 2015; Duttweiler & Passoth, 2016; Kristensen & Ruckenstein, 2018; Lupton, 2013; Selke, 2016). For example, Lupton (2013) identifies technology-self relations such as the cyborgian body-machine metaphor with a view of the body “as a machine-like entity with ‘inputs’ and ‘outputs’ [–] glossed as ‘performance’ [...] that can readily be measured and quantified” (p. 24). The production of data-selves, or in terms of Kristensen and Bode (2015) “digital doppelgängers”, i.e., numbers-based and seemingly more neutral and objective versions of ourselves, raises questions about trust, control and self-maintenance of the “unpredictable nature of one’s body and the data that are generated about oneself” (Lupton, 2013, p. 29). Thoroughly elaborated ideas about the self as a laboratory (Kristensen & Ruckenstein, 2018) as well as the self as a database (Schüll, 2016) have been presented. Although these are great as metaphors and explain the phenomenon in terms already known from other contexts, they do not apply a consequent self-perspective on the self-tracking practice. To ask about the self, the human being as the smallest unit of society, means searching for the entanglement between the inner perspective of the subject, the outer perspective of the observer, as well as their relationship with that technology. My work focuses on the “self” in “self”-tracking, but “the Self” turned out to be a problematic term – as explicated comprehensively in chapter 2.4. – since its transcendental and empirical scope cannot be clearly divided nor set in a clear connection to each other. Therefore, it is meaningful to investigate the self in the relational dimension to itself and technology while applying that technology onto oneself. Thus, self-relations are the first part of my main results, followed by technology relations.

⁸¹ Another interesting perspective would be the phenomenological and post-phenomenological perspective on self-tracking practices. Either it would happen by examining the subjective-objective relation to individual intentions using this technology and its conclusions about the object (the body, mind, habitual attitudes) taken into focus from the same subject who is examining. This would start with Merlau-Ponty’s and Plessner’s famous analytical distinction between “Leib sein or Körper haben”, see the work from Vormbusch and Kappler (2018) regarding this topic. The post-phenomenological approach would concern itself rather with the methodology, but also strongly with the human-technology-world-mediation (see Ihde, 1990; Verbeek, 2005), which does not go deep enough into the underlying technological impact factors, human triggers, and motives. See also Zwier et al. (2016): “This leaves undiscussed how mediation theory about ontic beings (i.e., technologies) involves a specific ontological mode of relating to beings, whereas consideration of this mode is precisely the concern of phenomenology” (p.3).

Even though self-tracking cases may therefore appear to be very individualistic, patterns and shared imaginations that may apply to more than one individual emerge and thus enable the building of clusters with the help of which one could attempt to synthesize the observations made into a more general framework. These shall explain and depict the impacts on a possible society of (data) self-trackers at some point in the future. Expanding on these considerations, in this work I focus on self-relations with their inherent socio-cultural embeddedness and develop the perspective of examining ST as a practice of technologically mediated, enabled, encouraged, or enacted self-relations.

KAROLINA: “Actually I like swimming, but it's also kind of boring for me. I wouldn't have thought there were so many calories to burn. Because I only notice that I did sports when I was sweating, of course. But here you can see that.... And that's fun...and a reason for joy”.

Statements like these, which can be found with all my study participants, reveal a noticeable shift from an interior interpretation and sense-oriented understanding of the self to a technologically mediated self-relation. People do not need to seek insight and interpret their emotions; they look at their data and read “where do I stand” - as PHIL formulated. As we will see self-understanding will take a hybrid form based on sensual and data information as well as their “translation” according with the user's values matrix or current mood. The generated quantitative numbers qua serial or continuous measurement become a component of self-formation and self-affirmation or self-verification – which I also demonstrate in the following.

There is a degree of uncertainty around the terminology of technologically assisted self-practices or, following Foucault (1988), the digitally supported Technologies of Self (which are in fact meant as techniques or methods), or technologically aided digital ST tools (devices and apps) when talking about ST. With this in mind, ST can be located in practices and in technologies. As explained above, the focus in this work is on the relations that are being enacted and supported by this technology and the practice. These relations can be unfolded into self-relations and technology-relations. When I thought about how the individual attributions of meaning could firstly be aggregated and secondly clustered, I found two general differentiations: relation to oneself and relation to the technology used. Regarding self-relations, I firstly found a lot of evidence for the self-controlling relation – which then, in my opinion, contrasted but also mirrored the self-caring relation, for which I also found a lot of evidence, in an interesting way. As I will demonstrate, both of these can be seen as the two-sided dimension of technologically mediated self-relations: self-controlling as the

rationality-oriented, seemingly objective procedure of monitoring and guiding oneself, on the one side, and self-caring, as rather emotion-related, referring to subjective self-images and subjective understandings, when engaging in practices intended to serve oneself and take care of one's well-being (in a broader sense) on the other. Furthermore, both relations entail elements that can be ascribed to self-control and to self-care. For example, paying attention to moderate caloric intake can be seen as both self-control and self-care. Moreover, the control dimension manifests itself in three facets: to control oneself and to lose that control in a double sense, to be controlled by others (as mainly discussed in the “surveillance in ST” debate), and to lose control over controlling oneself. These dialectics⁸² and ambiguities can also be found in the self-caring mode where, besides the obvious self-thematization and observation, effective aspects of self-affirmation and verification of one's self-understanding exist alongside self-deception and negative effects such as shame and unhappiness. Again, elements of self-care can include elements of self-control. For example, paying attention to regular exercise may include logging exercise sessions and checking and evaluating them for continuity. I use the term dialectic in its synthesizing meaning, where what seems like antipodes (not opposites in a logical, i.e., contradictory or contrary sense) complement each other and construct a balancing mechanism for oneself, to harmonize the tension between the need to discipline and control with the wish to care for oneself. For example, a reminder to go jogging is not understood as a mere instruction, but as a supportive motivation that relieves the memory - like from a coach or a nanny (as FLORIAN said).

I argue that by withstanding the cogency/ temptation/ convincibility of binary logic – care or control, rational or emotional, numbers-based or intuition-based – and embracing ambivalence we can better understand the complex ways in which people attempt to maintain their body, wellbeing and whole life in our digitized world. Thus, in the following, I will explicate the modes of self- and technology relations, which can be represented as two ambivalent sides and read as contradictory yet can also exist simultaneously as my empirical material demonstrates. In the case of self-relations – it is a complex dialectic between control and care – and in the case of technology relations they complement each other – where technology is used as a means (for treatment and enhancement, for example) and a counterpart (for attention, assistance and care, for example), and as Heilsversprechen, as I will demonstrate.

⁸² The notion of dialectics is very prominently occupied within the Hegelian and Marxian philosophy as a form of thinking, and a mode of becoming with regards to the opposites in things or concepts and the finding and revocation of these opposites. It could be promising to investigate the self-control and self-care relations along this path of thinking.

In the philosophical tradition there are famous examples of elaborated human ambiguities. For example, Merleau-Ponty's (1962) famous example of the blind man's cane that is initially perceived as an object but after a time of practice becomes a perceiving object, by which a former bodily extension becomes a bodily incorporation to enhance the sensual apparatus, or Plessner's ⁸³ (1975) distinction between being and having a body by which coping and interpreting abilities in relation to the world as well as to oneself is required and distinguishes humans from other beings. It would therefore have been possible to conceptualize these ambivalences along the axis of humans as objects on the one side – with bodies they can work upon and humans as subjects experiencing themselves. However, I think that this distinction cannot be made clearly and would disturb the order of the clearer ambivalence between control and care, which I will explicate in greater detail below.

⁸³ "Positionally, there is a threefold: the living is body, in the body (as inner life or soul) and apart from the body as point of view from which it is both" (Plessner, 1975, p. 293) "The eccentricity, on which outer world (nature) and inner world (soul) are based, determines that the individual person has to distinguish in him or herself individual and 'general' self" (p. 300).

5.1 Mode 1: Self-Control Relation

ANDRE “For me, tracking is more like transparency, i.e. making transparency of what I do or what I don't do, so little sleep is more like not doing, or too little sleep - not doing. No, it's just a kind of reminder for me: so to speak: hey come run a few more meters or walk a few more meters⁸⁴ ... or go to bed earlier⁸⁵....”

What we see here in a nutshell / pars pro toto is actually what I define as the technologically mediated self-control relation which encompasses mental components, such as perceiving, becoming aware of and discovering previously unknown information about oneself. This relation further encompasses complexity reduction such as the clear visual illustration, the confirmation, validation, and vindication of unclear guessing and feelings about bodily or behavioral aspects. It also comprises the handling of algorithmic recommendations, responses to data feedback and their visual representations with regulatory actions, as well as their circumvention and finally, possible downsides of these motivational drivers in the form of obsessive or lost control.

Before proceeding to the definition of the self-control relation I will explicate the notion of control and how I will use it in this work. Despite its common usage, control is used in different disciplines (e.g., computer science, management, or organizational studies) to mean different things. Control can be understood in two essential aspects: as a mental and an action-oriented dimension⁸⁶. In the first dimension, control is a process that is essentially defined as a nominal-actual or target-performance comparison. Besides knowing the target object and value, it is essential to be able to identify the actual value. The process encompasses activities such as perceiving, checking, and comparing data that serve the current status description. The second dimension consists of regulation, planning, i.e., preparing for action by determining the direction, extent, and duration of a measure and finally, acting itself

⁸⁴ When he looks at the data and sees how far he is from his 10,000 daily steps

⁸⁵ When he looks at his sleep tracker data and sees that he, again, only slept a few hours

⁸⁶ Because of the two general forms of control: to check and to steer I decided to structure the findings within the self-control mode along the axis thinking - acting. There exists however a theoretical underpinning behind this division as well. I refer to Foucault's thoughts about change in people's ideas in relatively short periods of time, that is related to their actions and reactions, without neglecting that thinking is related to tradition. He expressed this in an interview with Rux Martin in 1982: „Social historians are supposed to describe how people act without thinking, and historians of ideas are supposed to describe how people think without acting. Everybody both acts and thinks.” (Martin, 1988, p. 14).

including not acting. Here, it is vital to define the action to be taken, i.e., knowing what to do and how to regulate and adjust the output function in question to achieve the desired result(s).

In linguistic usage, people generally call it “to be in control” or “to have⁸⁷ control” of something. These linguistic habits already indicate that this dimension has several facets. Throughout the conduct of this work, I thought intently about whether control is actually and effectively exercised or whether it is mainly a sense of control that is brought about or created by the practice, and how to detect the difference. However, this question could only be clarified in the context of further investigations. “Most people are hungry to pursue interesting work and make meaningful contributions” which can be promoted by the “access to inherently interesting tasks and exposure to autonomy-supportive situations”, as Converse et al. argue (2018, p. 18). My findings indicate that the ST practice conveys and confirms an autonomous way of life, which is how most of the people I tested perceive themselves and talk about their lifestyles. ST technology applied to oneself evokes hopes for a potency/effectivity and the improvement of a condition – on the one hand through promises and on the other hand, in view of the technological achievements to date, through drawing and bundling these hopes (for redemption) for oneself. “It is the mirroring of the ego in the form of data that *gives the real feeling* [emphasis added] of activity, of self-control and thus of self-design in the literal sense”, writes Kaschuba (2019, p. 148).

The political agenda these days is governance through self-governance, which invokes an interesting paradoxical co-existence of an illusion of freedom and control via control engineering (previously discussed under the term cybernetics). The effect is then the self-control relation expressing itself in a twofold way. It is foremost but not only about gaining control, but it is also about losing control, which in turn is expressed in two ways: being controlled and when the control is out of control, i.e., over-control. I will explain these facets at the end of this chapter. Another facet of the control paradox may lie in deliberately and self-responsively choosing aspects to change or improve while concurrently delegating this responsibility to ST technology (Schüll, 2016). This again shows the ambivalence of self-control and self-care to which I will return in greater detail in the following chapters.

People start ST for diverse initial reasons but at the core of this practice is gaining a greater sense of control over their lives (Ajana, 2018). This can be illustrated in various forms

⁸⁷ Interestingly, this consideration may fit well into sociopsychologist Erich Fromm’s work about the differences of the modes of being or having in modern societies “To Have or to Be?” (1976). He describes how both the individual and social character structures differ at the present time and historically, and how these structures effect the conduct of life.

–as status quo of bodily values, as orientation with regards to finances, physical activity or work productivity, as the development of a sense for a meal’s calorie count and the consecutive interventions and steering of food intake or cash expenditure habits with regard to future weight or financial goals. People who self-track have often already experienced impulses in the past which changed something in their lives for the better and they perceive themselves as able to do and achieve this. This is the case for ANDRE, who was already self-tracking with pen and paper, and also for RAGNAR who, as a technology consultant, is always looking for technology solutions. It is also the case for KAROLINA and ARNE, who had both already tried many different ways to lose weight as well. Digital self-monitoring technologies promise to offer support in many areas one might want to improve. As psychological studies reveal, having a sense of control is linked to beneficial and positive outcomes, such as self-esteem, having the power to act and feeling self-effective and self-responsible (e.g., Converse et al., 2018; Tangney et. al, 2004).

I understand the self-controlling relation as a process consisting of mental and action-oriented activities which, using digital self-tracking technologies, affect a certain number of self-controlling activities⁸⁸ and convey the sense of being self-responsible, results-oriented and efficacious. Technologically mediated self-control is a significant contributory process in the form of a feedback loop depicting the development and maintenance of self-relations mediated through the application of technology onto oneself. Self-control unfolds into the two formations it encompasses: perceiving and monitoring a state, as well as navigating, regulating and governing one’s activities based on that information. These regulatory actions in turn lead to the observational status, which provides information and comparisons about the observed state. My results indicate that in many of the interviewees, regular use of ST technologies leads to a sense of being in control – in terms of keeping, regaining, or enhancing control over one’s life. Self-control is the most concise and most obvious mode of self-relations mediated by digital self-practices and could also be described as a hard mode. In the next chapter, I will analyze how the other side of the coin, namely the technologically mediated self-care as a rather affective and soft mode dimension, differs.

Having defined what is meant by technologically mediated self-control, I will move on to discuss its components, meanings, and mechanisms to the users. I structured the following

⁸⁸ This is a voluntary reminiscence of Foucault’s formulation of the Technologies of Self: “which permit individuals to affect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and ways of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality” (1988, p. 18).

subchapters along the technology assisted self-control process, where mental and action-oriented steps often intertwine but can also stand separately.

Table 4
Technologically mediated Self-controlling in relation to an exemplified control process

control process	application of ST technology onto oneself	impacts on the self-control relation
identifying actual value	see the data and get knowledge through ST measurements and recordings about bodily values, movements, performance, behaviors, affective states	become aware of processes in the body, behavior; contributes to the development of (“sharpening” of the) senses for something that is important to you – e.g., learn/train to estimate calories, expenses, blood sugar values
determining target value if unknown and comparison	get comparative values with reference to your own stored historical data (e.g., weight) or references to the average value delivered by the ST device	get orientation on important life issues; either get confirmation or contestation of earlier guessing
adjusting outcome function	obtain recommendations, i.e., advice from inbuilt expertise (algorithms, databases) and adjust your behavior (intakes, training or workloads etc.) based on that	Trust in and partly delegate decisions to that technology, which reduces complexity and thus the burden of decisions on important issues; in order to obtain goals, adjust values (i.e., numbers) in self-maintenance mode
monitoring the progress	iterate points 1 - 3	positive (confirmation/ affirmation) or negative (frustration, anxiety) effects, depending on measurement outcomes; motivation to continue or possibly abandonment of that practice

Note: own representation

Firstly, I will explicate how ST is used to get information about the actual values in question that lead to awareness of and often reflection on particular conditions, triggers, correlations, and dependencies. In the next step, I will demonstrate how target values are being determined: a) either by oneself, b) by the algorithm within the ST device, or c) derived from shared expectations and societal norms and how comparison generates orientation and affects the users in other ways.

The next subchapter then encompasses the action-oriented side of self-control: planning, regulating, and monitoring of regulatory processes and their effects in terms of adjustment of behavior, i.e., goal function based on measurements with focus on achieving goals. It should be noted that no regulation is part of this step and describes a circumstance

where no action is taken. In this case, the self-tracking practice often turns out not to be convincing or is experienced as annoying or frightening (e.g., Carmichael, 2010; Dudhwala, 2018; Rooksby et al., 2014).

Another interpretation is that dealing with the activity of measuring and numbers is considered a sufficient and satisfactory activity as such for several reasons. This may be the case if either the goal is not (yet) known, or the ST practice is not about behavior change but about something different. In many passages of my interviews it became obvious that dealing with numbers only may be due to effects one wants to induce: for example a) a sense of meaningfulness in creating something (visualizations, for example), b) producing something of value (such as data), c) doing something (measuring, experimenting) at all, which was the case for Arne, Tabea and Karolina, or d) experiencing a calming, security generating state in a kind of own time zone, which was the case for Ragnar, Florian and I, and was reminiscent of the experience of flow⁸⁹ (see Csikszentmihalyi, 1975, 1994). Especially these components of the self-control dimension blend into and can have the effect of the self-caring.

5.1.1 Cognitive/Mental Mode: Awareness, Reflection, Complexity Reduction and Orientation in Life

It is a common assumption that by grasping unknown and unseen aspects of life we can govern them more (Edwards et al., 2010). The little things we do every day, but are not aware of, at the end add up to our lives, states QS Inventor Wolf. “When we quantify ourselves, there isn’t the imperative to see through our daily existence into a truth buried at a deeper level. Instead, the self of our most trivial thoughts and actions, the self that, without technical help, we might barely notice or recall, is understood as the self we ought to get to know” (Wolf, 2010, para. 40). Unsurprisingly, all of my interlocutors self-tracked in order to get information about a particular aspect of their lives. This chapter will explicate in which ways the self-control mode unfolds and how the generation of data about oneself affects the user

⁸⁹ Csikszentmihalyi conceptualized the notion of “flow”, for which he earlier used the word zone (1975) to explicate a state of absorption, where the focus is constricted to one activity and the “sense of time fades, along with the troubles and concerns of day-to-day life. Flow provides an escape from the chaos of the quotidian”, he wrote. Csikszentmihalyi identified four “preconditions” of flow: “first, each moment of the activity must have a small goal; second, the rules for attaining that goal must be clear; third, the activity must give immediate feedback so that one has certainty, from moment to moment, on where one stands; fourth, the tasks of the activity must be matched with operational skills, bestowing a sense of simultaneous control and challenge” (Schüll, 2012, p. 227).

on a cognitive and action-oriented level. In this step, the data produced is first perceived and engaged with. As a consequence, this action may cause affective experiences, self-affirming and self-enhancing effects as well as disturbing ones that all contribute to the formation of a self-image in the mirror of technology. By this I argue that there is a complex interplay between the control and the care dimensions that manifests itself in the self-tracking practice.

“It is important to see how much I was doing here” - “I need written proof”

By tracking fitness activities self-trackers can easily check if they are in line with monthly goals or get hints on which activity or how much more time is needed to reach their goal. It allows people to keep track of their goals and anticipate whether they will deliver the results you long for. To be or to feel on track is one of the essentials of self-tracking. ANDRE has been self-tracking his runs and cycle rides for over 15 years now. In the beginning, he kept his records on excel sheets and upgraded and expanded his technical instruments step-by-step, to keep track of his activities.

ANDRE: “...it [is] important for me to see how much I was doing here.[...] That's why I know exactly how much I have run there per year, how much I have cycled, how much I have not swum to be able to do triathlon and such things”

“...not because that thing is tracking me somehow, but because I see (stresses) how many steps I take there a day”.

As we have seen, KAROLINA is tracking her steps, runs, bicycle rides and other forms of sports that are capable of being tracked. When I asked Karolina why she was doing that, she answered similarly:

KAROLINA: “So that I know... how many kilometers I have run, how many calories I have burned... I think because I can measure that (!)... Not only that I feel tired and sweaty from running around the Alster, but I also need written proof (!)”... “It never would have occurred to me to ride so many kilometers (!)” (21.00) “This is totally motivating” ... “I think to see the overall result... ..to get an overview ...”

The information gained is not merely neutral information. It firstly gives information on certain parameters, but also validates the activity with all its side effects (such as the calories burned) and in a sense proves that the activity was worth the effort and contributed to the goal that was set (here: losing weight).

“It creates awareness... It is like a reminder”

When I later double-checked and asked Andre what he was/is self-tracking for he assured me many times that for him, it is all about knowing where he stands towards his goals and gut feelings, about transparency, as he often expressed himself.

ANDRE: “I really only experience transparency with it... it creates awareness... and motivation only because I have seen (*emphasizes*) that I have only slept 5 hours.... For me, [tracking] is like a reminder, or making transparent what I do or what I don't do, so little sleep is more like not doing, or too little sleep - not doing. No, it's just a kind of reminder for me, so to speak. Hey, come run a few more meters or walk a few more meters”

Transparency can be described as a state of availability and traceability of information about the object in question. Self-tracking thus increases the level of information, which leads to greater transparency about a situation and thus increases the reliability of decisions regarding options for action. Visibility of results and previously unknown values in conjunction with awareness is one of the main themes promoted within the QS idea – as expressed by the slogan “self-knowledge by numbers” – and can be found in various studies about self-tracking practices (e.g., Neff & Nafus, 2016; Ruckenstein & Pantzar, 2017; Sharon & Zandbergen, 2017). The question arises who this transparency is intended and made for. A great deal of criticism has already been voiced about the lack of awareness of data protection and privacy and data ownership in social media as well as in the supposedly individual collection of data in self-tracking (see for example, Bernard, 2017; Stiegler, 2018). Of my test subjects there was no one who would have shared his or her data on social media, i.e., with a larger number of partially unknown people. Four out of eight people shared their data with a very small and intimate circle - in two cases it was a family member (KAROLINA's brother, RAGNAR's mother), for ANDRE and TABEA it was sports friends with whom they prepared for a long bike tour or marathon. Another two of the eight self-

trackers, as more or less active members of the QA movement, showed parts of their data in show & tell presentations at a Quantified-Self meeting in which about 20-30 other dedicated self-trackers participated, but this served to illustrate their experiences with a particular ST project. When asked about data protection, my interlocutors were aware of the dangers but also trusted that the company offering these technologies would not sell the data stored in the cloud to third parties for advertising purposes without being asked. They believe they are in control of their data and assume that it is as they would like it to be, says RAGNAR. PHIL glosses over the problem by sharing knowledge about how to monitor and track from the outside, e.g., by WLAN log-in attempts and location services that run unasked in the background, as well as tracking functions via cookies and the like when surfing with a standard browser. With this knowledge he feels he is on a "safer" side than people who have no awareness of the topic, although he cannot say what will happen with his detailed and extensive collection of data in the cloud now or in the future.

The reminder ANDRE speaks of is meant as something that comes to his mind and consciousness, which otherwise would be imperceptible or forgotten, something he rather would not do. Being aware of this information motivates him to adjust his behavior in moments and situations when he realizes that he did not move enough that day or slept only 5 hours that night. The awareness of a condition leads to motivation as an encouraging factor in practicing self-tracking, which itself belongs to the action-oriented dimension, but is named hand in hand here. As such, it acts supportively as it relieves one's own memory.

The information obtained must be of interest and value to the user, who already had a focus on the topic, to get involved with ST technique and technology:

ISGER: “[It is about] whether I make something more conscious through this or whether I deal with something more consciously. If you don't feel the need to go mega-sporting now....so I wouldn't be motivated [to go running] just because I wear a (pause) fancy watch...maybe I was once jogging just to see if it works...”

ISGER expects an app to make him aware of something, to say something he did not know yet. The fact that he ran 500 kilometers this year, for example, is not a great piece of information for him, he already knew that, as he casually explains, and just because it is written there in black and white - ISGER finds that too banal. His devotion to the ST process is considerable. He had already gathered data for almost a year but then realized that he did not program his app properly and the substantial amount of data he assembled was not meaningful at all because he had not had an initial plan as to why, what and how to track in

such a way that he could use the data to generate insights on his working style. Finally, for him the analysis consisted first of all of looking at what is in the data.

ISGER: „you always see patterns there ... we have the habit of seeing patterns everywhere, but I just look inside if there is something for me (emphasizes) that makes sense in some way. Something (pause) really, like times, for example, the times when I am most active or something like this...”

As long as the concatenation of information he gains is meaningful to him individually, he is happy with it, he tells me with a satisfied and really happy face expression.

The practice and data produced must be meaningful to the users. Meaning is also a topic for Ragnar. RAGNAR tells me that he wants to be creative and also produce something through his work. It would not be enough for him to work only in a reactive form as he puts it: to answer emails and phone calls.

RAGNAR: “And that just wouldn't be enough for me. Because I [want to] design and build something myself again, then we're back to this Ikigai⁹⁰, this 'purposeful' thing and do something meaningful. I want to tackle and change and design and transform things myself”.

Ragnar describes himself as technically interested. He loves to try out technical gadgets, but they must have a connection to his life, they have to be to some extent productive for his current issues in life. So, it is not about just playing around, he is looking for something that might help him reach his diverse goals and feel better about different areas of his life. He looks for this in the realm of digital technology on the one side, but simultaneously employs techniques like meditation and reflection, which he finds in spirituality. Besides tracking his physical activities and steps he is very much interested in what he calls spirituality.

RAGNAR: “Another thing is the topic psyche, spiritual basis, I saw another tool yesterday. Something what you put on when you sleep, because you can get into lucid dream states through it...that would be really cool if you could control your dreams through such stimulation tools.”

⁹⁰ He refers to the Japanese concept of a purposeful sense of meaning in life that means “reasons for being”. See for example Kumano, M. (2018) “On the Concept of Well-Being in Japan: Feeling Shiawase as Hedonic Well-Being and Feeling Ikigai as Eudaimonic Well-Being”. *Applied Research in Quality of Life*. 13 (2): 419–433.

Half a year later, in our second interview, Ragnar also talks about a technical device that you put on your head as a headband and which, with the help of EEG, should be able to manipulate the brain waves in such a way that you can enter lucid dreaming and thus consciously control your dreams. He finds this exciting and the product innovative, but not risk-free. He is fascinated by it,

RAGNAR: “that you really have a connector for conscious dreaming. And whether that works I can't say exactly, but I find something like that sometimes exciting. But of course, these are also points where I say ‘Yes, lucid dreaming can be learned in other ways’. But if it should work, it would definitely be innovative. But of course, it is always a risk when you sleep, and you really do manipulate your brain waves in such a way that you can change your dreams accordingly. It's just not completely harmless.”.

To control and steer such activities with the aid of digital tools is what he thinks of, not to leave things such as lucid dreaming to chance but to evoke them whenever he wants is his expectation. In this sense, ST inspires him to develop ideas and ultimately can empower him to search for desired solutions by himself instead of waiting for market products. He is also looking for tools that help him deal with stress, like breath tools. This is connected to his search for dealing with stressful situations, especially in meetings at work. As described in the previous passage, Ragnar considered different possible strategies for his problem, such as doing physical exercises before the meeting. However, using technology such as the above-mentioned breath app would give him a sense of control over his plan since he would be able to receive feedback after each breathing session as well as, potentially, advice from inbuilt algorithms on how to continue. Ragnar seems to look for tools to control his body and mind, but not desperately or externally driven by some form of professional or social ambitions. He was already strongly seeking something in the spiritual realm. While he asserts to be very goal oriented in business questions, he has made the experience that if you “want to achieve something desperately, it will not work. Here, it is better to try things out and then look where it leads you to”, he says. His case confirms and illustrates the central role played by technology applied onto himself in relation to many domains of his life (professional, personal, spiritual) where he is seeking intervention and improvement of situations, to be in control.

“It gives me validation that I should...”

There is another significant factor of building the self-control relation, the validation of former guessing, a feeling, or intuitive idea through checking and monitoring a value. On the flip side, this value can serve as vindication and justification for actions and behaviors for which one could not find a sufficient reason to realize them before. ST technology, in this case, serves as a partner of sorts that assists in finding possible solutions - and adjusts existing ones.

ANDRE: “Why sleep tracker? Because I always sleep much too little anyway and that sometimes gives me validation that I should go to bed earlier again, nothing else does it.....it ...sometimes motivates me to close my eyes earlier when I have seen: You have slept only 5 hours again”.

This additional source of information entices him to focus on himself and to steer his actions towards his wellbeing. Due to the numbers-based and objective looking as well as the clarity of presentation, this technology supports his already existing wish for a longer sleep. It gives him a more substantial weight through the data-based evidence for that. In this case, Andre knows that he is neglecting his sleep quantity but is not convinced unless he sees the data and advice from the ST app.

There may be two interpretations of such behavior. The data reported here appear to support the assumption that he needs a sort of vindication or sufficient affirmation for his hypothesis. In the first case, ANDRE subjectively suspects that he needs more sleep, but wants to conform to social norms and images, according to which an entrepreneur, not to mention the founder of a start-up, does not sleep for long and instead draws his energy from his passion for work. The ST technology justifies him and gives him vindication as to why he should do it, for example through comparison to another norm, such as the average duration of sleep and the sleep deficit resulting from the comparison to that he could refer if somebody asks at all. Another interpretation could be that people who already have a high degree of self-control can neglect or doubt the subjective need for more sleep to do what they have to do instead. They do this until this need is clearly shown in the form of measurement, and the unclear feeling is brought into consciousness and rationally confirmed. The discrepancy between the subjectively assumed need for sleep and the actual duration of sleep is thus balanced out by a technologically supported measurement. That measure mediates objectivity and control-ability that then leads to regulation of the amount of sleep. The ST technology serves as an instrument to balance out subjective sensation and social desirability or rather the questioning of these subjective sensations.

Thinking about one's necessities and needs in view of the data collected and becoming aware of previously unseen aspects of one's life broadens the information base and expands the sense of control over these aspects. This attitude is in accordance with my observations of further interviewees, especially technologically oriented and solution-seeking people.

ISGER deliberately expects the ST tool to provide validation for things he only has a vague idea and feeling about but wants to obtain more clarity and security about. He wants to know whether he worked enough for a project by looking in greater detail at how he is spending the designated time. In this way, he has the proof, mainly for himself, and believes in himself and feels good when presenting his work results to his project partners. But he would not show the data itself, as he emphasizes vehemently. Isger has gathered 1,111 reports in the Reporter App (as he shows me on the display), which he seems a little proud of, and tells me that he was deliberately pursuing a large data set to get a good basis for his decisions.

ISGER: "This is only for me, here again: this confirms or disproves something to me, just to have this self-confidence...first and foremost I am obliged to myself that I am not deceiving myself...or even strengthening (emphasizes) myself, ...because you can work yourself to death or something...as I said, with software development you can always do something better".

Similar to Andre, this search for confirmation may also be a seeking of approval, of justification through an external, objective, and hard to doubt "authority". In order to contest a possibly existing (and socially inoculated) feeling of obligation to work more, or the other way around, suffering from a bad conscience about possibly not having worked enough on the project, he would need more evidence for his feeling. With the data in front of his eyes, he can more easily assess his work efforts and thus complete the working day and feel good about it.

ISGER "... this reflects as self-reflection a feeling of what I had or have ... as I have been telling myself ... for some time now that I am consciously paying attention to it. And that it gets affirmed, that's what I like about it.... just a gentle confirmation, 60 to 40 is just a number, but I know how many entries there are, (look and there are 1,111)... that encourages me that what is written there can already have a relevance for me.....That I have this analysis phase, I think that's terrific. It (the app) just doesn't do that because it's so incredibly complex... "

What he particularly appreciates about this process is that it provides a moment of self-reflection. “Do I perceive what I am doing as work or not?”, he asks himself. The other great advantage for him is that he can generate a large data set based on this question which will be relevant and helps to “reduce human interpretation by relying on” a kind of mechanical objectivity to which Kristensen and Ruckenstein (2018, p.7) also refer concerning ST. The theme of validation, which may be a hidden vindication or approval, blends to the affective dimension of the self-caring mode to which I will return in greater detail in the Mode 2 chapter, when discussing technologically mediated self-care as well as its affirmative and affective responses to technology. This observation goes along with that of other authors, such as Schüll (2016).

“The app helps me face north” – Orientation through ST Data

First, PHIL tells me, he tracks because he has always been interested in technology on the one side, and on the other side, he is interested in QS for health reasons. He also strives to get data - he calls it base value - about his physical activities, which he is doing a lot of. He appreciates having his data easily available, with the customary advantages of the digital: independence of time and space.

PHIL: “I try to do without paper if possibleand scan almost everything.....for convenience reasons.... Because then I always have the data with me”.

A more important value of the ST practice for him, however, is orientation. PHIL uses several apt expressions to describe this: the app supports him to face north – to orientate and locate – it is a way to find guidance through the thicket of life and ground him, as he sometimes expressed during the interview. As we know, he tracks virtually everything in his life: media consumption, finances, sports, calories and much more. He often says:

PHIL: “It helps me use time better...It brings orientation in life...It helps me train certain behaviors, but I'm not too consistent with it....”

The numbers are a compass that guide him through his various daily decision making. He recognizes the effect it has on helping him orient himself while claiming not to depend on it in any way. It just gives him additional knowledge and the sheer possibility of adjusting something because the self-tracking process gave him additional certainty or the “relaxed

consciousness” of being well informed Arne already spoke about. Phil’s numbers-oriented approach also applies to areas in life that are not performance-based. For relaxing and calming down during the day, for example, he uses a meditation learning app that guides him through a 10-day introductory program. Thereafter, one can pay to continue with guided meditation for as long as one wants. “Such a meditation app helps me ground myself back and get back into my everyday life”, he explains dispassionately and calmly. He considers the orientation effect to be applicable to anyone.

PHIL: “For example, someone who gets a statement of account is quantified per se.... He has a basic value, a status value on which he orients himself - which gives him orientation in his life” (he emphasizes this). This person can then make “an evidence-based decision” if he can spend more money or should rather save some, Phil explains. “Someone who does not get a bank statement lives out of his wallet and spends too much in case of doubt”.

I made a similar observation about myself. In the following passage there are many aspects I also detected in the remarks of the other study participants that fit well into the mode of self-controlling as a knowledge component for comparison, structuring, orientation, and the generation of recommendations.

MYSELF: “This is now the third time I’ve done this, i.e. 3 days in a row, and I don’t really know what to expect. After all, I know what I like and what I am not so happy about. Maybe these graphical statistics/ reports will make it clearer to me what I should not do or do less...! Where do I want to become better? I want to be more satisfied with my work results - which I am definitely not at the moment. It takes me far too long to do any kind of preparatory tasks: planning, preparing, creating to do lists, deleting mails, cleaning up, tidying up. Probably because there is disorder in my head. ... Why do I use the apps? They seem to give/ bring me structure. Something I can hold on to”.

There is another aspect in gaining orientation through self-tracking, it is the relief from hard to make decisions that we face every day. I will discuss this affective topic in more detail in the Mode 2 chapter about technologically mediated self-care. In my own experimenting with diverse ST apps, the usage of the Pomodoro app, which counted the number of time slots I spent working on my PhD, was the longest lasting. I often write about it, struggle with the proper amount of pomodoros to strive for, and the accompanied feelings when I reach them

or do not. I obviously needed orientation, something to guide me through the long path of writing a dissertation amongst what felt like thousands of other duties in my life.

MYSELF: “After all, the day is often so disjointed that I can't keep up the time I have planned to work on the dissertation without disturbances. There are phone calls in between, jogging when I feel like it, making lunch etc. I.e., at the end of the working day or towards the end it motivates me to take 1-3 time units more to reach the planned goal of the day. And that is great! Without the pomodoros I would not have an overview of how long I have been sitting at the dissertation and so I would probably not do anything more in the evening. And with the Pomodoro app I do a little more and feel better. Afterwards, I (mostly) have the feeling to have done something and to have the absolution for free time”.

Even though it felt good for me to have the app running and counting, and I got really mad if the app had functional failures one day, I rarely looked at the data afterwards. And likely never longer than a month ago - it still was important for me to have the data, have the proof that I had done something. Later, I will adress how busy I was tinkering around with the right number of pomodoros per day, the right length of breaks, if these should all be counted per day or per week and the like. This revealed even more that I just needed something to hold on to.

ANDRE also emphasized that having all his tracked data in his mobile device is just important for him. Throughout the interview, Andre repeats that it is mainly transparency, i.e., seeing the recorded information, he needs from these tools. No external motivation is needed, nor reminders to do sports. He is intrinsically determined to do it. He only needs knowledge about his progress, the assessment of how he is doing (performing) this month and what there is left to accomplish his self-set goals. This “transparency” has a function. It gives him orientation in relation to his objectives. How many kilometers did he run this month, how many did he log on the bicycle and how many hours did he sleep per night? Based on this data, he can decide whether he should go for a run this evening after work or should go to bed earlier. Besides decision making, he needs to record and keep his runs and other activities and have them just in case.

ANDRE: “For me, it is automatism. So... it's not that I feel any love for it, but it's automatism. And urge... I don't know. It's probably more of a compulsive thing, it has to be there, you know, it's like I put on shoes, I just put the strap on and I put the phone in there. Just like normal”.

Here, we can find at least two perspectives to evaluate Andre's behavior and attitude. From one angle, he might be leaving decisions about his runs and duration of sleep to self-tracking technology in good faith. This might appear as a dependent delegation of decisions to external entities/ authorities, making him look like a person who does not think and act independently. Which then might be traced back to neoliberal demands and dispositions of our postmodern times. The other version could be the exact opposite, making him look like an autonomous individual who knows what he wants (accomplish his running and biking goals) and who is able to apply various new supporting technologies for that purpose. Instead of treating these purported instances of decision delegation to technology as "lapses in agency, we might take them as rich clues and an immanent critique of the models for agency currently at our disposal to make sense of the increasingly mediated terms of contemporary life", Schüll similarly argues (2017, para. 27) It makes sense for him not to just go for a run not knowing how much he did at the end of the month because he needs to set his own goals and live a goal-oriented life that makes it easy for him to be accountable to himself. In his world, it is part of daily routines, like putting on shoes when he leaves the house he puts on his wristband and starts tracking on his phone.

Simplified Decisions through Information and Visualization

ST technology promises to provide knowledge that is necessary to learn about correlations and causations, as well as formulate and test hypotheses. Information about and conscious knowledge of the current state of oneself pivotally supports setting the route for the following steps. As known from decision theory, additional information increases the reliability of decisions. To get more information means being in a more secure and reliable state, no matter in which part of your life. "In fact, personal tracking might best be understood as prospective rather than retrospective", Rooksby et al. similarly conclude (2014, p. 1171). As a result, ST tech can be interpreted as a mediator between the above-described postmodern emotions of loss of anchors with the burden of making decisions in a variety of aspects of everyday life and orientating oneself towards a successful future.

For example, as a student I was always proud of how good I was at multitasking, but later I realized that this was only true up to a certain point. The more tasks were added in normal adult life, the more difficult it became to keep everything in view concurrently and to make good choices and decisions in all areas of life – such as the form of employment, the form of partnership, buying a flat, the choice of suppliers for energy, communication, and the

like, planning daily meals, etc. When I started self-tracking, it was in the above-described sense: to get lucid information to which I could refer and which I could use to orientate myself. My first approach was therefore purely informational but had a touch of discovery spirit. No matter how irrational this might have been, I was feeling very excited with an unspoken hope of discovering something I did not have a clue about.

MYSELF: “first, I thought about which measurements I want to take. Not yet: which goals, only: What do I want to measure? Sleep interests me very much. What ‘happens’ while I sleep? I don't have any visible information about that, e.g., how calm or restless was I during the night? How often did I turn over? Was I awake? Do I also have a REM sleep phase? Then I am interested in heartbeat or pulse monitoring...how does it differ over time?”

Many aspects of one's body, mind, and behavior are either not visible or one is not aware of them. Holding technology in your hands that was previously available only to specialists may feel very exciting. Becoming self-aware of “something that is typically not a subject of reflection” means, according to Ruckenstein (2014), nothing other than “converting previously undetected bodily reactions and behavioral clues into traceable and perceptible information” (p. 69), no matter whether any action will follow or not. Crafting our autobiographical narratives as we go through life means actively constructing a self-identity as a coherent narrative about ourselves, which assures stability and consequence in one's choices and actions. It is not primarily a set of visible traits and attitudes, but rather an individual, reflexive understanding of a person's life story or a consistent feeling of biographical continuity. “A lifestyle involves a cluster of habits and orientations and hence has a certain unity - important to a continuing sense of ontological security⁹¹ - that connects options in a more or less ordered pattern” (Giddens, 1991, p.82), which decide not only about acting routines but also about self-understanding and identity. And we are ultimately responsible for our identity project. With regard to self-tracking, many decisions a person makes every day, such as how many steps to take, how often to breathe in a minute, how much to eat or drink, to have or not to have reproductive sex, how long to meditate etc., can become routines in our crafted lifestyles and can be supported or even unburdened through ST technologies.

⁹¹ Ontological security means not only to feel trust in the surroundings we are living in, in that the world around us is what it appears to be, but also the belonging to and being an accepted part of a group is very crucial. It is that basic ground on which an individual can build his or her self-identity and choose roles (Goffman, 1956) in life. To feel ontologically secure means to possess answers to fundamental questions like: Who am I? Where do I belong? What is my role in life?

However, this search for information may not only be meant to find proof or evidence for something, but also a direction to develop, a possible future to pursue. There is an inherent fictional aspect to self-monitoring and personal tracking. “Like controlling, as an instrument of control for the anticipatory optimization of production in companies, monitoring, as a mode of anticipatory safeguarding, is also oriented towards the future”, argues Krasmann about public surveillance programs: “It is always more than just monitoring and control, it is always more than just continuous observation, compiling data and comparing given data with standards and target values” (2004, pp. 168-169, as cited in Althans, 2010, p. 65). These considerations also apply to personal monitoring: it is imperative to identify undesirable developments in advance. Particularly in health-oriented self-tracking, the present is constantly confronted with future expectations, with speculation.

**“It is about a more or less equal co-existence of different sources:
hard facts, subjective feelings and experience”**

Although the expectations of the capabilities of technologies may still be high and sometimes exaggerated, there is no evidence that people valorize data over their intuition and subjective feelings in self-tracking (see also Mopas & Huybregts, 2020). They aspire to learn something about themselves with the aid of technology. However, my interlocutors largely reported not taking the gathered data and recommendations too seriously or submitting to it. The obtained data is rather understood as an additional source of information, an additional source of inner feelings, intuition and experience, contributing to a hybrid or multiple form of knowing. These results are consistent with those of Neff and Nafus (2016) as well as Sharon and Zandbergen (2017), who call it negotiation between the data sources and one’s own intuition and feelings. “When people elicit sensations through tracking, they shuttle between observing physical signals felt in the body and observing the recordings of them” write Neff and Nafus (2016, p. 75). All together, they build an assemblage of sources of information with which one can learn to understand how one’s own body responds, for example, to sugar by observing one’s feelings and compare them to the sensors’ outcome. In this sense hypotheses of causes and effects and further decisions could be built because of a richer decision basis and a better understanding. When I asked Arne if he is passing over or putting aside his bodily sensations and whether he is scared about losing his intuition by relying so much on measurement data he answered:

ARNE: “But my personal opinion on the subject is that it is about a more or less equal co-existence of different, I would say, information sources and one can be based on hard facts and data. And the other is my subjective feeling, my sentiment. Coupled with my experience. So somehow there are three different sources of information, without assessing them I try to connect and combine them in the best case in the brain in the broadest sense.....I try to make a kind of overall picture...That means in the end the picture that is formed is somehow complex and somehow always, in the best case, more meaningful than any of them alone...So somehow the gut feeling is influenced by something, positive or negative, whatever. Totally value-free”.

This quote indicates that ST technology enriches the decision base when people are making sense of these data by considering them together with other sources of information, i.e., intuition, experience, emotions, subjective beliefs, and the like, and thus try to understand something about their individuality and to have their lives managed or rather maintained on this basis.

“Sharing and comparing with friends is just more fun” – Data as Narratives

In Tabea’s perception the interaction with the tool or app in no way determines her actions as she often emphasizes the element of entertainment in all of this engagement. She is quite satisfied using them: “because for me, the gadgets just added the fun factor” since she had used a simple stopwatch for training plans before. It is a notable difference compared to her previous equipment because, for example, her Jawbone wristband, which she wears daily, draws her attention to her not having moved for hours, she explains. And that is what she appreciates. Additionally, “all the sharing and comparing with friends, it is just more fun”. For her, it is a kind of game and a way to stay connected with friends to whom sports mean as much as to her, and with whom she shares her data occasionally.⁹² She then explains to me, obviously joyfully excited:

TABEA: “So what's really funny, that we ...um... meet ...um... with ...um... with friends, that we then: oh, look here, the last few days, I've had a lot

⁹² Curious readers may have noticed that she did not share her data on social media because she thought she was doing this just for her, and of her around 30 friends only two women shared their data, like distance and speed of a run, on social media.

of ...um... good sleep phases or ...um... look my monthly average is now so and so, that we compare ourselves a little bit actually through these apps. But ...um... this has more of a fun character”

This data serves as interesting content for self-narratives as well as shared narrations and experiences of a subject which is meaningful for her and her friends. The same aspect is immanent in the QS show & tell presentations at conferences and local meetups. People use data to tell others something about themselves, sometimes also to disclose and talk about difficult issues but in an apparently unemotional manner, instead using numbers to underpin their rational self-narrations. She also noticed that after a period of intense, daily engagement with her data it decreased to her looking at and engaging with her data only once a week. Kristensen and Ruckenstein (2018) address another component of fun when they report about a self-tracker who through increased body awareness and a newly gained confidence experienced his diet as fun. He said he would even enjoy eating during his diet more than before, because of this data enhanced and “total sensory experience” (p. 9).

“This relaxed consciousness: I know (now) how it works, and if it annoys me significantly, then I change it”

Sometimes data production does not immediately lead to action. Insights gained can also be saved for later. It is also possible that the lessons learned shall never be used at all - a circumstance that I will explain in the next, action-oriented part of the self-control dimension. ARNE, who worked as a controller in a company for a period of one year, says about his love of dealing with data:

ARNE: “This again has something to do with the topic of control. This knowledge that I, uh quasi have control over the situation. uh.....Where then immediately again this question comes up about this control compulsion or control freak or something like that. Nope, but this relaxed consciousness: I know how it works, I know what I have to change and if it annoys me significantly, then I change it”.

In summary, the following components play a role in the mental category of the technologically mediated self-control mode. First of all, it is about recording information. The technology measures and stores data about conditions via sensors. Secondly, after a period of collecting data, these are visually displayed and thirdly, they provide us with information, and any differences compared to our own historical data or statistical averages. This

information gives the actor an opportunity to reflect on himself. This first form of self-monitoring is extended by the application of ST technologies to previously often inadequate areas such as continuous monitoring of heart rhythm or blood glucose levels, insights into the composition of sleep or insights into one's own work productivity or patterns of financial spending. In the second part of the self-control mode, the action-oriented dimension, we will see how these technologies affect the executive level, how they motivate and how they discourage further actions, adjustments and affective responses in body and mind.

5.1.2 Action-oriented Mode: Algorithmic Recommendations, Motivation and Self-Challenge, Regulation and Non-regulation

How to set goals and whose are they anyway?

Setting a self-tracking goal is an even more reflexive activity than looking at the gathered data, since it urges you to ask what you want to reach, what you are doing those activities for and if they serve you at all. Do you want to extend your runs, lose weight, feel well rested after a certain amount of sleep, or do you want to just feel active while doing, tracking, and archiving lots of activities during a week? Success means different things to different people – there is no “one size fits all” recipe. For example, KAROLINA set her daily steps threshold as 7,000 steps. After experimenting, she decided to decrease the amount because it was realistic for her and her circumstances and she would still move much more than before and more than the average individual usually does. Thereafter, she pursued her individual goal continuously.

Same thing with productivity and sense of success at work. Once the data in question is obtained some try to analyze it, correlate it with context variables and draw conclusions. With Ragnar, we have already seen⁹³ that he hypothesized about his work performance in relation to his bodily fitness and state of mind.

⁹³ I talked to Ragnar twice, six months apart, and he referred to similar situations in both of the interviews, for example stressful situations in meetings and his endeavors to tackle them.

RAGNAR: “Then I look at ... respiratory rates, how they depend on the context ... people, formats, contexts. If I am especially nervous at a meeting with special people, what can I do to ... get rid of the nervousness and I think about self-optimization⁹⁴ possibilities, that maybe before the meeting with this particular person, who makes me a little bit more nervous, in most of the management situations, that I just go and see that I do some physical exercises maybe 5 or 10 minutes before, to make myself calmer, to become calmer”.

Taking action or regulating can be seen as an additional step in the control process. It is a more implementation-oriented act, rather than controlling in terms of checking and monitoring. In technical terms, regulation is the adjustment of the target function based on the result of the measurement. If applicable, the registered deviation serves as an input for the next iteration and, if necessary, behavior adjustment with orientation towards the goal results. It works like in the famous example from cybernetic machines, the thermostat, where heating or cooling is compared to the nominal value and adjusted (increased or decreased) according to the measured temperature. Regulative thinking resembles functional thinking, in terms of rule based and flawless machine-like functioning. For example, not only moods that are difficult to grasp and correlate with variables, even weight is, in general, a function of more than one variable to consider. A sustainable weight reduction is not only the result of reduced calorie intake, but it also depends on the hormonal status, the state of water in the body, salt intake, movement, muscular mass, and the like. With self-tracking, there is at least the possibility of correlating measurements with possible impacting factors and seeing them all clearly in visualizations, such as progressions, percentages, progress bars, or frequencies. Self-tracking serves well as a means for complexity reduction as it offers clear representations, for example in the form of a dashboard. Other studies argue likewise that self-trackers are driven “by a desire to control and optimize the overwhelming complexity and uncertainty of life”, as Sharon and Zandbergen (2017, p. 2) conclude.

Most cases of using ST technologies are of a pragmatic nature. People seek to improve their times in sports like running or cycling, they search for more effectivity in their work

⁹⁴ I suspect that Ragnar used the expression “self-optimization possibilities” because I used the word in the first place when I explained the topic of my work and what I would like to talk to him about. Sadly, this question stays nebulous because he only used this term in this sequence, which led me to state in the chapter on self-optimization that none of the people I tested spoke about self-optimization literally and of their own accord.

performance, time savings in daily or professional tasks and the like. I will illustrate this point in the next chapter.

"How can one work any better?"

At first, Ragnar took a pragmatic approach to ST, which he saw as a mixture of innovation, an attractive price, and help in achieving his goals. His goal at the beginning was weight loss but later, and in his narration very present, his main favored was increased productivity.

RAGNAR: "And working more productively does not only mean working with productivity tools, but also to really see that at the fitness level you are always ready to... have a clear head, be concentrated and... There I am also always optimizing myself and checking 'What can I do now? Are my 10,000 steps that I want to do today after all..., can't I even do them between two meetings?' And then I can do my steps again and see how that affects the meetings when I have my sports break in the middle of it...Because I could sit on my desk chair for ten hours without any problems. And that is sometimes very exhausting and then I check again and again 'How can I work better?' ...during a conference call to go for a run, through the forest, just to get new thoughts, oxygen to the brain. Just things like that".

The application of ST technology to oneself encourages reflection on oneself, it creates a locus for preoccupation with oneself under the pretext of optimizing performance and improving physical, behavioral or financial values. Optimizing, for Ragnar, means testing and experimenting with certain hypotheses and seeing if they work, i.e., whether they bring relief and improve his perceived work performance or stress level.

In a lecture (FES Friedrich-Ebert-Stiftung), I asked students for their understanding of optimum/ optimal and got different answers. For some, it is the maximum "more is not possible", for others it is a personal optimum (e.g., they were personally very satisfied when they achieved a grade of "3" in their Math thesis), and for others it is a successful balance between different tasks and goals they have in life. Furthermore, the process of optimizing is, in the context of companies and organizational processes in the team, always assessed as positive. It is supposed to bring a certain form of relief. In media reporting and many personal accounts to the contrary, it has a negative connotation, such as subjecting yourself to external pressure – as thoroughly described in the chapter "Discourse of ST as self-optimization" above.

In some scientific fields it is rather a process than a result. For example, in chemistry (similar to process engineering, another student says), it is about optimizing reaction conditions - variables are exchanged until the goal is reached: a higher outcome or the avoidance of waste, reduction of energy, or costs. It is a laborious process, but the output is excellent and it remains an optimum until someone else finds/ achieves a new optimum. In football, on the other hand, it is not about optimizing the individual but the entire team, says another student. There are many different understandings of what an optimum is and how optimization works. For some it is very personal, like an average grade in Math, for others it is teamwork. For everyone, however, the optimum changes in time and context and is often replaced by a newly defined “optimum”.

The target values, such as the well-known 10,000 steps daily,⁹⁵ may first be determined by one’s own considerations, ideas, and moods. Secondly, they may be suggested by an algorithm and its inscribed (Akrich, 1992) assumptions implemented in technology – and then gratefully adopted by the app used. Thirdly, they may have their origins in shared expectations and societal norms, whereas it is difficult to determine to which extent the first two are also affected by the last one. To a certain degree, they are inevitably dependent on socio-cultural norms, however our own desires, hopes, and beliefs, as well as the corresponding programmers and their companies’ intentions all interact deeply. Pols et al. (2019) likewise conclude the existence of different types of “psychological subjects” (p. 111) in both the ST assemblage and discourse that are involved in making sense of numbers and vice versa letting numbers act on them. “These subjects are decentered and multiplied” (p. 98) as expressed in free will, technological determinism, the use of built-in nudging, and aesthetic and creative approaches to both own goals and the gadgets application among the users.

Likewise, I was interested in increasing my work performance (for this dissertation) by strengthening my concentration. Nevertheless, my optimum stage may have varied from that of another person, measured in working hours or produced units, such as written pages. To somehow improve output, but the accompanying feeling was also the goal, I guess. I expected to succeed and was happy in advance.

MYSELF: “My newest test object is called Muse and is a meditation helper - a brain tracking headband. Why did I get it? To improve my brain performance. To improve my concentration, to sharpen my focus. For this

⁹⁵ For a possible origin of the famous 10,000 steps see chapter 1.2. History of ST tools

purpose, I have started meditating regularly this year. And the tool Muse is supposed to help with this. I'm also curious how it wants / is supposed to track the brain - I have no idea. On the website it says that Muse wants to help build a habit. I've been using it for the last 2 days now and I don't really understand how the tool works. After each session, the app displays a diagram with amplitudes that show the activity level. These are not so easy for me to understand yet. The tool works in such a way that you are given continuous feedback on your thought state or distraction state. For example, if you have a calm state of mind, you will get feedback with the chirping of birds - waves and wind follow mental distraction - so that you can directly counteract and focus. This is intended to train one's powers of concentration. Does not sound unreasonable. But I have the impression that the feedback is not really true. For example, I once had some thoughts, but otherwise I was breathing calmly, and the birds were chirping - so not really. Or does the feedback come with a certain delay...? Anyway, I am quite excited because it sounds so promising to be able to focus my brain on command, so to speak. I imagine how I can finally reach my reading and writing goals much faster". (AutE.)

"You need a coach, feedback, a sense of accountability" – Schüll (2016, p. 8) quotes a CEO who spoke at a digital health industry summit in 2015. The discussions primarily revolved around which functions the gadgets should be equipped with to motivate users to change behavior through technology and thus construe a model of "digitally assisted self-care", not least to "make data tracking a habitual facet of lifestyle" (Schüll, 2016, pp. 7-8). The unanimous belief among technology providers was that users would not want to look at thousands of data points and instead would want simple recommendations and feedback with personalized direction. Here we again have to face the discussion about the nature of the relationship between autonomous users' will and the influencing functions offered in the devices.

"I think the challenge is not to win against others, but to challenge yourself" – Motivation is ... when you challenge yourself.

It turns out that, with self-tracking technologies what is understood as motivation for doing something is not so much happening in competition with others (as the competition theory in the market economy claims) but in challenging and surpassing oneself. FLORIAN tells me that he experienced motivation when he documented his training and progress. At this time, he was studying engineering and did sports to balance out the burden. Then he realized that this motivated him and was fun. Similarly, Andre:

ANDRE: "...with this [tracker] I can see all my movement data, how much I move (Jawbone)...this really motivates (emphasizes) me to get the train or taxi much less often, but rather, if I somehow have the feeling, you have 15 minutes left, I walk from Dammtor to the office".

Andre as a sports enthusiast and an already experienced self-tracker, even though he claims not to need external goals for his physical activities, gets motivated by looking at his tracked data.

ANDRE: "When running or cycling, I set myself a goal, monthly goals - and when I see that it motivates me to go running again tonight - it is a motivator".

He responds to my question whether the rank or position (what is a default setting of the app) compared with his friends and other members of the community or other users of the app is relevant to him:

ANDRE: "I don't care about that, I'm... I've already mentioned that before, so I'm not a competitive guy...".

He uses ST technology to keep track and regulate the extent of his activities in response to measured data. He likes to use these tools because they appear scientific to him, something he can rely on. He got used to the convenience of these tools and would not go back to manual tracking anymore.

ANDRE: "...I only experience motivation by seeing: you only slept for five hours... it has something... scientific? to me... Goals, structure, clarity - that's it, but if it's not connected, then it annoys me, no I won't use something like that ...".

The motivation he experiences comes solely from his actual and historical self-data. This indicates that in ST it is rather the self-challenge that encourages people. This again oscillates between the urge to assert oneself in the omnipresent environmental and (discursive) conditions of self-optimization.

PHIL is a good example of someone challenging themselves. Although not comparing with others, his procedure is not totally free of any external recognition. Nevertheless, what counts is to be better than one's historical self, than a run from last year, for instance. On a

wall-mounted wardrobe Phil has at least 30-50 medals from obstacle races, triathlons, and cycling. He obviously enjoys having them. Taking part in such competitions and, of course, tracking them is an event:

PHIL: "...where you fight with yourself, I think the challenge is not to win against others, but to challenge yourself and be a few seconds faster next time".

My self-observation can serve as an example here as well.

MYSELF: "With the new year comes the good resolutions. Not only for the New Year, but I always have something in mind and see potential for personal improvement everywhere: getting up earlier, being more focused or concentrating better - therefore learning to meditate or doing meditation exercises regularly. I have been planning the latter for a really long time now. ... A long-awaited wish or even need of mine, I often feel so absent-minded, jump with my thoughts to and fro and can't really stick to a topic, unless I write... Now I absolutely want to try implementing the meditation practice for myself again. Let's go whole hog: every day should be all right. So, I might try something like a 30-day challenge. Because somehow, I have to motivate, discipline and certainly reward myself".

Then I continued to ponder about how to make it:

MYSELF: "B.J. Fogg emphasizes the reward effect and I already wrote above: Reward and motivation go together. Now, somehow it doesn't feel quite complete when I just call this challenge out for me. There has to be some kind of testimony or publicity involved for it to be real and not just said that way. The next question would be, what should this testimony look like? Are diary entries or check-ins on coach.me enough? Maybe combined with a post on Facebook, if I made it and can post the screenshot about this statistic? That actually feels very good...Or write a blog article about that challenge and post every day when I did it...?"

I pondered and wrote some more pages about that topic and concluded the entry for that day with:

MYSELF: "I'll have to think about that... I'll take some time today and decide in the evening. Because deciding faster is my second big resolution for 2016".

This reveals some themes embedded in the self-tracking practice: to determine goals for which I could employ ST technology, to look for a testimony (archive, visibility) or recognition in the form of publicity on social media maybe, just to get the feeling that this challenge is “not just said for me” but somehow real. “In any case, I feel a much greater obligation to go through the challenge than before, when I had already started several attempts to meditate regularly ‘just like that’”, I wrote in my observations. The testimony I talk about in the above quote is similar to KAROLINA’s expression of “a written proof” she needed, to the transparency ANDRE was talking about so often, as well as to FLORIAN’s reported documentation that motivated him to track his trainings – all of them entail an aspect of testimony and evidence, a little bit more truthfulness. What encourages people to use ST apps is that they can challenge themselves (and in a few cases their network of friends) and experience greater truthfulness and sense of reality and commitment to oneself and one’s activities. I will come back to that topic when I discuss the aspect of capturing and celebrating achievements in the chapter about the self-caring mode.

Like Karolina, ANDRE repeats that he is not a competitive guy, he just likes to do all his sports and the tracking for himself. He actually does not use ST to stimulate himself, as he says, the incentive for him lies in running itself. However, he enjoys seeing his results together with some contextual information and thus feels incited. He is used to setting goals by himself and using these gadgets and tools to get feedback and information on how many kilometers he already completed this month in comparison to his own goal, as well as in comparison to his friends’ activities that month.

ANDRE “...for me it's really these monthly goals for running and stuff... I think they're pretty good. So just to see - hey, can you make it? This month I've got 120 km to run, can't you do it? That's a bit of a motivation for me. Just to see that and after the run you can see it there, I can see how far I am so to speak”.

This quote entails both dimensions of the self-control-relation, the incitement and desire to act as part of the action-oriented usage and orientation as part of the cognitive aspect. Some form of acknowledgement may also be entailed here, but ANDRE went to great lengths to assure me he had no emotional involvement with “the thing” as he refers to the tracking device. This was difficult for me to accept since I felt he was proud when he showed me his gadgets and explained what they are able to do together with all his collected lists about his runs and cycles and the like. Once, he even posted a picture to Facebook, something he otherwise does not do when it comes to private things, as he told me, about the

accomplishment of a long ride around the island of Mallorca. His explanation was that there were people somehow waiting for a message on whether they (he and his friends) had done this or not – he only posted it for this reason. It is difficult for me to imagine that - after a long bicycle ride of about 400 km, when you are certainly hungry and exhausted, you think to post something just to let other people know, without any emotional involvement. It seems to address his sense of accomplishment, which is also discussed by Pink et al. (2017). I will return and discuss this element in greater detail in the self-caring mode-chapter.

Competition is also not a driving factor for TABEA. When she told me about her first preparations for a triathlon, I asked her if winning was an important factor for her. She could not relate much to this question, either in terms of optimization or self-optimization. Like ANDRE and PHIL, it is more about challenging herself, a gradual improvement towards her goals, and her goals are always set so that she feels alright with never reaching the limit. It supports and encourages her to be, get, and stay aware of moving enough and eating right so that her blood pressure is not too low, which would otherwise be forgotten about.

TABEA: “So, now, the first three times [she did the triathlon] ...it [the driving force] was the good feeling of getting through it. And then to feel comfortable. To test more in the first one, how do you deal with these three disciplines one after the other, because I never did all three in training, just cycling and running together or vice versa running and cycling, but never all three together. Therefore, it was, first of all, about the experience how it [the triathlon] is like. And... um... now for next year we will be aiming even more for the goal on single distances ...um...better time, better times. I think, winning is not the most important thing, more so the times for me. I think that I can improve my times and that I will clearly tackle the long distance or the Olympic distance later on...

[But] I have noticed that I find it exciting to increase my performance or to move in a direction that is not necessarily connected to such a competition”.

Another example is ISGER, who is not using any sports-related tracking or tracking of vital signs yet, because he has no goals there: “I don't need to prove to myself that I am or am not athletic”. Isger is by no means motivated by comparisons or ranking lists - he is just not the type for that, he says, and does not see any sense in challenging himself in comparison to others. If he compares, then rather to himself and his historical data sets – a pattern that appeared surprisingly often in my sample, as for example with KAROLINA, ANDRE or FLORIAN.

It is very noticeable with my interlocutors that nobody was particularly interested in competitions. Rather, they provided the framework for the exercise of a particular sport but not the goal. The goal was to become better for oneself. Additionally, PHIL highlighted the gamification effect that many apps offer. Then, he playfully keeps up, and competes with other people (he shows quotation marks), so that “this helps you to see where you stand on the one hand and on the other hand it is a motivating factor”.

Algorithmic Recommendations: Alleviate the Burden of Decision-Making or Delegate to Technology?

The technologies of the self discussed here can be based primarily on reflexive processes as described in the first part. However, they can also be (and increasingly are in society) driven by algorithmically driven processes. In the multi-optionality of our lives some people need comparative values and frameworks, and others need concrete recommendations for actions to be able to act – some say to function.

PHIL can control the tracked data from his scale on the corresponding smartphone app and, depending on which target value he entered, the app shows the percentage of protein, fat, and carbohydrates he can consume. Based on this data he can “optimize the composition of his diet”. About his tracking toothbrush, he says:

PHIL: “The advantage is that I can connect the toothbrush to my mobile phone and a) get instructions on how to brush my teeth and b) see how I have brushed my teeth in the process”.

He appreciates receiving information that is difficult for him to assess, as well as recommendations for improving his toothbrushing habits. He collects the data and takes a look at it from time to time - twice a week – just to see what he did but does not evaluate the data very much.

KAROLINA illustrates the case of the desire for more than mere orientation through ST technology. She tries to improve her sleep and hopes to get concrete advice from the self-tracking app. She seems to trust the tool and expects it to tell and show her what the best solution would be for her, and her sleep behavior in that case.

KAROLINA: “I am using this [Withings watch] ... that also examines sleep, how long, deep sleep and so on. And that is also important for me because

a few months ago I had problems with sleep, and I didn't know why. ...That worried me a little that I had some sleep disorder. And then I observed that...whether I could sleep well and had enough sleep at all, whether that was enough now. He⁹⁶ controlled all that and he shows what percentage I've reached. Because I'm supposed to sleep for eight hours”.

She told me that she takes this reference value of eight hours seriously and tries to stick to it. Somehow, it is known that eight hours of sleep is recommended, but to see that recommendation in relation to her sleep behavior and the attached question of how to improve it has a greater relevance to her. After she had monitored her sleep behavior for about three weeks, she discovered that it is good for her to go to bed earlier, before 11pm. She admits to having a better sleep rhythm since she has been following it.

As already described, ANDRE needs his data as feedback and input for his decisions, for example whether he should adjust his activity, in this specific case his sleep. He is obviously guessing that it might be too little, but just looking at the device's display tells him enough to adopt the advice:

ANDRE: “...well, I'll look at that, but I'm not gonna analyze it or anything. It just tells me: ‘Hey, come on, get into bed early tonight!’”

Goal-directed action can also be interpreted cybernetically, as an instance of a cybernetic process that runs between the self-tracker and his data. This process, set in motion by measurement and data feedback, can be understood as a "technique of optionalization" (Traue, 2010, p. 273). Traue describes this as an “informationalization of normativity” where modes of “control and measurement of performance provide the individual with 'feedback' on the success or failure of the goals they themselves are striving for or that are demanded by organizations” (Traue, 2010, p. 273). In this sense the feedback entails or is understood as information and not as imposed order and provides the individual with orientation with regard to the user's goals. However, as Traue elaborates such feedbacks can be misused to urge the user to set the “right”, i.e. normatively informed goals demanded by governmental or commercial organizations. Due to the limited scope of this work and my focus on the user's self-relations I cannot pursue this topic in further detail at this point.

As I illustrated at the beginning of the chapter “Technologically mediated self-controlling relation” this process can be described as a feedback loop that encompasses

⁹⁶ Karolina is using the pronoun he, which may be interpreted as anthropomorphization. I will explicate this interesting observation in the technology-relations chapter.

measuring the actual value, comparing it to the nominal value, noticing the difference, if any, and, finally, adjusting the behavior function in a way that will fit the target value. The feedback loop connects the users to their past selves, plus the algorithmic processes on which the feedback loops are based “train themselves on our data, and they then train us by feeding us more of what they determine we like” (Brubaker, 2020, p. 788). Decisions taken based on that feedback have been discussed as delegation of decisions to technology (Schüll, 2016), with both its life-facilitating potential on the one side, and the risks of being manipulated on the other. The reason may be that people need support from technology to make good choices, as Schüll argues (2016), and they often get this in the form of nudges in better directions – such as Andre’s “come on, get into bed earlier tonight”.

In western societies, the answer to what makes people persist with activities typically involves certain types of internally rooted motives to achieve, self-actualize and enhance self-esteem (e.g., Markus & Kitayama, 1991). Sociologists provide external social and cultural implications, such as compliance with social desirability and the pursuit of socially recognized role models, such as creativity in social practice (Reckwitz, 2016) or entrepreneurial thinking (Bröckling, 2002; Bührmann, 2012), for example. Nevertheless, it is challenging to determine the interconnection between both sources of causes/ motives, the psychological and the social.

Like ANDRE and FLORIAN, TABEA, too, feels motivated to do more and go the extra mile to reach the recommended 10,000 steps mark, for example, and to plan her daily chores, for example, in a way that allows her to reach the goal.

TABEA: “Funnily enough, this caused me to notice that I just noticed, based on what I saw, how often I move or how much I move, or even how I sleep. That I then ...um ... had such an incentive to improve it again, whereby the gadget itself, the Smart Coach, tells you - man, you have now entered 10,000 as the limit, 10,000 steps as the limit, you only have 7,000 today, you're still missing 3,000. When you read this at 5 o'clock in the evening, then you think: you know what, I'll go around the block. That's right. I'll go again, I need another, I don't know, milk and then it's worth it, coming over 10,000 steps like that: ‘Yes!’”

There is a clearly playful touch and fun elements inside the practice. Moreover, at the same time, the device serves as a sparring partner, a companion, a counterpart that is “interested” in what you are doing, how your progress is, and which seems interested in your wellbeing and care. This tendency to anthropomorphize technical devices was already beautifully described by Sherry Turkle (1984, 1995) and seems to be a human idiosyncrasy,

especially if the device contains some human-like features such as the ability to “speak”, even if it is only in written form or “listen”, even if this is only data input for processing, machine learning and personalizing the repertoire of functions of that device. People have the tendency to attribute mind and intentions to nearly every object around them. It is quite common to confuse subjectivity and objectivity, as my example of Ellen Langer’s study about the Illusion of Control (1975) demonstrates. Many people assign human qualities to nature (e.g., mother earth), technology – for example, some people give their cars names and personify their printers and other everyday objects. “We call our computers stupid and even yell at absurdly innate things like doors if they get in our way at inopportune moments”, Hutson aptly illustrates what he calls the nature of magical thinking (2012, p.15).

PHIL uses the app Smarter Time for time management issues and is satisfied that “based on my behavior, the app learns in which rooms I move, what I do, for that I am in a meeting and the like”.

It is noticeable that the two women in my sample took the recommendations of the apps more seriously and tried to stick to them accordingly, as they told me. It appeared to me that they unconsciously/ undeliberately tried to fulfill the app’s expectations. The men were a bit more flexible in their accounts of its integration. However, they also relied on the recommendations, for example ANDRE and the “get more sleep” advice, RAGNAR with “do some exercises before stressful events” and PHIL with “you can spend only this amount of money in this category”. The difference therefore might only be in the communication about the handling of algorithmic devices. It has been pointed out in the literature that gender biases seem to be inscribed (Lupton, 2016b; Sanders, 2017) and I would further argue that they are performed (Butler, 1990) in the usage of ST technology, as they are in everyday life. Sanders (2017) points to teleologies of ingrained body and habitual ideals in self-improvement regimes and argues to “read these [self-tracking] devices as a sign that power is increasingly exercised at the intersection of biopower and patriarchy” (p. 54). Gender specific considerations should be applied in further ethnographical studies about self-tracking but cannot be pursued any further in this work as to not exceed the scope.

One interpretation of the overall reception of advice from an app could be trusting technology in conjunction with a simplification of decision making that leads people to adopt the device’s evaluations as their own. This interpretation also resonates with Schüll’s idea of delegating decisions about a proper conduct of life to technology. What should I eat, how long should I sleep, how long can I focus on work, how many working hours are enough, and when to go for the next run? These are just a small fraction of myriads of questions which

individuals in western societies are confronted with in their daily lives. Here, the technology is a means to get orientation and advice and relieve ourselves of having these questions gnaw away at us all the time. Schüll (2017) argues similarly that users “engage these tools with some ambivalence, admitting a wish both to take charge of themselves and to delegate that task, burdensome and confounding as it is, to data technology; they speak of feeling cared for by the automated interventions of their devices and released from hard-to-meet demands for self-regulation” (2017, para. 27). By relying on suggestions from algorithms and references given by ST apps and devices we may outsource responsibility for private estimations, opinions and decisions to software developers, designers, and their companies, and as such begin to relocate agency to computer technology and run the risk of being manipulated, misguided, or overseen (Frischmann & Selinger, 2018). Many people already unsuspectingly follow recommendations by choosing which book to read next, movie to watch, album to listen to and so on, and they seem sort of proud that the app “knows them” so well. As algorithms are mostly hidden, it is hard to assess whose interests they take into account. Addictive designs and algorithmic evaluations in digital technologies undermine the autonomy of individuals, as examinations in social media (Zuboff, 2019) and slot gambling machines (Schüll, 2012) demonstrate, and translate behavioral knowledge into power. Klauser and Albrechtslund (2014) similarly emphasize that the ST technology development, which they subordinate in Big Data practices, bears “a substantial outsourcing of meaning to apps and computerized systems, which are based on data gathering and processing. This provides real-time evaluations and recommendations so transforming the apps into ‘pocket dictators that are constantly expressing themselves’” (Thrift & French, 2002, p. 311, as cited in Klauser & Albrechtslund, 2014, p. 278). The question is whether we have started ceding control over our decisions and needs or we are just simplifying decision making with regards to less important things. The manipulation of needs and desires, as is well known, has a long history in marketing and the influence on consumer choices and may now be transferred to the virtually invisible pieces of software in mobile technological devices that we use every day.

Looking at this from a further point of view, one could consider that human beings are on their way to decentralizing or decentering themselves, delegating and outsourcing sensing, feeling, thinking and deciding to algorithmic apparatuses. Since it is known and easily observable that technology is becoming not only pervasive but even more ambient, and appears as such unobtrusive to the user, the question emerges if, beside simple convenience and commercial interests, that kind of permanent technology could serve as new valuable

knowledge about the human condition.⁹⁷ What does it say about humans that we prefer to delegate the sensing of our bodies (at least in part) to machines? These kinds of questions are also being asked in the recently established academic discipline Media Anthropology, where, for example, David Kasprowicz thinks about Hans Blumenberg's notion of selfunobtrusiveness as the desired state of the "Leib" (i.e., as the sensing part of the body), as a non-conscious and well-functioning body in conjunction with delegation techniques. "Selfunobtrusiveness of the body does not lead to a dematerialization or an enhancement or an automatization of the body, but to the comparison of techniques of delegation" (Kasprowicz, 2018b, p. 5). Delegation techniques, as understood by Blumenberg, entail embodied techniques of the fulfillment of lust in past cultures of puritanism and Victorianism, such as clothing or dancing. Delegation therefore does not equate to giving up responsibility. On the contrary, it might even be understood as taking the self-responsibility part serious and trying to use as much external knowledge, resource, and power as makes sense for oneself and seems necessary. It could therefore be argued that outsourcing decisions in many areas of life with no severe consequences, such as what to eat, how much to move, how long to sleep or how long to work, leads to distribution and decentralization of responsibility which ultimately reduces the burden that they imply and makes us feel better. There is, however, a counterpart perspective that could be taken, namely of centralizing one's data from different sources into databases, available for many stakeholders and potential third parties. This aspect has been discussed by Schüll (2016), who coined the term of the database self, by which she refers to the centralized time series collections about the self "whose truth lies in scattered points, associations and dynamic accretions" (2016, p.9). These centralized selves may then be used either in reflective ways by ourselves as we get confronted with them or by algorithmic calculations that produce data doubles on which certain operations, such as targeted advertising and other marketing measures, can be exerted. As data doubles (see Bode & Kristensen, 2016) are to be considered as recursive and reflexive, "an important dimension of the lived experience of self-tracking is the ambivalence people may feel about investing their trust in the numbers and altering their perceptions to fit the demands of the technologies they use" (Lupton, 2014a, p. 85). "Information anxiety" (Wurman, 1990) defines a condition where people's identities (e.g., as an executive, academic, or healthy person) are so dependent on research or data that these people literally are what they know.

⁹⁷ Media Anthropology is a recently established, new academic discipline trying to explore the entanglements of Anthropology and Media, such as newspapers, internet and film but also social movements or health education, i.e. programs that involve media technology <https://forschung-sachsen-anhalt.de/project/medienanthropologie-15296>. However, the terminology is not very established since the two notions of media anthropology and anthro-mediality compete with each other.

I would like to further enrich this thought with Bernard Stiegler's perspective of the genealogy of technology. He suggests that humans and their bodies are linked to technology because of “la défaute d’origine”, arguing that humans “only occur through their being forgotten; they only appear in disappearing” (Stiegler, 1998, p. 188).⁹⁸ Transferred to technology as the receiver of delegation processes, the act of asking my personal tracking device what might be good for me seems to appeal to another (sort of inner) source of knowledge. With the use of technology we might get used to its functioning for the sake of our wellbeing. Technology has been invented to alleviate or accelerate certain tasks and duties in our professional and personal life and despite there for sure having been failures using it, the common experience has been that it supports us. In the same way as the unconscious thinking Tabea may experience, the suggestions the app made were made with a certain inner knowledge and for sure with the aim to help her with her specific endeavor, which is what she is using it for in the end. “Delegation therefore is not only a kind of prosthesis for curing the unconformability with our own bodies – it implies today questions how to create a health app for elderly people”, Kasprowicz ponders about how to design interfaces and sounds “since these media-delegation become part of daily embodiment practices – they become relevant for the bodily feelings of a self” (2018, p.6).

PHIL follows the algorithmic recommendations resulting from his analyzed data "to improve health" as he calls it, but not 100%:

PHIL “with the numbers I get here in training, I don't stick to them too hard, it just helps me to make training more efficient”.

He follows his own heuristics, which gives him orientation and provides a pragmatic everyday solution. Because he gained some knowledge already, Phil knows better when he can let go of his diet plan and eat what he is in the mood for. This is a kind of controlled liberty:

PHIL: “But I also know when I can beat the strands.”

Interviewer: When?

PHIL: “Well, if I say I have behaved properly the last few days, then I can do that.”

⁹⁸ In his three-volume-work “Technics and Time”, Stiegler speaks of the so called epiphylogenesis as the conservation and continuation of epigenetic experiences in technical objects.

Self-trackers do not meticulously follow the recommendations of digital coaches and trainers in the app but rather conceive of it as a source of information that they can use on the way to their goal. In the ST context, information is collected but not to make rational decisions based explicitly on this information. As argued above, self-trackers also make their decisions in combination with other data and depending on the current location and the accompanying people. The function of the collected data and the whole ST process is therefore not a mere evidence-based decision preparation but rather lies somewhere else.

Instead of treating these technological instances of decision delegation as “lapses in agency, we might take them as rich clues and an immanent critique of the models for agency currently at our disposal to make sense of the increasingly mediated terms of contemporary life”, Schüll argues similarly (2017, para. 27))

**“What, for me, is a normal relationship of...” – Self-Regulation is ...
when you Maintain Yourself to Achieve Balance**

To take a brief interim review of the findings until now, the action-oriented dimension of self-controlling encompasses above all orientation – based on information obtained, personal comparisons, or concrete recommendations from the app – and regulation of one’s behavior based on the knowledge gained. I chose the term regulation to broaden the scope of action-oriented ST application and not be limited to the terms of improvement or optimization, as they do not explain everything, do not describe the phenomenon comprehensively and give a too unnuanced picture in my opinion as a researcher and practitioner in that field. Self-regulation is, however, a term occupied by the psychological discipline⁹⁹ and mostly related to the self-determination theory (e.g., Converse et al., 2018; Deci & Ryan, 2000). The Self-Determination Theory (SDT) by Ryan and Deci (2000) is concerned with people’s choices and why they stick to them. For a long time, we believed that people were supposed to do virtually anything when exposed to rewards and punishment (behaviorism) as means of motivation – i.e., principles lying outside the person. But Ryan and Deci found that even with interesting rewards like incentives this did not always work out. Instead, they found three main principles of motives or needs that determine our volition to do something: relatedness, competence, and autonomy. Motivation in psychological terms

⁹⁹ at the latest since Norbert Elias’s considerations of the Process of Civilization (1967/ 97), it is not unusual to apply psychological questions to explain social phenomena and social change. Elias uses the term psychogenesis to describe the fine changes in human behavior, emotions and feelings that foster the human self-regulation of drive- and affect-related behavioral impulses in the ongoing process of civilization.

hence has to be conceived of as a concept which begins inside the person, as an intrinsic incitement to do something that is interesting and enjoyable, i.e., that satisfies the three basic psychological needs outlined above. In terms of SDT, ISGER, like all my other interviewees, felt competent in technology usage, autonomous in their decision making, and the field and activities they chose to track were related to them. However, with self-tracking technologies the self-regulation aspect is more diverse.

As we have seen, ANDRE, TABEA and PHIL use self-tracking for training purposes, which usually means to perform better, run faster, finish the marathon and the like. ANDRE tracks and monitors to see if he can reach his monthly running goals, for example. For TABEA, it is a mixture of tracking her training but also sharing and comparing with her friends to have fun and share narrations. PHIL tracks to regulate his finances, weight, state of calmness and relaxation, and almost every other aspect of his life, which could be considered as a huge life logging project of its own. Another example is RAGNAR, who wants to be more efficient or effective at work. Regulation (including improvement and optimization) is a clear component of, as well as reason and intention for, using self-tracking technologies on oneself. However, the degree to which self-trackers want to regulate and adjust their behavior differs and is in hardly any of the cases 100%.

RAGNAR: "I always look at it every day, how many steps I take... Now when I have 9,000, I don't run the extra lap. So now I don't have to do the 10,000 every day. I just don't have that pressure. But I'll still make sure I go out every day. Even if I don't always make it to the 10,000, so if I wouldn't do Quantified Self right now, it could well be that I would definitely do less sport, go out less. But I'm not slavishly doing the 10,000 every day".

ST technology arouses the desire to do more than you would without technology. It collaborates with the desire to transform from the realm of the imagined into the realm of the symbolic, to use Lacan's termini. Without the project-based approach of ST technology, goals, desires and intentions otherwise run the risk of being 'out of sight, out of mind'. Both the ST process - setting goals, following steps and progress, as well as the technology with its visual presentation, ease of use and mobility, promote self-care without an implicitly compulsory character. The latter is a matter of personality and character of the person who is driving.

Similarly, KAROLINA set a goal of 7,000 steps daily and not the common 10,000. I asked her why she did this.

KAROLINA: “I cut back [to 7,000] to make it work/ to be able to do it. Because 10,000 steps, then I would probably have to become a waitress, so that I could do that at work...”

She told me that she felt bad when she looked at her device and did not reach her goal. Her interpretation of that written proof, the number she reads, leads her to think of herself as lazy. And this does not correspond with her self-image, or her desired image of herself, which seems to coincide here. She tries to bring her actual and ideal concept of self into alignment. The self-tracking tech serves as an adequate method and the data as proof of that imagination. Accordingly, when she sees what she has done during the week (sports, different work tasks and the like) and that she reached her goals then it motivates her. This attitude includes, however, a further component of “soft ST” - as I would like to name the emotional and care-oriented mode of applying ST. For many of the self-trackers, regulating means balancing their feelings, their financial spending, their work-leisure time intervals and the like. Self-tracking at first serves them as an instrument to figure out the right amount of those investments “to feel in harmony”, as Phil says. Then the emotional release is an important factor of self-tracking as I see it. I will describe the care-related self-relations in ST thoroughly in the next chapter, the self-caring mode.

These procedures suggest that it is not simply a matter of following the inscribed “scenario” (Akrich, 1992) of 10,000 steps daily or algorithmic recommendations about nutrition, sleep, or movement, but rather a matter of intimate negotiation practices ranging from submission to evaluation to rejection. According to Sharon and Zandbergen (2017), the process of dealing with data resembles a process of negotiation rather than pure acceptance and obedience to the numbers. “There is a communication between your subjective knowledge and your objective knowledge that you are creating” (p. 1700), as an interviewee explains. It must be noted that their interviewees were all recruited at one of the first QS global conferences in 2013 in San Francisco, and as such it must be assumed that people attending this conference are associated with the group of pioneers and thus intensely involved in ST technology, processes and the reflections upon them. That might not always be the case for everyday self-trackers. However, within my group, ARNE said it literally, that the data is just another source of information amid a decision process. And even if Karolina and Ragnar did not name it that way, the same processes were at work.

I therefore want to make a differentiation to the self-determination or self-regulation theory and suggest the term life-maintenance/ self-maintenance to encompass the diversity of factors that are effective in the action-directed sphere of the self-controlling dimension.

Even more than the term self-management, which is often used in literature to refer to the entrepreneurial self and a form of business-like approach to conducting life, self-maintenance refers to a technical, engineering-scientific way of maintaining life and, in some cases, extending it. Self- and life maintenance is geared toward keeping the self-system in balance, in some cases getting better in certain areas of life but at least trying not to get worse. It entails the here described components of becoming aware of dependencies, weighing up different suspicions and emotions with numbers-based information, reducing complexity through visualization in the app, forms of gratification and keeping balance as well as having a counterpart for all this.

For example, ISGER considers his comprehensive tracking of him doing work and what he is focusing on at the given moment not in terms of self-improvement – which I asked about – nor self-optimization or self-regulation.

ISGER: “Yes... well... self-improving maybe just because if I set myself a goal (pause) that is desirable to achieve, then it is... if you call that self-improvement, then it is it. Otherwise, I would not do it... as I said before, technique is only a supplement, that's not the core, that's why I don't track coffee, because either I feel calm and I know my caffeine [level] ..., so you notice when you have too much coffee, that's the nice thing about your body, that you notice that...but all the stuff I am not attentive on I consider those relevantalso because of my goal to not invest disproportionately too much time in work”.

ISGER uses tracking technologies when he expects to learn something about him that he does not yet know. His most important goal is to keep balanced and not reach certain heights or optima, as he explains. He was already collecting data on his working behavior for half a year and wanted to continue for another half a year to find out what the perfect relationship between work and free time is for him, i.e., “what, for me, is a normal relationship between work and leisure, so I must first have some basis on which to argue” (ISGER, Int.). He was emphasizing that to get significant data to draw conclusions from, the duration of the data collection must be long enough. For him, just two weeks would not be enough and could not serve as a basis for decisions because of circumstances and specifics that might have happened during that time. The evidence presented thus far supports the idea that the whole ST process resembles an evaluation process in terms of a proper and systematic examination and assessment, rather than a simple improvement process. It is involved in decision-making by gaining insight and assessing alternative actions and goals and enabling reflection upon them. ISGER's goal is not to identify and follow external standards about

work intensity, but to identify his own habits and normalities in order to make decisions and maintain his life according to his individual values. It is not a question of optimal workload, nor a question of working more or less, but rather of finding out when he feels good with a special work-leisure time ratio/ balance and “on basis of which I [emphasis] can argue” (Isgler, Int.). Not with the data shown to others, he emphasizes, but as a reliable ground and a “relaxed consciousness” (to use ARNE’s expression again) for himself. He uses self-tracking to provide evidence and more solid basis for his decisions. As he explains, only relying on his gut feeling regarding time spent on something, like Facebook for example, he finds delusive. He therefore needs data to see if he is working enough or even too much. Interestingly, the app or gadget itself he considers stupid, it can only record something he determined, nothing else. The more important evaluation and analysis process remains with him, he states. This recalls Licklider’s idea of the human-computer symbiosis (1960), where both work together in that humans set up the plan and computers make the “dull” calculations. The ST device takes part in decisions – it may feel like a collaborator, a sparring partner – a role that is significant for Tabea and Karolina as well, a fact that I will discuss in the self-caring chapter below. While symbiosis is a term primarily used to describe “living together in intimate association, or even close union, of two dissimilar organisms” (Licklider, 1960, p. 4), recalling Licklider’s idea it is indicated here that the human-computer-relation may enter a new level of intimate connection between the users and their technologies in the ST assemblage.

For RAGNAR, the subject of control in relation to regulation in the form of correction or balancing is not unfamiliar either. So, like many others as well, he checks his emails even when he is on vacation with his family. It is nothing big, he says, but might become interesting.

RAGNAR: “But it also has a touch of control to it, if you just want to know what’s going on and so on, and a little bit more... If something bad happens, you can always take corrective action. Well, I don’t have to work on vacation, but every now and then you think ‘Man, if I know a few things that are getting out of hand, I can take some corrective action’”.

According to the self-trackers’ accounts, ST technology serves to create awareness and not just assumption by seeing and perceiving numbers that represent their own behavior. But no one talks a lot about control or, more precisely, uses this term. Arne, for example, does not see himself as a person in need of excessive control. He circumvents this term and refers to it as relaxed consciousness, a perceived security that, in case of doubt, he could apply all

his knowledge and the tools he learned about while experimenting with self-tracking technology.

ARNE: “And the moment it really kicks me, or where it really bothers me I can change it at any time. So this ... this has then again something to do with the topic of control. This knowledge that I, uh quasi have control over the state. uhm.....Here then immediately this question about this control compulsion or control freak or something like that comes up again. Nope, but this relaxed consciousness, that I know how it works, I know what I have to change and if it annoys me significantly, then I change it. And um, why it's not right now... Okay, it's just because of that there are other issues...”

PHIL, for example, paraphrased it like this:

PHIL: “Control is such a negative word... I would say consciousness... you have a consciousness for certain situations because of certain values... and you have a base value to orientate yourself by... and that just gives you the opportunity to reflect. ... I am not a controller, I work in marketing and I am rather a creative”.

He makes a remark at the end, saying he does not want to be scourged by values and allows himself flexibility in life. The overall tracking practice can be experienced as justifying personal deviations that can be compensated (balanced) in the long term. For some, the regulation itself is less important than knowing how to do it, if needed.

Self-control refers to the fact that recording, meticulous logging, graphical evaluation - often in the form of a dashboard with time-measuring bar charts, percentages of completed tasks in the form of pie charts, progress curves and tachometer-like goal attainment indicators - create a feeling of control (which need not necessarily correspond to the actual degree of goal attainment). Self-tracking devices often include the ability to show a representation of the stress or relaxation level, or the productivity of a day in comparable figure over a longer period of time in the form of visualizations. When bodily states take the guise of numbers, statistics and curves, they convey a scientific form and the feeling of depicting reality (Bode & Kristensen, 2016; Duttweiler, 2016; Pharabod et al., 2013; Ruckenstein, 2014) offering a “mechanical objectivity” (Kristensen & Ruckenstein, 2018). “Knowledge is power”, my grandmother always said to me when I was a child, but is it? How to address “the contingency of knowledge and knowing” (Hughes, 2015, p. 771) is still an open question scholars argue about.

Three of the interviewees, PHIL, ARNE and FLO, the ones with the most extensive use of self-tracking tools in many areas of their lives, who were significantly interested in weight loss with the help of ST apps, are the ones who periodically reassess their goals in this regard. All three of them talked about their upcoming new diet plans, such as ketogenic-vegan nutrition or intermittent fasting, during several meetings and conversations. The individuals concerned radiate confidence and assurance that they could achieve their weight loss targets at any time, if they so wished, with the help of data (such as recorded food intake) and recommendations on the composition of their diet. The data and the use of ST tools convey predictability, feasibility and confidence in the successful outcome of the project, all of which are in the hands of the users. One can interpret this circumstance as not being willing to adapt their lives and their pleasures to the "health" orientation of the respective app. They also allow themselves to eat more than the app has planned for them that day.

PHIL: "I don't want to feel pressured either ... if I go out to eat and I can't track the composition of a meal because I don't know what's in it, then I eat anyway ... and I can also go over the top sometimes as well I think..."

As long as he generally knows his own individual statistics and has recorded his calories, physical activities and finances, Phil is able to set his own benchmarks and allow himself to act in line with the framework he devised which may include not following his guidelines religiously all the time but just doing what feels good to him in a situation.

“Because then I am ‘only’ human” - Non-Regulation

It is not prescribed in ST usage whether the self-control activity will result in action-guiding consequences as the following example demonstrates. Arne initially appears as someone who knows what he is doing with his measurements. As stated above, he accurately describes putting together three sources of information: gut feeling, experience and data, to get an overall view of an aspect of his life. Data sensing and one's own sensual or intuitive feeling hybridize in the ST practice, resonating with studies that describe the ST practice as affective and embodied (Mopas & Huybregts, 2020; Lupton, 2018; Pink et. al, 2017). When I ask him what he is doing next, after getting this picture, he becomes imprecise and indecisive. What is he doing all this for?

ARNE: "Yeah, I don't know. [...] What do I actually make of it? Sometimes I might make something out of it, sometimes not. Sometimes it is a

complete flop. So even if you know quite clumsily: eat healthily, exercise, then you lose weight and bang, it's that simple [supposedly]. Now I have maybe a whole, whole lot more knowledge, know how, information and a perceived incredible apparatus and the result is nevertheless always exactly the same: somehow beginnings of a paunch, unfit... So, you could say, 'How can this happen?'... Because of this manifold knowledge, so obviously everything should be perfect. ...OK, at the end of the day it is somehow not, because even then I am 'only' human and totally normal..."

However, judging by the effort involved in the measurement process, there have been little or no results or success rates. ARNE does not seem to be as strict with the implementation of considered measures as with the measurement process itself. Speaking of controlling in technical terms, the controlling process has no consequences, i.e., no adjustments to the target function. This may be because either the target is not yet known or it just does not exist as such, or it is not known how to adjust the function. It just may be that reaching the goal ultimately does not have the same importance as being prepared to do it one day if the time is ready for it. Knowing about the proper and possible way conveys a sense of security that is more important than the goal itself.

We can understand measuring, analyzing, and interpreting individual data as attempts to cope with individual health and risks. Hacking (1990) referred to the burgeoning of statistical calculations in the 18th century, which was then mostly directed at larger scales rather than individuals, as the taming of chance – which we now might transfer to the taming of individually aware /hyper-aware personal risks and contesting them with a sense of control. "In this vision, individuals turn the traditional notion of surveillance on its head: By intimately monitoring themselves, they increase control over their own lives, liberate themselves from unwanted habits, pursue their goals with maximum insight—and thus better their chances of success" (Beato, 2012). This intimate surveillance Berson (2015) also talks about is then already an instrument of intervention, not only of observation.

Despite all the possible reflection, the expansion of the basis for decision-making, its improvement through guidance and recommendations for action, which seems to be inherent in ST tech applications, self-controlling can go astray.

5.1.3 Losing Control - Too Busy with the Numbers/ Process - In Numbers We Trust - Ambivalence

The beginning of the 19th century is often seen as the birth of enthusiasm for understanding people through numbers and statistics (Porter, 1995). But do we really trust in numbers, or do we rather pay attention to them? The latter ascription may be the more important one, stating that those things we pay attention to exert power over us (Beer, 2016). “Numbers have a strong morality within the socio-material context in which numbers are qualified as adequate, true, boring, evidence of ‘bad behaviour’, or good or beautiful reporters on the wonders of the body” as Pols et al. (2019, p. 111) likewise argue. The occupation with measurement and numbers is a significant factor in the self-control dimension of ST. Obsessive, irrational behaviors fall into this category, too.

For ANDRE, involving his tracking device in his activities has also something obsessive, although he calls it automatic:

ANDRE: “It's an automatism for me. Well... it's not that I feel love for it, but it's an automatism. And desire... I don't know. It's probably more of a compulsive thing, it has to be there, you know, it's like I put on shoes, I put the strap on and I put the phone in there. It's normal”.

I have several such unexplainable cases of app usage, where I felt I had to use them when a question popped up, such as the mood tracking app or the pomodoro app.

MYSELF: “I can't concentrate! When I wrote the exposé, I knew what I wanted and what it should look like, so I was able to make 10 or 12 Pomodoros daily - but now I can hardly do 8 and that frustrates me a bit. I can explain that because this and that whatever else I have to do... So, my goals are exaggerated. So much is certain. What would be a realistic number per day? Or is a number per week better? ...I'm doing some calculations... Maybe I'm too busy with the numbers, too? Anything to accomplish what I think will bring me forward? Probably. Why do I believe in numbers so much? They somehow offer me support, orientation, something I can follow. Sometimes it seems to me that I am more concerned with the goals and their optimization than with the achievement of the goals and the related outputs for me” (AutE., Nov 2015).

I tried to organize different tasks, such as my day job, household, sports, social and cultural life, and writing this dissertation. I decided after some research to check the easy-

looking Pomodoro method, for which there are tons of apps in app stores. As one can see, while there were times where it served me well, there were others it did not. The app could not take away the difficulties and burdening tasks that go along with writing an original monograph about a not yet very established field of academic knowledge.

I then compared my approach with that of my partner, who always goes by gut feeling and who seems satisfied while I was unsatisfied but convinced me that after all I am making some progress. My considerations then went into why I was discontent and if it was just a habit to expect more from myself or if I could trust my feeling of in fact not progressing quickly enough. Another aspect which shines through here is a kind of obsessiveness with data, goals, tools or the process of measuring. Dudhwala (2017) makes a similar observation when she reports on participants who admit to experiencing some form of compulsion and priority to track rather than achieving the original goal – such was the case with a manager who wanted to destress after work and go running. When he discovered that his phone, which was supposed to record the run, had run out of power, he interrupted his run and went back home to charge his phone first. The peril here is that numbers displace the original goals at some point in the practice, resulting in being more engaged with maintaining the numbers than oneself (Ruckenstein & Schüll, 2017).

Over two years later I was still using the Pomodoro app. I changed the app to sync with the devices I used for work, laptop, tablets, and smartphone, but the method was still the same: work for 25 minutes, then take a five-minute break and back again until a long break of 30 minutes, or as long as you have set. As it turns out, I had some obsessive issues with it, too.

MYSELF: “This morning, when I wanted to start the Pomodoro app, I realized again how much it actually annoys me. The synchronization of app data between Mac and phone did not work, so I was shown a lot fewer units worked in the last week than I have done. I find that sort of thing extremely annoying. It's always bothered me the most. What am I running this thing for? So that I can see and document how much I have done. The Pomodoros should help me achieve a regular dissertation-workday and give me the good feeling that I'm doing enough for it. Now, when the data doesn't sync, first I get a twinge of panic - have I really done enough? Next, I feel cheated in a way - or I'm cheating, I can't quite tell at the moment - because I wonder if by this simple recording of work intervals, I'm fooling myself into thinking I'm actually getting something done. Isn't it rather the case that the quantity of hours worked only fools me into thinking I'm also making qualitative progress? That, in turn, makes me kind of mad! So many times

I thought ‘I’ll just leave this stupid app, it’s just annoying. I no longer look at the bars afterwards anyway’. If anything, I only look at the previous week’s view and see if I have managed the planned 35. Sometimes I also look at the whole past month. If the bars are high and regular, then I am happy and feel good. Somehow also a little proud. I am doing something! In moments like today, however, I find it all very doubtful. Am I not just fooling myself? Am I just lulling myself into a sense of security that I am doing something and therefore have everything under control? Now I nevertheless felt a certain compulsion to start the timer again when I began writing here in the research diary. Why? As justification that I am doing something? I think I should consider another way of structuring my day....” (AutE., Jan. 2018)

I think that I felt this kind of obligation because I expected to gain some form of knowledge through the practice in fields in which I was kind of dissatisfied, felt uneasy and burdensome and strived for an improvement. i.e., these fields were the most relevant to me and ST technology seemed promising. Since I am persistent, I have been able to overcome the occasional feelings of unwillingness and have stuck to the plan of measuring for a while and seeing if there were any positive results.

Previous investigations into self-tracking likewise point to self-reported obsessions with the numbers and measurement as such (Dudhwala, 2017; Foss, 2014; Lupton, 2012; Rowse, 2015). Unintended and unwanted consequences may emerge, such as loss of control or misdirected control. For example, Foss (2014) reports on a situation during a climbing excursion he did with his friends. One of them got lost, which they only realized in the evening. A search troop, of which he was a part, was formed to find their friend. In this rather dramatic situation, he admits to having felt the strong urge to switch his tracker on to record the distance they were about to complete to find their lost friend. He realized the inadequacy of his reaction and decided to abandon this habit. With a similar conclusion, Carmichael (2010) reported after many months of tracking and experimenting that she got anxious about losing her intuition relating to her body and her own decisions while being obsessively occupied with measuring and numbers. She thus finally decided to cease the practice while staying engaged with health-related topics by founding a patient experiences sharing platform.

In some cases, what starts off being harmless escalates, for example in the case of the eating disorder anorexia. What started as a simple diet brings feelings of attainment and control. According to Freeman (2009), people vulnerable to this diet often “are in circumstances where they feel trapped and under pressure to succeed; or they feel out of

control in their lives. The reward they get from exerting control over their food consumption and consequent weight becomes of exaggerated importance and may begin to dominate their existence” (2009, p. 12). In the same way, some individuals may feel that self-tracking gives them a sense of control over their selves, their tasks, and lives, while trying to get a grip on and maintain their lives.

From another perspective, it could also be the case that technology and practice have taken over the reins and are controlling them. In the specific and eidetic example of anorexia, which is classified as a pathological disorder, it may be valid to evaluate the situation as such, but is it the same case in on oneself applied technology to self-track? Is a genuine or total control over oneself possible at all? Or is it always the case that we can only feel we are in control, or have a sense of and perceive control, but can never be sure to keep this condition for more than a day? There are certainly domains in life that are more explicable in that context, like finances for instance, but even this domain is full of risks, which the insurance industry willingly shows us. With health it might be similar. We can try to prevent as much as possible, but our genes and environmental conditions may outweigh these endeavors. Or the technology as such promises control but can also deliver false alarms. For example, a mammogram - a diagnostic method women can use every two years from the age of 50 with the goal of early detection and by this prevention or cure of breast cancer, can go wrong with significant consequences. It has been shown that there is always a percentage of false detections and as such unnecessary cancer treatments that result from this method of trying to exert maximum control over one's health. Also, in the case of physical training, which may be the most adequate domain of application for ST, there are other factors, such as one's form on the day, bodily preconditions or being worn out, mental and social issues and just the contingency of life, that may run counter to the calculated success.

Here, PHIL represents a conscious overachiever.

PHIL: “I have completed the 28th marathon, I have done several hundred kilometers, I have done four triathlons. I have done bicycle races. Well, of course you can say that it is very pronounced and goes beyond the measure of healthy anyway and the thing is that I use equipment and digital training plans for me always on the one hand not to underchallenge me, but also to keep me in the fence to give me the illusion to train healthy”.

One could comment he was a compulsive tracker - but for him it is a means to get a better handle on things. Obviously, he loves challenging himself that much and assumes that using the tracking instruments is a way for him not to overburden himself as it is widely known that competitive sport is not exactly healthy for the body.

PHIL reported on another exemplary situation at a QS meetup: For a business coaching session he was not allowed to take anything digital with him or write anything down, just sit and talk. He was confused, nervous, lost, he told me afterwards:

PHIL: “For me, this is a form of loss of control when I only talk to my business coach...nothing is measured or recorded there (laughs)”.

When I asked him about it at our later meeting and interview, he did not remember it that way and did not want to confirm it. Either he wanted to include an entertaining factor in the presentation, or he was uncomfortable admitting the loss of control or the feeling of loss of control in our two-person conversation. “It’s so important to our peace of mind that when we feel out of control, we invent the feeling – and we’ll be more than happy to do it. It is preferable to the feelings of fear, anxiety, insecurity and uncertainty. We may not even be aware of the things we do to fulfill this desire. We may insist on needing things to be a certain way”, it says on The World Counts Blog (n.d., para. 4), a Danish open-source website dedicated to addressing global problems, such as environmental issues, population, consumerism, and the like.

These findings are in accordance with previous studies. These show that one can develop a sense of greater control over body and life by engaging with visualizations of tracked data, such as curves, maps and trajectories, which has also been stated in other studies (Lupton, 2013; Ruckenstein, 2014; Viseu & Suchman, 2010). Tracking, noticing (seeing) and monitoring one’s data, especially those previously unseen or not visible, mediates possibilities to intervene and control one’s behavior where potential for improvement seems to exist. Lupton (2013) hints to this peculiarity that I also observed among my respondents. It is the possibility of exerting control over one’s data as such, or as Lupton puts it, to control their data selves. “As part of these processes, self-trackers interpret ‘the numbers’ they produce on themselves in certain ways based on how they want the numbers to represent them or underlying assumptions about what they mean” (Lupton, 2013, p. 29).

Showing his scale, which also measures CO² concentration, Phil gains results in the form of numbers that are meaningful to him:

PHIL “these are values that I can then control and work with to improve them”.

It is interesting that he is referring directly to the numbers and speaks of them as if they were a part of his body system that he wants to maintain. He is working on these numbers as proxies or representatives of the corresponding areas of his body and life.

However, numbers are not neutral as one can observe in everyday life.¹⁰⁰ Their meaning is dependent on adopted values, personal preferences, and beliefs. The objectivity of one's data is relative to the user's subjectivity and valuation, as likewise Pols et al. (2019) point to. How they want to see themselves determines which data they choose to keep or record, and it also determines the result of the comparison in reference to the benchmark value they put these data into relation to. It is therefore not only - or only superficially - about regaining control over one's life but is also about constructing a self with the data that according to Lupton (2016), may correspond better with the self-image we carry with and about us.

STers can also experience displeasure, reluctance, fatigue, and burden in the practice. Sometimes, the users themselves cannot explain why they are continuing the practice. Example KAROLINA: I ask her how long she will stick to the Withings watch that she has used for about half a year now. At the beginning she checked her data daily and pretty much after every workout she looked to see if it was recorded and how many calories she had burned - and sometimes she made corrections if the kind of workout was not correctly recognized by the device. Now the device has learned to better distinguish her activities and she does not check it as often anymore. She also seems a little bored to me at our 2nd interview, at least her initial enthusiasm has subsided.

KAROLINA: "I don't know how much longer I'm gonna wear this. If I don't get bored, then [I keep using it]. I have such phases where I am motivated and do everything and then comes the lazy phase".

It was the end of October, the days got shorter and shorter, there were a lot of rainy days and so she felt her interest in physical activity dropping. And no app could help her out of this fatigue and get her to train again.

After experimenting with the mood tracking app, I was not convinced of the scope of functions with regards to the range of possible answers one could give to describe the actual

¹⁰⁰ This can already be apparent from mere body measurements: a height of 180cm has a different value for a woman or a man, same thing with age: an age of 20 or 50 is valued differently in women and men in our societies.

mood. After a while I got more and more reluctant to insert my answers a few times a day, but did not stop doing so anyway:

MYSELF: “I find the TYH app not very helpful. Most of the time I do the questions to have them checked off - why? I will stop doing this. Before I do, I'll have a look at the statistics. But I don't think I can learn anything new about myself there. I still don't quite understand why I keep doing this...”

In times where no goal was specified, the engagement with self-tracking gave me at least a feeling of doing something. At least I am reaching my numbers/ figures. This is similar to PHIL's understanding when he described that with tracking numbers, he was interested in whether he could “work on the values and improve them”. Here, the self-tracking practice serves as practice of self-care which manifests itself in the attempt to find solutions for personal issues, no matter if physical, emotional, or behavioral in nature, in and with technology. The tracking, registering numbers and documenting my work efforts calmed me down and made me feel better. But the results were not how I wanted them to be. The reason could be that the emotional response of feeling secure/certain and in control of my tasks and duties was directly influenced by that ST technology and helped me just to maintain my life to some extent. Kristensen and Ruckenstein (2018) made the same observation and refer to this phenomenon as “hitting the wall”. The user's subjective experience was restricted and felt burdensome because tracking drew attention away from the actual event. Instead of enjoying “running in nature or meditating”, users became skeptical about continuing with the practice “as attention centers on the monitoring task rather than the milieu and embodied perceptions” (Kristensen & Ruckenstein, 2018, p. 10).

As discussed above, the loss of control can be divided into a loss of control over one's data and a loss of one's control over control (e.g., overcontrol, compulsion to control), which was seen with more participants than the (experienced) loss of control over one's data and being exposed to their appropriation through third parties. Only a few of my interlocutors raised objections regarding data protection and privacy. Only PHIL thought about it and decided to accept future risks for current benefits, as he explained. He pointed to the omnipresent surveillance to which we are constantly exposed when moving outside our homes, using smartphones with WIFI and geolocation as well as just browsing on the internet and using personalized web services, such as Spotify or amazon. Literature, however, discussed the perils of surveillance and exploitation by states and corporates with the result of declining these services altogether or the advice to use them wisely (Frischmann &

Selinger, 2019; Klauser & Albrechtslund, 2014; Till, 2014; Zuboff, 2019). At this point, I want to recall Steve Mann's concept of *sousveillance*¹⁰¹ as “bottom-up” surveillance. Self-tracking in the *sousveillance* mode may be seen as an act of community-based reporting from the first-person perspective about topics of concern like local traffic situations, pollution, and the like - all of which is discussed recently in terms of citizen science and environmental activism initiatives and citizen sensing (Gabrys, 2014).

5.1.4 Mode 1 Summary – Technologically Mediated Self-Control: Orientation, Motivation, Limits, and Illusion of Control

The results suggested distinguishing between two modes of the self-control relation, which can be divided into two basic approaches to control. Firstly, the mental or cognitive mode, which is mostly about monitoring, getting information about aspects of one's life and comparing with own expectations, previous experiences and other sources of knowledge such as reference values presented within the app, i.e., often inaccessible, covered and unknown information and correlations about oneself get revealed and come into awareness. Often, users aspire an enriched knowledge base about a subject which is then reduced in its complexity by data visualization, comparison and trend forecasting which assists with orientation.

The second, action-oriented mode encompasses the subsequent steps of experimenting with goal setting, adjusting behavior and regulating bodily values based on that additional knowledge. Here, an important part is self-challenge and the lust that is created by seeing the data and progress, seeing that I have excelled/outdone myself again. Not regulating the actual issue at all, and rather engaging with the process and data for other reasons, is also part of this mode, since it refers to taking action and specifies what kind of action is taken. It also encompasses the aspect of algorithmic advice in the form of user-oriented recommendations that contribute to making a decision about what to do and how to act.

This chapter has worked out how the technologically mediated (also induced or enacted) self-relation of self-control in ST can be described along a classic control process

¹⁰¹ See chapter 1.3. for a more detailed description of Mann's *veillance* and *sousveillance* concepts

analogue to the technical notion of the control process: Read the ACTUAL status, compare with the TARGET status, adjust if necessary. However, as I demonstrated, the importance and meaning of control (in the ST practice) has changed. Control is no longer heteronomous control over someone, but foremost a technique that assists with orientating oneself, facing north and grounding oneself securely back on earth in the multiplicity of daily and long-term decisions. For example, the process of regulation in ST is not strictly set and executed. The meaning of the values one reads is also negotiated highly individually. What may look like control and exaggeration from the outside means getting a grip on it from the inside, understanding it, checking if it is true for yourself and finally balancing it and providing harmony.

With regard to the original question, I argue that self-control encompasses self-optimization respectively self-improvement between environmentally predetermined and at the same time implicitly chosen logic of increment (ARNE, FLORIAN), and progress control for training purposes and achievement of objectives (ANDRE, TABEA, KAROLINA). Thus, self-control acquires an augmented meaning in which it is contextualized with the maintenance of one's own life and concept of self.

“What it means to be owner of oneself, however, has involved very different degrees of control over the boundaries around the self in different historical periods”, argues Emily Martin (2000) on the change in characteristics of the social concept of a person to concepts of “the ‘individual’ seen as owner of himself and his capacities” (p. 512). With regard to technology, human boundaries and agency are constantly being negotiated (Haraway, 1991) or discarded (Barad, 2007; Bennett, 2010). The application of self-tracking technologies onto oneself has obvious effects on the self and distributes/ decentralizes this “control over the boundaries around the self” towards technology and creates technologically mediated self-relations that in turn establish more intimate relations with technology. An illusion of control conveyed by the self-collected data also shines through clearly in some places. Via reflection on their data corpuses people develop data dependencies and as a result, in a dialectical negotiation process, allow technology to enable, co-“enact” (Mol, 2002) or even push identity shaping processes and the understanding of their bodies. Self-control as a technologically mediated self-relation in the context of ST technologies reveals itself to be less about mere self-optimization but rather about orientation in a thicket of distributed data that becomes information through analysis and aggregation and then becomes (self-)knowledge through contextualization and synthesis with other sources of information, such as experience, intuition, and trial-and-error. In the end, self-knowledge can then define ways for treating or responding to data.

5.2 Mode 2: Self-Care Relation

PHIL: “If you look at how cell phones have changed our world, both positively and negatively, and as we said before, we have a big counter-movement and not without reason, yoga, meditation, Pilates are big movements.

One lives for the day, time passes very quickly and what we also lack a little bit, unfortunately I am not good at that either, is to appreciate the moment and things and bring them to mind. And when you do many things in life, then you do them unconsciously, something like eating.

It (self-tracking) is therefore also about getting an awareness of certain things

[and] certain data are simply helpful for me
and the [ST device] is a very assistant tool”

Here, Phil explains how he experiences the digitization of our everyday lives (using the example of smartphones) as an environment of fast technologies that need to be slowed down using certain techniques. The ST tools and tracking practice support him in shifting down a gear and turning towards himself, in order to perceive and become aware of “things in life” and thus to care for himself. I consider these tendencies and also others that I will illustrate in the following, as witnesses of the turn towards the self and practices of self-caring (to a wider extent) that are now being applied with digital technologies. Although executed in a technological milieu, at the same time they can serve, not least as a countermovement to technological development and its impetus.

I understand self-care or caring for the self, like Foucault’s inward turn (see chapter 2.4.), to apply certain “technologies of the self”. These are meant to be self-practices and techniques but may also include technologies “which permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and ways of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality” (Foucault, 1988, p. 98). Today, this focus on oneself is exerted in slightly different ways: to explicitly consider one’s self apart from the familial, social, and environmental integration, and apart from explicitly being told how one should live. In this chapter I will try to shed light on how self-care is practiced today. Like Foucault (1988), I consider the reference to “*epimeleia heautou*”, a self-care approach that constitutes the self as the subject of one’s caring acts, as significant beside the in western cultures common approach of constituting the self through self-knowledge – in Foucault’s terms expressed through the ancient greek adage ‘*gnothi seauton*’.

As explicated in chapter 2.4, Foucault introduced the term self-care with regard to the question of the subject behind the discourse in sociological debates, and its “technologies of the self”. Foucault described the latter as important techniques of self-care, such as to reflect, to take time aside to meditate, to write treatises, letters to friends and self-disclosure (like Seneca’s letters), as well as listening to their feedback and comments, taking notes on oneself and keeping them in order to review them sometime later, “to reactivate for oneself the truths one needed” (Foucault, 1988, p. 27). Today, self-care is primarily understood in the context of health and wellbeing, not only in a physical sense but also including mind techniques in terms of mindfulness or brain training, for example. However, from a socio-ecological point of view it is obvious that self-care is a “less significant determinant of health than would seem to be the case judging by the emphasis on self-care in popular culture”, argues Christopher Ziguras (2004, p. 13). What then is meant by self-care today? And to what extent is technology involved in it? In his critique of neo-liberal self-care promotion Ziguras examines the popularization of self-care in different fields of everyday life in western societies. He sheds light on the proliferation of self-help books and self-help treatments such as aromatherapy and New Age literature which states that “the maintenance of one’s state of health is purely in the hands of the individual” (2004, p. 7). Promises like these contrast the fact that health and wellbeing are products of various influential factors of the environment, such as hygiene and sanitation, absence of violence, and availability of water, for example, rather than a primary product of self-care. It further depends on personal determinants such as genetic and psychological disposition, as well as habitual behavior, such as doing sports, drinking alcohol or smoking. Due to the prevalence and presence of self-care advice and products today, individuals in western populations, despite enjoying expectations of being the healthiest and oldest humans living on earth, are “increasingly burdened with impossible responsibilities, unrealizable expectations, escalating anxieties and ceaseless striving” (Ziguras, 2004, p. 13), rather than becoming empowered as claimed by self-care promotion. These burdens, responsibilities, and longing for greater control over life may steer hope and preoccupation towards those digital technologies that promise people they will gain greater control over their health and wellbeing and let the user feel in charge of his or her destiny. To gain or regain control is unquestionably an important desire that finds a counterpart and support in new tracking technologies, but it is not the whole story. As I will demonstrate in the following, applying technology onto oneself leads to a new understanding and new practices of caring for oneself and as such enacts the technology mediated self-care self-relation.

5.2.1 Attention and Preservation Mode: Self-Reflection/ Introspection, Self-Thematization, Archiving

The results suggest that there are two modes of self-care relation. As above, within the self-control relation these modes can occur after each other, forming a process, but they can also occur independently in one form or the other. The first one is the attention and preservation mode. This mode encompasses: self-discovery, shaping the self-image, and emphasizing individuality (and even uniqueness). It also involves new forms of self-documentation in the form of mostly numerical self-data in body diaries, and numbers-based autobiographies. The second type entails confirming the self-value and individual self-image one holds, and actively inducing experiences that generate or evoke emotions - which will be discussed in greater detail in the next subchapter.

As shown in the self-control section above, reflection and self-knowledge form a significant part of the self-tracking experience and can serve as valuable information to plan and execute further steps of action. In ST, people think deeper about a subject and also from different perspectives with regards to weighing up more/ several sources of information. However, the self-knowledge part and the time invested in reflection can account for further self-related qualities, which I will refer to in the following.

**“It’s really exciting to discover how something is for me - I am
someone who breathes faster than the average”**

RAGNAR: “Well, first of all it's exciting for the first time to really see the data about everyday things like breathing. That you know for example - hey how is my breathing. So, for example, that I really see how often I breathe per minute. That would be one thing, ok, I find out I breathe about 18 times per minute and also the question when I breathe especially fast or especially slow. That is what I correlate with my day that I say, ah interesting, in the meeting you breathe faster and more nervously, than in the other meeting, interesting....”

To discover something unknown or something you were unaware of about yourself is a constitutive experience that first brings something to consciousness and thus generates knowledge about oneself. This knowledge can be used to generate awareness and a form of orientation compared to earlier states or to other people and it may serve to formulate goals one wants to achieve. The other present aspect in this experience is affective. As RAGNAR

aptly describes, it is exciting to get to see this. A new relationship to oneself is created, which says: I am someone who breathes more often than the average. It is a new component in the definition of one's self-image and identity. And it makes us peculiar, not average, distinguished from the masses. Without tracking technology, it would be difficult to find this out and enact the self-image, in Annemarie Mol's sense of enactment as the doing of bodies in addition to having or being a body. In that sense the self-tracking technology enacts the new mode of self as being someone who breathes 18 times per minute, with the average breathing sequence being 12 - 16 times per minute for adults.

The discovery aspect was seen in other interviewees as well. Most of them carried a pronounced curiosity, virtually a firm expectation of finding something surprising, belonging very much to their individuality only, with a nearly magical excitement.

ISGER: "...that you run short distances better than long distances, or long distances better than a short distance ... or is it because you have eaten better or something. That would be something for me where I would think - wow.... software is relevant when it can do more than an Excel spreadsheet.... For example, if it can recognize per se (pause) you are an afternoon person and then I can look into the data afterwards and see, oh (!) now I know where it comes from...."

ISGER is enthusiastic about computer science, which he sees as a modern craft. His idea is that his studies in computer science will provide him with a sound basic knowledge that he can use to implement his own ideas, for now centered around his own questions. With self-tracking he seems to have found a tool where he can on the one hand learn something relevant about himself and on the other hand learn what makes a great software. These steps both go hand in hand in his mindset.

The enthusiasm for these new discoveries may however fade after a few months, as a consumer study from 2014 showed.¹⁰² This is not surprising because after knowledge about one's own behavior has been gained, it does not have to be confirmed anew every day. Nevertheless, the duration of the data collection was different for my study participants. For TABEA it was a few (3-4) months, for RAGNAR several (6+) months, for ARNE 1-2 weeks and for ISGER 1-1.5 years before they assumed to have collected sufficient knowledge for themselves and could draw conclusions and action imperatives for themselves from the

¹⁰² Following the early Endeavor Partners Study from 2014 (Ledger, 2014), the majority of people cease the ST practice after a period of 6 months.

accumulated data. TABEA explains this using the example of her sport and sleep data tracking activities before a triathlon:

TABEA: "...it was like that in the beginning I really had the goal of hacking it every day and also looked at the week things [/results], where I was always happy when the Smart Coach gave me some cool feedback. And after a while it subsided, so that I only looked it up once a week and no longer every day"

The curiosity decreased because the learning effect has occurred. Tim Ingold explores the area of learning and embodiment in his book "Making". In it he states that the only way one can come to know things "from the very inside of one's being" (Ingold, 2013, p. 1) is via a process of self-discovery. "To know things you have to grow into them, and let them grow in you, so that they become a part of who you are" (Ingold, 2013, p. 1). This position points to the lived practices and how they unfold over time. Adapting new technological methods is, like any learning process, a continuous process, rather than a defined period of time. It involves cognitional acts like perceiving, thinking, or making decisions, as well as an embodied experience. Embodied experience in self-tracking appears to be mediated by different sources on perception and knowing, as well as after a number of iterations of obtaining and making sense of the data against the backdrop of an already internalized spectrum of knowledge. These are firstly own assumptions and expectations, as in TABEA's case (and that of the other respondents as well). They may be enriched or disturbed by comments from friends and colleagues, and they certainly get disrupted in the process of gathering more or less precise but frequent and somehow individual data about oneself while using digital self-tracking technology. Sociologist Deborah Lupton (2017b) pointed to the socio-materiality of human-nonhuman relationships with reference to Merleau-Ponty (1962, 1968): "Phenomenologists of the body such as Merleau-Ponty have emphasized the relational and interembodied nature of human embodiment and the subsequent mediated and technologically distributed nature of human perception and knowledge", she argues (2017b, p. 3). For PHIL, for example, who is tracking almost all aspects of his life, technology serves not only as a source of information but rather as a tool for developing a sense, or to use Annemarie Mol's expression, "enacting" (2002) a sense, for example of financial spending or calorie consumption, together with, or rather, in interplay with technology. Phil tracks his spending with the finance app "You-need-a-budget.com". He splits his money into different budget areas, like taxes, tech, holidays, clothes, phone, but also fun - after that he knows how

much he can spend on something in any given situation. He describes it as developing a feeling:

PHIL: “Then you save yourself some nonsense... That helps me to get a little bit of a feeling for the money...What I'm doing is sharpening my senses...That's what I'm doing...”

Other interlocutors expressed it in a similar way. Using ST technology helps them train their awareness and assessment/estimation and thus helps them, in a certain way, develop a sense for activities that up to now took place rather unconsciously, like intake of nutrition and fluids for example. The thought figure and motive for sharpening the senses can be interpreted in this context as practicing, i.e., training the handling of money until it becomes ingrained – similar to riding a bicycle, for example. In this respect, it supports Sloterdijk's view that continuous exercise is crucial for balancing out the "vertical tensions" a person is constantly exposed to in life. The idea of sharpening the senses will be taken up again in the technology relations chapter below.

A story about an individual, a person or their authenticity is no longer the written, subjective narrative about an event or a person's mental or physical experience but can also be expressed in technology assisted and methodically attained self-data. It is the close association between numbers and data with scientificity, objectivity and neutrality which makes this technology so attractive to many people. This alleged objectivity of numbers has been thoroughly discussed genealogically in its historical development and philosophical implications (e.g., Daston & Galison, 2007) and with reference to self-tracking (e.g., Lupton, 2013; Schüll, 2016), revealing how the attitudes and ideologies of product suppliers, programmers and designers help shape these supposedly neutral tools from within. It could therefore be presumed that self-trackers follow the tool's feedback based on the scripted functions, values, and recommendations. However, I could not prove this assumption with my interlocutors. On the contrary, Phil, Florian, Isgar, Tabea and of course myself were all reflecting on the data and what it could mean for us. But the apparently scientific process itself impressed everyone. ST presents itself as a constant process of self-directionality, without claim to universality, together with the evaluation and negotiation (and thus reflection) of different forms of information sources, be they qualitative, quantitative or blurred. The perspective of individual cases is able to generate knowledge, for it is not possible for a subject to make a definitive cognitive proposition about an object, so one can only make subjective propositions (Gumbrecht, 2004; Merleau-Ponty, 1979). Likewise, anthropologists and ethnographers argue for a while now to take the perspective of the subject. Sherry Turkle

(1984, 1995) and Daniel Miller (2000), for example, derived their insights based on ethnographically gained subjective participant accounts about how the usage and appropriation of personal computers with regards to social networks affected the individual user, and then made their conclusions with more general propositions. Many ethnographic studies, especially in the ST field of self-quantifying, self-monitoring and self-experimenting studied here, have adopted this perspective, as shown in the literature review chapter.

“That may be true for most, but is that really the case for me?”

In western societies, being an individual self has a strong historical and cultural value. Authors such as Charles Taylor¹⁰³ (1989) and Anthony Giddens (1991) argue that there is a necessity to live one’s own individuality in an authentic and exceptional way due to the loss of given identity shaping structures. “Each of us has a unique way of being human. Each person has his or her own ‘measure’”, Taylor argues with reference to Herder, “which consequently generates the idea of ‘a self-determining freedom and originality’ (Taylor, 1991, p. 362) as an ethic of the modern self in western societies. This originally moral ideal implies the pursuit of self-fulfillment and valorizes an authentic life over making oneself more or less comfortable in an outwardly/externally structured life. The ideal of the “true authentic self”, as Elliot (2004, p.28) argues, suggests “a search for that nugget of true identity buried inside a person, like hidden treasure. [...] But selves are never simply discovered. They are also made. We shape ourselves by the choices we make, and we are also shaped by others—our families, friends, peers, societies, and cultures” (Elliott, 2010, p. 370).

For example, Arne was intrigued by the sheer possibility of checking things that are said to him or that he reads somewhere by himself with technology, which made him feel autarkic.

ARNE “At home, for example, my blood glucose meter flies around somewhere, meaning that I have simply looked at it myself, how do certain foods affect my blood sugar level. ... the possibility to acquire a certain maturity and simply say ‘Ok, I have a certain amount of autarky’, or I am

¹⁰³ In his historical study of the “Sources of the Self” (1989), Charles Taylor unfolds a continuously progressing differentiation of the relationship between individual and society in Western culture. Taylor traces the ideal of authenticity as a moral category to 18th century’s writers Herder and Rousseau who expressed the expectation that every one of us has the capability of moral sensing of feeling, rather than knowing, what is right or wrong, which then should be applied to decisions concerning oneself.

simply able to reflect what is written somewhere, I personally find that great and I like it”

To lose weight and search for a best individual diet for him, ARNE questions general recommendations and is skeptical about whether or not they apply to him personally as well.

ARNE: “For example, this ‘You can't eat white bread, you have to take whole meal bread’, you shouldn't do this, you shouldn't do that, and that has this and that effect... That may be true at large, but is that really the case with me? And how is my (!) blood sugar curve due to food A, B or C? I can just check that...I can measure my fasting blood sugar, I can pour myself a cup of coffee, or two and every ten minutes I can measure my blood sugar, measure my blood sugar, measure my blood sugar and then somehow determine a course. I can do this in ‘X’ days in a row and say for myself: ‘Yes, that's the way it is for me (!) or even not!’”

He then continues to explain why it could happen that one food that normally cannot affect your blood sugar level, in fact could. This reveals that he invested time in researching about the causes and effects of food on body functions. Nevertheless, he was keen to test and see it on himself. I experienced the same curiosity towards my very own pattern, i.e., my individuality, regardless of whether or not the information would be of use at all and questioned if the general sleep patterns would work for me or if I would recognize a rather unique form.

MYSELF: “I was most excited about the sleep monitoring. So far I have only two measurements available and can only say that both times I spend 52% of my sleep time in ‘light sleep’ - REM phases are either not recorded or do not take place with me”

However, experimental accuracy is of persistent discussion within the quantified-self community. For example, Swan (2013) lists a catalogue of named objections directed against self-research regarding their scientific soundness, such as: “the small sample size of $n = 1$, studies not being randomized or blinded, the inability of the experimenter to be objective” (Swan, 2013, p. 92). Self-researchers would rather fall into the biases of own expectations, the wish for confirmation or the peak-end, which can be continued with “the problematic aspects of self-reported data, the difficulty of controlling for environmental and hereditary variables, the lack of precedents and models to help in the conduct and understanding of self-experimentation, the possibility that results are only a hypothesis, and the potentially confounding influences from known experimental dynamics such as the placebo effect and

the Hawthorne effect”, Swan argues (2013, p. 92). Objections against self-observation as a scientific method were formulated in many scientific disciplines before. A classic example within social psychology is Nisbett and Wilson’s (1977) examination of studies with participants’ self-reports which suggests that the introspection capabilities are limited. Although participants are mostly able to explain their behavior, this explanation may not be accurate because there may be little or no direct access to mental cognitive processes, like evaluations, judgements, and the initiation of behavior.¹⁰⁴

However, seemingly individualistic self-tracking ethos of n-of-1 can serve multiple goals: from personal aspiration to mindfulness, from DIY health to participatory medicine, from public health to citizen science (Greenfield, 2016). In my research sample the self-experimental approaches of ARNE, RAGNAR, PHIL and ISGER had shown significant results - for them. ARNE could find out how a certain consumption of coffee in relation to other activities influences his blood sugar level. PHIL did a lot of experiments and learned that meditation sessions during the day were the best way to calm him down, to “bring [him] down to earth”, as he describes it. RAGNAR figured out that doing exercises before an expectedly uneasy meeting was the best way to reduce stress and ISGER was in the middle of a self-imposed 1-year experiment to show him which working habits would best suit him and his wishes. There is a portion of assumed neutrality and objectivity in the tracking tools and the produced data that self-trackers trust. ANDRE saw a kind of scientific quality in the figures that convinced him to follow the recommendations regarding the duration of his sleep. ISGER used a scientific approach with a long period of measurement and observation. TABEA appreciated the opportunity to learn a fair amount about how to improve her individual training and sleep via feedback provided from the ST app. All of this conveyed a convincing truthfulness that was, however, not meant to have absolute validity but, as we have seen, was as valuable and useful and “more or less equivalent” to other sources of information, as ARNE put it. Intensive self-trackers or those from the QS environment in particular conduct manifold and detailed self-experiments, e.g., quantifying experienced grief due to a bereavement (Greenfield, 2016) or searching for evidence with regard to one's own

¹⁰⁴ “Instead, their [the participant’s] reports are based on a priori, implicit causal theories, or judgments on the extent to which a particular stimulus is a plausible cause of a given response. This suggests that though people may not be able to directly observe their cognitive processes, they will sometimes be able to report accurately on them. Accurate reports will occur when influential stimuli are salient and are plausible causes of the responses they produce and will not occur when stimuli are not salient or are not plausible causes” (Nisbett & Wilson, 1977, p.231). Other investigators criticize: “The analysis of situations and appraisal of the environment . . . goes on mainly at the nonconscious level”, as Mandler argues (1975, p. 241), within which the “unconscious processes . . . include those that are not available to conscious experience, be they feature analyzers, deep syntactic structures, affective appraisals, computational processes, language production systems, action systems of many kinds” (p.230).

hypotheses regarding one's allergies “on the scale of the individual person” (Christiansen et al., 2018, p. 112) in a kind of “1-Person laboratory”.

“Can it help me grow beyond myself?”

Seen from this perspective, self-monitoring and measuring serves subjectification rather than objectification in the form of external but internalized norms and goals geared towards optimization.¹⁰⁵ The monitoring process, the insights gained and the awareness of blind spots in our life may lead to an improvement or, if you will, optimization and might lead to one omitting certain places or foods, shortening working hours or times with no movement or expanding areas of activities that serve personal wellbeing. Besides systematic “quantifying the self” with its self-experimentation one can, however, build a new and promising approach in science. Personally, tailored medicine,¹⁰⁶ which is eminently more possible to implement in an era of big health data, comes to public attention. In this respect, more people are convinced to take over more responsibility for themselves, and thereby seek for personalized answers to their individual questions.

During my phase of checking out mood tracking apps (such as Happiness and Moodpanda), I also tried the graphics (and not text) oriented app In-Flow. Several times a day, at random times, the app asked how I felt and how my energy level was. I was supposed to indicate this by choosing from five “smiley-like” faces, ranging from awful to awesome. I was curious to see what would show up:

MYSELF: “A tool with which I can keep track of my efforts, see achievements, successes, somehow use potential for improvement. How do I see myself when I have used these tools for a long time? This is one of the questions I would like to ask the participants of the study. Who am I now?”

¹⁰⁵ An opposite position can be shown on an utterance from a friend of mine with whom I discuss my research while jogging. Andreas, a university professor – runs regularly, does Asian martial arts and tai-chi and is engaged with his health and fitness as a kind of lifestyle – stated that he would never use these devices. He would be afraid of losing his bodily intuition and these tools may undermine it, he said. Additionally, the tools do not seem individual enough for him and in general he is against the pressure to measure in the world. Nevertheless, when he was checking his blood pressure when he once had problems with it, he felt relieved and reassured when he saw that it was within the normal range, he admitted.

¹⁰⁶ “The existing paradigm for scientific research was developed in an era when it was difficult and costly to obtain large amounts of data from large numbers of people and reorganize and select cohorts at will. One issue is that the generalized cohort in which a study was completed may not be representative in the correct way to any individual. It is known that many prescribed drugs are ineffective, perhaps half”, explains the Glaxo chief in an interview in *The Independent* (2013). I have listed more arguments for putting oneself as the subject of investigation in the above chapter about historic examples of self-experimentations.

And who could I be? Can an XY App help me to get there? Can it help me grow beyond myself?"

With a technology that is supposed to help you look inward and get to know yourself better, it might be possible to surpass yourself, to overcome yourself in some points - at least that is what I thought.

Self-trackers do not see themselves as average human beings

Nor as standard cases, especially not as standard patients. A frequent personal history is formed by insufficient or incorrect treatment of one's disease or handicap by doctors, which is often the starting point for ST. This was the case for FLORIAN and the insufficiencies he experienced early on, which he asked me not to name publicly. It has also been addressed a few times in the ST literature, e.g., Wolf (2009) and Christiansen et al. (2018), who struggled with allergies and eczema and wanted to challenge the dominant theory, according to which allergy is a misdirected immune response. "Thomas' idea was that his immune system did not shoot in the blind but responded to the grass pollen because it had at some time in his past made an association between grass pollen and problematic bodily states. Thomas thought he potentially could influence his immune system to reverse its decision about classifying grass pollen as a threat by keeping his body in as good a shape as possible during and especially at the onset of the pollen season" the authors report (Christiansen et. al, 2018, p. 104). Disappointment and mistrust in the health system as well as a new health-awareness and willingness to invest in one's health build a kind of "medicine as culture" (see Langwieser & Kirig, 2010; Lupton, 2012). Correlations between medication and symptoms, their dependence on other factors not considered by traditional medicine, as well as the possibility of observing and examining those states nearly continuously build the attraction of the self-tracking practice which is motivated in this way. Self-tracking studies confirm this: for many users of ST, highlighting and exploring their own singularity is a fundamental component of that practice (Kappler, 2017). Reasons given by the literature (e.g., Bode & Kristensen, 2015; Dudhwala, 2017; Selke, 2016; Unternährer, 2016) that were also detectable in my study comprise pattern recognition, i.e., learning something about oneself, and self-change, changing current states and behaviors. In the above quote one can find a search for confirmation of inherent self-images and phantasies about growing beyond current limits. One can also find indications of a hope for 'Technology as Heilsversprechen' (a topic I will return to in the Human-Technology Relations chapter below) in the above quote, in the form

of the wish to grow beyond one's limits. KAROLINA's and ARNE's accounts likewise indicated a hopeful attitude towards the gadgets, particularly with their long-pursued project of being effective in weight loss which they hoped they could solve with ST tech. Other participants likewise emphasized the interest in either testing hypotheses and whether they are true for them or finding out their individual breathing intervals (RAGNAR), sleep patterns (KAROLINA) or the ratio of time spent working to free time (ISGER). In self-tracking, uniqueness is proven by the idiosyncratic pattern of numbers, and not by comparison with others (Unternährer, 2016). In the first few years following the emergence of the QS, uniqueness could also be proven by being an early adopter and possibly becoming some form of influencer (either on social media or in the market). ARNE seemed to me to be particularly driven in this regard. At the beginning of the popularity of fitness trackers he ran a website and a YouTube channel with video explanations about QS and related topics but ceased to do it when it got more popular, and more competitors appeared on the market.

ARNE: "Getting involved in a competition is not attractive...That has lost some of its appeal, something more exclusive... special/ singular is somehow better, or more interesting..."

Most recently in "The Society of Singularities" (2017), Andreas Reckwitz demonstrates how, from the late 1970s onwards, time is increasingly being shaped by a social logic of singularity.¹⁰⁷ What this means is the valuation and valorization of particular, exceptional experiences, something unexchangeable on a social level, and not only for the individual. Reckwitz illustrates the striving for singularity through many examples in the area of living and identifies a structural change from the social valorization of the universal (des Allgemeinen) that was a leading social principle in modern times. Reckwitz tries to localize and explain this per se individual intention, however, in the social as a larger social expectation and reality. "Central to it is the more complicated striving for uniqueness and exceptionality, which of course has become not only a subjective wish but also a paradoxical social expectation", he postulates (p. 9), arguing that "practices of valorization and practices of singularization go hand in hand. When people, things, places or collectives appear unique, they are attributed a value and they appear socially valuable" (p. 16). With self-tracking we

¹⁰⁷ Reckwitz does not use the term singularity in the understanding of a tipping point to an age of machines, uncontrollable and unforeseeable in their boundless artificial intelligence. By choosing this term in a socio-economic sense he draws on the works of Lucien Karpik, *Valuing the Unique. The Economics of Singularities*, 2010, Princeton and Igor Kopytoff, »The Cultural Biography of Things«, in: Arjun Appadurai (Ed.), *The Social Life of Things. Commodities in Cultural Perspective*, Cambridge, 1986, p. 64-91.

might be witnessing or reinforcing a shift or rather an evolution in terms of the understanding of the Self, its individuality, agency and authenticity with a transition to uniqueness or exceptionality, the latter of which must not be understood necessarily as superiority which is better endemic/domiciled in the transhumanism movement. What is being perceived as exceptional becomes valued and, it appears, not only individually but also societally precious. This feeling is fueled by the relative novelty of ST wearables and apps that have been available on the market for around a decade only, which convey the avant-garde and pioneer-like touch.

The constant demand for self-invention and self-fashioning (Reckwitz, 2012), which is already observable on social media, may find its further assistance and anchoring in self-tracking technology. In today's society, which is highly media-connected and publicly present – at least in the new media – the paradoxical phenomenon of large-scale singularity emerges. Especially on social media there is the theoretical possibility of presenting oneself in an individual way. On the other hand, laws and behavioral norms and trends regulate the communication and representation of the supposed individual in social networks online. There are more or less unwritten laws that have developed into tangible how-tos: from which content (for example, holiday photos) in which form or quality (mobile phone photos on Facebook, aesthetic shots on Instagram) to the type of textual attachments (status messages and location information on Facebook versus only hashtags (linkable keywords) on Instagram) to which data are posted in a way that they receive the greatest possible attention. Inevitably, this leads to the leveling of one's own presentation, be it through specifications on photo dimensions, selection lists for hashtags, as well as the basically more or less prescribed positive mood in order to receive positive feedback in the form of likes, comments or shares. Nevertheless, the idea of authenticity is especially present in and ascribed to social media, where it is considered a value to be authentic, to have your own style of voice and a personal style with regards to clothing and appearance. But at the same time these styles are being elaborated, designed and tuned, resulting in performed authenticity. Sharing personal details while sidestepping the filters of corporate communication and public relations is, for example, a recognized sign of authenticity for celebrities and micro-celebrities using social media. However, social media rather encourages a constructed self-representation with rather edited pictures, voice recordings and statements. “As a result, revealing personal details becomes a way to appear authentic while maintaining carefully constructed personae that fit within an acceptable image”, argues Marwick (2010, p. 18), which results in an easy to market “strategic, edited self” (2010, p. 349). The question of authenticity, however, can only be tackled

ambiguously. The concept of authenticity as a human quality is historically variable, socio-culturally variant, and finally changeable with relation to the technological environment.

“Well, I have actually copies of everything still somewhere...”

According to his statement, ARNE has documented various topics in a kind of logbook or diary, long before QS and mood tracking apps. He emphasizes how he had enjoyed playing around with different parameters in excel sheets and seeing if he can find patterns and discover something in the data. But also: that he likes to keep the records, just in case.

ARNE: “I have documented when I was in the solarium, when I trained, when I was in the sauna, what the weight is, how the training was, with a three-line daily journal, if you like, and have linked this over a period of time. My idea was ‘Ok, I would like to somehow read how the quality of life in the broadest sense is influenced by the different parameters that I can collect’”.

Interviewer: “Have you kept this data?”

ARNE: “Yes! Well, I have actually copies from everything still somewhere... That means ... I have this, quasi-form, where I have entered my values so analogously, or partly I have typed things on the PC, then printed it out and stapled in a folder. And afterwards, actually, there is even still somewhere, a kind of book, notebook, whatever, where I can leaf through, which also has another quality...now...where suddenly something like pedometers were there with corresponding apps, with corresponding web dashboards and so on and so forth. So that my efforts to do that myself have declined to an extent”

But still, he keeps all his manual entries, and the diverse dashboards and app data. In sum, all of my interviewees, including myself, kept their data and, for example in the case of holiday pictures, rarely looked at them after a while. The personal and self-collected data were regarded precious and valuable enough to remain in the possession and range of its owner. This reflects a value concept that is generally accepted in our society and the current digital economy/ business data: “Data is the new oil”.¹⁰⁸ In a comment on an early QS-article from Alexandra Carmichael in 2008, Gary Wolf shares this observation: “There are people

¹⁰⁸ Widely credited as the first person to coin the phrase is the British mathematician Clive Humby in 2006

for whom collecting data is itself a rewarding activity. The data feels like a valuable possession, and the systems for gathering it up have inherent interest". Florian is a good example of the gratification that stored data about oneself mediates, which is reflected in the self-care mode of self-tracking.

FLORIAN: "I have made the experience that this tracking, this documenting is motivating for me. Well, I'm coming from the topic of self-management, I've already tried with to-do lists, but when that's checked and it's gone, it's different than when it's documented, when I have a track record...And that actually inspired me very much and then I tried more and more, had a sleep sensor - 2011 or so, I think - sent to me..."

Here, FLORIAN expresses not only his initially rational, goal-oriented approaches to ST but also a wish to produce and keep a documentation that may prove his efforts as well as convey a sense of personal satisfaction. The desire or need to store the data in any case, in order to have it "just in case", was also especially present with ARNE. He kept all his tracked data and also the apps he used and explained to me why he was not using his partly comprehensive tracking data and gained insight to establish a plan and put those data into an action strategy.

ARNE: "Yeah, I'm a bit more relaxed now in that respect, I now know 'OK, if it really, so really really gets on my nerves, then I'm able to, then it's like a drawer that I pull open. Pull out my tools, my tools, my methods and use them. So, I find myself in the comfortable situation, for myself, the feeling that I say "I'll just let myself go" in quotation marks. And in the moment where it really kicks me, or where it really bothers me, I can change it at any time...This knowledge that I have quasi-control over the state'"

In this case we have an instance of a sense/ feeling of control or probably an illusion of control – mediated by the possession of data. Similarly, many drug addicts are convinced that if they really wanted to, they could stop consuming the drug. In ARNE's case there is no need to talk about an eating addiction, in fact he just wants to lose some pounds but has not tackled this yet because of other urgent projects and events in his life, as he tells me. So, this sounds reasonable. However, when I met ARNE for a second interview and talked to him in an informal situation a few months later, he still had a couple of kilograms too many on him after my impression. In a kind of self-reflexive manner, he says:

ARNE: "...I'm not perfect and continually perfect. ...you can't always perform at a high level. Also, a training, a good training, it's not always full throttle. It's a well-dosed combination of exercise stimuli, of recovery/regeneration...So bit by bit, you get better somehow"

The highly self-tracking PHIL presented thoughtful considerations for keeping the data, and first of all, using cloud services for that. Although they would bear a lot of privacy problems, as the previously discussed surveillance debate (also) in self-tracking emphasizes, they bear benefits for him as well, as he explains.

PHIL: "The development is so fast today that certain data that you collect today where you say 'oh, what are they good for?' can be used at a later date... whether from third parties, service providers or yourself, you have to be aware of this and pay attention to how much you want to pass on, because 'even today you do not know what such data will be used for in the future'..."

"I say the benefit is greater than the harm - at the present time - and a certain form of convenience and status today is more of an advantage than a disadvantage"

However, most people probably have clear goals and ideas for the present that they accumulate and keep the data for - and do not just document the deeds and archive the data. As a student of information technology/ computer sciences, ISGER knows how valuable data as such can be. Data collection must have an immediate exploitation, utilization, or application idea for him beforehand, and not solely serve as an archive.

ISGER: "...with all due love, that's the point, the phone knows where I'm sitting, how long we're likely to be talking here...uh like the ...uh... air pressure in the room is... probably by pulling the GPS coordinates from a database somewhere, so the information just pooled at this point here is massive. But if you can't make anything out of it, I'm sorry but (pause)... There are enough computer scientists who are happy just to collect information. There is this approach according to the motto 'as long as we have collected information, we can use it somewhere like this'...I just don't know...That's why I keep my tracking tool so minimal (pause) if I don't know or if I can't guess now what I'm going to do with the data later, (pause) then it's no use, because I don't want to work for the future but for now, I'm in the here and now and would like to have my feedback for now. And not maybe that I know in retrospect that I worked like this and like this 10 years ago or in the last two years? This is just the question what to make of it"

Furthermore, he finds the current applications of implants with the help of which one can open doors etc. pointless or not very exciting, as it only shifts the function, but does not bring him any useful additional information about himself. He finds tracking to simply determine the number or to check off activities unfulfilling. Also, theoretical considerations are less interesting for him than direct, pragmatic actions.

ISGER: “that's the difference, if I just track my coffee to track the coffee, just for the sake of an activity I'm saying: done today, work through my checklist, I don't want that, because that's not fulfilling for me... I even call it extreme because tracking for tracking's sake... Because there is always something to do. And as long as you admit that you can always do something, you will always do something and that's why you will never be finished. And ...more with the status quo, to be satisfied with the way you live, to look, I just reached my little goals, and so on. And if they are super important to me, I can improve them and so on”

ISGER's sense and goal orientation may be linked to his studies and the elective profession of a computer scientist, and as such to his self-identity respectively self-image construction.

The Body (Data) Diary - New Forms of Self-thematization and Archiving

Self-tracking has often been contextualized with former types of a written diary (see Fröhlich, 2018; Rettberg, 2014). Diaries can consist of many different things: jotted notes or thorough descriptions of thoughts, contemporary testimonies (Anne Frank, Victor Klemperer), confessions (Augustinus), lists of things one likes (Curt Cobain), feelings, sexual encounters (Anais Nin), social encounters, lists of achievements, lunch and dinner composites (Marc Aurel), media consumption, purchased items and the like. As we have seen from the explanation of life logging, which represents a specific form of self-tracking for primarily documentary purposes, the data accumulated can also serve as a body diary. Phil, for example, tells me about his tracking being a substitution for a written diary:

PHIL: “I'd like to do it, but unfortunately I'm not disciplined enough, because I don't have enough time ... and I keep saying that I actually want to write a diary, and I do it automatically through all my digital stuff [the

tracked data], so that in retrospect I already have a form of diary based on the stuff”

Firming and confirming the self-image through self-tracked data is a relevant factor in ST. Unternährer (2016) argues similarly, drawing on the theoretical figure of Alois Hahn’s (1987) “Selbstthematization”, which discussed confession, therapy and coaching as types of self-thematization, and in this sense he brings the reflection in self-quantification in relation to the problem of identity formation. ST represents an equally intimate practice as self-thematization. Self-trackers keep data on goal achievements, sentimental memories of an event, document certain periods of life, keep track of their weight and caloric intake during pregnancy, for example – primarily or solely for themselves. Drawing on Berson (2015) who, in his research on the language bodies and technologies talk to each other, detects a new “intimacy of surveillance” (p. 40), whereby surveillance is “not just apparatus of observation but intervention” (Berson, 2015, p. 134). In the same way, ST data is not just noticed but serves as a catalyst for reflecting and perceiving changes and differences in oneself over time and experiencing positive feelings about one’s self.

The “digital footprint” (PHIL) that appears while tracking oneself establishes new forms of numerical self-thematization. PHIL always carries his data with him on his smartphone, primarily for pragmatic reasons as he says, but it also increases a sense of security for upcoming decisions. He can always reach out and have access to his data in case he needs it at some point in the future, as he explains.

PHIL “In the moment one scans the data one does not know that one maybe will use them someday...this entails personal data... Data that you log, where you quantify things in the end” “... these are also something like places, where you are, where you have been... and you get a digital footprint, which you can review later on...”

The documentation and preservation of memories, seeing personal changes, keeping track of sports, financial spending, remembering training data, keeping record of one’s progress, rather than data analysis, are significant factors for most of the people I talked to about digital ST. As with PHIL, storing measured data also enacts the motivational aspect of not breaking the pattern and thus reveals the factor of obtaining stability offered by a routine.

MYSELF: “As a runner I somehow like to store this data. I did this earlier, about 2 years ago with the Runtastic app. But it often crashed on my Android phone - so I entered a lot of data afterwards. I have not yet found

out why. So often I did not look at the activities [data]. From time to time as motivation, when I saw that I was running twice a week and asked myself if I should go running, so that this week is recorded (documented) twice as well”

Throughout the interview, Andre likewise repeated that it was important for him to record and preserve his training dates. He then showed me how many kilometers he had run in the first months of the year, how many there were during his trip to Mallorca by what he presented himself as an intense sports practitioner.

ANDRE “I just do it for me... for me it's just about having all this stuff just in here” (!) (points to the phone)

He used these data to reflect on himself (and his athleticism), to have content for narrations with others, and also just for pragmatic reasons. This means checking if he has reached his monthly goals, sometimes comparing himself to his training group and otherwise keeping this data for years and maybe forever. Archiving the data serves as a memory supporting function for ANDRE, and as he proudly explained, he could show me exactly how many kilometers he ran in 2005, there seem to be other factors in play rather than the purely pragmatic. Self-tracked data builds a new category of digital archiving in terms of accuracy, abundance and frequency of data available. Storing of fitness progress and bodily values while trying to achieve goals in running or other areas, such as losing weight or sleeping longer, supports memory and the continuation of set goals.

Another interesting contextualization idea regarding the storage of signs of achievement of strenuous undertakings like, for example, giving up smoking, learning to play and practice a musical instrument regularly or healing from a disease, can be related to building a ‘museum of the self’ (Gonzales, 1995). Jennifer Gonzales calls such stored, arranged and displayed things about oneself prostheses of the mind, and the spatial representation of identity an autotopography. “This prosthetic territory...is made up of the more intimate expressions of values and beliefs, emotions and desires... The autobiographical object therefore becomes a prosthetic device: an addition, a trace, and a replacement for the intangible aspects of desire, identification and social relations”, she argues (pp. 133-4). Self-tracked data represent parts of our identification: What did I eat today? Have I been running this week? Even if one does not want to believe it, very few people are aware of such things. These data therefore may be included in precious domestic archiving of personal and family artifacts. Apart from photos, gifts, documents and medals, holiday souvenirs, one’s own

master's thesis, entry tickets, drawings, or emails or working documents as a sign of achievement, self-tracked data may also entail sentimental memories. In the same sense as an autobiography as a written succession of identifications in time – often bound to experiences and fantasies, to needs and deficiencies – the autotopographical object in the form of the self-tracking device, that is worn and records and stores experiences, wishes and insufficiencies, contributes to a formation of self-understanding and the representation of identity, as became evident in KAROLINA's wish of being an active person and wearing and using a fitness tracker and further self-tracking apps.

These data can simultaneously be used for communication with others in terms of self-narrations as seen with TABEA and ANDRE (also observed by Sharon, 2017; Unternährer, 2016) and storytelling underpinned by numbers (Lomborg & Frandsen, 2017), as is also observable in the QS show & tell meetings. Digital archives “are also used to connect with others, to define the self and the family, to fulfill obligations and, quite conversely to efforts of remembering, to safely forget” (Kirk & Selen, 2010, p. 10). Once saved, stored and archived they allow to put them aside and to devote oneself to other matters. From a homo economicus perspective, it is reasonable to store and archive data that is potentially valuable and can possibly at one point be useful in monetary terms. Collecting data about oneself, no matter how untargeted but nevertheless comprehensive it may be, “is not an end in itself, but a wise precaution”, Unternährer (2016, p.201) likewise argues. Because we do not know the future and its conditions and requirements, tracking and collecting self-data may account for risk mitigation and protection, which was seen in FLORIAN'S, PHIL'S, KAROLINA'S and ARNE's stories. However, as with Arne, Tabea, Florian, myself and the aforementioned, the possession and storage of data served not solely rational (i.e., economic value, security) purposes but entailed an affective component expressed in positive emotions, such as pride and satisfaction.

There is a long anthropological tradition in studying the role of artefacts in cultures (e.g., Appadurai, 1986; Malinowski, 1922; Mauss, 1954) arguing that human artifacts are not simply tools for survival nor do they possess only an economic value, they entail a wider range of personal and political values and social lives as well. “While from a theoretical point of view, human acts encode things with significance, from a methodological point of view it is things-in-motion that illuminate their human and social context” (Appadurai, 1986, p. 5). As in earlier times, people like to keep personal things. This happens primarily for sentimental reasons: pictures from high school graduation and achieving university entrance qualifications, work certificates, medals, and also many other artifacts with a sentimental note, like children's first drawings, wisdom teeth, diaries written with friends from

elementary school, etc. Logging and storage of the data one gathered could therefore be interpreted as archiving of affectively resonant and cherished objects. For many people there have always been documents, photographs, pictures, videos, wisdom teeth, the first long plait and the like that they want to keep as a memento. Many things are “often kept purely for sentimental reasons such as associated feelings of achievement” (Kirk & Selen, 2010, p.13). But at a deeper level it turns out that the things “achieve a sacred status through one or more of seven principal means, described as ritual, pilgrimage, quintessence, gift-giving, collection, and external sanction” (Kirk & Selen, 2010, p. 10). Archiving personal tracked data fits in at least three of these categories: the broad category of sentimental feelings, ritual, and collection, and possesses a clearly affective dimension.

Even if the ST data appears to be of no concrete purpose for the user, it can serve to evoke a range of emotions. As has been shown, ST practice and data promote positive feelings about oneself but can also evoke negative affects, all of which I will describe in the next mode: confirmation and affective mode.

5.2.2 Confirmation and Affective Mode: Self-Affirmation and Self (Re-)Construction mode, Emotional Release and Escape from Routines

“How is it that I have always been who I am yet no longer am who I was?” (Samuel Beckett’s character Winnie in Happy Days)

Western individualism unfolds into many nuances in ST, such as attention to oneself, reflexivity, autarchy, authenticity, a sense of uniqueness, sometimes also exceptionality and self-invention, among others. This chapter thus shows how the postmodern understanding of the self finds consideration, verification, and reinforcement in self-tracking. Looking at the specific intentions and uses, self-trackers reveal a search for formation, confirmation and verification of their self-concepts and lifestyles in and through the data and practice. The look in the “quantified selfie”, i.e., the data collection, badges earned, the continuity of the curve – all this contributes to it. This confirmation or non-confirmation was also accompanied by a range of emotions.

“I feel cheated... a false image of me is created”

A recurring feature in the self-tracking process appeared in many empirical studies (e.g., Dudhwala, 2018; Kristensen & Ruckenstein, 2018; Pink et al., 2018) as well as in my data material, with respect to “the incompleteness, inaccuracy and dispersed nature of personal self-tracking data” (Pink et al. 2018, p.1). It refers to the many self-trackers who get annoyed and feel cheated of the experience and like their trust was betrayed when the data recording did not work or got lost. If a recording did not work, because the smartphone was not charged or the function had an error during the activity, many felt as if they had lost something in that event or as if it had not really happened at all. They reacted annoyed and often invested effort into manually entering the data into the device afterwards.

MYSELF: “Right now I'm really angry because this Pomodoro App doesn't work properly - oh I could just as well have a round at the punching bag now - that's how angry I am. I'll do that right away, but now I want to capture this feeling. What makes me so angry? The number of pomodoros is not synchronized correctly between the devices: while I counted 7 ps on the iPad, the next time I start my Mac, the app only shows me 5 ps! That's the way it was today - that makes me angry! It is not the first time this has happened! I already have a certain amount of error tolerance - but after 5 - 10 bugs I've had enough now! I feel ridiculed, cheated. About my performance, which obviously is not documented here properly. Has it been like this before without me noticing it? After all, I did not always/ every day check the number of the previous day yesterday. But now, after this has happened so many times, I think that this probably has happened before. So, I trusted blindly and was cheated! That's why I use the shit that tells me how much of the goals I set for myself I have already achieved for today. That I can get an overview on the weekend and if necessary, decide if I want to have a few more sessions on Sunday/ weekend or not. After that I want to adjust myself and now I have to find out that it doesn't do shit the stupid tool! How that annoys me. It has always annoyed me when the Runtastic app didn't measure correctly and crashed, so that I had to manually add up how much I ran at home at the end of the run. Of course, I had to find out how many kilometers I had run by looking at the map first - that costs me time, which I hoped to gain with the help of the app - at least the Pomodoro app. With Runtastic it was more like this, but also with PT, that if the performance - yes my performance becomes semi-public through tracking - which also becomes public somehow by appearing in the app in the graphic display, although only I read it (!) - if the performance is not recorded correctly then a wrong picture of me is created, a picture I am confronted with, a picture that blames me having done too/so little, but

which I know internally is not true. And this internal ‘but I know how much I sat there’ - this loses its meaning especially when I rely on such a gadget, I give something away, a power of (ultimate) decision, I feel in a weaker position compared to the app at that moment, which has it ‘black on white’. So, on the one hand I feel wrongly judged. But by whom? By the app? By a possible future viewer? I just feel the sense of being cheated even stronger”

A panoply of negative feelings is contained in this quote, such as losing trust in a particular technology and feeling betrayed in one’s expectations, and above all anger about the misrepresentation of the work performed. Apart from this, considerations of self-image and its contingent publicity, and fear of the social disclosure of weaknesses, become visible. These assessments are generated based on the number that represents the work effort. The number becomes virtually existent and possesses its own persuasiveness against the inner belief. In the case above, this number converts into a function of the social other, in front of which one would like to make a good (self-) impression.

People use (technological) objects for identity construction and verification, to express or to explore their own individual life as well as to relate them to others (Csikszentmihalyi & Rochberg-Halton, 1981; Turkle, 1984). Csikszentmihalyi & Rochberg-Halton (1981) identified a number of functions of domestic objects, of which firstly signs that express qualities of the self “separating the owner from the social context, emphasizing his or her individuality” (p. 38), and secondly signs of social status and belonging which “expresses the integration of the owner with his or her social context” (p. 39), are the most important for my argument here. In that sense, self-tracking may serve as a source for situating oneself between the dynamic centers of the personal and the social. The relationship between people and objects can hereby be described by two major coordinates of organization: “one that runs from action to contemplation; the other, from self to others” (p. 112) – dimensions that become visible in the relation between self-trackers and their ST technologies as well. These analytical polarities however, often merge/blend into each other in ST. For example, if the aim of the ST application is to motivate action, the collected data is often used for contemplation and reflection. The data acts as a mediator or facilitator for the other dimension. When ARNE says he wants to lose weight and then records his food intake, he uses this data after a while to make a diet plan and finally start the diet. Conversely, recording data about oneself and analyzing (contemplating) it in ST leads to an action that may not have been intended before. For example, RAGNAR started taking walks and making business phone calls on the go during his working hours when, after recording his moods, he realized that his actual physical participation in certain meetings was stressing him. Action and reflection alternated.

Likewise, on the axis between the self and others, reflections about one's self-image and its potential weaknesses swing between the poles and often overlap. This example indicates the already highlighted possibility of mitigating uncomfortable feelings about current circumstances in life (that can also be reflected in the social world) through ST and generating positive feedback on oneself.

“I want to see what I've accomplished... I feel like I've done something”

For KAROLINA, achievements, evidence of her accomplishments, and her self-image are relevant in tracking her rides, workouts, and steps.

KAROLINA: “Because, like I said, I want to see what I've accomplished. I want to see these burned calories, for example how much I've been cycling a week. Because you don't realize it. I cycle about 15 kilometers a day, because I go to work like this. And then somewhere after work. And then a few kilometers come together in a week, by the way. Without doing any workouts and going to the gym. And that also helps for the psyche”.

“It motivates me and I feel like I've done something”.

“Why is that important? Because I prefer to be an active person and not just a lazy one sitting on the sofa and do not make steps...I need to see this. Not just telling or feeling... So, I look at it, and I think, ‘I did something’”.

“It is a confirmation/ recognition”

Like Karolina, most of my interviewees reported that they experienced satisfaction when they reached a goal, such as the 10,000 steps mark, for example, and got a reward in the form of a documented achievement and accomplishment – sometimes accompanied by virtual medals and badges. Other authors also report about the user's pleasure of documenting their activities, such as “pleasant experiences [...] special walks [...] or] to underline their effort” (Rooksby et al., 2014, p. 1168). The collection of self-data itself may already be regarded as rewarding. Documenting (and as such witnessing) achievements, performed work, and sport sessions can extend these forms of gratification. In media use research, the theory of uses and gratification (developed at the beginning of the 1970s) is the main focus of research into the reasons why individuals use a particular medium and the gratification they receive from it. The motives for using mass media were here typologized as follows: “diversion (i.e., as an escape from routines or for emotional release), social utility (i.e., to acquire information for conversations), personal identity (i.e., to reinforce attitudes, beliefs,

and values), and surveillance (i.e., to learn about one's community, events, and political affairs" (Ruggiero, 2000, p. 26). In usage patterns of self-tracking technology, we can detect some of these gratification patterns as well: affirmation of beliefs and values about oneself, content for self-narrations, and emotional release. The opportunity for psychological gratification, both in ST tech application and technique itself, and in the persuasiveness of the resulting figures, cannot be underestimated. As with checking/ completing To Do lists, seeing completed runs, working sessions or the ideal teeth brushing routine brings instant gratification and satisfaction. The positive feedback KAROLINA obtained through the device may have also led her to actively generating it with its consequences of a more appropriate or attractive self-image – a kind of a nice looking quantified selfie – of an active person, as she said. The same kind of gratification can be assigned to ARNE, ANDRE, PHIL, and FLORIAN as well, who were tracking and collecting their physical activities over a longer period. It may not be the overriding reason but with such repeated experience, the ST tech could be used to produce self-supportive, and self-caring emotions.

“I feel more comfortable taking this into my own hands”

The wish to take things into one's own hands can obtain gratification in self-tracking through the confirmation of an active and responsible self-image when practicing and experimenting with ST. The following examples of Arne and myself may illustrate this.

ARNE: “I believe that everyone is the architect of his own fortune.... And it can, no matter how you twist and turn it, it can't get any better, for ME, and there I am just a blatant egoist and say so: ‘egoism is self-care in the purest...format for me’ somehow... If I do not take care of ME...oh.... I have to find out for myself what is best for me... Andagain there is this topic ‘Quantified Self’, it is about the I, it is about the I-centering...Yeah, uh, uh, I have mixed feelings about that... No way, what if you care ONLY about YOU, if somehow your own cosmos exists around you, you are the center of the universe...Then I say ‘OK, sure, this can, so theoretically it could take more than that it is somehow painful for the environment...But at the end of the day I am not supported by anyone or anything, I am the center of my life, that's the way it is”

Being autonomous and self-responsible, and acting like it, is a characteristic of, and of value to, most of the study participants, even if they did not emphasize this explicitly, because it probably felt self-evident for them.

MYSELF: “Who am I doing this for? For myself? I think the clear answer is: yes! I don't feel obliged to be fit and efficient for the state or society but for myself and indirectly for my loved ones. I also feel more comfortable taking this into my own hands than following any recommendations that are oriented towards the average citizen”

We can see from these examples how self-tracking can be used to confirm one's self-image and thus support self-creation and identity formation by applying ST technology and looking into the mirror of data. Visible tokens of achievements and progress represented by numbers are also relevant for TABEA, ANDRE, ISGER and FLORIAN as well, who said: “...this is very important, I think that you have the impression: ‘Hey, I am achieving something in my life’”. To summarize, self-tracking as a becoming cultural technique, with its engagement with data and the data-self, is, as I argue, often applied to generate feelings one wants to feel such as: a) to feel active or effective (to experience self-efficacy in psychological terms) i.e. to produce, create or do something at all (ARNE, ME, KAROLINA), b) to experience something reassuring, to convey a grip on reality through meditating (RAGNAR, ME, FLORIAN), c) to convey meaning by doing something meaningful (TABEA, PHIL, ANDRE), and d) to feel special /singular while doing something not very familiar to the main population (ARNE). ARNE's statement above also reflects the nowadays so common attitude to pursuing happiness and wellbeing in a self-responsible manner, which Cabanas and Illouz (2019) describe in their book on "Happycracy" as a scientifically and commercially pushed happiness imperative. In the past 20 years the expectation arose that everyone can achieve fulfillment and happiness in life if they only have the will and apply the right tools (consulting self-help literature or technology). This promise is, however, always bound to the lifelong learning attitude and, economically, it could lead to imaginaries of a perfect lifelong product. This attitude fits very well with my study participants and is reflected in the endless tracking possibilities of ST tech. Self-tracking as an approach, however, supports both long-term and short-term goals with instant feedback in the form of data trajectories over a chosen period of time. This is the case for Arne, who changed his ST projects several times in a short period of time. Many self-trackers use the functionality of quick results from short-term experiments and set temporary goals to see if they can reach them and how much effort is required, and consequently adjust to higher or different goals. In this sense the data has a performative force on the users and, vice versa, the users develop agentive forces through the data. Also, KAROLINA indicates, when I asked her how she handles the data, that looking at her results on sleep and steps influences her actions:

KAROLINA: “It feels good [to look at the data]. But I'm going to continue to go today. And then take a look [again]. I have reached my goal, 8 hours, I have achieved/ managed this!”

The eight hours of sleep that the app recommended to her serve as a small yet sufficient cause for activity potential and a sense of accomplishment. It motivates her and makes her feel good about herself, but only for a short time, then she is looking for the next goal to reach. The self-improvement never stops with her and neither does it with the other study participants.

KAROLINA: “That I've swum more in a shorter time, for example. Which means I swam faster. And that feels totally good. Actually, I like swimming, but it's kind of boring for me, too. And I don't think that's gonna do much good. [That] I can't burn a lot of calories there, but that's not true. And then I saw how much you really lose. I wouldn't have thought there were so many calories to burn. Because I only notice that I did sports when I was sweating, of course. But here you can see that... And that's fun, because if I'm consistent, I see the progress”

Drawing especially on the examples of ARNE, KAROLINA, and MYSELF, I argue that self-tracking technology can be applied as a facilitator and a technique to induce and sustain self-affirmation, affirm positive feelings and act as a buffer against stress. Self-affirmation describes a cognitive process by which individuals preserve their self-worth in the face of their shortcomings. This process is associated with the urge to overcome cognitive dissonance (Festinger, 1957), which results when deciding between competing alternatives, or when recognizing that you made a bad decision, or if you made great efforts only to find that the result does not live up to expectations, or if one realizes that a task that has already been started is more strenuous or unpleasant than expected. Dissonant states are perceived as unpleasant and create inner tensions that urge us to overcome them. By doing so we minimize defensiveness, stress and anxiety when facing threats to our positive self-concept and stay open to ideas of self-improvement in areas that are important to us. These techniques imply, for example, distancing from the source of the dissonance, devaluating the source of dissonance with regards to the negative message, concentrating on other personal capabilities or eventually trying to improve on relevant areas, all of which induce self-affirmation and self-esteem. With regard to social media, the proliferation of an always positive self-

representation may serve as an example¹⁰⁹. In the context of self-tracking systems, the engagement with the measurement process, with accumulating and visualizing data, correlating it and experimenting with different tools can lead to self-affirmation in the above sense.

ARNE can be given as an example. His personal relationship with his partner did not work and he was constantly trying to build a career or business of his own, which is yet to be achieved. He emphasized that he loved visualizing workflows, and keeping track of business processes as well as financial expenditures, but somehow could not get to where he wished or imagined himself to be after some years in business. Against this backdrop, his enthusiasm for the measurement process and visualizations is well explained. The possible subsequent steps to take to reach a certain personal goal, such as weight loss, were not that important anymore. The ST practice has reduced his cognitive dissonance regarding the lack of success in the professional domain that is very important to him and has strengthened his self-esteem.

Creating and Evoking Affects with and through ST Technology

It becomes visible that the practice and data are addressing and eliciting emotions, such as satisfaction, sense of security, self-esteem and many more. ST practice, as it was likewise shown in other empirical studies (e.g., Greenfield, 2016; Rooksby et al., 2014), turns out to be not only a practice of objectivity and rationalization but also one of subjectivity and emotions.

MYSELF: “One day I was pondering about why I was doing a lot of rather unimportant tasks before starting the day with a really important one. I tracked my tasks in to do lists (such as the Mac reminder app) but also with pen and paper and realized that it was not so much about having them done in order to get a clear head for the important things. It was rather for the quick gratification, an instant reward, that made me feel better about myself. ‘Does checking off items on the to-do list give me a quick reward kick? A good feeling, satisfaction, a bit of pride is also present, peace, relaxation, stress relief, discharge.’ I asked myself” (AutE., Apr. 2016)

¹⁰⁹ For example, Reinecke & Trepte (2014) have shown a “positivity bias in SNS communication” (p. 95) which is understood as preferred positive self-representations over negative. This contributes to the establishment of positivity norms in social media as well as increased psychological well-being. The later although stays restricted “for users who already possess high levels of well-being and who can engage in positive authenticity effortlessly” (p. 100).

Another illustration of this affective and dissonance counteracting connection to and resonance with ST technology will be demonstrated in the following example. As already described I was annoyed when my time spent working was not recorded correctly or not at all by the Pomodoro app. Then I felt deceived and disappointed by the app's representation of my work effort and wanted to correct its track record and thus obtain a good feeling about myself again.

MYSELF: "So I found the setting again, with which you can adjust the number of pomodoros performed afterwards. And I already feel much calmer and better with it. I almost smile at it. I adjust according to my memory - hm, but how was that, I don't remember exactly what I read or wrote and when. So, I make the adjustments according to my feeling. And if I'm a bit over the top with the assessments, then it's not so bad (as if I were underneath). So, it's about creating a good image of myself. What I see there should give me a good feeling... So, it is somehow simply about a good feeling - you do something, you can prove it, but first and foremost it is about the good feeling about oneself/ for oneself/ like oneself..."

What we can observe in ST is that in the human interaction with these technological devices, affective forces and agentic capabilities are being mutually generated.¹¹⁰ Seeing the data one has generated leads to intentional acting, i.e., to being motivated to act and even to act more than intended. And this leads to a multitude of affective reactions from pride, joy and self-efficacy to disappointment, stress and uncertainty among others. Tracking may reveal or reassure us what is of value to us. People often unwittingly assume that values such as happiness, justice or freedom are akin to scientific quantities like numbers, weight or length. Properties like weight can be represented by numbers and they can be compared in threefold ways to each other: they can be bigger, smaller, or equal. On the contrary, values like pride, love, caring and self-esteem cannot be represented by real numbers and are as such more difficult to communicate and deal with. Nevertheless, they are often addressed in the ST entanglement. Also, Neff and Nafus (2016) understand ST as a practice that mediates feelings. They refer to a QS show & tell talk in which a presenter expressed the positive feelings she got when she saw the total number of her self-tracking experiments. This gave her a "greater sense of self-accomplishment" (Neff & Nafus, 2016, p. 72). The act of making

¹¹⁰ These topics have been also discussed by Lupton (2017b) with regard to the feminist materialist perspective as well as theories of vitality of matter, according to which humans and non-humans cannot be individuated and thus meaning and perceiving becomes embodied also through the matter and artifacts with whom human intertwine.

sense of her data conveyed positive emotions, such as pride and feeling vindicated by the measurements. The practice mediated a positive self-affirmative relation for her. Ruckenstein (2014) also demonstrates an active influence of visual data presentation on users: „Once visualized, the data generates new kinds of affective ties between people and their measured actions and reactions” (Ruckenstein 2014 p. 77). Users make their daily decisions dependent on the gathered ST data by “framing social wholes and entities, giving a new kind of value to their personal realities and everyday doings” proposing explanations that “can produce permanence and stability but can also profoundly change ways in which people reflect on themselves, others and their daily lives (Ruckenstein 2014 p. 81).

A pendant to getting confirmation through ST technology in the cognitive and affective dimensions is a confirmation in the form of justification of actions in order to feel affirmed/ validated for who you are. It comes in the guise of examining what is good for oneself but can also be seen as an instrument or authority for justification. An example is ISGER, who was trying to figure out the best balance of the amount of time invested in work, as shown in a quote above. Therefore, he set up a long-term tracking project to get enough data to get reliable results he could trust in and rely on. Finally, he admitted that knowing his specific times and hours of working helped him assert himself when with his clients, without showing them the data for justification but rather using it for himself. He ultimately had this knowledge, confidence, and a good conscience about it in his app, just in case. Likewise, blogger Derek Alston¹¹¹ reports: “I’ve been getting better at it, but I haven’t always been the best at listening to myself, and my needs, on an emotional level. Tracking this data has helped me stay connected to listen to myself. For example, I haven’t always realized how much/ little ‘me time’ I need. By tracking social activities, I’ve been able to find the ‘sweet spot’”. Beside quantified variables like these, Derek took diary like notes with insights into his activities and tracked results. This is a caring and reflective ‘me-time’ that he spent with himself. This example shows that through the choice of the object of his tracking – in his case social activities – he actually already had a gut feeling, firstly about the importance of this topic for him, and secondly that it is not in balance right now. Maybe he already had an idea about the number of social contacts that felt good but needed a kind of proof, attained from data-based and rational considerations.

For myself, the Pomodoro app with the help of which I recorded my working units informed me when I reached the target of eight pomodoros a day. A nice jingle rang out and

¹¹¹ “Self-Knowledge Through Data Nerderly: How to Quantify Yourself” (n.d.)
<https://www.derekralston.com/self-knowledge-data-nerderly/>

a message appeared on the right corner of my desktop: “Congratulations! You have reached the target!” After a while, or maybe this had been from the beginning without me noticing it, my goal was rather about reaching the specified number than a content-oriented goal, such as finishing a chapter or writing a certain amount of pages or paragraphs. In my thinking I literally quantified myself and changed the focus from contextual to rather abstract measures because the result of having achieved the daily working goal provided an emotional release for me. I changed the target amount of pomodoros from time to time and experimented with between six and 12 units. Depending on how I defined and implemented one working unit - for example only writing on a paper or this dissertation, or also researching, reading articles or attending meetings, the target number of pomodoros changed. For writing only, it turned out that six pomodoros with a duration of 25 minutes each was doable for me. After I received the notification on my laptop, accompanied by the cheerful jingle I had chosen beforehand, I knew I could stand up from my desk and do something different. Leisure time filled with sports, hobbies and social activities could begin. Many times, I struggled through a cycle of six pomodoros, and did not finish until the sound and the notification “Congratulations, you have reached the target!” appeared. It served as vindication, finishing work accompanied by the knowledge and feeling that I accomplished my numerical workload and thus felt I could relax. In many, if not most, cases, the findings above indicate that it can be primarily about achieving, perceiving and dealing with certain feelings rather than about achieving a specific number or result. Beside emotions, eliciting or more precisely simulating bodily sensations with the help of this technology is another approach in order to make sense of the measurement process and the data. I will come back to this in the next chapter about the Relations to Technology in ST, where I will address the topics that ST technology, beyond its function as a tool, especially as an enhancement tool, can serve as a counterpart or better: a companion (Haraway, 1991; Rettberg, 2014) i.e., a kind of a dialectic partner who¹¹² is mirroring one's values, who is caring and interested in your current condition and state.

The above arguments of obtaining agentive capabilities and affective forces could be cautiously expanded by the ontological confirmation/validation self-trackers may experience to a certain degree. For example, the Japanese conceptual artist On Kawara's project “I Got Up”, where he sent postcards with the time he got up in the morning to different recipients, such as friends, his gallery, and the like. This project lasted for years and can be understood

¹¹² By using the term “who” I do not want to claim that those technologies are alive, sentient or have their own intentions and feelings. In my understanding and framework I conceive them as tools that are used in such a way that they take on a certain (not necessarily purely functional) role for us or more precisely a role that we ascribe to them.

as a self-quantification project. But because the actual numbers, i.e., the times he got up, had no meaning at all for the artist, as Abend and Fuchs (2016) analyze, the meaning of numbers was somewhere else. Kawara's self-quantification project was "not a tool for the optimization of his health or lifestyle [...but rather] a statement confirming his existence" whereby the numbers were "just distracting from what is at stake", the authors conclude (Abend & Fuchs, 2016, p. 8).

But the numbers also seem to have another meaning. As already suggested above, ST data and technique can exert performative powers over their users, a topic which I will discuss in greater detail in the technology relations chapter. Even if they do not show their results to anybody, something that hardly anyone has done, there is at least a recognition by their technological counterpart.¹¹³ This indicates an intimacy of the relationship between technology and user that I could observe here. By intimacy between technology and user I mean that the technology is not just registering and recording the user's activities but is playing a rather active and caring role. The ways in which technology interacts with the user in ST create affective forces as well as to some extent closer affective relations, where the "truth" (i.e., the data) about the user is shared only between the two of them. As I will show in the chapter on technology relations, users experience the tools as supportive and encouraging, for example by being reminded to workout, take medicine, or drink a glass of water. Others enjoy personalized tips on nutrition, their sleep habits, or relaxation. These experiences reveal a certain intimacy as they are shared only between the tool and the user, who feels seen and cared for, as I will show with examples from KAROLINA, TABEA and me. Other authors (Rettberg, 2014; Ruckenstein, 2014) have also already referred to a perceived companionship, according to which ST technology is experienced as "a daily companion" or a "silent persuader" (Ruckenstein, 2014, p. 75) that they would not want to be without. This may explain why some people in my sample have spoken about their devices in a personified way – a finding that I will talk about in the technology-relations chapter. Many feel motivated by seeing the numbers and reflecting on themselves through the data. In this sense, the use of ST tech therefore also has an effect on agentive capabilities, e.g., motivation to achieve the goal and even go beyond that. These agentive capacities are then often fueled by promises ingrained in those technologies as well as the respective feelings of hope and confidence and are accompanied by feelings of self-satisfaction and self-efficacy. From the findings described here, self-tracking or quantifying the self can be seen as a potentially never ending, lifelong self-improvement regime – and market. In the same

¹¹³ A topic to which I will return in chapter 6.2 of the findings.

manner as nutritional supplements, life-coaching, and mindfulness techniques (i.e., yoga, meditation etc.) are currently adopted as common western practices of self-care, self-tracking can also play a significant role there.

At this point I want to insert a link to my contrast group. These were mostly people from the Bay Area but also two from Hamburg (Germany) who were not self-trackers but were interested in or have worked on the topic of self-improvement/ self-optimization. As explained in the vignettes section above, people from both groups seemed to take the topic of long-term improvement seriously. What struck me most was that the non-self-trackers talked about improving themselves or their clients in order to make the world a better place. Starting with oneself, the good feeling about one's body and mind, the de-stressing, the focus on personal development and a healthy lifestyle would sooner or later transfer to the community, the society and ultimately the whole world, they told me. This presence may be explained in different ways. For example, it may be grounded in US-American discourses. The Bay area is known for its technical optimism and empowerment thinking and may reflect the ideology of the people who meet in interest groups in the Bay Area. The coincidence (fusion?) of computer engineers with creative members of the counterculture movement in California in the 1960s – which Fred Turner called the “extension of the 1960s consciousness revolution” (Turner, 2006, p. 219) - constructed the lasting imaginary of empowerment and liberation of people through technology. However, it was remarkable that none of the interviewed self-trackers referred to such a world-improving idea in mind, although it cannot be denied to them per se.

5.2.3 Care on the Wrong Track: Self-Doubt, Self-Deception, and Self-Distraction

Various mixed and negative feelings and reactions to a particular technology also occurred among self-trackers. For example, distraction as a means of and motive for escaping from routines and gaining emotional release found its medium in the ST practice of some interlocutors. Below, I will describe these negative feelings in ST primarily based on my auto-ethnography, because I gathered a lot more data in this respect, than from the interviews, informal talks or participant observations in QA meet ups and conferences. However, my observation and interpretation of certain utterances and behaviors of this study's participants suggest that these feelings can also appear in other STers.

“Am I somehow not ok?”

Sometimes the data and its comparison with expectations may be disturbing and the information one gained may evoke feelings of uncertainty. To some extent, everyone has an assumption about his or her current state. For example, most people can recognize when they are stressed or relaxed, when they feel active, exhausted, or tired. Getting feedback from the measuring instrument that differs from your guess can induce a certain uncertainty and mistrust either in your own perceptions and assumptions or in the measurement's result and the operational reliability of the technology.

MYSELF: “after I went jogging and came back from the route by bicycle and after I have shopped on the side at a bigger grocery, I checked my tracker for the distance, speed and above all my heart rate during those activities and I noticed that during the ride my heart rate was pretty high (150 bpm): That surprised me that it was so much or so high. I felt well trained. Questions as the following appeared: What was going on there? What is actually normal? and also: Am I somehow untrained, so somehow not ok? I have been jogging regularly for several years now - I should be well trained for that. Why am I not? Or is it normal? What is normal? What others feel (e.g., my partner), what the average person feels? What my average or best value would be or should be - a perceived value or historical best value?” (AutE.)

The interaction with the instrument and this information had several effects on me: I doubted my perception and experience of the ride, the number made me feel astonished, it made me feel uncertain about myself, what I knew or expected and felt about my body and it made me reflect on it, including questions about what is considered to be normal. For a short time that uncertainty turned into anxiety about whether I could have some kind of heart disorder due to this measurement. Another example of this effect can be described in the case of sleep tracking.

MYSELF: “Tonight I tracked my sleep with the Xiaomi. I slept for a long time, 9:26h, and believed that I slept very deep - but the tracker said that I slept mostly lightly and only 1.5 hours deeply. In comparison, on nights when I thought I was sleeping more restlessly, I reportedly slept 3.5 hours deeply. Anyway, this info has me pretty worried today. Slept that long! And then only lightly!? I feel it differently than the tracker - who is right now??? In any case, I am worried, almost anxious. Is something wrong with my

perception? Or am I ill? I should do more tests - longer and with different trackers. Will I know more then? At least that is my hope and expectation”

Dudhwala (2017) reports similar experiences with her interviewee who thought that he was able to guess his glucose level after many weeks of tracking but when he looked up his actual value on the display, the deviation made him uncertain and left him feeling uncomfortable about his senses and his body. Another example stems from Carmichael, who experienced self-doubts in her ST practice: “The desire for a ‘perfect’ chart with smooth lines and a big helping of self-control is another one of those illusions that set you up to feel like a miserable failure. [...] Tracking myself is like standing naked in front of a mirror: there’s nowhere to hide, and new lumps and wrinkles become visible” (Carmichael, 2008, para. #18). At first sight it looks like the technology would possess greater authority, and the figures it produces have a deep impact on us and influence our opinion and the decisions we make. However, it is possible that these results might be biased because of the relatively limited familiarity with these still young technologies. This experience may disappear after a series of repeated measurements and monitoring of the value in question, in my case repeated monitoring of my heart rate while jogging and then while riding a bicycle followed by a measurement in the recovery phase. More experience with dealing with tracked data, a longer period of time during which it is collected, and larger time series data can reduce and eradicate these feelings of uncertainty and discomfort.

Beside negative feelings about bodily perceptions, negative feelings about one’s concept of self through the usage of ST tech can arise. I asked Karolina how she feels when she does not reach her goal, for example her daily steps:

KAROLINA: “If I don’t achieve my goal when I look at it... Badly”.

Interviewer: “And how do you feel there, what do you think?”

KAROLINA: “That I was somehow lazy”.

At some point in her past, she created the self-image of being an active person and likely, as she describes her many activities to me, she lives the very same way. When she does not reach her goals, dissonant responses arise. While achieving goals was the initial reason for her to start self-tracking, the obvious desired result of this activity can be interpreted as an increase in wellbeing – be it feeling proud, satisfied, relieved or experiencing self-efficacy. As Giddens (1991) thoroughly analyzed, guilt and shame are the prevalent

factors for the ontological insecurity and existential anxiety of the self in the times we live in, where the formerly prevalent feeling of guilt is now overarched by a feeling of shame in the individual. “Shame bears directly on self-identity because it is essentially anxiety about the adequacy of the narrative by means of which the individual sustains a coherent biography. It originates as early as guilt, since it is stimulated by experiences in which feelings of inadequacy or humiliation are provoked” (Giddens, 1991, p. 65). Shame derives when we fail to achieve goals and disappoint expectations, be it our own or those of others, i.e., when we cannot live and also represent the vision of the ideal self. This may account for the attempt to counteract these emotions with a positive self-presentation – a phenomenon that is also well observable in the self-portrayals on social media sites.

Referring to the previously described justification of one's own actions through ST technology and practice, the following example expands this purpose and refers to a performativity of matter with regard to technology I felt a barrier preventing me from leaving my desk without reaching the planned amount of pomodoros (i.e., slots spent working). It felt almost as if I were not allowed to finish the working day, and only the device would have the authority to give me permission, regardless of the fact that no one other than I got to see this data. Of course, I had no punishment to fear, but with this tracking procedure I could obviously counteract the fear of failing in my efforts to reach the declared productivity goals (i.e., this dissertation), and blaming myself for bad self-organization and lack of willpower. And then, by implication, if I stick to the tracking practice and keep track of the scheduled slots of work time I will have proof (first and foremost for myself) that I tried my very best to write a good dissertation and it would not be my lack of investment that is to blame. The technology relations chapter will discuss the special and close relation to technology further and in greater detail. There I will describe how the relation to/with a technology can look like to which one can delegate parts of one's own responsibility for a success of a project and which conversely “responds” with desired feedbacks, i.e., impinges/acts on one.

Negative emotions of aversion and frustration may appear with regards to the device or app used. For example MYSELF, using the mood tracking app it annoyed me after a few weeks of usage for just disturbing me with questions but without any practical result for myself. The app pops up at randomized times of day and asks the user how she feels right now, offering a choice of seven predefined moods on a scale ranging from very bad, to neutral, to very good and claims to be a scientific research project to help understand the causes of happiness. When one of those questions popped up, I noted in my diary:

MYSELF: “I realize, but have known for a long time, that I am in a worse mood when I am less productive, when the work is not going well. Why do I do it [the tracking] then? Somehow, I expect the algorithm behind it to reveal some truth about me that is not yet so clear to me. I've looked at the reports in the meantime, but I haven't found anything great, not even well prepared. Why am I still doing this? Because I think: adding a little bit more data feed might bring more insights - more data -> more insights”

After many weeks of asking myself over and over again why I am doing this at all, I quit using it but kept the data on my phone for three more years and finally deleted it from my phone due to storage capacity problems on my smartphone. The thoughts and feelings described above might have arisen due to the fact that I did not have a specific and clear question in mind when I started using the app. Rather, I hoped for a kind of discovery, insight or aha-effect about an intimate yet unconscious and unknown facet of myself. This example also indicates a relation of hope towards the technology of improving something, providing answers, breaking some thought or physical limits, and thus enhancing my possibilities. In this case, technology again takes a relational role to the user. It takes the role of a promise of salvation – a subject that I will discuss in greater detail in the technology relations chapter below.

Self-Deception, Narcissism

In my sample, nobody talked overtly about cheating in relation to data. Rather, I obtained testimonies of these occurrences in informal conversations with people who did self-tracking, at informal events like parties or in bars.¹¹⁴ Many of them reported discomfort when an activity was not recorded. The consequence was that it felt like this activity had not happened. Others who tried to track activities, feelings, food intakes or financial expenditures continuously fiddled around to get nice looking results, such as an uninterrupted curve of daily meditation, and by this represent themselves positively. This data usually made them feel satisfied, and maybe a bit proud and excited, as if the results were their own. This can be seen as a transition from the realm of the imaginable into the realm of the possible and, through the de facto data available, into the realm of the factual. Even if nobody else sees the data, these self-trackers were tempted to cheat a little. A concrete example of this is a

¹¹⁴ A well-known fact in qualitative research, especially in surveys and interview situations, is that there is a bias towards social desirability, i.e., an overreporting of positive behaviors over socially undesirable behaviors (like cheating), to avoid embarrassment or discomfort in a social situation (see, for example, Krumpal, 2013).

situation I once had with an activity tracker that recorded an 18km run on a running app I had been using for a while when it was actually 12km. I was tempted to leave the result as the higher number because, although not true, it felt close to the (soon to be) truth. As presented above, Carmichael (2008) reports about the temptation to deceive the device and partly oneself for the sake of a perfect looking chart. “There is a harsh honesty to tracking that can be hard to face. Yesterday, for example, I really didn’t want to record the 3500 Christmas calories I consumed!” (Carmichael, 2008, para. #18) which would have caused a feeling of a failure to her. A similar example from other studies is Dudwahla’s (2017) interviewee who did not want to enter that she had not met her diet plan over Christmas, while she had been deliberately sticking to it and wanted to keep this picture of the data about herself.

I argue that self-tracking can be applied to evoke positive feelings about oneself, after which follows that one of the rather unobvious aims within self-tracking is to reduce dissonance and increase wellbeing through self-affirmation. The next quote relates to my already described anger about the misfunctions of the pomodoro timer, which was supposed to count my working units.

MYSELF: “I just feel the feeling of being cheated even stronger. I rely on the app working together with me in a partnership, goal-oriented / in my objectives and direction. I hope that it provides me with correct information that helps me make the right decisions, I rely on it. But if it doesn't work, then my hope to become better in this point, falls through. I must then let my hope go ... Then I feel like a little child who was disappointed because her idea of what she wants to experience and how she wants to experience herself was deceived - and the child has to realize: I cannot rely on anyone! Later the reproach may be: Everything must be done by oneself!

The interesting thing from this point of view is that in the opposite case, when my performance was presented higher than it was, I had nothing against it. This was the case when tracking with the Withings Pulse Ox. It showed the running distance exaggerated. So Runtastic measured with the help of GPS say 9.2 km - Withings showed 14 km. For a short moment I even found this motivating. A better, faster, more powerful image of myself was created and mirrored to me. I kind of liked that already. And even though I knew (I wrote about it above a couple of months ago) that it was not true, and in itself there was no point in tracking the distance with Withings - I briefly considered keeping it for that very reason” (AuthE. Jan. 2016)

This quote of me thinking about my feelings and reactions when I realized that the tracker incorrectly recorded fewer units of work shows a range of emotions that one can experience triggered by one feedback information from the device. Firstly, the panoply comprised: anger, disappointment, hopelessness, sadness and in the opposite case: joy, pride, incitation, arousal. Because of the apparent preoccupation with oneself and the occasionally deceiving reactions, this behavior can be described as narcissistic, as also reported by Boesel (2013). This may reflect Christopher Lasch's ideas about the "narcissistic preoccupation with the self" (Lash, 1979, p. 21) that he diagnosed as a characteristic occurrence in current times. But considering narcissism as an extreme expression of pride, these types of cheating can be seen as giving yourself a little pride, in the sense of combating shame, trying to build oneself up, self-affirming and sustaining one's value. "Something that we were perhaps a little underprepared for was the emotionality of activity tracking", Rooksby et al. (2014, p. 1171) likewise conclude in their qualitative study about the usage of activity trackers. "For most people, tracking was directly tied to self-esteem. For some it tied into pride at completing marathons, achieving fantastic speeds on a bicycle, and/or raising thousands of pounds for charity. For others, the tracker tied into body image problems, to aging, and/or to broken relationships", they report (ibid.). We can therefore assume that people not only experience but also evoke and amplify emotions by applying digitally assisted self-tracking with monitoring technologies.

Being in the Zone – Self-Distraction

When one uses these media technologies for self-distraction, the "goal-free" application of ST can be understood as a variation on being in "the zone" and forgetting daily duties and worries. In her ethnographic investigation of machine gambling in Las Vegas, Natasha Schüll (2014) shows how a sense of "being in the machine zone" is created by a corresponding design: simple operation, nostalgic game elements, soothing audio environment to keep the players gambling. Gambling machines designed in this way become a compelling medium, where "time slows down to a continuous present, an unending series of buildups and climaxes...[and] the gains and losses begin to feel the same" (Schwarz, 2006, p. 55, as cited in Schüll, 2014, p. 404). Players fall into an illusion of control over the time and money they invest and the games' outcomes, while everything is designed to keep them in the game. It is then no longer a question of winning or losing the game but of staying in that state of contrived contingency and perceived enchantment within the machine zone. The obvious need of today's gamblers is apparently "a smooth, insulated zone where nothing unexpected

or surprising can happen”, argues Schüll, beyond which “far-reaching anxieties around precarious economic and social circumstances, and ambivalence toward the prevailing cultural expectation that individuals be flexible, adaptable and poised to adjust themselves to these ever-changing circumstances” (2014, p. 406-407) are revealed.

How the players experience the game in its deeper implications therefore differs to its actual mechanics. This divergence between the mechanics inherent in technology and the experiences of the users can also be applied to the technology of self-tracking, I argue. It is not so much about achieving a numerically representable goal but rather the experience of tracking itself. For many self-trackers, an activity in a sense does not count if they cannot track it or if they recognized afterwards that something went wrong with the tracking. ANDRE, for example, when on vacation with his family, had planned (resolved) not to use his smartphone at all. However, when he went jogging, he had to take his wife’s smartphone to record the run. For myself, it was also mostly annoying when I realized that my smartphone did not record the run correctly or at all. I felt really upset because it felt like stolen time. To correct this and compensate for my bad feeling I recorded the time afterwards and made the entry manually. The reward seemed to be adequate in relation to the activity, to have a whole array of activities recorded and stored as data in its visual representations. Similar to the uses and gratification theory in mass communication, the benefits of using a medium / technology can be to distract oneself or to generate positive emotions. The example of ARNE revealed that his supposed interest in the objective recording of number-based physical values or performative results had more to do with the collection and presentation of these figures than with decisions and actions based on them. Of course, Arne is free to act based on his results. However, the devices give him the feeling of having already done something for his health, wellbeing and effectiveness through the tracking activity itself, which was my interpretation after various talks with him.

The immersion in a practice for the sake of the practice can in this respect also contain compulsive elements and cause negative affects. The following quote entails many of the aspects already discussed related to keeping a positive self-image, a certain dependency on feedback from the technology needed for it, and the emotionality of the ST practice.

MYSELF: “On the other hand, tracking and constantly running the [pomodoro] app really stressed me out. For one thing, it didn't help me concentrate any better. On the contrary, I was even more distracted because I regularly thought about whether I should turn the app on or not, whether I should pause it when I take a break or look something up on the

Internet or simply distract myself on Facebook, etc. - or not. It really became really unproductive or counterproductive. I feel much calmer since the thing is no longer running in the background. Of course, I would have liked the app to motivate me to stay on track in the work sections and to take a short break in the break sections, like it did at the beginning. In the end, however, I just worked sloppily and partly just cheated, i.e., I let the working time still tracking, although I have just not worked, but chatted, made something to eat in the kitchen or answered work emails (so completely different tasks). The app then confirmed my six to eight pomodoros at the end of the day, I felt somewhat absolutized, and then called it a day. But that did not have a lasting effect. In the background slumbered the bad conscience that I do not track properly here and "cheat" whomever. Who actually? Somehow myself, because otherwise no one sees it and probably no one will ever get to see it. Or perhaps nevertheless it will? Maybe one day someone - myself after a certain time interval? - or my supervisor? A community that I join? A programmer who is supposed to correlate my data with other data or somehow evaluate it to show trends? Or is this meant to demonstrate to just anyone that I really worked? That I really sat there and at least tried to write, to think, to conceptualize, to do anything conducive to the dissertation? But who do I want to show that to? Or is this about my self-image? That, for example, after a few months or years I simply no longer know exactly how long and how intensively I actually worked there on some tasks. And the data from the app would then show: yes, she really worked a lot during this time, so and so many hours or pomodoros per day, partly or mostly also on the weekends... Or do I need the self-image of the much working Agnieszka already now, and the whole thought processes also take place in much shorter periods of time, so that already a few weeks later I can no longer say exactly how long I worked every day. And since my hunch is actually that I feel like I'm working all the time, the app should reflect that, please. Even if nothing really productive, in the form of finished written pages of the diss came out of it." (AutE. Sept. 2016)

Although quantifying may involve compulsive moments, it is not necessarily inherent in the technology or practice. Some people stopped self-tracking when they felt they were going through difficulties using specific apps, getting accustomed to the apps' ways of "thinking", as well as the apps' affordances (Gibson, 1979) and preferred to spare themselves the burden of another task in their lives (Dudhwala, 2017; Kristensen & Ruckenstein, 2018; Lupton, 2018). To apply ST tech to oneself is therefore to some extent bound to an alleviation respectively solution or answers to problems or questions which one thereby hopes to obtain. If this technology does not deliver the hoped-for results quickly, the practice is mostly abandoned. Another reason is someone not having clear goals or questions regarding a

particular technology. For example, ISGER told me about the experience of abandoning the practice when he realized that using his Fitbit does not give him any reasonable results nor any satisfaction.

ISGER: “I got away from the Fitbit because I didn't see the sense in it, because I didn't have a goal, I mean, you can set a goal technically, but if you didn't see a goal yourself... with all due love... I don't have to watch my weight, I'm reasonably in shape, so I don't have to measure something athletic or compare anything...”

Arne lost interest and stopped self-tracking when it got more and more popular, but also since realizing that he could not establish a business based on it. He was the type of user that collected the data and was rather concerned with its representation. He tried to figure out different correlations, experimented with illustration and visualization of his data - but always for a relatively short time, such as three weeks for each experimental project. Then he shifted his focus to other promising techniques of self-care relevant to life improvement, such as nutrition experiments.

5.2.4 Mode 2 Summary – Technologically Mediated Self-Care: Self-Attention, Self-Confirmation, Body-Diary, and Misguided Care

The second technologically mediated (also encouraged, stimulated, induced) self-relation was synthesized from my data is self-care. Based on my empirical material, digital self-care via ST can be broken down into facets of increased and often goal-driven attention to oneself, confirmation of one's self-perception and positive self-image, and dealing with affects. The attention and preservation mode unfolds as placing oneself in the center of attention in a digital medium, by an increased involvement with oneself, aiming to get better acquainted with oneself and thereby having the basis to take better care of oneself. Furthermore, a new form of self-thematization emerges here: the numerical diary, where detailed reports about data corpuses and achievements are stored in archives for years. Archiving one's gathered tracked data enters the fund of things stored and kept. Kept just in case it will be needed one day for the doctors, for example, or documented achievements kept for nostalgic reasons. In this sense, the “body diary”, which barely costs any effort as you

enter content and keep it up to date with “one-button” tracking technologies - as appreciated by ANDRE and PHIL, for example - represents a new form of digital diaries. Similar to the profiles on social media platforms and social networks, publicly available body diaries in the form of dashboards (e.g., gyrosco.pe) appear on the market as easy to use and publicly visible solutions. Andreas Reckwitz (2017) demonstrated on various examples how current western (he uses the term postmodern) societies started to value the special and unique in the individual experience and, at the end, the individual experience itself. This search for one’s own peculiarity or uniqueness was reflected in the ST usage of ARNE and PHIL especially. Seeing oneself not as an average citizen, for example by taking responsibility for oneself (MYSELF), cross-checking average health related assumptions (ARNE), being not an average patient (FLORIAN) was another visible indication of this attitude across my sample.

The second self-care relation, the confirmation and affective mode, entails affirming self-understanding and shaping one’s desired self-image and identity. In this we find affects such as being proud of achievements and the joy of feeling motivated to get active because the app “notices” it and pays attention, which nourishes one’s good feelings about oneself, i.e., the care for oneself.

The self-concept and self-image are no longer primarily constructed, confirmed, or rejected by the social environment, but also by the daily application of digital technologies upon oneself. Confirming one’s self-image through data is revealed in particular in examples like these: “I prefer to be an active person, rather than a lazy one sitting on the couch doing nothing” (KAROLINA), with TABEA and her reported better-than-average duration of deep sleep, or when I wrote that I wished the tracked data would reflect my working efforts properly. The data is adjusted and even manipulated to convince or deceive oneself to fit and affirm one’s preferred self-image, for example such as always working a lot (MYSELF). In the self-care mode, activities and behaviors are entailed which aim directly at taking care of oneself, but also those which deceive oneself. For example, one cares for oneself by ensuring that one sleeps enough like ANDRE did, or taking care of one’s frequency of breathing and stress level, like RAGNAR, reflecting on and perceiving one’s life mindfully, like PHIL and TABEA did, not eating too much, like KAROLINA did. But on the other hand, caring for oneself may also be understood in terms of reassuring one’s self-concept or at least concealing a bad opinion or impression of oneself by representing oneself as active and hard-working (KAROLINA, MYSELF, ISGER), or as technically savvy and self-responsible (PHIL, ARNE, FLORIAN), or as behaving meaningfully through practicing self-tracking, like TABEA and PHIL did. Examining these self-nourishing and self-affirming modes of application of ST,

moments of negative affects in the usage of ST, such as self-deception, self-doubt and shame, also appeared. The ST practice and technology elicited those affects that in turn lead the practitioners to either abandon the practice and technology or use it to combat and create or maintain a positive self-image through the self-tracked (and sometimes manipulated) data. Because we usually value positive feedback about us rather than negative - as the self-enhancement theory in psychology states, we strive to gather these positive images and impressions about ourselves, to feel good, i.e., to care for ourselves. ST practice with its partly extensive procedures then at least provides a sense of being able to operate these digital technologies, to visualize data and, in case of doubt, be able to use those data beneficially.

A recent viewpoint of the concept of selfhood is the idea that human selves and bodies are experienced and produced as information systems and, because of constant interaction with nonhumans, cannot be conceptually separated from material objects (Haraway, 1991), such as data or technologies. In this sense the ways in which people confront and engage with visualized personal data are as significant as the technology itself (Lupton, 2016b; Rettberg, 2014; Ruckenstein, 2014). In particular, Haggerty and Ericsson's (2000) idea of data doubles as representations of the user's own body created by the use of the app, Hayles's (2012) figure of thought of technological tools as active cognizers, or a more recent contribution by Lupton (2016b) about digital companion species, deliver valuable insights into this topic. Haggerty and Ericson describe the emergence of a new type of body in the form of digital traces of a person's movements, preferences, habits and lifestyle (2000, p. 611), which transcends the concept of human corporality. The interesting part of the self-tracking context is that of abstraction and representation of the gathered data, as well as the mechanisms through which that data is able to restructure the lived experience. Sherman (2016) likewise points to this form of mediation and even translation, drawing on Walter Benjamin's discussion of the mechanisms of image capture and distribution as a lens through which to review the current moment. Interestingly, the subject and object of the observation and representation concur. The negotiations between self-images and data images - between the selves and their data doubles or digital doppelgängers (Bode & Kristensen, 2016) - that happen as an intertwining of the subject, the measured object, the produced data, and the measuring technology, all together co-constitute the self-tracked self. I would further argue, that beyond the negotiations, that happen rather at the beginning of the occupation with self-tracking, when the ST technology and especially the data is kind of new or uncommon to have for the user. Later it becomes an agreement between the device and the user: I do the activity, you save / interpret the data, remind me of doing the activity and whatever was agreed on.

Beside self-affirmation and self-preservation in digital archives, in social contexts the gathered data and numbers can serve as a starting point and a facilitation of conversations and stories about one's intimate affairs, which would otherwise not be as easy to discuss, especially not with strangers at semi-public events (such as QS meet ups). “Data become ‘signals’ that are added on to, or into, subjective narratives, in the form of [...] ‘digital storytelling’”, argue Sharon and Zandbergen (2017, p. 1704). Such thick data can be seen as a nuancing of Clifford Geertz’s concept of thick description, which establishes “a new element in an aesthetic and continuous process of identity construction” (Sharon & Zandbergen, 2017, p. 1705) as well as the identity affirmation and enhancement in the above explicated sense.

5.3 Self-Relations Summary:

Ambiguity, Co-Existence, and Non-Closure of Self-Control and Self-Care

The Polar and Ambivalent Self-Relations of Control and Care

I developed my arguments by first investigating how ST tech influences, promotes, or even determines my relationship with myself. Concurrently, I deepened and refined my initial insights through field observation (attending conferences and meetings of interest groups in the field) as well as in-depth conversations with selected ST practitioners, as described in the research design section. In this way, I found the technologically mediated self-relations of control and care, and indications of the complex and interconnected interaction between self-control and self-care. Self-control and self-care at first glance may seem as contradictory or opposing relationships, however, they can appear together, complement, and promote each other. While control is generally understood as a fact-based, rational act, caring is one of the soft factors of action associated with emotions. I structured my findings in a way that firstly describe the facets in each self-relation of self-control and self-care. These chapters contain rich descriptions of the ways and contexts of the application of ST technologies and their meanings for users – which I synthesized into facets of self-control and self-care relations.

Where appropriate, I give indications and suggestions on how both self-relations may complement or mirror each other in a meaningful way. For example, the aspect of validation of former guessing, assumptions, and hypotheses about interdependencies, correlations, and causalities with regard to the body or life in self-control mode resonates with the self-caring mode, where people discover their peculiarity or seek to confirm their self-image through numbers. When people produce and store knowledge about themselves, in the form of complexity-reducing and orientation-providing data collections and their visual representations, to enhance self-control, they can be simultaneously happy and confident to store and archive these data to keep a record of the progress they are making and their achievements in the self-caring mode. As described, in the self-control mode self-trackers gain orientation through recommendations from the app or comparison with their historical values to obtain a better basis for managing their behavior. At the same time, they feel more capable of taking responsibility for themselves and thus generate positive and reinforcing self-images, which contributes to self-care. Because cognitive dissonance is often part of everyday decision-making, the acquisition of additional information (which at best reinforces one's own opinion) in the self-control mode helps to compensate for the negative feelings associated with it through calming down or conveying the sense of technical expertise for example. Previously unseen or unnoticed inner processes, such as heart rate variability, stress level, sleep quality or calorie consumption (self-control), can unravel the mystery of one's body and its responses in a relieving and reassuring way (self-care).

As a practice of rationality and emotions, ST balances some of the many ambivalences/ambiguities of life, as I sought to describe qua the emergent self-relations of control and care and how they are interwoven. In their complex interrelation, self-control and self-care also testify that we live in and have to deal with a world of ambivalence. The human everyday life is characterized by more ambivalence than we probably assumed. For example, the wish and necessity to work productively and at the same time be creative or have plenty of free time, to be athletic and surpass oneself in self-challenges and be allowed to be lazy, to invest in disease prevention and still be able to eat anything you feel inclined to, to have a handle on one's finances and also sometimes get carried away. Things like individuality and authenticity have to deal with expectations of social conformity, familiar obligations have to deal with individual hedonism, financial limits have to deal with consumeristic dreams, and the societal expectation to pursue happiness has to deal with personal reluctance, laziness or resistance.

In addition, self-relations can also be conflicting within themselves and with each other. In this sense, the technologically mediated control relationship includes not only the actual

execution of self-control, but also the loss of control in a twofold sense: being controlled by others and the loss of one's own control over self-control. For example, the first case is ANDRE tracking his runs to know how much of his monthly running goal he has already completed and what is left to do. The second obviously refers to the ever-present possibility of one's own data being exploited for third party purposes - a possibility one has to deal with anyway, as PHIL reported. And the third entails overreactions to (not tracked) data, the compulsion to track even if it is not really appropriate or necessary, or cheating with data entries (for example MYSELF, who wanted to have a nice looking, i.e., continuous data curve/course). In the same way, self-care can be misguided into self-deception when one manipulates one's data which is nevertheless only visible to oneself to gain the reward of feeling good about a deed that was never done. Or, when self-care becomes the top priority in one's life and the concerns of other people are neglected, self-care can culminate in narcissism. People experience, evoke and amplify positive feedback and, by applying digitally assisted self-tracking with its monitoring, analyzing, and recording shares, experience it as deeply emotional and self-affirming –as for example KAROLINA, MYSELF, RAGNAR, ARNE and many people I talked to informally reported.

ST is Becoming an Integral Part of a Non-Completable Life-Maintenance Process

The empirical material of this study suggests understanding ST rather than an instrument for life maintenance, than for straight optimization. This encompasses forms of staying healthy, safe and at ease. At a minimum, it includes activities that strive to prevent diseases and deterioration, and prolong the actual fitness of body and mind, which also means finding appropriate optima for oneself, rather than deriving them from absolute or general external guidelines. Through this, a sense of more control over one's life arises and ST technology and practice lead to a “relaxed awareness” (ARNE) of what is happening in the body and important issues in life, which creates the sense of being able to manage things when needed, and thus caring for oneself to an appropriate extent. The practice and technology stabilize oneself and partly balance the insecurity and burdensome decision making that arise in the multi-optionality of daily life, through obtained information/knowledge, feedback, and advice. TABEA, ANDRÉ and PHIL appreciate the apps' recommendations, PHIL uses it to “ground back an earth”, KAROLINA needs written proof to feel good about her activities, MYSELF, I felt relieved to finish the working part of the day and start the leisure part and ARNE and ISGER needed self-experimentation to figure

out and reassure their individuality and exceptionality compared to the average. The numbers thereby show “if one is still in harmony”, as PHIL summarized, and if not, comparing them with one’s own historic or desired values gives indications on how to achieve personal balance. As with the self-controlling relation, technologically mediated self-care can be interpreted as a coping/ balancing mechanism for emotional release in daily professional, societal and private constraints (e.g., ARNE) as well as offering escape from routines, for example. For many STers who are using ST devices without much engagement with the data whatsoever, a kind of implicit agreement between the device and the user could be assumed where the user commits to exert the particular activity, while the device is obliged to measure and record the data accurately, and finally be ready for use whenever it is needed.

The mediality and materiality of digital self-care technologies is to be taken into consideration when analyzing the conditions and consequences of ST practices. Following Traue, we face the dualistic discourse of whether subjectivation practices of different forms such as self-care, are liberating and agency giving or “at least susceptible to — mechanisms of *control*” (Traue, 2010, p. 3). Is it about internalizing the external coercion to self-optimize or, as a resistant practice, reclaiming/ reconquering the possession and prerogative of interpretation of self-data (Nafus & Sherman, 2014)? However, following Deleuze control does not end when a state of equilibrium is reached, since we are living in modulations and not in finalizable forms or states. “In disciplinary societies one was always starting again (from school to the barracks, from the barracks to the factory), while in societies of control one is never finished with anything - the corporation, the educational system, the armed services being metastable states coexisting in one and the same modulation, like a universal system of deformation” he argues (Deleuze, 1992, p.5). In the never completed process of self and life-maintenance, self-tracking with its modes of self-control and self-care becomes a balancing instrument that is able to compensate disturbances and unease by persuading or motivating someone to move (RAGNAR) or meditate (PHIL: helps him ground himself), it helps to reduce complexity and thus provides orientation like a compass (e.g., in finances with PHIL), and it stabilizes through numbers-supported affirmation in one’s own lifestyle and plans (e.g., ISGER, KAROLINA, ARNE). Furthermore, it supports the user in becoming or staying motivated to self-control and regulate, and reach their improvement goals through self-challenge, progress control, and algorithmic/ AI based recommendations. TABEA, ANDRE and PHIL are the best examples for this aspect. These results correspond with observations in other disciplines. In psychological studies it could be shown that higher (self-reported) self-control contributes to performance and achievement (Tangney et al., 2004). The connection between self-control and performance hereby proved to not be significantly

driven by social desirability. This result contradicts the widespread assumption that neoliberally fueled subjectivation and self-governance endeavors are the main triggers behind the popularity of self-tracking (e.g., Ajana, 2018; Kappler & Vormbusch 2014; Lupton, 2016a, Selke, 2016; Sharon, 2016, Ruckenstein & Pantzar 2017). Another result of this study was that higher ability to self-control was strongly correlated with “higher self-acceptance or self-esteem, which is often regarded as a vital aspect of mental health” and is furthermore aligned to “a broad range of positive outcomes for the individual”, as Tangney and colleagues argue (2014, p. 312).¹¹⁵ This result supports my argument of the interwovenness and mutual promotion of self-care and self-control.

However, there are not only positive effects, as one may exaggerate and overcontrol. Overcontrol as expressed in obsessive-compulsive pathologies, like for example in the case of the disorder anorexia, rather reflects the individual’s difficulties regulating and steering their capacity for self-control and as such suffering from lack of control over their self-control. This result resonates with my observation of self-trackers – for example PHIL, FLORIAN, ARNE, KAROLINA and MYSELF- who self-track many aspects of their lives dedicatedly while some of them could not prove to channel all efforts into goals and achievements or to only generate positive emotions.

Ultimately, the effect of these technologies has not yet been sufficiently studied and sustainably tested. Due to the short period of time self-tracking tools, apps and gadgets have been widely available, long-term assessments cannot yet be made. Regarding the promises and expectations about these technologies, ST can on the one hand be considered a further seduction by advertising and an incentive to buy and possibly establish a lifelong dependence on such propagated offers for the ST practice (Brubaker, 2020; Dumit; 2012; Rettberg, 2014; Schüll, 2016). On the other hand, ST technology affords space to devote attention to and evaluate and reflect on oneself and derive the customized “Technologies of the Self” (Foucault, 1988) that are right for oneself. This attitude then indirectly influences other factors of health and wellness, such as a clean environment, psychological wellbeing (peace of mind), attention to foods that have harmed you so far and the choice of foods that are good for you (as researched in an ST experiment), promotes better sleep and thus so-called side factors of health (such as little stress, sufficient sleep).

¹¹⁵ An often encountered limitation of psychological research, and in this case also of this study, is its reliance on self-report and the possibility of distorted self-perceptions. “In principle, our results might reflect a response bias or self-deception pattern that causes people to report high self-control along with positive outcomes on adjustment, performance, and other variables” (Tangney et al., 2014, p. 313).

Finally, PHIL nicely summarizes what I found dispersed in various accounts of ST: to become aware of one's life, to live in the present moment, yes also to challenge oneself but above all to feel in balance and stay in harmony with oneself. Likewise, Sharon and Zandbergen contradict the widespread dataism (van Dijck, 2014) suspicion in ST, describing it as "a practice of mindfulness, as a means of resistance against social norms, and as a communicative and narrative aid" (Sharon & Zandbergen, 2014, p. 1695). Instead of subscribing to data fetishism, which implies a blind trust in decisions based on numbers, STers seek for a deeper understanding of their drivers, behavior patterns or unwanted affective responses in order to change them for the better or to self-confirm their experienced state of being. This last quote in this chapter also already contains indications of the assistant role of technology, to which I will come back later by analyzing the assistant role in ST technology in the next chapter Relations to Technology and technology as a means.

PHIL: "It is also about getting an awareness of certain things. One lives for the day, time passes very quickly and what we also lack a little bit, unfortunately I am not good at that either, is to appreciate the moment and things and bring them to mind. And when you do many things in life, then you do them unconsciously, something like eating. In the Quantified Self scene, they're always looking at improving performance values, but it's not necessarily about improving higher, faster, further, like the six million dollar man from the 1980s series, but rather it's also about simply using these values to compare them, to look at them, not always with the goal of getting better, but simply to see if you're still in harmony"

Digital technologies are transforming the ways in which people present themselves, the ways in which they reflect and construct themselves, and in which they regulate themselves (Brubaker, 2020; Turkle, 2011). ST provides resources for all three purposes and delivers technologies and practices not only for maintaining bodily states, managing performance and behavior, but also inducing pleasurable and relieving experiences and producing feelings of connection and belonging.

6 MODES OF TECHNOLOGY-RELATIONS IN SELF-TRACKING / SELF-QUANTIFICATION

It goes without saying that new technologies that are becoming part of our everyday life do not remain just technologies, they develop an ulterior/additional significance for people that also affects their relationships to technology. Sensors, wearable devices, numerical data and their visualizations as well as the feedback mechanisms generated in the app in the form of recommendations, encouragement or praise, for example, influence individuals profoundly. It is therefore worthwhile taking a closer look at the role these ST technologies play in the application and shedding light on their relations and meaning surpluses for the users.

In this chapter, I will firstly describe how the observed relations to technology are evident in the self-tracking practice. In doing so I will no longer present how ST technology functions in the self-control and self-care relation but will try to work out meanings and meaning surpluses that go beyond this. These relations to technology I found can be roughly divided into two modes: technology as a means and technology as a counterpart. In a further step of analysis, the counterpart can be subdivided further into a companionable counterpart and a more superior counterpart to which we address our expectations and hopes. The resulting three technology relationships are: technology as a means, technology as an intimate counterpart and technology as a promise - a (promise of salvation) Heilsversprechen. As I will also discuss, these three technology relations mediate, encourage, and orchestrate the seemingly polar or ambivalent self-relations of control and care which in fact, although to different degrees, were found simultaneously in all my subjects and sort of complemented each other.

6.1 Technology as Means

6.1.1 ST as Means to Maintain but also to Enhance the Self and Life

It is obvious that ST technology can and will be used as a means to tackle goals and plans in the modes of self-control and self-care. In this context, “means” comprises digital or

analogue tools, devices, and apps as well as the accompanying techniques, i.e., practices of applying them. ST is used as a tool in various scenarios, from monitoring daily exercise, one's medication regimen, calorie intake, work performance, training progress and relaxation techniques to one's menstrual cycle, financial spending, adequate sleep, healthy sitting posture, speed of eating, or proper spin when brushing teeth. In the above chapters, a lot of examples have been given showing how ST technology is used to measure, compare, store, orientate or motivate in order to support the respective control or care intentions.

Besides this obvious usage, the two most salient meaning contexts that emerged were: the self-enhancement potential of ST technologies and numbers as performative media/technologies. The section ST technology as a means focuses on the enhancement aspect first and discusses the performative aspect of technology in context with its meaning as a promise of salvation in the third and last subchapter. I employ the term self-enhancement to include all activities that aim to improve known capacities as well as to explore and, if possible, to expand not yet possessed capabilities related to body, mind and activities by means of digital tracking technology.

There have always been great expectations of emerging new technologies with regard to human development (I am aware that I must omit many enormously important areas of human life, such as environmental protection, national and economic interests, basic research and so on). Technology has often been envisioned and framed as enhancing human life in areas such as memory, problem solving skills, or intelligence in general. Vannevar Bush's idea of the MEMEX¹¹⁶ (1945) as a device supporting memory retrieval, Ross Ashby's concept of an "Intelligence Amplifier" (1956), J.C.R. Licklider's considerations on a "Man-Computer-Symbiosis" (1960), Doug Engelbart's program for "Augmenting Human Intellect" (1962) or science fiction author and visionary Stanislaw Lem's outlines on the human-technology evolution in "Summa Technologiae" (1964) serve as great early examples of people's imaginations and expectations of the cooperation between humans and computers and its benefits or perils for humanity. For example- in "Design for a Brain" (1952) and "Introduction to Cybernetics" (1956), Ross Ashby, psychiatrist and a pioneer in cybernetics, develops the idea of intelligence amplification - which means the effective use of information technology in augmenting human intelligence - an idea which was discussed in the cybernetics field of those times. Ashby himself can be counted as an early life logger, as he kept a journal for over 44 years in which he recorded his ideas about new theories. He started in May 1928,

¹¹⁶ This was later taken up by the Microsoft engineer Gordon Bell as the "MyLifebits" project in 2001

when he was medical student at St. Bartholomew's Hospital in London. Over the years, he wrote down a series of 25 volumes totaling 7,189 pages. In 2003, these journals were given to The British Library, London, and in 2008 they were made available online as The W. Ross Ashby Digital Archive. In the early 1960s, Engelbart and Licklider formulated concepts about how to expand human thought zones and capabilities with the help of computer technology, thereby initiating inventions such as simultaneously working on the same document from different locations and using a pointer (now known as a mouse) to easily move within a working document. Licklider's ideas, imaginations, visions and anticipations of the early computer terminals that were connected to only one mainframe computer consequently led him to envision the "Intergalactic Computer Network" (Licklider, 1963), later known as the ARPANET and then the Internet.

The rapid development, increasingly cheap availability and gradual omnipresence of digital technologies has shown how not only machines, but also human work and other performance processes can be made more efficient. I see self-enhancement similar to the artist¹¹⁷ Stelarc: "It's not an issue of utilitarian improvement of the body and mind but rather of exploring...and experimenting with different ways of operating and becoming aware in the world" (Science, Technology & the Future, 2012) – with the use of technology. According to Stelarc, we currently live in an age of body hacking and gene mapping and soon, neural jacking – these tools will prosthetically augment and amplify our sensory and cognitive experience of the world. He emphasizes that body hacking should be a point of individual choice and envisions an "evolution by the individual for the individual" rather than some form of social engineering.

"These are values...that I can improve"

Technology, no matter whether digital or not, always served as a means to an end in the first place. Digital technology does this primarily by producing and operating with numbers. Besides "self-knowledge through numbers", "in numbers we trust" could be another claim of the QS movement or other self-tracking scenes. Within the examined self-tracker sample these ends, or purposes were primarily to achieve certain, primarily numbers-based, targets (e.g., to swim x kilometers per week), to learn something about oneself (how many

¹¹⁷ Artists generally can be considered inspiration for change and innovation. An example is Andy Warhol who, in his silkscreen works that he elaborated with machine-like precision, once stated: "the reason I'm painting this way is that I want to be a machine, and I feel that whatever I do and do machine-like is what I want to do" (short documentation on youtube from 1965)

calories did I burn on that run, how often do I breathe in a minute), and to develop/ acquire new habitual, physical or psychological skills (e.g., 3 workouts per week, 4 glasses of water per day, 4 hours of focused writing etc.). Preventative medical checkups such as blood tests, healthy nutrition and regular exercise are considered measures to increase health, longevity and wellbeing. Self-trackers follow the same logic but do so in various areas of life with a scientific looking approach of data collection and data-based forecasting that ensures a proper self-made reliability. The assumptions are similar: the checkups, the monitoring and the data must be collected regularly over a certain period of time, the further processing of which enables pattern recognition and conclusions to be drawn about possibly required adjustments of the influencing variables in order to optimize the dependent variable (e.g., sleep, productivity or weight). With ST the goals are the targets users aim at, but the numbers and self-data are a compass that guide them through their choices.

PHIL meticulously and continuously collects, among other things, data on his bodily values, movement data and food intake. Rather than trying to improve his perceived wellbeing, body sensation or mood he appreciates the additional information through ST data.

PHIL: "...where I not only get my weight measured once during a consultation, but also enter and transmit my weight there daily. Or if I measure my food intake and say every day, I determine the following nutritional values, fat, carbohydrates, proteins, and I get a recommendation where it is said that in order to achieve a certain goal, to build muscle mass, to lose weight, to counteract certain diseases, you have to divide the composition of the three areas protein, calories, fat you have to do differently...

These are values that I can then control and work with to improve them"

To "promote his health", PHIL is tracking all kinds of variables about his body. Using his WIFI weight scale, which measures weight, body fat, muscle mass and bone mass and also indoor air quality based on CO² concentration, he gains results in the form of numbers that are meaningful to him. His tacit assumption is that through working on improving them, he will simultaneously improve or optimize his body sensation and satisfaction. It is interesting that he is referring directly to the numbers and speaks of them as if they were a part of his body's machinery that he wants to maintain – regardless of how he feels in his body i.e., as an organism.¹¹⁸

¹¹⁸ I refer to the term organism in the sense of a living animal or plant.

PHIL is operating on the level of blood values or other numeric indices that are not spoken about very often outside the doctor's office. Numbers-based approaches are a well-known form of weight loss goals. Mostly, people focus on reaching a certain specified weight that is either derived from the Body Mass Index (BMI) or just set deliberately, for example: "I want to lose 20 kg" or "my ideal weight would be 64 kg". Also, RAGNAR, for example:

RAGNAR: "I'm a big fan of setting goals.... And I think it is very, very important that when setting goals, you always have such little measurement indicators where I can see 'am I at the goal yet?' and 'how far away am I?'. These self-tracking tools help me immensely to achieve the goals that are important for me. Because otherwise I would run the risk of always having goals that are too vague, like 'I want to lose weight again and again', which then just never works out"

ARNE talks about the process of weight reduction with the help of his gadgets and apps as a technical process or machine-like apparatus which he can control consciously and willingly as a human. Regarding his weight goals, he reports the below.

ARNE: "but yes, when the point of dissatisfaction arrives... where I say 'OK, the level has reached the extent that I say this has to change! Like now recently... End of the line: Almost 100 kilos cracked. Uh...so now it has to be enough! Yes then I will start to start the, let's say, machinery somehow"

Numbers-oriented approaches are also known from other areas, such as in entrepreneurial project planning and most other business and organizational areas.

PHIL: "In business administration, you have the KPIs, the key performance indicators. And this is nothing but base values. And yes, in certain areas I use these values to optimize myself, to do things better, for example, if I say: 'I ran a marathon this year and the next one should be faster', then I have values to do that. But also to do things in a regular way, to not run too much, which is harmful, to not run too fast, which is harmful, to run fast in interval training. And there it helps me"

Although it is known that operationalizing goals is a better way to reach them than following just rough intentions, applying that monitoring technology follows reification, instrumental thinking and fosters and enacts a technocratic and overly materialistic and rational approach to oneself. Sharon (2017) reports about the journalist Rob Horning (2013) who argues that authenticity today refers to "the synthesis of data created as a result of the

exhortation to always measure ourselves and share that information” which creates the sonorous phrase and to some extent belief “I am what I track” (Sharon, 2017, p. 115). The more possibilities we see to change ourselves in the desired way – via motivation helpers, remedies for bad feelings or bodily enhancers – the more we might develop and promote a constructed image of ourselves as the engineers¹¹⁹ of our lives. In our technologized world, we not only consider the world to be controllable with the help of technology but increasingly also ourselves, argue Frischmann and Selinger (2018). Approaching oneself as a functional entity can be seen as the qualitative difference to most former conceptualizations, where thinkers had theorized about other people or whole societies in objectified and mechanistic terms. Since the 1960s, we have been living in an increasingly technological and computerized world. Just as we invented computer language, computer processes and functions, they in turn started to shape our actions, language, and thinking. Media articles are framing the body as an input-output device, emitting digital exhaust, whereby “not just companies and governments [...] are beginning to view the individual as a data factory: we are beginning to think about ourselves in these terms” (Mahdawi, 2013). Likewise, in her study about the self-help genre and especially time management, Melissa Gregg (2018) interpreted the obsession with productivity and its ramifications that people increasingly behaved like machines or wanted to become like them. The examples above recall the maintenance of a machine: If the fuel or oil gauge in the car falls below a specific value it will be accordingly refilled so that it is back in the proper range. Quantifying goals and measuring their progress through key figures and indicators just seems reasonable. It is therefore not surprising that the digital self-tracking tools that people apply to themselves are accompanied by computer-functional ways of thinking that influence us and our way of life beyond the use of these tools.

As Daston and Galison (2007) show, the so-called “scientific objectivity” or “mechanical objectivity” that is seen at the core of scientific approaches, has its birth in the positivism-era around the mid-19th century. “Objectivity is the suppression of some aspect of the self, the countering of subjectivity” (Daston & Galison, 2007, p. 36) by eliminating all subjective interferences, i.e., where “nonintervention – not verisimilitude – lay at the heart of mechanical objectivity” (p. 187). From this perspective, ST can be assessed as an application of mechanical objectivity by valorizing numerical data such as sleep duration and sleep cycle

¹¹⁹ Discussions about the gradual substitution of body parts by improved (more powerful, longer lasting, healthier) units, up to the expansion of the ability to think and the senses by implanted chips and sensors can be found within the transhumanism debate since its first publication by Julian Huxley in 1957: *New Bottles for New Wines*.

over the subjective impression of feeling rested. But as explicated in different sections of this work, most self-trackers, at least participants in my study as well as those of others (e.g., Kristensen & Ruckenstein, 2018; Sharon & Zandbergen, 2017), do not follow blindly and apply this “mechanical objectivity”. In fact, it is being assembled with further sources of knowledge about oneself, such as intuition, personal experience and current situation and circumstances. In the 20th century, further epistemic virtues arose, as Daston and Galison (2007) argue: intuition and hermeneutic interpretation, which persist within the co-existence of diverse scientific paradigms. As Edwin Hutchins elaborated in his detailed ethnography “Cognition in the Wild” (1995) about the cognitive processes among a ship’s crew in a navy ship, cognition is not only based on objectivity. “In the beginning, the structure of the computation seemed to be driven exclusively by interaction between limitations of the human cognitive system (specifically memory limitations) and the availability of data in the environment” (Hutchins, 1994, p. 342). However, it turned out that the crew (and potentially other experts too) rather use a process of pattern recognition, which is not a rational process per se, but rather a matter of perception. Hutchins’s ethnography issued into a critique of the assumptions about cognitive processes commonly stated by rationality researchers, like the heuristic search for problem solutions.

“My body...In the end, it's a machine”

An example of objectified speaking about oneself is ARNE, which might be grounded in his work-related business background. Arne is convinced that thinking about and visualizing his life in processes, in the form of inputs that result in certain outputs, is very helpful to gain an understanding and derive next steps.

ARNE: “OK, in a way, my body is kind of a corporation too. There is an input, there is an output and I have to somehow make the best possible performance out of what I bring in, make out of it. In the end it's a machine and I try out what can I put in differently, what can I do differently in the form of training to increase performance, or whatever, to lose weight, to gain weight, what possibilities do I have, what parameters can I somehow adjust to achieve any kind of result”

ARNE already uses similarities, which I would like to generalize in parts for the explanation of the meaning of ST. Thinking and acting with ST tech resembles a mélange of managerial and economic thinking and engineering or technical maintenance of the body,

self and life. With these self-monitoring and self-tracking tools, ARNE tries to augment his area of possibilities by figuring out the right causalities for him. My observation was that he was more interested in the measuring process and data representation than in reaching end goals. One can also interpret this behavior in terms of the psychological self-enhancement and self-affirmation mechanisms that people use to reassure one's own worth for oneself (and others), which I described above in Mode 2. Focusing on skills that one is good at, one can deflect from the less successful. Or, to bring up Arne himself again, one can interpret this in such a way that in the end we are human beings after all, who, in achieving their wishes and goals, can always have something come in the way, to which they momentarily pay attention - for completely individual reasons.

ARNE: "Because of this manifold knowledge, so obviously everything should be perfect. ...OK, at the end of the day it is somehow not, because even then I am 'only' human and totally normal"

ISGER, who has been tracking his working hours and its circumstances for 10 months already (with the goal of tracking for a year and then finally analyzing them) wants to kind of find out "his own biological working rhythm". He was very much engaged with the design of the tracking process, the tracking objects, classes, titles etc. that he defined to track, and also spent a lot of time analyzing and reflecting upon his data.

ISGER: "Basically, I would look at what what format first, I have as I said, because this app is just very stupid (laughs) so in the sense of I specify what my activity is, I do not select anything, i.e., I must first see what ... uh ... activities I have, are they correctly clustered, are they described, are they detailed, are they at the same level, I can compare them. Then I look to see if that's the case, or rename them, or find groups that are good, and then I look to see what kind of metadata there is in rest periods, in locations. Which combinations occur frequently, is there perhaps a certain time of day when I check my emails most often, then I can decide to say per se - then I only check or I take it on myself, exactly because otherwise it would be a good idea, but then I have internalized the concept for myself, because I believe that it is what is optimized for you, to know that you don't have to think about it anymore"

The last sentence is another indication of the relieving and unburdening effect of adding gathered self-data in the form of numbers and correlations into the decision making process. The most interesting part in this statement is, however, that he is looking for a data-based concept for himself which he expects to find with the help of ST technology. He is searching

for hints and anchors on how to manage and maintain himself best – how to find out when he is most productive or when he usually intuitively and mostly unnoticed likes to check his emails, he illustrates. Then he would try to establish a routine for this, i.e., how to group – to cluster as he calls it – some tasks and improve efficiency.

ISGER: "because I just don't have a regular work schedule. And to see if I myself (pause) have a fixed work schedule, ... in a biological ... [sense], or [is it] because of my... um... my social environment, that it has actually settled down"

There is a need/ wish to discover a truth about oneself in technical terms, a yet hidden mechanism which is characterized by regularity, consistency, predictability, and reliability. It is a mix of a management and scientific approach to analyze and establish fixed working and task processes for him, that proved (and this is important for him) to correlate with some inner forces or customs. Self-trackers operate in “a field of tension between reification and increasing autonomy, between body optimization and the search for identity”, argues Vormbusch (2016, p.44). Especially this example of ISGER suggests thinking of a shift from a socio-psychological self-concept to a socio-psycho-technological self-concept, as already indicated in the above Self-chapter.

FLORIAN, just like Phil, wanted to have a good overview of all his data to be able to recognize patterns and trends at a glance. To do so he manually captures his tracked data from different apps and devices in an excel sheet while always looking for a good solution available on the market. With Gyroscop.e he finally got one. This kind of dashboard produces a digital image of the bodily and behavioral data which can then be embedded on the website or blog and thus be made visible to the public, as FLORIAN did.

Figure 5

Florian's Dashboard –collection of self-tracked data – mind section



Source: <https://gyroscop.com/igrowdigital/helix/mind/> last accessed April 11th, 2019

On his website you can read that he spent seven hours on the computer on a particular day, that he slept until 10.00 am on Thursday, you can reconstruct when he did workouts and what his peak heart rate was. His weight, body fat and glucose level are also visible as well as the places he had been to on this or the last few days. Apart from the already technoid-looking name of the dashboard, their release brings another aspect that may soon become more popular in the media landscape. Perhaps we are witnessing a shift from We-Platforms (social networks & communities) to Me-Platforms, where people may represent themselves not as socially responsive profiles but as technical objects.

“What I am doing here is sharpening my senses”

Self-tracking is, amongst other things, outstanding due to the multitude and variety of sensor technology (see Chapter 1.3.). This chapter deals with the idea of developing new skills and deepening experiences through sensors, that became evident with some participants in this study and also myself. With ST tech, it is tempting to conjecture more profound interventions in human nature. For example, for some it is about developing additional senses through sensors, like RAGNAR for example, or sharpening and training their potential senses

through tracking, like PHIL. Two women I talked to informally, in their 30s and 40s, both stated that they track to acquire a feeling, i.e., an intuitive knowledge.

ANONYMOUS: “I track food because I want to get a feeling, a sense for it... because there’s so much hidden fat and carbohydrates in that food...” (Obs.)

The women were trying to develop a feeling for calories – a sense for something that is usually not perceived sensorially. Sensor-supported self-tracking can therefore serve as a means to train, enhance or evolve the sensory apparatus by transferring sensing to other entities, i.e., technological sensors. ST serves as a means to enhance in the sense of acquiring new skills, learning and attaining a hybrid organic-information from the machine/technology – not necessarily ontologically new but newly developed or revealed in oneself. Mopas and Huybregts (2020) had similar findings where participants “relied on their fitness-trackers to do this spatial and bodily sensing for them and incorporated these devices as part of their identity and everyday routine as endurance athletes” (p. 26).

Some people start to sense their level of stress after practicing with stress sensing devices for some weeks. This must not sound surprising since it is an expression of a greater awareness towards the interplay of sometimes complex factors – such as noise, time of day, deadlines, illness, lack of movement and the like, that all together cause unease or anxiety that are generally experienced as stress. Other people, like ISGER, get a better sense of their use of time after some tracking practice. PHIL describes his comprehensive tracking as a training for his perception. He uses the finance tracking method from “You-need-a-budget.com”. He divides his money into different target areas, such as taxes, tech, vacation, clothes, phone, but also fun - after that he learns how much he can spend in the evening.

PHIL: “What I’m doing here is sharpening my senses”

PHIL,¹²⁰ who considers himself a person with above average awareness, also declares this attitude in tracking situations, for example in the realms of nutrition, sports, and also finances and relaxation, all of which he considers doing deliberately, reflexively and with the intention to train his abilities in these fields. He acts as if he had potential senses for a variety of self-related habits and conditions that he could uncover with the help of ST. He expects

¹²⁰ The analysis of PHIL at this point is based on my interview and observation material in combination with an online resource where Phil talks about his self-tracking procedures for a student film project <https://mediathek-f3.hs-hannover.de/mediathek/kategorie/exporter/video/reportage-self-tracker/>

the exact mechanism regarding his eating habits via calorie counting and his ability to calm down in a busy working day he trains via regular meditation. PHIL's behavior could be interpreted as self-optimization in order to fulfil the demands of the world he lives in, but it can also be interpreted as his approach to make him feel better dwelling in his life - to solely maintain his life.

PHIL: "You just care more about the money. Then you save yourself some nonsense... It helps me to get a sense for the money."

What PHIL means here does not refer to sense extension in McLuhan's understanding, i.e., adding glasses to improve vision or wearing a hearing aid (or implanting a hearing implant) to improve hearing. It is rather the developing of new senses or uncovering hidden ones.

These kinds of new experience layers were present in my empirical data, whether positive or negative, experiences. For example, TABEA was convinced and felt she was having enough sleep when the data said that her sleep quality (shown in duration of deep sleep phases) was good and even above average. Another example, MYSELF, I developed data-symptomatic tension, stress and anxiety about getting sick because of the high level of heart rate variability my fitness tracker had shown me after a bicycle ride. These examples indicate that data as a technology of noticing transferred into a sensation. Nafus and Sherman (2014) observed that "the data has moved inside [...] in a way, transduced (Mackenzie, 2002) into a sensation of having slept well, or into a temporal habit like waking up early" (2014, p. 1788). Also, Kristensen and Ruckenstein (2018) address this issue in their ST study, referring to self-trackers who talked about "a total sensory experience", "sharpening of the senses," and a "production of new senses" (p. 9) when engaging with their tracked data. Data in ST can thus be seen as a technology of noticing, of becoming aware, and "feeling the body with and through data" (Mopas & Huygberts, 2020, p. 33). It could also be attributed to the nowadays popular mindfulness techniques. As such, it is not indicated that ST practitioners accept and apply the data presented to them by their ST devices but rather they employ "a mixture of the organic and inorganic, and the natural and technological" (Mopas & Huygberts, 2020, p. 38) for decision making and identity construction.

As explicated above in the very first findings chapter, the ST application is often considered an initial stage in a much-desired behavior change. The app is involved in collecting knowledge about the body and the reactions to certain applied techniques to be more productive, more efficient, to improve one's athletic performance or to lose weight, for

example. With the QS data the individual body becomes “a more knowable, calculable, and administrable object” (Swan, 2013, p. 85) for the users.¹²¹ Describing the development of new senses through technology self-application, several other novel terms were suggested by scholars. For example, the “techno-gaze” (Ruckenstein, 2014), offering insights into personal data flows through measuring devices, analogies of the sixth sense in technological devices (Dumit, 2012; Schüll, 2016), or “exosenses/ exoselves” (Swan, 2012). A similarly used term is “intro-sensing” (Kristensen & Ruckenstein, 2018; Nafus & Sherman, 2014) or transduced data (MacKenzie, 2002) to point to the process where information received via a sensor gets ingrained in the body in such a way that it gets embodied, i.e., perceived or experienced as its own sensation. The sixth sense¹²² is no longer a supernatural ability such as psi abilities, telepathy, or clairvoyance, but has recently been discussed as a technology mediated and yet embodied experience.

However, instead of totally relying on their quantified-self data, many ST practitioners, such as PHIL for example, emphasize that there is no understanding without context, and some “interpretative schemes that characterize the quest for self-knowledge” (Sharon, 2017, p. 115). Pantzar and Ruckenstein (2017) therefore speak of a “situated objectivity” that is being formed not only by the numbers collected but also by prior experiences, previous expectations, as well as shared cultural understandings about the observed topic. This knowledge is being gained in a combined and eclectic manner to fit expectations and make sense in the user’s everyday experience.

The decision to combine measured data which enriches/establishes the rational part of the computation with different sources of information makes self-trackers their own programmers/ developers of their self-related issues. Self-trackers apply their own heuristics

¹²¹ Technology expert Melanie Swan nicely illustrates the concept of exosenses with examples of wearable sensors and augmented reality devices. “There is a wearable device that gives haptic (i.e., touch-based) feedback as to where the direction North is per a locational vibration in a worn electronic device. Another example is LEDs that blink in time with heartbeat, as sensed by a Polar chest strap (Eric Boyd, www.rtbot.net/sensebridge), or other biometric data such as smiles (Nancy Dougherty). Haptics is not the only exosense delivery made available; metrics like heart-rate variability, blood pressure, galvanic skin response, and stress level could be made explicit via audio, visual, taste, or olfactory mechanisms” (Swan, 2013, p.95).

¹²² It should be noted that a discussion exists around the so-called Sixth Sense Technology, which began with Steve Mann’s invented devices that started in 1997 and comprised a camera and a light source, such as EyeTap or the Telepointer and later “WuW” (Wear yoUr World), invented by his colleague Pranav Mistry. This technology is akin to augmented technologies, i.e., technologies that allow a seamless connection to and natural gestures interaction with information on the internet and that is expected to widely spread in the near future. Recently, this topic gained more attention in discussing designs and applications of wearable devices for a deeper ingrained human-computer interaction. See, for example: Rao, S. S. (2014, December). Sixth sense technology. *International Journal of Science and Research*. Volume 3 Issue 12 (pp. 1068-1073); Sabahat et al. (2018, April). A Review Paper on the Emergence of Sixth Sense Technology and its Applications. *International Journal of Computer Applications* 180(31), (p. 22-25)

by adding their experience and the desire to follow the recommendation to the supposedly objective part of the data, and by taking into account environmental variables such as location and company. Thus, it is also important for a quantifying self-tracker whether the recommended carbohydrate intake in the evening collides with a scheduled dinner with the partner or a football event with friends, resulting in a personally chosen - and in the best case consciously decided - non-observance of the number-based recommendation.

One could conclude that the feeling of wellbeing is redefined. It no longer corresponds directly with a feeling in the body or a thought in mind, nor is it totally relying on values, for example blood values as is customary in medical practices, but it is made up of various components. Data are added to the gut feeling which confirm the feeling, complement or expand it, or contradict it. Hansen (2015) speaks of “casual objectification” of computational data which elicits “primordial feelings long before it coalesces into subjectively unified experience” (p. 158-159). These internalization processes can finally lead to the above stated negotiations and a situated objectivity or, as I would put it, augmented situated subjectivity. Perhaps the noise in our information-flooded world is so massive that we can no longer hear ourselves. In this sense, ST tracking helps to rediscover and feel our subjective sensations by bringing together measured data plus environmental variables and social contexts that are important for the individual. This is where a supposedly ambivalent or counterintuitive event occurs: ST technology mediates or uncovers sensations in relation to us.

“If one could manage to intervene in these deep evolutionary mechanisms...”

For some participants, ST was envisioned as a means in respect to possible or desired organic/biological self-enhancement. RAGNAR envisioned a semi-automated regulation of the human body and its deep-seated organic reactions with input and feedback coming from technology.¹²³ This application or device could warn him in advance when facing critical situations in which he always reacted in similar patterns, such as to escape the situation,

¹²³ Sensory substitution as related to the human perception and brain has been proven by several studies since its invention in the 1960s by Paul Bach-y-Rita. For example, the Tactile Vision Sensory Substitution (TVSS), as the substitution of sight through tactile pressure on parts of the body (Bach-y-Rita et al., 1969)¹²³, the substitution of the sense of hearing through the sense of touch (Novich & Eagleman, 2014),¹²³ or substitution of sight through the auditory sense with the vOICe (Meijer & Metamodal, 1996).¹²³ Sensory augmentation through data just started to become observable in rare reported cases by people self-tracking body values, who reported to have learned or at least stated to be in the course of learning to sense their glucose level (Dudhwala, 2018; Mol & Law, 2004).

where he expressed the wish to become able to overcome deeply ingrained bodily "reflex-like" reactions. Instead, he envisions training to apply other responses to such situations, of which he gets a timely warning, such as to "attack", which in his case means to get active and, for example, confront the counterpart with discussing issues.

RAGNAR: "I would like to have such an app to feel even more consciously into the condition whether I am really fleeing, freezing and congealing or fighting. Because that would bring me liberties, if I could get even closer to it". ... "that's an exciting idea if you could manage to get into these deep evolutionary mechanisms in such a way that you can get into this condition, this point or maybe even a few seconds earlier through these tools, through these Quantified Self Tools, and then just avoid falling into the same mechanisms... Not always falling into the same pattern. But to really have the liberty to 'So, now I'm going to decide to flee, and not to fight'. 'Tomorrow I'm going to decide to fight and not to flee' or something like that"

Thanks to the efficiency of ST technologies and the availability of low market prices (e.g., for devices coming directly from China), he believes that a "quantum leap" and more degrees of freedom in decision-making could one day be possible with the Quantified Self.

RAGNAR: "The more you can really record the EEG pattern, the more you can get closer and closer to this pattern where you can read out the emotions in a neuronal way.... because always just measuring the classic steps or heart rate, calorie consumption is quite nice, but somehow, I think that Quantified Self will take you to new levels and a quantum leap, when it will also become more psychological and not just be based on pure physiology"

Although RAGNAR was one of the interviewees who talked the most about the possible broadening of biological and instinctive abilities, almost all other interlocutors, for example PHIL, FLORIAN, ARNE or TABEA, and ME, indicated an openness to deeper interventions through explorative self-experiments. For example, ME, I was very much interested in enhancing my brain/thinking capabilities through wearing a meditation headband (MUSE) that records brain activity in real time and gives acoustic feedback on whether you are focused (silence) or confused (storm). I thought that by meditating with it very often, paying attention to the feedback and thus training to refocus, I could expand periods of concentrated thinking. It may well have made a difference, but it is always challenging to say afterward

whether the improvement can be attributed monocausal to the device or also occurred because of my intent and increased attention.

6.1.2 Revisiting Self-Optimization as Self-Enhancement between Self-Control and Self-Care

This chapter comes back to the theme of self-optimization under which self-tracking was and is prevalently subsumed and discusses the above elaborated enhancement-relation to technology from the angle of media studies, STS and philosophy of technology. Likewise, in the ST field, other authors (e.g., Berson, 2015; Bode & Kristensen, 2016; Schüll, 2016; Sharon & Zandbergen, 2017; Wolff, 2018b) sought other angles rather than the rather dusky, neo-liberal, pan-optical and surveillance-oriented evaluations, and broaden and complement the analyses of self-tracking. I argue that the perspective of already well-described subjectivation processes (Foucault, 1991; Rose, 2007), i.e., situating the subject as a carrier of dominant discourses, rather than an autonomous agent, obscures the view of yet unknown and little discussed potentialities. These comprise acquired agentive power through self-development, enablement, and empowerment through gained (self-) knowledge rather than power in economic terms. This opens up a perspective where power can produce and transmit knowledge that in turn reproduces the power and as a result may lead to more empowered societal and individual change. Self-enhancement is to be understood in the ST context not only in terms of neuro- or bio-engineering terms of bodily or hardware upgrades with improved biological cells or implanted digital sensors. In ST, as a concept related to self-affirmation in psychology, it receives a psycho-technological meaning, which means that technology is serving as a means to enhance the psycho-dynamic dimension of our self-understanding. When facing challenges such as “practicing effective health behaviors, maintaining persistence and motivation to achieve difficult goals, coping with daily stress” (Taylor & Sherman, 2008, p. 2), people apply techniques of self-affirmation and self-enhancement to preserve their psychological balance. The techniques encompass positive illusions, such as inflated self-ratings, the ascription of positive results to oneself and negative ones to others and the generation of situations that alleviate or counteract feelings of failure. The self-deception in ST described in the self-care relation mode can be explained well against this background. It should be noted that there are nevertheless people who take up the self-optimization discourse affirmatively and invest a lot of time and energy in order to

correspond to a socially respected image – like I observed with ARNE, and, to some extent, PHIL and RAGNAR as well. “There is, we would argue, both tremendous potential and urgent need for a critical engagement with the imaginaries of wearable augmentations”, Viseu and Suchman (2010, p. 194) also attest, while referring to computational devices that were aimed to enhance the human body and might eventually lead to a symbiotic relationship between them both. New modalities of attitude towards data generation in other contexts than Big Data, within which data is used for advertising and other dominant corporeal practices of data aggregation and exploitation (Till, 2014), were shown in Nafus and Sherman’s (2014) study. Their so-called soft resistance modality “happens when participants assume multiple roles as project designers, data collectors, and critical sense-makers, rapidly assessing and often changing what data they collect and why in response to idiosyncratically shifting sets of priorities and objective” (Nafus & Sherman, 2014, p. 1785), thus cutting data into pieces and disrupting algorithmic logics. A similar finding is presented by Sharon and Zandbergen (2017) with self-tracking as a practice of resistance. In their interviews with self-trackers from the QS environment they suggested three practices which differ from the commonly criticized, assumed data fetishist attitude of self-trackers. Similar to critical analyses of the economy of big data, this critique draws on a reduction of phenomena to numbers and valorization of those quantitative data which entail normative and standardized consequences for all of us (Dormehl, 2014; Lupton, 2013; Morozov, 2013). By self-tracking as a practice of resistance the authors do not refer to the usage of the generated data in a different way, rather they refer to the mere process of recording data about things which seem important to them in the moment, thus increasing their mindfulness and awareness about daily life around them. By doing so they strive “to know a bit of the processes that are hidden from you, along the way, by the society in which one grows” (Sharon & Zandbergen, 2017, p. 1702), as described by an interviewee of theirs, and experience the very process as liberating.

Self-Enhancement Potentialities - Generating Sixth Senses, Producing Datasenses

From an anthropological point of view there have been views that described human beings as physically imperfect, not able to survive in nature due to a lack of specialization. Anthropologist Arnold Gehlen (1940) conceptualized humans as physically and morphologically deficient beings, for example in lacking natural physical weapons and guards such as claws, appropriate dentures or adequate body hair to protect them from environmental perils. The answer was to create a culture that enables humans to shape their

environment in such a way that it offers them suitable conditions. The supposed physical disadvantage thus lifts humans out of their environment and gives them a special position as a self-determining and future-oriented creative being.

Self-enhancement is a profoundly technologically inspired, mediated, and enabled augmentation and amplification of bodily functions and human capabilities. Activities and technologies include, for example, brain enhancement technologies (e.g., brain-computer interfaces) or physical augmentations such as exoskeletons, RFID/magnetic/implants that add previously impossible capabilities such as sensing the earth's magnetic field in the fingertip. The limits of self-enhancement are at the current state of technological development. Self-optimization is, on the other hand, a basic need because we are deficient beings (Mängelwesen, A. Gehlen). However, the ST-supported activities associated with it – such as weight regulation through exercise and diet, or productivity enhancement through focus exercising via meditation – serve, I argue, to provide orientation and structure and thus balance-finding in life - what I call Life-Maintenance. “I believe that it is what is optimized for you, to know that you don't have to think about it anymore”, as ISGER described. The limits of self-optimization are never-ending in principle, and as such vulnerable to addiction.

First of all, the self-control relation with its examples in the self-discovery section of the cognitive dimension fits appropriately into the mode of using ST to self-enhance. The lust and curiosity to discover one's own behaviors that are new, unknown or that one was unaware of, responses to stimuli, hidden bodily potential – all indicate that ST technology is aimed to reveal this potential and make it accessible. While technology often serves as a means to an end, it need not be applied in a targeted manner and serve a utilitarian purpose (e.g., to lose weight). Rather, it can just as well be used in an unpredicted and unexpected way with an open outcome. Even if the original objective is no longer pursued, the technical measuring instruments will continue to be attractive and “libidiously filled” (Balandis, 2018, p.85).

We can begin to incorporate “data [...as] a ‘prosthetic of feeling’, something to help us to sense our bodies or the world around us” whereby these senses and sensations “can become uncanny reliable”, Neff & Nafus likewise observe in their self-tracking monograph (2016, p. 75). Also, in their ethnographic study Mol and Law describe “the use of measurement machines to train inner sensitivity” to blood sugar levels, which they refer to as “intro-sensing” (2004, p. 48). Berson (2015) depicts sensor supported perceptions as “softening of the boundaries between” inner bodily sensing and in data encoded experiences that “exist by virtue of their availability to our senses” (p. 34). Kang and Cuff (2005) claim in their study of

pervasive computing and augmented reality that microcomputational sensing introduces what amounts to new sense organs and creates additional experience layers, for example through gathered infrared data that convert into valuable information “as if human beings were granted an additional ‘sense’ in addition to sight, hearing, taste, smell, and touch— a sort of sixth sense, a datasense” (2005, p. 99). This may sound and in fact be an exaggerated expectation, but nevertheless the data someone is presented with contributes to the perception of the moment and as an additional actual entity to an “attained actualit[y]”, as Hansen (2015, p. 147) states with reference to A.N. Whitehead’s (1929) process-oriented philosophy. The data affects the person’s perception of the world and ultimately their agency within it with a shift to “a data-driven anticipation of the future” (Hansen, 2015, p.4). This electronic-sense “understood in contrast to sense organs as internal processors of sensory information and indeed to any agent-centered (perceptual) perspective” (Hansen, 2015, p.148) carries enormous potentials for causal effects and “future concrescences” (p. 106) in interaction with the flesh sense – but also independent of human perception and neither of them privileged, he argues.

Sanders (2017) examines digital self-tracking practices in their ambiguity, on the one hand to expand the ability of self-care and self-knowledge in a counter-normative and more liberating way and on the other to facilitate regimes of biopower and patriarchy. ST projects can, in the former sense (which I will use here for my argument), be pursued goal-unoriented and thus experience enhancing where participants “would resist a teleology of beauty, gender identity, or health and surrender herself to an open-ended and temporally unbound transformative experience” (Sanders, 2017, p. 56). Once detached from goals nourished by beauty and health norms, such projects can serve their practitioners in a mindful way – guided by a spirit of openness and not clinging to a specific outcome – and liberating by evaluating the data with less judgement and self-criticism, disobeying rules and instead exploring new courses and limits.

Interventions in human nature such as fitness trainings and already almost ordinary cosmetic surgeries seem to reflect the competition requirements, significant cultural concepts and accelerated time regimes within which we live today (Rosa, 2014). However, I would like to emphasize the democratization aspect at this point and emphasize that those interventions can have a democratizing and liberating effect allowing “for inventing oneself as something new and not yet imagined”, as Sanders (2017, p. 56) likewise observes, and can also be seen as a “Democratization of Beauty” (Rosen, 2004). As such, ST devices do entail aspects of enhancement and empowerment that expand human agency and allow to take fate into their

own hands and to attempt to change perceived limiting aspects, rather than following the neoliberal logic of optimization and growth in economic terms. It is therefore not too far-fetched that the desire to develop some kind of new data-mediated (or enabled) sensory capabilities, which seem unattainable with the ordinary senses, and to innately embodied knowledge about the vital function at issue and develop a habit which yields the desired outcome, addresses to self-tracking technologies and its further development.

Self-Enhancement Perils – Reductionism, the Question of Authenticity

Beside considering the liberating aspects inherent in ST, Sanders (2017) primarily criticizes ST technologies as expanding the “neoliberal-era biopower and post-feminist patriarchal power” (p. 36). As technologies “of surveillance, normalization, and discipline” they can lead “to the attainment of normative femininity” (Sanders, 2017, p. 36) through increased “levels of biometric surveillance” (p. 36) rather than enhancing the human capacities in deliberately chosen areas.

Berg (2017, p.9) interprets the broader understanding of sensors as an “acceleration and intensification of the sensory experiences when being mediated and interpreted through these devices” and hints to the perils of increased pace and reinforced disconnection from oneself that they might carry with them. Likewise, Kappler (2017) is concerned that the practice of self-measurement also contains the danger of reducing the body to a functional context that must be controlled and is otherwise unreliable. The perils are that self-perception and trust in one’s own senses may decrease in favor of trust in external digital media, especially so-called expert systems and technologies – that automation bias trumps human judgment. KAROLINA’s and MY experience with sleep trackers can serve as an example: we both thought that we had had a good sleep the previous night but the device presented a different picture of only few deep sleep moments and rather light sleep phases. This is usually a moment that irritates users: who is right? Was my sleep really that bad? Is something wrong with me, my feelings and sense of my body? Am I sick? There have been cases, not only within my sample but also in other studies, where this kind of technocratic approach to the body and mind as primarily functional entities has been discussed. For example, in Dudhwala’s study (2017) where her interviewee thought that he was able to guess his glucose level after many weeks of tracking – that he had developed a kind of additional sense, which he did not possess before and which is not possible to sense in the traditional bodily way. But

when he looked up his actual value on the display, the deviation made him uncertain and left him feeling uncomfortable about his senses. When we become accustomed to accepting digital instructions unquestioningly and all too willingly, it could lead to a habitualization of self-behavior as a mere machine with thinking outsourced to technology providers and devices, as Frischmann and Sellinger (2018) warn. In their book “Re-Engineering Humanity”, the authors claim a reconsideration of what is at the core of humans and warn not to unconsciously consent to every technology as well as their accompanying terms and conditions of use given to us by large tech companies. They warn that “the blurring of the line between the human and the machine appears to achieve near-complete realization with the optimization of everything from walking patterns to personal relationships”, as reviewer Kalpokas (2019, para. 5) pointedly puts it.

Many human enhancement technologies – such as cosmetic surgery, drugs, nootropics, growth hormones, let alone all the almost cyborgian equipment like artificial legs, cochlea implants, etc. are readily available on consumer markets in the western world. With these technologies, specific cultural practices and notions co-evolve. At the same time, questions reveal with respect to the technological divide respectively exclusion for demographics or regions, and also to data ownership, responsibility and agency in exceptional cases, for example in the interplay between the human will, the artificial leg and a trampled dog.¹²⁴ “The problem is not the drift to mechanism but the drive to mastery”, argues political philosopher Michael Sandel (2007, p.27). A growing desire for enhancement technologies can be observed in the face of promises and predictions of genetic engineering and enhancing drug prescription practices. These technologies might not necessarily undermine efforts and erode human agency, but the “deeper danger is that they represent a kind of hyper-agency, a Promethean aspiration to remake nature, including human nature, to serve our purposes and satisfy our desires”, Sandel (2007, pp. 26-27) concludes that in its excessive form might obscure, devalue, and even erase human capabilities, advantages, and genius. Technology critics such as Martin Heidegger (1977), as one of many thinkers of our times, expressed how a restricted instrumentalist world view leverages our understanding of ourselves and guides the kind of societies we create. Continuous application of monitoring, tracking and self-improvement technologies may lead to the construction of new subject-positions to interlace with the global realms of data circulation and result in a society of exceptionality and

¹²⁴ These are questions that arose within the current debate in AI ethics about responsibility with regards to self-driving cars for example. See e.g.: Nyholm, S., & Smids, J. (2016). The ethics of accident-algorithms for self-driving cars: An applied trolley problem? *Ethical theory and moral practice*, 19(5), 1275-1289.

superiority seeking selves with an “imperishable body” (Chrysanthou, 2002, p 470) in mind that grow increasingly into the main focus and general acceptance of human aspirations in the world. Since ST technologies are geared to adjusting (or optimizing) oneself to an ideal self, the notion of authenticity¹²⁵ becomes ambiguous in this context as well. With the advent of poststructuralist ideas of subjectivity, the notion of authenticity began to change. The enormous adoption of social media self-representations and the broad acceptance to a diversity of enhancing technologies (see Elliot, 2011) testify this development. Cosmetic surgeries can, on the one hand, make people feel better with a fixed nose, nicer breasts, longer penises, delayed baldness, or whiter skin. People who do not feel sufficient in their brain performance during studies can take drugs such as Ritalin or Adderall to increase focus, employees can try to overcome sleep deprivation via an intake of the modafinil containing drug Provigil, and shy and anxious people can begin with the intake of antidepressants like Prozac or Zoloft. On the other hand, the correction of such traits seen as weaknesses leads to deeper ingrained social norms and even more stigmatization of the personality traits and physiognomies they wanted to remedy. “In fact, once the use of an enhancement technology becomes widely accepted, it paves the way for changing social institutions in a way that drives the demand for the technology even further” (Elliott, 2011, p. 367). They become able to change society in ways that force more and more people to use it, regardless of whether they prefer to or not. Beside this self-reinforcing effect of self-enhancement technologies which yields less freedom and authenticity and instead more homogeneity and new pressure for compliances among individuals there are, however, other aspects to consider. Elliott (2011) gives account of a football player who suffered from social anxiety disorder and could only deal with it by antidepressant treatment and therapy. He describes the effect as getting in touch with his true identity again. “Soon thereafter I was able to start acting like the real Ricky Williams”, the patient described, which suggests that “technologies may change people or make them feel different, yet they somehow find a way to describe the change as a process of becoming themselves, or putting them in touch with themselves, or showing them a part of themselves that was previously hidden from them”, argues Elliott (2011, pp. 368-369). The return to the self that is perceived as authentic - usually a desirable self-transformation - seems to be largely based on feelings towards and about oneself and could be equated with, but also confused with, the elimination of unwanted, unpleasant, or hated aspects of oneself.

¹²⁵ For a great discussion of current ambivalences of branded authenticities in different spheres of life, such as politics, creativity, religion and the self-identity, see Banet-Weiser (2012).

It should be kept in mind that digitally supported self-enhancement - whether it comes from perceived inadequacies in the encounter with technology, the power of imagination and creative drafts of possible futures, or perceived coercion by external circumstances and conditions – may become more popular in the near future as technology for those purposes becomes more mature and accessible.

6.2 Technology as Counterpart

6.2.1 Intimate Relationships and Personification of ST devices

As we live in a technologized world and are used to integrating technologies into daily routines, the relationships with them will evolve as well. In times where we are surrounded by assistive devices and programs, such as Siri and Alexa in our smartphones and smart home applications, we got used to and may expect individualized assistance from more and more applications in daily life. The way we regard them, the importance they play for coping with everyday life and the compensation they offer in socially or individually experienced lack of support - which does not dissolve just by the heading of self-responsibility - all lead to a more intimate relationship with ST tech as personal assistant and even counterpart.

In self-tracking devices people sometimes see a kind of interested counterpart, a dialectical partner, and they experience an intimate relationship with them. Continuous interaction with those devices may encourage people to even attribute personality or emotion to them. These devices are treated as humanized counterparts and sort of social actors as indicated in using the pronouns “he”, in the same way as assistant systems with female voices or navigation systems are often referred to with the pronoun “she”. I observed this theme of personification of ST devices in this study’s participants. These and further observations, which I will discuss below, suggest an increased intimacy in the relationship to technology that is also used for non-obvious purposes that do not follow any external direction but serve the adjustment of affective processes.

“He learns by watching what you pay attention to”

TABEA: "He learns by watching what you pay attention to. That is, whether you read the nutritional tips, or whether you read the sleep tips, or whether you set the sleeping time, i.e., a reminder. And the more you quasi-feed the thing and the more you deal with the thing, the more the thing learns about you and can evaluate you better. And the less time you spend with it, that is, you only look at it once a week, instead of every day ...um ... well, I often saw things twice, that is, I saw tips twice, because I didn't click. (pause) I don't know how big the repertoire of that thing is ... my idea at the

beginning was, the more I give him data, so data with data I mean the more I tell him what I like to be considered, the more he learns about me. And can then give me specific tips. (pause) But I believe that there are limits. But that would be really cool. I would really like that”

TABEA enjoys getting feedback from the smart coach function of her Jawbone smartwatch. This may be information about the distance she ran, a praise for having achieved her step goal, nutrition recommendations while training for a competition or sleep tips for a good time to go to bed, for example. The alleged delegation and thus passing on of decisions to technology, however, turns out to be a desire for assistance and for more individualized solutions. The continuous tracking allows the ST tech and its underlying AI algorithms to learn about the user and thus to provide personalized and individualized recommendations. She said she would appreciate it if the device could learn more about her and, by customization to her needs and the resulting modified relevance, orientation, and tailor-made guidance “he” offers, she would trust it. In this statement, a wish is expressed that would otherwise be found in friends or partnership relations but is now being sought from technology. TABEA also expresses a large amount of confidence in the received recommendations from the app’s algorithm but also some skepticism towards the tool’s capabilities – which still does not dissuade her from believing in the essential support that these tools provide her with. Eventually, the final decisions on the following steps remain with her presumed autonomy. However, the ST device expanded the information sources through additional sensing and bringing information to mind that she was previously unaware of.

Likewise, KAROLINA is referring to her smart watch using masculine pronouns, as we can see in the quotations above. Karolina mostly uses the pronoun “he” when addressing her device, although she obviously did not think of it as an animate entity.

KAROLINA: “And then I observed that... whether I could sleep well and had enough sleep at all, whether that was enough now. He controlled all that and he shows what percentage I've reached. Because I'm supposed to sleep for eight hours”

“As long as my watch is here, he will notice everything”

As personal assistants, ST devices are available 24/7, constantly noticing, recording, and sometimes commenting on one's steps, for example. On the example of the following quote from KAROLINA, one can think of technology as a supporter, a caregiver, something that "is" interested, is noticing everything, is attentive – and conveys the feeling that someone is taking care of you.

KAROLINA: "Well, as long as my watch is here [points to her wrist] he will notice everything I do [laughs]"

These above quotations indicate an affective relation of the users and their ST devices through anthropomorphizing/ personifying them. User express affects of pride, joy, satisfaction and trust – and also negative emotions such as annoyance and frustration, as described in the chapter "self-caring-mode" – in explicit reference to that technology. Since, of course, they do not really believe it is a soulful entity, we are talking about a personified relational setting. Interestingly, this explicit kind of personification only occurred with my two female interviewees. They did not use the masculine pronoun continuously but also used the neuter pronoun and called the device 'the thing'. When our devices generate reports, automatically logging how and where we have moved, how much we ate and drank and how long or short we have worked effectively, "we have allowed technology to become very deeply enmeshed in our self-representations", Rettberg (2014, p. 56) similarly argues. The observation of anthropomorphizing computers has already been made by Sherry Turkle (1984, 1995) in her pioneering ethnographical work on user-computer relations in the 1980s and 1990s. As explicated in the "Why Ethnography" chapter, Sherry Turkle's extensive research with over 400 computer users in various contexts showed strong affective reactions and personifications of computers by their users, influencing people's self-image and their way of thinking about personal and social relations. Drawing on Turkle, we no longer insert commands into the PC, but enter dialogues and create virtual environments, which then become part of our reality. Our relationships to computers are changing our minds, self-understandings, and self-concepts, she argues, what is emerging is a new sense of a decentered and multiple self. I interpret above examples as an instance of anthropomorphization of technology. Anthropomorphization is usually understood as attributing human characteristics to non-human objects, and can apply to many artefacts, phenomena, and events, also such as Religion (Guthrie, 1995). "Artists and audiences alike see even inanimate things as humanlike. We may anthropomorphize objects simply by placing them together. (Guthrie, 1995, p. 85). A body of research on the personification phenomenon has tried to find explanations. For example: anthropomorphization was

described as a means to cope with the stress of interacting with technical devices (Luczak et al., 2003) – a result that fits well with the description Turkle gave of a woman working with computers in a travel agency who had accused the computer of having made a mistake, not as an excuse, but because she really believed it.

Also, TABEA very frequently speaks of her devices using personal pronouns like “he says..., he shows..., he gives me...”. It indicates an earnest approach and a seriousness with which these tools are used. For example, while tracking her sleep she compared the data and results compiled by the device that show if she had had long phases of deep sleep or if most of her sleep was light with her own feelings and then approved the device’s results, referring to it in a personified way.

TABEA: “... so I think I have a relatively good body sensation and notice ... um ... if I drink too little, for example, or if I haven't had enough sleep, or if I really lack movement. And that then my sense is in line with the things he tells me. Say, if he tells me you had very little restful sleep, that I noticed that too, that it also corresponded.”

When I double-checked if she had ever had another, contradictory experience, she denied it. Even when she has slight doubts about the outputs related to her sleep quality, she feels self-affirmed and somehow self-elevated (“above average”) when the device shows her that she is supposed to have had 3 hours of deep sleep – which she considers very good.

TABEA: “For example, he knows my age, my weight, he knows such things, you just enter that at the beginning. And that he then ...um... referenced you're a woman of that age and weight and that's it ...um... is the average at 2.5 hours of deep sleep or something, or 2.3 something, approximately. And that means you are above average; you had a good night... (laughs)”

She relies on the algorithm’s references to her age group and sex with which she can compare and seeing that her value was above the average transduces the sensation of having slept soundly and being relaxed. These examples again indicate how engaging with self-tracking technologies and relying on their authority, truthfulness, and reliability can impact our sensations and emotions and thereby mediate a self-relation and reinforce these technologies' usage in the future. The technologically mediated self-understanding of feeling rested becomes obvious in this example.

A portion of skepticism remains since she was, after several queries, unable to clarify or conceive of her giving the authority to determine her mood and condition to the app. She

stated that when she was in interaction with the app, i.e., engaging with the data with correlations, causations, tips, or improvement plans – she was in the mode of being with the app – as she named it. This can be interpreted as the above-described state of “being in the zone”, which TABEA experiences like a quality time with herself or with a friend, where she reflects and talks about her behavior or a bodily condition and feels in “resonance”, to use a term from Hartmut Rosa’s (2016) “Sociology of the good life”.

In a later part of the interview, KAROLINA says that ST is like a journal/diary for her. This description is the only one she gave during the two interviews, but it further substantiates my argument of a perceived intimacy between ST technology and the user. This intimacy manifests in the form of a dialogue or a project executed together with a counterpart, the ST technology. For a long time now, she has been trying to lose weight, but she cannot make it last. ST tech seems to be a new, promising method and tool that fuels her expectations, and she hopes it will be able to help her reach her long-aspired goal.

KAROLINA: "Because I constantly gain and lose weight and work on it to have a better figure, and I think this [tracking technology] helps me ...then you can see if you have improved or not ...then I can see my progress (!) ... and also to see that I am doing something (!)"

“Like a nanny saying, ‘Hey, watch out!’”

The third metaphor used for engaging with ST technology I came across in my empirical material – after PHIL’s “aligning to/ facing north” like a compass, or to ground oneself, like taking roots and standing straight and strong like a tree – is the caring nanny. The already discussed (chapter 4.3.1 (2)) observation that ST technology offers orientation and relief from the burden of task multiplicity - what some authors (e.g., Schüll, 2016) refer to as delegation to technologies - reveals here a possible new relationship to technology. Technical devices used in daily situations may be seen as helpers, friends, trainers and sparring partners, as the material in the case of KAROLINA and TABEA exposes directly, and, in the case of ANDRE, RAGNAR, FLORIAN and PHIL, indirectly. The four of them appreciated the device’s recommendations but without personifying them directly. For example, ANDRE said several times: “It [the ST app] just tells me: hey go to bed earlier” – a recommendation that he finally followed. Likewise RAGNAR, who did respiratory exercises recommended by the app according to his perceived stress levels. FLORIAN made many of his daily decisions based on his personal data dashboard, deciding whether he will

exercise that day, for example, and PHIL followed the app's recommendations regarding his food intake and financial expenditure, for example. Technology thus can be seen as "experience that is open to the sensual, emotional, volitional, and [...] imaginative aspects of felt experience", McCarthy and Wright (2004, p. 184) likewise conclude. Self-tracked data can thus form a "lived experience" (McCarthy & Wright, 2004, p. 183), whereby the context of use and the user's current life situation form a complex assemblage altogether.

FLORIAN reported in an informal talk about his newest connected home gadget that was able to measure the CO₂ percentage in every room, among others. He became frightened when he invited a group of friends over for a party in the winter and found that the CO₂ level in the apartment increased more than average. Florian immediately got scared, opened all windows, and even considered finishing the party earlier. Even months later, when he retold the story at a local QS meetup, one could notably feel his irritation about what he had experienced. Nevertheless, the next time I talked to him I double-checked that situation and wanted to investigate his anxiety further but then he toned down the description afterwards.

FLORIAN: "eeh, no not party over...But it was actually totally exciting to see that 20 people in the apartment led to a value of typically between - in our case it fluctuates between 500 and 1000, and in summer it is 400 to 700, depending on how you ventilate - and that this value with 20 people producing so much CO₂ indicates 3000 or 4000. That was just interesting and I already aired, it's true that I then said: 'Yes, sure, now I have to open windows right away'. And then I also noticed that I was missing this oxygen myself. It wasn't fear, it was just... Actually I was grateful that the technology... Maybe I had drunk too much alcohol and wouldn't have noticed that the air is shit and then it was helpful (!), this support was simply like a nanny saying, 'Hey, watch out!' [laughs]"

FLORIAN states that after reading the CO₂ value on the meter he actually sort of felt the lack of oxygen himself. The data transduced into a feeling of less oxygen, and additionally he felt gratitude towards the device that warned him – a piece of advice he followed immediately. This is another indication of the transition from endogenously and socially/inwardly determined to increasingly technologically mediated self-relations and self-perceptions.

Similarly, TABEA describes her device as a helper or a kind of minder when she talks about her low blood pressure, which she does not notice all the time, only when it gets too low. As she might notice it too late and will therefore not have a good training run or sports contest, she became interested in her heart rate and blood pressure values. She says that the

tech helps her notice processes in her body, for example when she drank too little, or did not eat enough:

TABEA: “And then I thought - hm, put that thing on top, then you can see your blood pressure (laughs), so I played with it a little bit, actually, that a um...not a watchdog - that is too much, but just because I see that it’s all right, I’m just kind of around 60, which is not so high. And, that’s, um... yes such a small helper”

As explained above, it may be sociologically interpreted that using an app, for example to explore our moods in certain places – like MYSELF at the refuge at the Baltic Sea¹²⁶ or in certain situations, like RAGNAR in face-to-face business meetings (although he loved his work and employer a lot) – is to be judged as outsourcing and delegating decisions to a technology, and more specifically, to an algorithm that is built relying on the cultural standards, societal norms and personal biases of the developers and may be steered behind the scenes by people led by economic or political interests. Anthropologically, by looking at the individual human being, it may also be interpreted that using the ST app is rather an act of taking a closer look with a partner at one’s moods, taking time to engage with oneself – when else does one ask oneself how one is feeling right now? The ratio indicates that this is truly an excellent place to work or spend one’s spare time. However, other factors such as other people or the absence of other people, the surrounding, amenities or other things turn out to determine the mood in a significant but maybe yet unnoticed manner. The ST app then is the counterpart who “listens, pays attention, gives feedback and advice” and assists in revealing those factors.

PHIL tracks his food intake precisely. He takes pictures and adds his calorie intake at every meal, although exceptions happen, too. For him, it is important to see how much he has already eaten during the day or week to then decide what and how much he can indulge himself.

PHIL: “When I see that I’ve been eating correctly over the past few days, I know that I can kick over the traces”

¹²⁶ There I discovered after using a mood tracking app that I did not feel well there although I thought I must feel great because it is at the sea and in calm surroundings - something I usually appreciated a lot - but obviously this was not enough to ensure a good feeling for me, for I was lacking other people and felt alone there.

Thereby he shows that that he is not meticulously following the recommendations of the apps but finds them rather helpful - like a casual talk with a friend. For example, he also feels supported by his toothbrush:

PHIL: “that starts with me having a bluetooth toothbrush that picks up the brushing. With common sense, you can say that's unnecessary because you actually know how to brush your teeth. But it's just a help and if it can do that, it records it in the background while you brush, you can download it as a PDF, you can look at it and it's helpful data where I don't have to do anything except use the toothbrush and then it all goes automatically”

By accompanying and acting in a quasi 'partnership' and giving feedback on actions and assisting in getting things done / personal projects of all sorts, intelligent technological systems can be seen as partially substituting interpersonal relationships. In addition, the privacy of the data shared with them contributes to their being perceived as companions and becoming a projection surface for social interaction. ST technology and data “perform” as sort of social actors: a friend, a partner, trainer/coach or a nanny. Since ST is not a spatial phenomenon, neither physical like in the interaction with robots nor virtual like with holograms, the attribution of human characteristics to ST Technology applies in the meaning and in a relational way. With the notion of anthropomorphization I emphasize the increasing role of digital technologies for changing forms of relationships in the digital age and relevant sociological as well as ethical issues coming with them. It has been argued that the anthropomorphization of technical devices is a common phenomenon (Caporael, 1986; Eddy et al., 1993; Luczak, 2003; Nass et al., 1993). Likewise other studies (e.g. Luczak et al. 2003; or Bovenschulte 2019) discuss technical devices as a kind of digital life companions. “This [the omnipresence] can lead to an anthropomorphic projection on the part of the human interaction partner, who perceives the technical system as a person and the interaction with it as a social relationship.” (Bovenschulte, 2019, p. 1).

When technology support is missing

Accordingly, an experienced lack of supportive information can lead to negative emotions about the technology and about oneself as well. I observed myself, for example, getting disappointed when the device did not support me in the expected way and did not provide the wished-for information to improve or to relieve obviously experienced burden.

This resembles a longing for support that one would or could also address to a friend or family member but is now being transferred to technology.

MYSELF: “No less important are the associated apps. They offer me a graphical presentation of my collected data and hopefully (!) also tips or coaching on how I can improve something - in terms of sleep or running, for example. I have tried the Withings health mate app and don't think it offers that much. Simple graphics, and no tips - just simple, general information about sleep”

According to the titles and teasers of myriads of available self-help books on the market, people can achieve whatever they desire and ever wished to transform into. Once they know the methods and have the right tools they can rebuild/ remake themselves anew, they promise. In this sense, ST tech may increasingly serve as a practical further development of, or complement to, self-help books. As we have seen, it is seen as a kind of collaborator and a dialogical and dialectical partner and is deeply involved in discovering and uncovering things in and about oneself. Technology offers support and relief in difficult decision and questions with guidance, permission or justification regarding the management and conduct of a good life.

The ST tech and especially the tracked data gives justification for doing something or not doing it. For example, it can be experienced, as in my case, in the form of the good feeling of having met an interim deadline. One can feel like it is allowed to step away from the intentions and duties, be it only after negotiation (Sharon & Zandbergen, 2017) with the gathered data and the advice given to us by technology. For example, it may lead to someone going out again and taking a few steps because they have not yet reached 10,000 steps, which is the case with TABEA, ANDRE and RAGNAR, for example. A variation of this is permission and admission to act or to refrain from acting on one's own initiative and redemption from an obligation, for example PHIL when he felt that he could indulge in a sumptuous meal after spending the entire week recording calories and sticking to the recommended sum, or MYSELF after completing a fixed number of work-pomodoros (time slots of, for example, 30 minutes) I felt free to do something else.

MYSELF: “...one should set goals and then reward oneself for achieving them - in small steps of course. I always forget to reward in a conscious way. And I feel more ‘dismissed’/released now I can do something else, the hanging sword of Damocles above me is gone... Weird”

It was as if a teacher, a parent, or some other legitimate counterpart would confirm that I had done enough work for the day and allowed me to get up and do something else. For some time now, there have been areas where certain personal tasks have been delegated to technology, such as reminder apps to think of chores for example, calendars to remind us of our friends' birthdays, notes apps to capture and record ideas and thoughts. Online, there are a lot of comparison sites to elevate decisions on which providers and suppliers to choose, for example for electricity, mobile plans, insurance, physicians, restaurants, and the like. Digital assistants and wearable devices arise within self-tracking technologies to help us choose nutrition based on our bodily values and goals, to compile training plans based on our individual goals and heart rate monitoring, to remind us of the right posture (the posture belt) by vibrating when we sit at the desk like a C, to eat more slowly to assure better digestion by counting the frequency and speed with which we move the fork to the mouth (Happi Fork), giving us a gentle acoustic feedback signal when we gobble dinner, i.e., chew a meal less than 30 times before we take the next bite. It is tempting to delegate such for us important tasks we want to take care of too little helpers, led by the seductive imagination of then gaining more time for other (more) important things in our lives. As Rosa (2005, 2013) argues in contrast, saving time through technology and even thinking we would gain more time when technologies free us from certain duties is a misconception because we are simultaneously more engaged with the technology itself and with maintaining, for example charging, updating and upgrading. We may even use these technologies more often (e.g., do laundry more often when using the washing machine) so that at the end the time-saving is leveraged out. I argue that ST devices can penetrate even more areas of our lives and relieve us of many burdensome tasks. As a result, they are becoming more important for us, but they also entail the potential for dependency. If not used consciously, digital helpers may misguide and manipulate users through the allure of passing over decisions to economy oriented, programmed algorithms i.e., advice without thinking, as has already been suggested (Dumit, 2012; Frischmann & Selinger, 2018; Schüll, 2016).

An idea related to the one presented here of more intimate relationships with ST apps and devices is the idea of data's intimacy. The idea that "machines will know us better than we know ourselves" reflects, according to Hong (2016), a "'knowing' that embraces modernity's epistemic virtues of accuracy and objectivity" (p.2). Yet PHIL, who also tracks his media consumption, is very flattered by the Spotify playlists that were suggested to him, for they matched his music taste very well after a period of learning about (tracking) his listening behavior. In a similar way, self-tracking apps could (machine-) learn about the body, and the user's other specifics such as mood and habits and would present smart advice one

day. This could sound like the following alert: “The last time you had this heart rate, blood sugar level and number of steps, you had a bad night” - the user would then be advised/educated, like by a parent or a good friend, with possible countermeasures to avoid this.

6.2.2 Rethinking the Human - Technology Relation as Coevolution

There is a long tradition of assuming that technologies are not neutral, not a product of free human creativity and engineering and a bare tool (Heidegger, 1954). Simultaneous development und mutual influence of humans and technology has also been postulated by many authors before (Lem, 1961, 2013; Licklider, 1960; Simondon, 1958, 1989) and may be considered a Human-Technology Coevolution. Licklider’s ideas of a human-computer symbiosis prove to be prophetic considering the described link between the application of monitoring, tracking and improving technologies with respect to oneself, the resulting data and the human reflection and accompanying emotions. While symbiosis is a term primarily used in the context of organisms, it is already indicated here that the human-computer relation may enter a new level of intimate connection – a dialectical partnership as I call it – between the two participating parties. I observed that the engagement of the user with the ST technology, i.e., the tracking process, the devices, and the data, was primarily a one-on-one relation. Users barely shared their data with friends, spouses or family members and the exchange of data took place primarily between the user and technology. ST users took the recommendations seriously, although the final decision on their respective courses of action seemed to remain in their custody. These decisions were based, as explained, on the one hand on data, supplied comparative values, own empirical values, and memories as well as the feeling in the respective situation.

The types of relations to technology can only be theorized as a continuum in which these relations do not stay exclusive but can rather change in time and context. For example, electricity as a background relation in Ihde’s (1990) post-phenomenological terms can change into a hermeneutic relation if we want to determine the exact amperage and it might change into an alterity relation when we use home assistant systems to adjust the brightness in the room. As technology builds an important part of a culture - some authors even equate it with nature or rather proclaim technology as the new nature of humanity (Haraway, 1991). It is

known that cultural techniques like cooking had a deep influence on human development and changed how our bodies developed. We have smaller jaws, smaller guts, bigger brains etc. Nowadays, in the same way it is to be expected that our bodies and cognitive selves will change with the technologies and cultural practices we accept as our daily routines. And it can be expected that the technology-human coevolution will lead to new relations and levels of intimacy that strengthen the relationship between people and technology and even redefine it in terms of partnership and dialectics.

Ruckenstein (2014) sees a co-evolution of ST tech as active processes with humans for “while being shaped by self-tracking technologies, [people] also, in turn, shape them by their own ideas and practices” (2014, p. 70). Also, Kristensen and Ruckenstein (2018) follow on from the idea of a co-evolution¹²⁷ between human biology and technology and see a strengthening in agentic forces through the self-tracking practice – as data visualization “pushes people to act and reflect” (Ruckenstein, 2014, p. 73). Sharon (2016) emphasizes negotiation efforts between the data and the feeling self, Rooksby and colleagues (2014) point to strong emotional components, such as guilt or shame, in the interaction with ST technology, similarly others point to feelings of “doubt, guilt, fear, dismay, disappointment and hesitation as well as joy, enthusiasm, and pride” (Salmela-Leppänen et al., 2018, p. 1, as cited in Ruckenstein & Schüll, 2017, p. 268). ST users sometimes report feeling addicted or compelled to use gadgets even in extremely inappropriate situations, like in a lifesaving expedition (Foss, 2014) or like they are losing their intuition and the sense of their own needs, which leads them to seriously rethink and even cease the use altogether, as Carmichael (2010) did.

I argue that at the beginning of using ST technologies many want to improve aspects of themselves, such as weight, sleep quality, fitness, or productivity. When they notice and experience that the devices pay attention to them, that they record every movement and event we tell them to and give us advice, information and knowledge and celebrate our achievements – all these mediate a feeling of being cared for, a perceived care for ourselves with the help of technology. Since we like things and activities that are good for us, it can be assumed that this technology providing attention and affection is also gladly used (more often). This deepens the intimate relationship with this technology in turn and a positive cycle may be initiated. The longer we apply these techniques on ourselves, the more our

¹²⁷ Sharon (2014) elaborated on the thought history of the coevolution idea following the ideas of French materialists that had discussed a coevolution along different human dimensions, such as language (such as Gaston Bachelard (1934)), organs (“tools and machines are kinds of organs, and organs are kinds of machines” (Canguilhem, 1975, p. 143) and environment (Simeondon, 1980).

knowledge about the good functions of these devices grows in turn. We contribute to their development as they do to ours (see also Ruckenstein, 2014). As one might have already seen in robotics, technology is quite suitable for arousing feelings and evoking the wish to possess and build a connection with it. Anyone who has ever experienced robot pets or robots in geriatric care knows how quickly an emotional response to them can occur. It is therefore quite reasonable to expect that dealing with technology that gets and feeds back a relatively exact picture of a self (perceived interest) and advises actions and behaviors (based on collected data with the help of algorithmic wisdom programmed into the app) conveys a feeling of having a connection with it and being cared for. Additionally, the engagement in ST can be considered a tacit agreement between the STer who commits him or herself to exercise, drink water, save money and the device that analyzes the progress, keeps the records and advises on particular measurements, if needed – a partnership matter.

However, the interaction with these devices can be treacherous. Schüll's (2016) term of "data for life" points to the targeting of ST products for lifelong use. Industry actors, such as the designers, developers and marketers behind those products design them to guide our behavior through the promise of decision making support and thorough care for oneself while constantly updating products for that purpose. Likewise, Rettberg (2014) points to the aspect of the nudging designs of ST devices, as they are "designed to keep us interested, sending notifications to our phones if we have ignored them for too long" (Rettberg, 2014, p. 58). They encourage users to keep their eyes on the goal in an often-gamified manner and thus to keep using these devices as smart supporters as well. "Lifelogging apps likewise claim that the current situation is a game, but these gamified lives of ours are games that will never end. There is no winning or losing situation, only a series of goals. Once one goal is achieved we must work towards the next" (Rettberg, 2014, p.59). The paradox situation that emerges here is a never-ending process of goal setting and goal achieving.

Furthermore, the scientific-like approach in ST can be linked to the mental image that the body essentially is/functions like a machine. Since the brain is part of it, it must also be "operational" (within limits) and desired performance improvements regarding memory, reaction speed, learning and linking new content, for example, must be generally attainable. Additionally, this idea can also be linked to the imagination, hope, and expectation that technology can be capable of and provide the desired functionalities and implement or transform them into ingrained human capabilities. ST thus reflects the idealization of the machine that is present also in other areas and expresses itself, for example, in the admiration of AIs like Deep Blue and Alpha Zero, the proliferation of stock trading bots, algorithmic automated call center queuing, the appreciation of the recommendation algorithms of Spotify

(as PHIL expressed) or Amazon, and recently even in AI based translation software like deepl.com. The tasks these machines do correspond of course to human tasks because that is what they were made for. And it is no wonder that machines completing defined tasks is much faster and more extensive. As a result, one could be happy to have such helpful helpers on hand or one could start to envy these machines. Nevertheless, a lot of thought is given to and investment made in the humanization of machines, but are we not heading into a self-machinization of people without noticing?

6.3 Technology as Promise

6.3.1 ST Technology as Promise of Salvation

Recently, questions about the onto-epistemological status of the generated data, the “thing-power” (Bennett, 2008; Lupton, 2017b; Viseu & Suchman, 2010) and their co-production of the agency of the self, nourish the discussions. The third technology relation that becomes evident in self-tracking, both in practice and technology, plays a special role in the elaborate triad of technology relations. It is the least proven, at the same time the most provocative, and yet, in my opinion, very plausible hypothesis. It is the relation to technology as a promise of salvation – technology as Heilsversprechen. The examples I am using to substantiate this hypothesis consist of the possibility of healing chronic diseases (FLORIAN or RAGNAR), helping to prevent disasters (PHIL, who knows that too much exercise is unhealthy and tries to keep it under control with ST) or fulfilling long nurtured desires (like losing weight for KAROLINA or ARNE, or concentrating better for MYSELF) that to date could not be realized by oneself. In this sense, technology as a Heilsversprechen¹²⁸ can act as a counterpart to whom one directs hopes and wishes. Technology is always more than just technology; it is also always a promise. In this context, the proliferation of computer science and engineering metaphors and their implied world views, philosophies, and assumptions in

¹²⁸ This relation to and expectation of technology also becomes evident these days in the AI debate. This debate has already been going on since the 1960s but recently new developed techniques, such as machine learning (ML) and matured neuronal networks seem to promise huge progress in, for example, medical diagnostical areas, criminology, efficient customer service and the like.

contemporary society is considerably underestimated. It is therefore worth looking deeper into it and to attempt to explore its origins and mechanics.

“It is like a Heilsversprechen”

Two examples of addressing hopes to technology for the healing of unresolved medical questions and diseases are FLORIAN and RAGNAR. They were measuring and observing their reactions, tracking patterns and dependencies as they were both trying to overcome chronic physical restrictions, as I described above in the motivations chapter. They were both already engaged in seeking solutions and treatments that would go further than the unsuccessful traditional medical treatments and placed their hopes on self-tracking technology. During an informal talk after a quantified-self meeting where we had a drink and talked about him using a variety of ST tools and practices, FLORIAN even named it literally: “It’s like a Heilsversprechen”. Apart from the already known ST practices, FLORIAN used services such as gene sequencing and PHIL used services that offered comprehensive blood screening with additional recommendations for the optimal diet to achieve certain goals (run a marathon, lose weight, build muscle, etc.) easier. For some of my interviewees, the expectations and imaginations of ST technology had something enchanted, mystical and unique and was not bound to an explicit cure of something.¹²⁹ RAGNAR was very much interested in intensifying his previous experience of lucid dreaming. Like he said in the quote I already used in the self-control chapter, steering dreams via technology intrigued him and awakened his imagination:

RAGNAR: “that you really have a connector for conscious dreaming. And whether that works I can’t say exactly, but I find something like that sometimes exciting. But of course, these are also points where I say ‘Yes, lucid dreaming can be learned in other ways’. But if it should work, it would definitely be innovative. But of course, it is always a risk when you sleep, and you really do manipulate your brain waves in such a way that you can change your dreams accordingly. It’s just not completely harmless”.

The urge to self-improve or self-enhance regarding performance and capability may also be linked, to a certain extent, to the field of religion or, more concretely, the loss of religion and the associated transfer of its meanings and functions to other addressees may

¹²⁹ On enchantment in the consumer culture see e.g., Ostergaard et al., 2013; Ritzer, 2010; on technology of enchantment as psychological weapons for manipulation, see Gell (1988).

play another important role here. The quest for self-examination, self-regulation and self-improvement is a core tenet in a range of world religions,¹³⁰ all of which have become important themes in the development of technology and its undercurrent of Gnosticism (Davis, 2015; Noble, 1997; Thompson, 2004).¹³¹ The second essential building block in belief systems is often the belief in a higher power and authority. A stronger belief in the power of technological solutions in many contexts of life that partly replace lost religious faith and support has been observed by some authors (Davis, 2015; Frischmann & Selinger, 2018). It is just as essential that modern science and technology has deep theological roots (Noble, 1997; Szerszynski, 2005) so that “technology is still inflected by soteriological meanings that were coded into modern technology at its very inception in the early modern period” (Szerszynski, 2005, p. 813). While technology shapes our lives profoundly, its mechanics and functions at the same time appear to us in an increasingly unobtrusive and obscured way. People thus may regard technology - for example Bluetooth, wireless internet technologies or AI based recommendations - as “magical phenomena” (Caiazza, 2005) and let their expectations and desires for a magic hand through technology grow. Technology is the new addressee of our hopes and desires and for some it even became “the reigning religion of our day” - as commentators bemoan technological development in the media (Mahdawi, 2013). Not only do we place all our hope in it in the case of illness and injury, but also in times where we need to choose and decide about so many aspects of our everyday life relief, assistance, or guidance come highly appreciated.

Similarly, applying ST tech can also give hope for acquiring or breaking a habit, such as smoking or eating less through encouragement and perceived or even shown attention. This was the case, for example, for KAROLINA who was trying to lose a considerable amount of weight (around 16 pounds in 2 months), which is normally not easy to accomplish, but she feels confident doing this with ST tech.

KAROLINA: “I would now like to lose 8 to 10 kilos by the end of the year. I have two months left. And if I continue to do what I did before, I can do it. And then until May, if I continue like this then until May I am already generally at my goal. I must be consistent. So short distances I would

¹³⁰ It has been criticized that the notion of religion as a western terminus is not applicable to the cultural and ethical systems of other parts of the world, such as Islam, Buddhism, Hinduism and others (see Tenbruck, 1993). For the sake of simplicity, I will use this term of religion anyway to refer to belief systems that are primarily used to help conduct life, to place hopes and sometimes also offer a theoretical possibility of life after death.

¹³¹ I am indebted to an anonymous reviewer of an optimization paper I am working on with a colleague who pointed to this

manage. For example, if someone said: ‘Yes, I have to lose 5, 10, 15 kilos now’, I would do immediately. But I have a lot more to lose. And it's such a long way. So I'm sticking to it”.

An example from MYSELF that I already used above is me trying to learn continuous concentration and putting my hope in new forms of self-technologies. I used the Pomodoro app, which should help me concentrate on work for at least the duration of the 25-minute slots and experimented with determining the number of pomodoros per workday. My problem was obviously that I wanted to do more than I actually put down on paper, which made me unhappy and feel like I was not efficient enough, which is why I put my hopes in new techniques (such as the idea of focusing on work for 25 minutes, and pausing for 5 minutes after, then repeating that cycle several times) and technologies that kind of run in the background remind me to take breaks and praise me for reaching the target, giving me a confident and secure feeling about myself.

MYSELF: “Why do I believe in numbers so much? They give me some kind of support, some direction, something to go after. Sometimes it seems to me that I am more concerned with them, more with the goals and their optimization than with the achievement of the goals and the related outputs, pleasures, etc.”

My interpretation of these thoughts, feelings and behaviors is that the app served as a kind of Heilsversprechen that supports me and nurtures me and gives me hope of improving my situation. The second part of that quote can be interpreted as being in a reflective entanglement, a dialectic conversation, and negotiation (Sharon & Zandbergen, 2016) with that tool that may resemble a meditation or prayer directed at a higher authority. Thinking “there is something wrong with me” (as described in the self-care chapter) and not knowing how to address this feeling properly serves as a similar manifestation in this category of technology as Heilsversprechen. Self-tracking activities can bring alleviation through any kind of engagement with oneself even in a yet unknown direction, it may have a function akin to a prayer – as I observed within my own ST practice. This can be interpreted as immersing oneself in an inner dialogue with a yet unknown superior entity which we consider powerful (i.e., influential) enough to help us in some way, be it through a hint, through a magic hand occurrence or just the relief of passing the problem to another instance. “At a macro level, science has become a powerful techno-social engineering tool that rivals religion. For some, it has become a secular form of salvation. Instead of praying to God or

the gods for help with some calamity, some place their faith in science's ability to solve all problems", Frischmann and Selinger (2018, p. 49) similarly argue.

6.3.2 Technological Messages - Promises in Marketing Communication of ST Devices

Many promises have historically been made in technology. For example, the Human Genome Project evoked promises of "blueprints of 'what it means to be human' to be drawn precisely, 'books of life' to be read, diseases to be cured—in a word, the 'holy grail' of biology to be grasped and quaffed", as Fortun (2005, p. 157) depicts the rhetoric in genomics sciences while arguing for an ethics of promising. Albeit sometimes promises appear exaggerated. They cannot be judged as mere deceptions or lies as they inspire research and development in basic sciences, which at the beginning were still not very productive in epistemological and economic terms. Sciences can become "a machine for inventing the future"—because, paradoxically, they've already downloaded part of that future into themselves, via promising", Fortune (2005, p. 165) argues.

We are witnessing an upvaluation and obsession with data in society, where data is being viewed as more accurate and precise than human perceptions and judgments (Beer & Burrows, 2013; Boyd & Crawford, 2012; Feiler, 2014; Sharon, 2017; Wolf, 2010), and therefore superior. Nevertheless, sensor technology, data mining, and AI based trend forecasting produce an abundance of diagnostically valuable data. Health data gained in this way "could never be detected by the eyes of a doctor in real-time", as Schüll (2018, p.9) points out, establishing "an epistemology that concerns itself with time-series data rather than immediate experience; correlation rather than causation; patterns rather than events" (Schüll, 2016, p. 9). While people may expect technology to be neutral and unbiased, it was shown that it is not. Technology presents inherent technological affordances, i.e., set default functions (Gibson, 1979), as well as inscriptions, i.e., the developer's cultural, social and gender biases (Akrich, 1992) and addictive designs (Schüll, 2012) – often for the benefit of third parties, interested customers' life cycles or patterns to address advertisement to, for example – that trackers need to be aware of.

Promises of achieving life relevant goals and desires, better sleep, cognitive peak performance, exercise intentions and healthier lifestyles, are the basis of most communicative

and design elements of ST technologies. “Live healthier and achieve more”¹³², “Get fit, motivated and connected”, or “get the best out of every day of your life” – it is no surprise that with these promises and invitations made by companies offering self-tracking devices many people feel encouraged to give it a try and see if their hopes and desires, self-images or hidden dreams finally find the right tool or technique to realize those intentions or even if they can help reach plans they did not even realize they had. I have described the strong aspect of motivation in the action-oriented dimension of the self-controlling relation. This invitation to do the exercise, to insert calorie intakes, to stick to the planned working intervals my interviewees experienced – although set up by the user – is appealing to us through and by the ST tech. In this sense we can interpret the technology as having a performative dimension and exerting power to impel us to pursue goals, no matter if they are purely individual or adopted from social and cultural norms and expectations.

ST technology appeals to the user’s desires through performative utterances, longings and needs and promise remedy. They thus convey and mediate a sense of care, support, interest, confidence, and a sense of security, be it ontological security or decision-making confidence. In this way, self-applied technology has a new function. It is no longer just a tool or extension of humans for performing tasks outside one’s own body or for transmitting information and mediating communication, for example, but has a direct effect on the organism.

As discussed above, TABEA reported that after retrieving her sleep data, which attested her a good sleep with deep sleep phases, she felt the sense of being well rested. Another example stems from a study by Kappler and Vormbusch (2014) where participants report a noticeable change in their mood (i.e., happiness) when triggered to assess it on a scale. All the testimonies both in my study and other studies in the ST field, such as that the ST app motivates the user to exercise, take more steps or go to sleep earlier, I likewise consider fitting into this category of technology-mediated feedback that modulates our actions. In the chapter about the negative side of the affective dimension (Mode 2.3, subchapter “Am I somehow not ok?”), I describe several situations where I, MYSELF, felt coerced and compelled by the app to fill out questions about my mood although I had already realized that it does not bring me the wished-for answers. Beside my hopes placed in ST technology to support me in crucial questions and help me find the way out of it, it also influenced my actions, i.e., to do the tracking, even if reluctantly. A similar occurrence was the running clock of the pomodoro

¹³² Advertisement slogans from Microsoft Band ad, Basis Peak and Optimized App for iOS <http://optimized-app.com>

app that urged me to stay at my desk until it told me that I reached the target and could go and do something else. The ST device can be experienced as “reifying and intensifying personal experiences”, Lupton (2018, p.12) similarly describes based on an interview: “I guess it just made me feel better knowing that eventually there might be some way that I could feel better. . . I guess if it showed me a particular thing, I could avoid eating it” (Lupton, 2018, p.9). The promises of ST devices thus inspire the imagination about the powers that are inherent in them and address one's own hopes and motivations.

6.3.3 Revisiting Motivations as Answers to and Reflections of Promises – Overcoming Oneself and Treasure Hunting

In this section, I would like to revisit the topic of intentions and motivations that was covered in the findings chapter 4.2 by looking at them from the perspective of technological affordances and technology's promises. In the first part of my findings chapter, I asked for the starting points and intentions the participants had to begin applying self-tracking technologies. I found four main motivations: We had the need to use tools to improve unsatisfactory things in life or manage performance issues and we had the diagnosis of illness and a search for something unknown (like a treasure hunt) in life. While the first two may lead to a hands-on use of technology as a means (a tool), the last two points may stimulate a visionary application of technology as Heilsversprechen. In the last chapter I demonstrated how ST tech is promising and manufacturing a sense of calculability to overcome uncertainty and cope with ambivalence. Furthermore, ST tech may act as an instance of Heilsversprechen, replacing the ancient reliance on magic, enchantment, superstition and mercy in life. With regard to ST, I refer especially to the still little explainable moments in the engagement with data. These are moments of self-deception - when one does not want to enter the real calorie intake (as in Dudhwala's [2017] example) or fakes the actual kilometers run (as in my case), archiving data without analyzing it for potential use in the future (e.g. ARNE, PHIL) in that they might be beneficial, the urge to track and the bad feeling that an activity is kind of lost if it was not tracked (MYSELF, ANDRE), and the good feeling when one sees data showing perpetual effort (e.g., KAROLINA, FLORIAN) as an uninterrupted curve of, for example, consecutive days of meditation or staying below one's maximum calorie intake. Often people need motivation to deal with their problems and wishes and to tackle their goals. Herein lies the quintessential function of promises, hopes, and illusions - just as in the idea of technology

as a promise of salvation. There is an expectation of future benefits that leads people to invest time in current activities. In the experiences reported by my interviewees as also in my auto-observation I received corresponding hints which are still tentative, but which are worth naming and being thought out at least. Especially the aspect of overcoming oneself caught my attention. These were moments where the self had aspired to overcome states such as feelings of shame, self-perceived and self-assessed weaknesses, inadequacy, or different sorts of insecurities – as many examples from Arne, Ragnar, Karolina, Florian and myself demonstrate. For them/us, technology performed, in the word's original sense, as a Heilsversprechen. This promise of salvation I see in its broader meaning – as a source of help, a solution to problems, and a catalyst of unimagined powers. I suggest that the application of techniques and technologies to overcome human shortcomings seems to be deeply ingrained in people and may have found its new key in self-tracking. In doing so, I draw on the concepts of Anthropotechnics (technologies that humans apply to themselves to realize their potential) by William Stern (1929), his son's Günther Anders' (1987) concept of the Promethean slope (the sense that people are inferior to their technologies¹³³) and Peter Sloterdijk's (2013) vertical tension (as a similar feeling of insufficiency in humans) that humans tackle through lifelong exercising.

The curiosity about sleep-tracking – i.e., being able to glimpse at what is happening during the totally unconscious phase of the day, during sleep, when we are dreaming – resembles treasure hunting. There is a wish to have a look inside oneself and to be able to do so whenever one wants (not only at the physician). Looking at one's heart rate during sleep or discovering inner secrets and hidden "truths" can be included here. For example, ISGER reported to be very interested in detecting an inner concept for his working habits, as he called it himself, through analyzing (in collaboration with the app) his self-tracked data. This gaze reminds but also slightly differs from Foucault's "clinical gaze" (1973), which was the authoritative view of an expert who is able to legitimately make judgments about our condition. The difference now is that we place our expectations about the proper assessments and medication strategies in a technological gaze, which we regard as somehow entitled, and that takes its legitimization primarily from being a technological entity. This recalls Daston and Galison's (2007) notion of "mechanical" objectivity being one of the main paradigms in scientific approaches of all kinds. Beside a profound knowledge of the scientific method, as it is widely understood, there is an inevitable ethical implication of a "self-mastery, the

¹³³ Günther Anders also suggested that technology formulates its own imperatives, completely independent of the social and societal systems in which it establishes itself.

assiduous cultivation of a certain kind of self”, as Daston and Galison (2007, p. 40) argue. Seeking to gain “knowledge by numbers” about oneself, i.e., using scientific methods and following scientific objectivity, can lead to self-trackers erasing their subjectivity and relying on the technically produced images (visualizations), data and algorithmic recommendations. However, as depicted in the self-control relation chapter, ST users barely rely blindly on numbers, but rather consider them together with subjective and situated sources of information. However, ST technologies, especially numbers, appear as if they exert an effect on users and as such are performative, i.e., not only mediating, but also constitutive on one's own identity (the self).

6.3.4 Reconceiving Performativity of Technology and Data in Tracking the Self

Performative¹³⁴ self-tracking means not only tracking the self but unfolding a material effect and thus significantly affecting, changing and enacting the self in the moment, over the course of the tracking practice and throughout the engagement with devices and data. I would like to discuss the idea of performativity of technology in the practice of self-tracking in a twofold way. Firstly, I suggest that the self changes its perception of itself and realignment of its actions during and in the aftermath of tracking when engaging with the numerical data collected about oneself. Secondly, numbers possess agency not only in how people relate to themselves but also in aligning to “technological thinking” and understanding oneself in technological terms. Users think about adjusting their values to idealized values or curve shapes and working on numbers (scoring weight or mood, for example) as PHIL stated so clearly, and improving them, rather than subjective feelings or well-being.

There is an expectation that technology with its hidden background algorithms and scripted functions, which exceed our knowledge, will in the manner of a magic hand illuminate or even reveal a hidden reality to and about us and show us ways to manage special issues and problems. As demonstrated in previous chapters, ST technology (devices and data)

¹³⁴ The idea of performativity of things (matter, technology, concepts) is based on Austin's (1962) conception of speech acts, in the sense that the spoken word or phrase does not only declare a thing or event, at the same time it produces a new kind of a status of a thing, like for example the couple that has been declared married changes their state and lives with the marriage. Butler (1990) applied the performativity concept to the concept of gender and showed how gender is constructed through the stylized repetition of performed gender acts.

exert a significant influence on the user's self-relations, their behavior, their mood, and their attitude towards technology. The performativity of technology described in this chapter has also been addressed from different angles by other authors in self-tracking literature. For example, for Kristensen and Ruckenstein (2018) "self-tracking produces a state in which self-trackers become conscious of their agentic aims and powers" which together with a changed self-understanding, and sharing one's own interpretation with others, e.g., in QS meetups, indicates that "the use of data and metrics is not merely a tool but has a performative and social objective" (p.8). Kappler and Vormbusch (2014) refer to performativity in their study about mood and especially happiness tracking by quoting an interviewee who described the concomitance of measuring happiness and at the same time possibly affecting that feeling by the very action of assessing his happiness level. It reminds of the famous discovery by Werner Heisenberg of not being able to separate the object and the process of observation.

"So rating happiness for me is quite challenging – it's not just an assessment about what you are feeling in that moment –it quickly has a second layer which is a social, contextual expression about the quality of your life. [...] What I learnt – I can't measure happiness without affecting it (Q9)" (Kappler & Vormbusch, 2014, p.11)

The authors refer to similar mechanisms in the finance market, where estimating the value of an investment vehicle simultaneously determines its value rather than revealing a pre-existential value. Also, Lupton (2017b) discusses in which ways personal tracked data enacts the human-nonhuman assemblages that she refers to as "vitality of data things" and "thing-power" against the backdrop of feminist materialism, vital materialism, and the anthropology of material culture. And Dudhwala (2018) speaks of "Doing the Self" with and through ST technology, and points to Karen Barad's agential realism that "calls into question the givenness of the differential categories of 'human' and 'nonhuman', examining the practices through which these differential boundaries are stabilized and destabilized" (Barad, 1996, p. 808). Self-conception as an independent individual closely linked to media technologies is not only a co-production with visualization, and representation (even if only for oneself) of data on movement, sleep patterns or heart rate variability, but also with the performativity of ST technologies and the data itself. Thus, certain perceptions and experiences are only made possible and produced in the technological/ media self-relation, such as the "sense" of calories in a meal acquired through food tracking. The performativity of technology is an interesting figure to think about, where we can follow the trajectories of

digital technology and its harvest, the data, and consider in which ways these assemblages exert a constitutive shaping effect on individuals and, in sum, society.

With regard to the second line of thought in the performativity discussion, which is closely linked to the above, the particular relationship between graphical or numerical data and the user points to a mechanization of thinking. In ST, a graphical representation of a healthy zone in terms of calorie intake by age and gender shall persuade someone to behave in a certain way to remain or become healthy. By quantifying what it means to be in a healthy range, these representations “perform idealized, typed bodies and selves” (Dumit & de Laet, 2014, p. 73), thereby providing a reflective process about his or her self-concept (self-understanding). Simply by watching the visualization, i.e., the graph for instance, the user becomes reflexively engaged with the representation of their self, since the “act of observation necessarily entails reflexivity” (Hayles, 1999, p. 142). Also, Pols et al. (2019) elaborate on how numbers can “act back” (p. 101) when they lead to unexpected effects, such as feeling compelled to self-track and as such experiencing not a gain but a loss of control over oneself. Thus, these representations attest the user a healthy state but at the same time can irritate or even alter his or her self-understanding and, to some extent, identity to an unhealthy state if they deviate from the idealized shape of the curve. In this situation, the measuring instrument exerts its agentic force on the user. Trackers, as Pharabod et al. (2013) also describe it, are drawn to a specific dynamic because they do not want to disrupt the continuity of the curve with breaks and outliers (Pharabod et al., 2013, p. 118). Information processes can be seen as active agents and numbers as having agency because “biometric and demographic statistical operations are agents, in that they *perform* idealized, typed bodies and selves” (Dumit & de Laet, 2014, p. 73). Also, previous studies on the relationship of body, digitization and visualization techniques already suggested that data impacts our actions of objectivation and instrumentalization of the body, which in turn fosters their observation and control. For example, Barbara Duden (1991) and Anne Balsamo (1995) show how medical visualization techniques, which enable the fragmentation of the body into organs, bodily fluids and states, urge self-control and awareness but are also driving the objectivation of the body and its surveillance.

The profound repercussions of digital technologies have been attested in similar contexts too, for example within human relationships with personal computers (PCs) (Turkle, 1984), with regard to the effects of commercial data harvesting practices on labor markets (Thrift, 2005), identity perception and production through algorithms (Cheney-Lippold, 2011), or the emersion of “cultures of circulation” (Mackenzie, 2005) that unfold a constitutive

formative effect revealing “the enactment of the social through data in the context of everyday life” when one tries to “decipher some of the ways in which data feeds back into popular culture” (Beer & Burrows, 2013, p. 56) up to a “new new media ontology” suggested by Scott Lash (2007) to capture new ways and forms by which information actively shapes lifestyles and environments (Beer, 2009). “The ‘stuff’ that makes up the social and urban fabric has changed – it is no longer just about emergent properties that derive from a complex of social associations and interactions. These associations and interactions are now not only *mediated* by software and code they are becoming *constituted* by it” (Burrows, 2009, as cited in Beer, 2009, p. 987). Programmability, as the logics of computers, is a part of every aspect of life: from politics and economy to metaphors we use to make sense of our world (Chun, 2011). Software and programming is increasingly understood in terms of algorithms today (Beer, 2009; Galloway, 2006) that translate the incoming data sets into a decision-making basis for their users. Algorithms are on the one side created by developers and coders and in turn shape the(ir) beliefs of which data is important to produce knowledge about algorithmic identities. Cheney-Lippold (2011) called the creation of algorithmic identities digital user proxies, upon which certain operations (such as targeted advertising) can be exerted. On the flip side, they offer alleviation regarding the multiple decisions in our daily lives. Software and algorithms “offer[s] the (illusory) power of automatically enforcing what they prescribe, doing away with human subjectivity, and its resultant inaccuracy and bias” (Lupton, 2016a, p. 56) and thus offer a promise of gaining or being in control of one’s impenetrable and multi-optional life.

Driven by the changed and increased meaning of information in our lives, epistemology becomes blurred with ontology. This process results in emergent ontological states, such as the self that becomes not only mediated and influenced by digital media but also formed/made/ constructed by it. The circulation of self-tracked data as feedback is particularly useful when considering the self as self-formed by this practice and technology. By means of that technology, the self is presumably in control of its weight, the self is active and not lazy, the self is in charge of its finances, emotions and dreams, and shapes them according to its ideas – as we have seen with PHIL, KAROLINA and all the other interlocutors. For example, RAGNAR, after practicing breath measurement for a while, discovered that he was a person who breathes faster than the average human. From then on he saw himself as a fast breather and sought ways to deal with it and treat himself accordingly. The initially epistemologically oriented practice is becoming ontologically aligned.

I argue that these shaping effects resonate strongly with mental gratification effects and affective adaptation practices (Anpassungsübungen). I use the German word ‘Übungen’ here

in the sense of Sloterdijk's phrase of the human as a (lifelong) practitioner and 'Anpassung' in the socio-biological sense of adaptation-evolution to the environment in a broader sense. ST practice deals with affective/ emotional Anpassungsübungen that the individuals involved need to tackle in their demanding, unanchored and authenticity (and simultaneously social conformity) requesting lives. As described above in the affective dimension, the various affirming and complex consequences that can occur in a self-tracking practice have a strong influence on the usage of these media technologies and vice versa.

It is, however, well known that ST technology does not only promote good feelings but that practitioners can also quickly feel compelled, inadequate (in the sense of Anders's promethean shame) or guarded (see Carmichael, 2012; Dudhwala, 2018). "Apparently, in the future everywhere we go, technological valets will track and assess our behavior, steer us towards our anticipated goals, and take care of our predicted needs", Frischmann and Selinger expatiate in the introduction of their book *Rethinking Humanity* (2018, p. 4). There are concerns that the now emerging techno-social engineering will manipulate "how we think, perceive, and act" – whereby the smart technology of the future will program us through an alignment of technologies with socio-economic interests by design. For example, we are getting more and more used to communicating with emojis that express a like (e.g., on Facebook), an applause (on medium.com) or a recommend on articles on business platforms, like LinkedIn for example. We can barely leave our smartphone in our pocket without looking at it every couple of minutes and it is hard to resist buying things on Instagram. In this sense they warn: "We are being conditioned to obey. More precisely, we're being conditioned to want to obey" (Frischmann & Selinger, 2018, p. 6).

These constitutive effects of data on individuals are still little explored and can only cautiously, and against various psycho-socio-cultural backdrops, be empirically presented in study results. Corresponding theoretical contributions/ constructs can therefore only be carried out tentatively at first and then empirically proven in subsequent studies. While it would be useful and interesting to take a deeper look at the broad range of feelings that could emerge through ST systems, it would go beyond the scope of this work, which rather focuses on promised powers and imagined capabilities, new self-images and self-relations that result or get strengthened therefrom.

However, it should be noted that the above arguments for the performativity of technology entail the problem of locating "the primary source of agency" (Wissinger, 2017, p. 9), when technologically supported empowerment is driven partly by governmental and market interests. Furthermore, it cannot be clearly determined and examined separately

whether the practice of tracking - i.e., human activity - or technology in the form of the measuring device and data have this effect on us. Because this cannot be decided unambiguously, we have to assume that the performativity of both the data and the practice gets agency assigned to it by the user. The agency can, in my opinion, be located on an axis of little to much agency. The agency attributed to technology is not very pronounced if, as described above, users use the data in deliberations or negotiations to a more or less equal extent as other sources of information. The agency becomes greater when technology is assigned the role of counterpart - coach, partner, trainer, nanny. And it becomes even greater when users regard ST technology as a promise of salvation and rate it as superior to their own effectiveness.

6.4 Summary – Technology Relations in ST

As demonstrated against the backdrop of my empirical material, the self-relations that became evident in self-tracking are not purely a self-interpreted awareness of personal experiences, but they are mediated in many ways by ST technologies. By examining the self-relations that took ‘Gestalt’ through the application and engagement with ST technology, the special role that these technologies play in it also became evident.

The third chapter of results comprises technology relations that become apparent when analyzing the cases in self-tracking for bodies, habits and moods do not remain in the realm of sovereign agencies and autonomous subjectivities but are shaped by technology. The ST technology I examined in this work comprises sensors, algorithms, and apps. The sensors are often included in wearable tracking devices or smartphones and measure movement, bodily values, time intervals, locations and other self-related quantities. Algorithms analyze the data, relate them to certain reference values and generate feedback and recommendations based on this process. And finally, the correspondent application visualizes the data, shows trends, reminders and often also gratifying gamification elements, such as badges and medals. These technologies not only alter the understanding of what it means epistemologically to be human in terms of shaping the perception of the world and ourselves but also ontologically (Barad, 2007; Haraway, 1991; Hayles, 1999; Savulescu & Bostrom, 2009), suggesting to overcome the ontological divide and solid boundaries between the human and the artificial (technological). My findings suggest that it is no more productive to distinguish between a technologically mediated and non-mediated self as it is to distinguish between online and offline. We are

constantly engaging in our life maintenance matters, social relationships, and the relations to ourselves through media and digital technologies; it is the world we live in.

The elaborated three modes of technology relations are reflected in the data in a twofold way. They firstly stand for themselves as they have existed since computerization started to become pervasive. They secondly inspire, enable, and enact self-controlling and self-caring. I therefore argue that these technology relations influence, promote and facilitate the self-relations of care and control through and within the interplay of ST technology and practice. In this sense, using ST tech as a means to maintain and enhance the body, mind and capabilities mediates a sense of control over one's self and life. Furthermore, to maintain and enhance capacities and capabilities by improved – or at least not worsened – moods, body feelings, finances or quality of sleep means contributing to self-caring practices as well. Analogously using ST tech as a counterpart, an assistant and dialectical device, facilitates the self-caring relation and mediates and enriches the self-care experience through attention, dialogue, and advice. Ultimately, the advice, attention and a form of dialogue given helps handle, get to grips and control certain areas of life such as work or athletic performance and a wished-for healthy lifestyle. Finally, this on oneself applied technology becomes a Heilsversprechen (promise of salvation) for oneself and underpins and fuels both the hope for better self-care in terms of treatment (cure) of diseases, disabilities, and perceived shortcomings as well as, even if only vaguely, inspires desires, expectations, and strategies to enhance (and control) more areas of life.

New Conditions for New Selves?

ST technology turned out to not only have utilitarian meanings but also strong effects on the relationship to technology. The utilitarian use consisted of using ST as a tool for the management of already known goals and intentions, but also - and therein lies the novelty of this technology - for the purpose of self-enhancement. The latter is understood in terms of self-discovery and self-enhancement of hidden and hoped for capabilities. Self-tracking technology can furthermore be interpreted as leveraging (balancing out) the “vertical tension” (Sloterdijk, 2009) we experience in our multi-optional lives and the omnipresent quest for happiness (Cabanas & Illouz, 2019) I argue that ST practice and technology have a balancing effect on these tensions and insecurities and thus appear appealing to use them to enhance well-being.

Moreover, I see ST technology as capable of producing human states and co-constituting their agency in relation to themselves and to the world. However, I do consider this co-constitution and co-agency as an affirmative collaboration, a kind of bilateral agreement about care and control, which is best expressed in the role of ST technology as a counterpart, i.e., as an assistant, advisor, or coach or even as the promise of salvation concerning our body, mind and very life.

Illuminating the new intimacy and familiarity given to technology in the ST provides a basis for scholarly deepening and exploration of this topic, which has received little attention in the ST field to date, but seems clear enough to me to point out and even highlight. In practice - tool design, health care, schools, universities, and workplaces – it may provide inspiration for the development of e-health programs or relevant precautions in their adaptation and implementation on a large scale. The perspective on ST as a technology of Heilsversprechen expands discussions around myths and magic of technology in the philosophy of technology and at the same time offers further input for possible ethical regulations, which in the technological field (as also in the field of AI), are increasingly requested as well as significantly necessary.

7 CONCLUSION

This dissertation presents an analysis of the relations to self and technology that emerge from and in the use of self-tracking technologies in order to demonstrate and discuss further and, I argue, more significant technologically mediated relations to self and technology, going beyond mere self-optimization.

At the outset of this work, I linked to current cultural studies and sociological assessments of self-tracking as a self-exploitative travesty deeply rooted in neoliberal thinking, unconsciously launched heteronomously by state and economic interests, that appears - or is meant to appear - attractive to users under the banner of self-optimization, as techno-optimistic groups like the Quantified Self network and publications like WIRED magazine proclaim. Applying the analytical skepticism articulated in STS as the trenchant provocation "It could be otherwise", my own ethnographic and auto-ethnographic treatment of the topic started from a different premise. I asked about the more profound experiences, logics, and dynamics in the encounter with these technologies and what they can tell us about contemporary human life and experience in a technologized world.

The self-relations made visible, addressed, and reinforced through the use of ST technologies can be subsumed under two broad themes: self-control and self-care. These two are addressed individually but also appear simultaneously through a special, ambivalent seeming and yet also concurrent existence.

While self-control is mainly characterized by awareness, a more affluent information base with higher decision-making certainty as well as goal control and adjustment, the self-care mode reflects softer factors such as turning to oneself, reflection, self-knowledge as well as enhancement or reinforcement of one's self-image through positive feedbacks and self-overcoming. Thus, self-control initially appears as self-discipline and self-education for self-improvement conditioned by externally determined system-relevant requirements. Complemented and mirrored by the self-care shown here, however, turning towards oneself reveals, a focus on one's own goals: not working more but less, for example, not setting the highest goals (e.g., number of steps) but the goals that are right and important for me - in short, an intensified work on one's own good feeling.

In a dialectical¹³⁵ interplay (in the cognitive mode) information, awareness, and complexity reduction on the control side interact with self-reflection, self-knowledge, and self-attention on the care side by providing uncertainty-reducing confirmations to prior hunches, relieving reminders, detailed data that might be helpful in the future for pattern recognition or treatments, and safety-providing orientation. In the action mode, proper goal setting, optimization of work efforts, motivational incentives, and data-based algorithmic recommendations on the control side, together with self-affirmation, gratification, and emotional relief from supportive helpers, act as assistants in the seemingly infinite set of multi-optional choices for self- and life-regulation that should ultimately lead to balance and harmony in life.

We can understand the controlling collection of numbers and statistics about oneself as a taming (Hacking 1990) of insecurity and disorientation, even if it can take on an illusory character when viewed from an external perspective. Technology gives the feeling of getting a better grip on one's life by using it - as Ragnar has put it - and of achieving a relaxedness, as Arne has put it, simply by dealing with oneself in a "rational", science-like way. Ultimately, it is about orientation and personalized/ individual assistance in maintaining and caring for one's life.

The empirical study has shown that self-control and self-care turn out to be two sides of the same coin. What they have in common is the constructive turning towards and confrontation with one's own self, its goals, desires, strengths, and weaknesses. The opportunities lie in strengthening one's health and well-being in a playful way, building and maintaining a positive self-feeling, self-image and agency, and discovering unknown abilities and potentials within oneself. The difficulties lie in self-overload, dissatisfaction when not achieving goals, self-deception and distraction, narcissism and even loss of control - internally through compulsion to control as well as externally through loss of data protection and exploitation of private data by third parties, as well as handing over responsibility (in the form of decisions) to technology (algorithms) instead of self-responsibility. The compulsion to self-control is interestingly mirrored by a commitment to self-care in the sense of a happiness imperative – happycracy –, as aptly diagnosed by Cabanas and Illouz (2019). It is regarded as imperative to create the best version of oneself, regardless of the fact that social problems are shifted into the private sphere in the process. However, this is not an inherent

¹³⁵ I do not apply this concept precisely along with the philosophical tradition of Marx or Hegel but in the sense of a duality that allows modes that initially appear separate and antipodal to work together and become a coherent unity.

characteristic of ST technologies, but is found in society as a popular trend towards the use of self-help offers, life coaching, meditation and yoga retreats as well as neurobiologically more profound interventions such as mood enhancers and concentration pills (nootropics) - as has been noted for years in academic writings (see Ziguras 2003, Traue 2011, Cabanas & Illouz 2019).

The motives of the users that became clear in the course of the study - namely: to use convenient tools to manage sports or work activities, to deal with a chronic illness, to combat dissatisfaction with a condition or one's own behavior, or the curious search for dormant potential in oneself - show the most evident starting points for the beginning of an ST application.

Meanwhile, the complex dynamics of and between self-control and self-care described in this work are set in motion by the ST technology (and practice) used. Why? Because this technology, like any other technology, represents and contains a promise. It is the promise of easier self-improvement through its use as a smart tool that accurately records, stores, compares, visualizes, and analyzes infinite quantities. The sensors used in this assemblage (e.g., accelerometer, galvanic skin response, ballistocardiograph) often provide a sense of enhancing or sharpening one's five senses. These data senses were usually compared and negotiated with their own senses, rather than blindly accepted. This negotiation can therefore be comprehended as a further step in the development of digital literacy. Like how one learns to recognize fake news or virus-infected links in social media over time, such training of trading off one's own physical and mood sensations against data provided by sensors can also help one better assess one's own well-being and personal condition. Self-data and one's own sensations merge to form an assemblage that, analogous to Floridi's (2015) phrase "onlife", becomes a 'life-sensing' - that is neither entirely numerical nor only physical - and that offers information, orientation, and confirmation in the daily decision jungle.

The apps used provide complexity-reducing visualizations, highlight patterns, and show trend progression. Built-in "coaching" functions provide algorithmic recommendations, often based on big data, but customized and linked to our identity, on how to proceed in order to achieve the respective objective or improvement. This increases orientation and decision-making certainty and thereby ontological certainty¹³⁶ (Giddens 1991) in life. The promise can even grow into a promise of salvation if it meets with corresponding hopes on the part of the

¹³⁶ This term refers to the confidence people have in the constancy and consistency of their own identity as well as the surrounding material and socio-economic environment of action.

user to cure an illness, to realize a long-cherished goal, or to acquire a skill that one did not possess before. People in secularized societies who take over responsibilities into their own hands that were formerly anchored in the state and the social can tend to turn to technology for the support that has fallen away, or at least to hope for it - as Florian suggested. The design and functionality of ST apps and wearables in particular make them well-suited to take on a more intimate role for the user. Intimacy (pronounced differently: in-to-me-see) seems particularly appropriate to denote this new role of digital technology and our relation to it. By learning about and adapting to the user's individual circumstances, personalized feedback, and tips to improve a condition, joyful encouragement, as well as continuity and constant availability, digital assistants become emotionalized and sometimes anthropomorphized / personified¹³⁷. This increases a confidence in oneself and relaxedness in relation to one's own environment of action. This was particularly evident in the remarks of the two women in my self-tracker sample, Karolina and Tabea, who also tended to talk about their ST gadgets using the personal pronoun "he". Beyond the anthropomorphizing, the engagement with ST tools can be understood as a tacit agreement, one could even say a bilateral agreement between two parties the user, who commits to an activity or behavior, and the ST device which constantly measures, records, and informs/recommends if required. Which by assumption promotes self-satisfaction and conducting a good life. It is to be expected that the relation to digital technologies will become more and more intimate and, so to speak, co-evolve with the maturing of the matter or technologies.

Also, in the relations to technology, I think a dialectic is visible, which shows the apparent contrast between its conception as a tool and means to achieve something and the approach to technology as a counterpart, moreover as shown above an intimate counterpart, whose advice and continuity is appreciated. This is not evident in all cases where ST is used as a tool for pure measurement and recording, but certainly in those where lifestyle is significantly influenced. Like Florian for example who puts his hopes for a cure for his chronic physical ailments in a tool for measurement, storage, and correlation analysis of personal data. Or Isgar, who bases the way he lives his life, in the sense of guiding and structuring his day, on what the measurements of his answers to questions he compiled himself, together with his own analysis of the data, yield for him. In this way, ST Tech provides a rational basis for an emotional premonition or even longing for a work-life split that is sustainable for him. The realization and the decision to do so is then approved or as can be more aptly

¹³⁷ The personification of digital helpers was demonstrated quite early by Sherry Turkle (1984, 1995) in her impressive and extensive ethnographic research on computer use in personal and professional settings and confirmed by a few contemporary research studies in the ST field.

expressed in German "blessed" by the technology. Here I understand the Heilsversprechenrelation (HV, promise of salvation) as a relieving legitimation, which counteracts possible feelings of guilt or shame, as it was often the case with myself. Ragnar also sought to resolve his stress-related speech problems in meetings through the use of ST technology. They advised him to do various relaxation exercises or encouraged him to look for alternatives to physical participation in meetings. This supportive "behavior" of the ST Apps reminds us again of a caring partner who accompanies us continuously and without signs of fatigue.

Finally, the results indicate that the concept of (self-)optimization, contrary to its etymological meaning of a logic of increase, can also be understood in a different way, namely balancing. In this context, optimization does not necessarily mean the fastest, the highest, the strongest, but something that is achievable and satisfactory for the self - within the framework of the given and the desired. Of course, there will still be individuals who accept the optimization and self-responsibility imperative for themselves. Nevertheless, the self-reflection often stimulated and implied by ST technology can have a relativizing, individualizing, and sometimes disputing effect on common norms with respect to one's own objectives. A study could subsequently be conducted on this and continue the debate on how optimization is understood in society and how it is distinguished from improvement and enhancement - as drafted by the computer pioneers Licklider and Engelbart in the 1960s. Finally, further ST research could contribute to the figure of the cyborg discussed in the posthumanist and transhumanist research field and illuminate forms of hybridity that are not corporal, but rather perceptual through agreements, negotiations, and "mutual resonning" of user and device or data.

This intensification of human-technology relations can currently also be observed in other areas. The digital voice assistants in our smartphones and smart objects, such as Siri, Alexa, Google Assistant, Cortana or Bixby, are taking on the role of personal nanny or servant. However, the field of self-tracking seems to me to be even more predestined for building more emotionalized, intimate, and partner relationship-like relations with technology. Engaging with oneself is different than engaging with the weather, traffic, or shopping. Because it is more personal, digital self-tracking engages more profoundly and touches us more, and can shape and change us more than non-digital self-care techniques, such as psychotherapy or meditation - whether it is more sustainable can only be shown in a few years with the appropriate research. On the other hand, technological promises, such as the promise of salvation, which is currently also being made in the debate on AI and machine learning, can be misused and tempt providers, developers and designers of corresponding

digital assistants to overshoot the mark and make promises that serve only their own economic well-being and not so much that of the users. The hopeful customer would thus covert into a lifelong customer whose goal of improvement can and should ultimately never be achieved. Corresponding ethical guidelines on the part of government and economic actors are needed here. At the same time, the optimization understood as harmonizing and balancing in self-tracking becomes a lifelong task which, in principle, can never be completed because with the addition of new important areas in life and over the course of a lifetime also the individually understood and conceived balance often shifts. Thus, in principle, new areas of improvement are always added. Until one gets out of the improvement cycle (also met in this dissertation) and says: Stop now, that is (good) enough.

PART IV

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APPENDICES

List of Abbreviations

ST	Self-Tracking
STers	Self-Trackers
QS	Quantified Self
QSers	Quantified-Selfers
PI	Personal Informatics
HTR	Human-Technology-Relations
HCI	Human-Computer-Interaction
STS	Science and Technology Studies

List of Figures

<u>Figure 1: Matrix of ST related terms in relation to activities</u>	<u>12</u>
<u>Figure 2: Manpo-kei advertisement in 1965 in Japan</u>	<u>20</u>
<u>Figure 3: Example of the ST app ‘Optimized’ and slogan</u>	<u>21</u>
<u>Figure 4: Schematic overview of the main data sources used for this study, the participants demographics, professions, and interview places</u>	<u>82</u>
<u>Figure 5: Florian’s Dashboard – collection of self-tracked data</u>	<u>249</u>

List of Tables

<u>Table 1: Quantified Self Tracking Categories and Variables</u>	<u>23</u>
<u>Table 2: Data sources and elicitation data</u>	<u>83</u>
<u>Table 3: Initial Intentions to engage with ST</u>	<u>94</u>
<u>Table 4: Technologically mediated Self-controlling in relation to an exemplified control process</u>	<u>139</u>

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