Bachelor Thesis 16th May, 2025

Primary supervisor: Dr. Claire Grauer

Secondary supervisor: Jun.-Prof. Dr. Karoline Augenstein

How does temporality affect transformative processes in social-ecological research projects?

Max Wäsch

Max.Waesch@stud.leuphana.de

Declaration of originality:

I confirm that the submitted thesis is original work and was written by me without further assistance.

Appropriate credit has been given where reference has been made to the work of others.

The essay was not examined before, nor has it been published.

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“Once we gain our wildest dreams that capitalism and the nation state and their slow and fast genocides are technologies of the past, we will still be dreaming. We have people to rehabilitate. Lands to rematriate. Soil to regenerate. The last couple hundred years of exploitation and theft cost us our worlds *in millennia*. There is no instant gratification to liberation because true liberation, where the land and seas and the people they birth are free free free – there is no arrival point. There is no cap on the dreaming.”

- ismatu gwendolyn, 2023

0. Positionality Statement

In the opening passage, essayist and artist ismatu gwendolyn deftly links some of the main themes of this thesis: questions of time, resistance, and the inherent link of social and environmental, liberating change. With this positionality statement, I aim to reflect my own relation to these themes, as well as make transparent the privileges that shape my perspective.

I am 23 years old, white, hold German and American citizenship, am able-bodied, and come from an upper middle-class household. I am also queer and perceived and socialized as a man. With these attributes come a myriad of privileges that affect my relationship to time as much as anything. Being comfortable with the English language has made the entirety of my thesis writing process easier, faster – I did not struggle with reading the predominantly English scientific literature, nor did I need to translate from the papers I was reading to the language I was writing in. Furthermore, the financial support I received through federal student funding and my parents meant that I was not pressured to engage in wage labor during my thesis, which made the task immeasurably easier. Being able-bodied also allowed me to take part in the normed modes of intellectual production at university.

At the same time, struggling to simultaneously write a thesis and find an occupation and home for after my studies, indeed trying to find a future as such, has provided a challenge. This challenge, in turn, made laughable by the threats of fascism and environmental devastation that pervade my loved ones' worries, as well as my own. But, how might we act differently if we were to recognize that these threats are not looming, isolated disasters? That some Indigenous and marginalized peoples have long understood them as the continuities of a centuries-old apocalypse? That the task of resisting and recovering will accompany us forever? Might we find joy in this? And so, with humility, I echo the sentiment expressed by the introductory quote, which has gifted me resilience and a changed view of time.

It is through time that we make demands for change. More specifically, the demand for social-ecological transformation, as I observe it in the literature, is a way for scientists to call for radical changes to our ways of living. These calls persist even despite scientific apprehensions towards making political demands. Describing such transformation may allow scholars to dream of a deeply different world. Yet, such dreaming is determined by power dynamics, by temporal dynamics. Who has the time to dream of transformation? How do they use it? Are there ways in which time and transformation are the same; as potential unfolding? These questions I carry with me through the following thesis.

1. Introduction

The issue of time is vast and has been part of social analysis for decades (see e.g. Adam, 1995). Understanding social contexts means understanding the way subjects experience time in said contexts. Examples include clock time, leisure time, work time, seasonal time, or nostalgia for 'past times.' These are not just variants of time which we experience separately. Though Western colonial traditions have established a linear concept of time (L. T. Smith, 2021), Indigenous and non-Indigenous scholars have since asserted that aspects of time are not linear, but can instead merge and be simultaneous (Kimmerer, 2013; King et al., 2023; Maclean et al., 2024; L. T. Smith, 2021; Vaagaasar et al., 2023). This includes notions of present, past and future. The term 'temporality' is used to capture such complexity, and describes subjective, non-linear experiences of time (Vaagaasar et al., 2023). Indeed, scholars have noted a research gap on intersecting, multiple temporalities (Maclean et al., 2024; Söderlund, 2013), which I aim to address with this study.

While temporality is subjective, one could argue that many of today's temporalities are affected by negative trends towards urgent social and ecological crises. The literature on "tipping points" (e.g. Lenton, 2013, p. 1) is an example of this, underscoring the likely irreversible consequences of current inaction on climate change and biodiversity loss. As a result, there have been demands across science and activism for a 'social-ecological transformation' of immense scale, of our modes of (re)production and our social bonds. This, then, raises the question how those working towards a social-ecological transformation experience temporality, and whether temporality and transformation affect each other.

Social-ecological work is frequently done in research projects, which possess their own temporal conditions. Since the 1990s, developments of "academic capitalism" (Slaughter & Leslie, 1997, p. 11) have changed the ways in which research is funded and implemented, including its pace. Often in connection with the project format, this has necessitated fast-paced, cost-efficient research, and led to a sense of precarity in academia (McKenzie, 2021; Ylijoki, 2014). Such temporal pressures are likely to affect processes of transformation, including how research participants and research environments change.

Thus, this study investigates how temporality affects transformative processes in social-ecological research projects. To this end, I first summarize literature on temporality and explain its significance to the individual, the framework of research projects, and social ecology. Next, I discuss different ways to understand 'transformation' in the context of research. Thereafter, I elaborate on the methodology of this study. To answer the research question, I interviewed three

participants from two different research projects, focusing on their experiences of time during their projects, as well as relationships to other project participants and moments of transformation. The results suggest that social-ecological research projects are rife with temporal tension through their engagement with both human and more-than-human environments, and the structures of academia. Transformation is shown to be deeply social-relational. After examining the limitations of this study, the discussion chapter draws further parallels to transformative 'resonance' (Rosa, 2017), and the issue of labor precarity (see McKenzie, 2021; Millar, 2017). This leads me to conclude by considering the question of temporal agency at the core of contemporary experiences of work and the struggle for social-ecological change.

2. Theoretical framework

To construct a theoretical framework for this thesis, I first define temporality and give an overview of its significance to individual experience. As research projects are the key context for this study, I then elaborate on temporal attributes in projects and academia, and how these result in an idiosyncratic, fast-paced temporality. Afterwards, I assess the role of social ecology in shaping temporality and show how ecological processes are linked to human experiences of time. Finally, I examine the term 'transformation' and its relevance to scientific practice, which indicates an importance of engagement with and for society.

2.1. What is temporality? How does it affect individuals?

> "As living beings we *are* time, we *live* time, we *feel* and *perceive* time; as human beings we *know* and *reckon* time, as members of contemporary Western societies we have *externalized* time, *created it in machine form* and now *relate to this time as a resource* to be sold, allocated and controlled." (Adam, 1996, p. 92)

As the above quote by Barbara Adam (1996) highlights, time affects us in various ways. Simply by virtue of being alive, we experience the passing of time in one form or another. However, our individual experience of time is complicated by our capacity to reflect on time, and our

shared views on what time is – "'my' time" is informed by "'our' time" (Adam, 1995, pp. 12, 19). Adam (1995) further emphasizes that perceptions of 'our time' are influenced by our language and clock time. Regarding language, she notes how we can refer to there being good or bad times and right or wrong timing. We may also think of our ability to "save" or "waste" time (Grauer et al., 2021, p. 2). Whereas language can flexibly describe time depending on context, clock time is marked by its invariability – an hour lasts an hour, always (Adam, 1995). Indeed, several scholars point out that this 'objective' invariability of clock time has influenced much of the Western preconceptions of time (Kimmerer, 2013), including within the social sciences (Adam, 1996; King et al., 2023). Yet, as will be further explored in the following, time is more complex than the linear progression of the clock, and can be experienced in diverse forms. Therefore, we are never simply studying singular time, but rather the different ways of constructing and experiencing it: Temporality.

Though the terms 'time' and 'temporality' are both frequently used in social analysis, temporality emphasizes that time is not singular, linear or static. As Hussenot et al. (2020) show, there is an ontological difference between time and temporality. In an "ontology of *time*", time is constructed as "standardized" and manageable (Hussenot et al., 2020, p. 50). In contrast, temporality emerges depending on different situations, how they are experienced, and how present, past, and future intermingle (Karlsen & Hildebrandt, 2023; Vaagaasar et al., 2023). On a theoretical level, temporality thus allows us to question linear understandings of time and acknowledge our subjectively diverse experiences of it (Vaagaasar et al., 2023).

The hallmark study of Darley and Batson (1973) is a good example of subjective temporality affecting behavior. Here, participants were induced with a subjective sense of urgency and then asked to walk from one building to another. With urgency, they were less likely to perform helping behaviors to a passerby in need; an effect which the authors likened to Tolman's (1948, p. 208) concept of a "narrowing of the cognitive map". Although there was a scarcity of 'objective' clock time in this case, it was the subjective, psychological experience of urgency that was more relevant in shaping the participants' behavior. Taking a more sociological approach, Maclean et al. (2023) analyzed a corporate-organizational setting, and found that both an organization's past founders as well as its possible futures can 'haunt' present decision-making. They thus advocate the use of the "language of the supernatural" (p. 2) for temporality. These findings illustrate how personal experiences of temporality affect behavior, and frequently dissolve boundaries between present, future and past.

2.2. How does temporality affect research projects?

Temporality is of interest in this study specifically within social-ecological research projects. Therefore, I will here discuss the role of projects in research, and the temporality which emerges from them. To define projects in the first place is not easy, since the literature is so vast that no singular definition emerges clearly. However, we can understand projects as popular organizational structures in management, because they promise efficient, flexible and fast-paced problem-solving (Ylijoki, 2014) which is task-specific (Söderlund, 2013). These claims to efficiency present a significant competitive advantage (Söderlund, 2013). In fact, projects have gained popularity even beyond the entrepreneurial sphere – scholars have coined this a "projectification" of society (Söderlund, 2013, p. 126; Ylijoki, 2014, p. 94).

This efficiency-oriented projectification is especially apparent in academia (Ylijoki, 2014). Here, it is crucial to point out that academic structures have in recent decades moved towards competition. Slaughter and Leslie (1997) were among the first to describe trends of "academic capitalism" (p. 11). By tracing faculty finances from the 1970s to 1990s in the UK, Canada, Australia, and the US, they find that a reduction in available public funding precipitated the search for external, commercial funding. Such 'marketized' funding had to be secured through competition. Coupled with increased globalization in academia, this has led to an economical research approach that seeks to "maximize prestige" for universities (Slaughter & Leslie, 1997, p. 17). Ylijoki (2014) affirms this analysis and views projectification as a key factor affecting research practice.

Project structures have an acute effect on research temporality. To illustrate this, Ylijoki (2014) distinguishes between "project time" and "process time" (p. 95). Though each are given great theoretical attention, her basic notion is that 'project time' requires that research is given a certain (official) pace and form. Conversely, 'process time' is more representative of the internal dynamic of research and its development (Ylijoki, 2014). She therefore defines project time as ordered, linear, fast-paced, decontextualized, and, importantly, predictable. This is because project proposals have to promise certain results to be attractive to funding bodies, and as a result, must predict their results before the research is done[1] (Ylijoki, 2014). Process time challenges project time on every level. Ylijoki (2014) defines it as incompatible with schedules, non-linear, slow or timeless, highly context-dependent and unpredictable. Process time thus

[1] 'Predictability' as such is greatly contested in the literature, especially with regards to social-ecological systems (see e.g. Bengston et al., 2012).

reflects research much more as a creative and organic act, which Karlsen and Hildebrandt (2023) similarly emphasize.

With project time and process time being diametrically opposed, temporal tension is inevitable. Having to predict a research outcome (project time) without being certain of it, or later experiencing setbacks in the research (process time) is likely to produce stress and affect interpersonal relationships in the project team. However, this tension runs deeper. As Ylijoki (2014) shows, project time is threatening since it involves a "colonization" of time (p. 98). The rationale of projects, she suggests, takes over other spheres of life beyond the project work: 'waste time' is minimized and relationships to colleagues and oneself become transactional. Other times, to which we could count time for familial relations (see King et al., 2023) and slower-paced intellectual pursuits, become marginalized "shadow times" (Adam, 2004, as cited in Ylijoki, 2014, p. 99).

Control over project workers' time is another important aspect of project temporality. Because projects are fundamentally temporary, those involved may feel that "time is always running out" (Lundin & Söderholm, 1995, p. 439; Söderlund, 2013). This requires that management carefully sequences and controls the activities of the project (Vaagaasar et al., 2023; Ylijoki, 2014). Work schedules are the obvious example for this, yet Ylijoki (2014) also notes that control over time does not have to be externally mandated – many have already internalized 'discipline' with time, and thus reduce "waste time" (p. 98) without needing to be told by managers. Performance reviews are another tool to ensure project workers are not 'wasting' time (Ylijoki, 2014). But, again, this has problematic implications for the social dimension of projects. Söderlund (2013) proposes that an economical approach, "projects as plan" and "projects as task" (p. 123), does not leave space for relationships emerging within the project, nor the conflicts being negotiated or the frustrations and satisfactions with the work produced.

Such colonization and control of time must be seen in the context of academic capitalism. As faculty funding becomes more precarious, so too do the conditions for project researchers (Slaughter & Leslie, 1997; Ylijoki, 2014). Those academics which do not have sufficient prestige and secure working positions become an "academic precariat" (Ylijoki, 2014, p. 102), frequently repeating short-term project cycles without securing a long-term position. This exact trend has stirred debate in the German academic sphere in recent years, culminating in the movement '#IchBinHanna' ('#IAmHanna'), in which thousands of scientists have organized to protest their short-term contracts (Bahr et al., 2022). Understanding a polarization between

established academics and precarious project workers may help to explain tensions in research temporality.

Considering their previously established ‘short-termism’, projects are oftentimes critiqued for a lack of temporal context. Because they are temporary, they may be considered an ‘a-temporal’ tool for the production of solutions (Karlsen & Hildebrandt, 2023; Vaagaasar et al., 2023). Still, projects are of course deeply influenced by their context. They have their own trajectories of inception, design, implementation and reflection, possibly even continuation or repetition (Söderlund, 2013; Vaagaasar et al., 2023). They are “in a state of becoming rather than [in] a state of final being” (Hernes, 2007, as cited in Karlsen & Hildebrandt, 2023, p. 907). They exist in political contexts, and may be actively linked to the past or future in order to gain legitimacy (Vaagaasar et al., 2023). And, projects are likely to be initiated by long-term organizations, which are themselves ‘haunted’ by the past and future (Maclean et al., 2024) and have their own habituated temporalities (Vaagaasar et al., 2023). These contextual factors influence which tensions arise in projects, and how or if they are resolved.

The critique above suggests, implicitly, a departure from projects in favor of a more slow-paced research approach. But, projects offer an element of structure that can catalyze less tangible research processes (Ylijoki, 2014). Also, the temporal separateness of projects may inspire action (Vaagaasar et al., 2023). And, project workers do retain some agency over how strictly they follow project requirements and how they interact with coworkers, for example by finding humor about intense funding requirements or taking the time to mentor newer academics (Ylijoki, 2014). In this light, project time is neither an all-consuming threat to the research process, nor are project workers helpless in how they deal with it. An interest in how temporality is thus crafted by project participants is central to this study.

As shown above, research projects are a highly specific context which offers a rich site for investigating more abstract questions of temporality. Söderlund (2013) emphasizes this by stating that project management research has neglected the intersection of “organization and process” (p. 125). When we consider how a project is organized as a (temporal) process, and how this is reflected in relationships and transformative experiences, we are looking at “deadlines, timing, […] temporary relationships, birth, death [and] grief” (p. 125) in and of projects. Interestingly, Söderlund (2013) advocates “ecological thinking” (p. 125) about projects, by which he means an appreciation for complexity, context, and non-linearity. Following this standpoint, I aim to employ such ecological thinking to a fittingly (social-) ecological context.

2.3. How does social ecology inform temporality?

Before discussing how the question of transformation plays into project research, it is worth considering social ecology as another specifying factor in this study, with its own effects on temporality. Although time-related issues in social ecology are varied and fascinating, the theoretical framework for my study only will only include a short overview. In brief, social ecology as a research field has gained traction in recent years for its joint consideration of ecological restoration and the social issues attached to it. For example, Férnandez-Manjarrés et al. (2018) suggest that social-ecological systems (SES) are unlikely to reach full recovery in a context of social unrest and violence. Kimmerer (2013) points out how Indigenous peoples have long considered ecological processes in the land and human trajectories as interdependent. It is thus unsurprising that human experiences of time would have an effect on our environment. Trying to save time via "car and air travel, 'fast fashion', or heating up frozen pizzas" (Grauer et al., 2021, p. 3) depends on human temporal experiences, but affects the environment through increased fossil fuel emissions.

Yet, human relations to the environment are more complex than consumption patterns. Adam (1996) emphasizes that the traditional Western separation between nature and culture is dissolved by environmental threats like pollution or climate change. These threats, she states, are originated by humans[2] but affect all things. In this way, environmental crises offer the potential to relearn our connectedness to our surroundings – "that [we] can be eroded like the stones and the trees in the acid rain" (Beck, 1992a, as cited in Adam, 1996, p. 90). Adam calls this connectedness, made salient by threat, an "interpenetration of nature and culture" (1996, p. 90). In realizing that humans are also nature, this interpenetration upsets the deeply ingrained Western notion of humans as separate from their surroundings (Adam, 1996). So, while our human ways of being, including our temporalities, are enmeshed in our environment, they may have a different pace and come into conflict with it. We are "biological clocks that beat in off-beat to the rhythms of this earth" (Adam, 1996, p. 92). From this, Adam deduces a task for the social sciences which I aim to follow in this thesis: Not a "choice" between ecological rhythms versus human temporality, but an "understanding of the complexity of these [human and ecological] times and their multiple interrelations" (Adam, 1996, p. 92).

[2] Importantly, large-scale pollution and climate change are not shaped by all humans equally. One could instead refer to these threats as corporation-made.

2.4. How can research be transformative?

Which 'kind' of transformation a social-ecological research project may achieve is no simple question. The ecological processes on site are subject to change due to research practices, as are the stakeholders (e.g., local residents) present in a social-ecological system. Academic traditions may be altered and subverted through research, and a project can impact the scientific landscape around it. The researchers themselves are likely to evolve throughout the project, and participants' own horizons or value systems may transform along the way. Schneidewind et al. (2016, p. 6) usefully conceptualize a transformative research approach as:

> "a specific type of science that does not only observe and describe societal transformation processes, but rather initiates and catalyzes them. Transformative science aims to improve our understanding of transformation processes and to simultaneously increase societal capacity for them."

The authors thus understand transformative science as highly normative and assert a close tie to civil society, for example in the form of real-world laboratories. They note that this approach is contested for blurring the lines between the scientific and non-scientific world, and caution against non-democratic structures and a lack of "societal responsibility" (p. 6). Despite this, they maintain that transformative science is ultimately suited to foster learning especially under complexity and uncertainty. Understanding science as an "embedded process, generating knowledge with and for a changing society" (Schneidewind et al., 2016, p. 15) therefore represents potential for social-ecological transformation as well as a shift of scientific traditions.

Decolonial and Indigenous scholars similarly emphasize such embeddedness. For example, Zonta et al. (2023) advocate transdisciplinary science, but find that current transdisciplinary endeavors still fail to engage civil society members at the early design stage of research, and in turn neglect a decolonial approach. Here, decoloniality is understood as an inclusion of different knowledge types, an awareness for historical power asymmetries, improved information access, diverse research teams and "giving credit and weight to a diversity of expertise" (Zonta et al., 2023, p. 107). In this vein, various scholars highlight that the short-term involvement of non-academics and/or Indigenous community members is not sufficient, and instead advocate building research collaborations as long-term relationships (C. Smith et al., 2023; L. T. Smith, 2021; Zonta et al., 2023). Unsurprisingly, however, institutional and funding structures (Zonta et al., 2023) and the associated fast-paced project temporality do not offer sufficient time for

such relationships. This hinders relational science, and may cause conflicts with stakeholders who are not included from the beginning (Karlsen & Hildebrandt, 2023).

There are several well-documented entanglements of Western science with colonialism and Western-centric temporality, such as early ethnographers' accounts of Indigenous peoples (see L. T. Smith, 2021). Though these entanglements are not the main focus of my study and will not be discussed in detail, it is important to consider Indigenous perspectives in the wider context of research temporality. The projects I investigate empirically have no explicit ties to Indigenous lands, peoples, or temporalities. But, Linda Tuhiwai Smith (2021, p. 63) posits that Western epistemology as such has aimed to control time and space so that "the individual can […] operate at a distance from the universe." This is antithetical to the relational, transformative research approach explored above. Here, I am not suggesting to apply any specific Indigenous temporality – of which there are myriad – to social-ecological research as a way to 'make it transformative'. Instead, acknowledging how many Indigenous scientific approaches center relationality, whereas Western epistemic traditions do not (Kimmerer, 2013; King et al., 2023; C. Smith et al., 2023; L. T. Smith, 2021), is key to investigating how research practice could become more transformative.

Transformation as such remains multi-faceted and elusive. There are various other conceptualizations, such as Rosa's (2017, p. 47) "resonance", or Mezirow's (2003) notes on transformative learning. Yet, this study does not aim to rigidify or quantify research projects' transformative capacity. Rather, it explores how project participants regard and experience it. Transformation may be closely linked to how participants view project 'success', which again is difficult to define, especially in larger groups (Tedesco et al., 2023). Like temporality, transformation is subjective, and therefore retains a certain vagueness. However, the above concepts of 'project as process' and relational, normative science offer an opportunity to examine transformation's various manifestations more concretely, and investigate how they are shaped by temporality.

2.5. Summary

To summarize the above theoretical considerations, temporality presents a suitable framework to explore subjective, non-linear experiences of time and social contexts. Research projects are one such context. Here, theorists have observed patterns of academic capitalism and projectification, which suggest a competitive, efficiency-oriented rationale for research. This

extends to time, indeed forming a specific 'project time' as described by Ylijoki (2014). Research projects in social ecology are furthermore influenced by their proximity to ecological developments and threats, which may conflict with human temporal norms like those of research. Finally, transformation can apply to social-ecological research in various ways and is theoretically diverse. Still, conceptualizations of transformative science and Indigenous scientific approaches generally emphasize the role of reciprocal relationships within the research process. This theoretical framework presents the opportunity to examine experiences of project temporalities and answer the question: How does temporality affect transformative processes in social-ecological research projects?

3. Methodology

3.1. Interview design and sampling

I chose the interview as a method for this study due to its suitability for accessing personal experience (McGrath et al., 2019). Such attunement to subjectivity is especially fitting due to the subjective nature of temporality (Vaagaasar et al., 2023). Ancona et al. (2001, p. 518) even describe "*temporal personality* variables", which may be captured via interviews. With the theoretical framework established previously, I utilize a "*theory-informed inductive*" approach in reference to Varpio et al. (2019, p. 993). This means previous theoretical considerations inform the entire study design; however, insights from the interviews are central, and can have an influence on the research aim. In my case, the data suggested that rather than transformative *outcomes*, transformative *processes* were central to the study, thus altering the final research question.

Though subjective experiences of the interviewee are central, the interview is crucially still a social situation. Various scholars emphasize that interviews, and the knowledge generated through them, are co-constructed by interviewee and interviewer (McGrath et al., 2019; Prior, 2018; Rapley, 2001). For example, Rapley (2001) notes that interviewee subjectivity is *"locally produced"* (p. 307), meaning the interview fulfills a performative purpose in constructing a certain identity. Conversely, Prior (2018) tackles the issue of 'rapport' and defines it as affiliation, i.e. the endorsement of the interviewee's perspective. He asserts that in cases of more sensitive topics, interviewer and interviewee both participate in creating affirming empathetic moments, and thereby establish rapport. Knowledge production through interviews is not one-sided, either. Both researcher and respondent can use the interview for reflection and learning, especially if the interview is designed to minimize hierarchies (W. S. Allen et al., 2023; Dei,

2005; K. Smith et al., 2015). The interview, then, is not a one-sided data extraction tool, but a social interaction with various outcomes.

How the interviewer conducts themself is therefore of special interest. Interviews are performative, which means that a researcher can choose to *act* neutral and distanced, or instead engaged and personal, without inherently *being* either of these (Rapley, 2001). The researcher in any case retains power over how the interview unfolds, even if a more mutual approach is chosen (Hesse-Biber, 2014). In this case, I have aimed to follow feminist and anti-racist interviewing traditions that advocate engaged, reciprocal conduct (see W. S. Allen et al., 2023; Dei, 2005; Hesse-Biber, 2014). This means participants were asked to offer their own input and adaptations to the interview content and semi-structured format. Moreover, as Prior (2018) suggests, affirmation of the interviewee's perspective to create empathetic moments was used to deepen the data collection. At the beginning of the interview, I also gave a brief introduction to my own personal interest in the research topic as a form of self-disclosure. Finally, member checking was employed to share authority over the final analysis (see p. 19). Each of these practices served to minimize hierarchies throughout the thesis project.

The interview was designed as semi-structured, meaning I prepared a guideline of questions, but this structure was open to adaptations depending on how interviewees responded. This allowed interviewees to adjust the order of questions depending on what felt most relevant to them in the moment. Moreover, the interview was designed to last for 45 minutes to one hour, because a longer timeframe may have overwhelmed participants, whereas less time would have negatively impacted the depth of responses. Interviews were held in person if possible, since this improved rapport, or via online software if necessary. As is widely recommended across the literature, initial questions were more superficial, regarding rough personal information on the interviewee's profession and position within the project (see Leech, 2002; McGrath et al., 2019). In a similar vein, to ease interviewees into the topic, questions about successful experiences in the project were asked prior to questions about challenges and frustrations. However, the semi-structured approach meant that interviewees sometimes 'delved deeper' more quickly than I had anticipated, which offered room for further inquiry.

Questions from the interview guideline (see Appendix 9.1.) revolved around a diversity of topics such as moments of perceived success, transformation of the self, the environment or the project, levels of stress and urgency throughout the project, relationships to colleagues, funding structure, and views on the project's and interviewee's future and past. Each of these enabled inferences on the temporality constructed and experienced by interviewees, and allowed

comparisons between the different emphases set by interviewees. Importantly, the interview was explicitly framed as not being an evaluation of the projects as (nearly) finished products. Keeping in mind the theoretical emphasis on process (Karlsen & Hildebrandt, 2023; Söderlund, 2013), the interview questions instead inquired into the 'becoming' of the project, unfolding both into future and past.

For interview recruitment, no more than four participants were sought due to the scheduling and analytical limitations of this thesis. Initially, participants were requested from one specific project, from which I knew a few of the researchers personally. For this case of convenience sampling, I attended a closing event, during which research results were presented, to better understand the project context and introduce myself to potential interviewees. Afterwards, I followed up with e-mails. However, only two researchers showed interest in the interview (pseudonyms 'Anne' and 'David'), neither of which I had known previously. Consequently, I reached out to three more projects via e-mail, from which one person responded with interest (pseudonym 'Jana'). The interviews with Anne and Jana were held online, while the interview with David was conducted in person. A final person from the first project (pseudonym 'Alva') later reached out, though time constraints meant that only an informal conversation was possible, without transcription or analysis. This constrained the rigor with which the resulting data could be treated; therefore, Alva's insights are only included occasionally when they clearly affirm or contradict other interviewee's statements.

3.2. Ethical concerns and consent

Various ethical concerns were considered in the design of the interviews. Reflecting about how we experience and 'spend' our time may confront us with dissatisfactions in our lives, for example with our working conditions. Envisioning the future, more specifically, can be a significant emotional challenge considering trends of climate change and biodiversity loss. Indeed, becoming aware of the vast consequences these trends will have on our future can lead to a kind of "futures loss", a disillusionment of the hopeful futures we had imagined for ourselves (Gardiner, 2017, p. 243). However, scholars like Joanna Macy and Molly Brown assert that engaging with and sharing this kind of despair is necessary for processing it; that it is proof of our interconnectedness, and that it "springs form our caring and consciousness" (Macy & Brown, 1998, as cited in Gardiner, 2017, p. 252). As a space to reflect one's own work and future, the interview was designed to create an opportunity for such "despair work", as Gardiner (2017, p. 243) suggests. Participants did use the interview to reflect their

frustrations and worries, but without stark emotional turmoil. This may have been due to how the interview was limited timewise, as well as the lacking familiarity between myself and the interviewees.

Furthermore, Grauer et al. (2021) advocate building "time use competence" (p. 7). The authors specify this as including an awareness of personal temporal needs, the ability to act on these needs, and a willing responsibility for one's own use of time. To build an emotional competence regarding time, first having awareness of how one experiences it may be crucial. Citing Ermath (1992), Adam (1996, p. 99) writes, "once we begin to see our mental maneuvers as inventions, they become not 'neutral' and 'natural' ways of behaving but instead modes of exercising responsibility and freedom." This can readily apply to mental 'maneuvers' around time. Ylijoki (2014) similarly emphasizes agency in negotiating temporality in research projects. Gaining awareness, responsibility and freedom in how we cope with time, then, is an important potential benefit of the interview. This is true for the personal level, but includes the project level, as well. The interview invited participants to consider how project temporality could be crafted more sustainably. Such reflections offer a notable dimension for the (re)assessment and comparison of social-ecological projects, as advocated by multiple scholars (Fernández-Manjarrés et al., 2018; Fischer et al., 2021).

Consent was gathered from participants via a consent form. While visiting the closing event of one of the projects, I gave a first insight into my research to gradually introduce potential participants to it (see Hesse-Biber, 2014; McGrath et al., 2019). I followed up with an email once more summarizing the interview's background and content. Participants contacted me personally if they were interested in the interview, and were then sent the consent sheet, including issues of pseudonymization, data storage and the member checking procedure. Full anonymization was not possible, as the descriptions of project experiences still retained potentially traceable personal information. However, participants' names and places of work were pseudonymized or removed from the transcripts. The explicit naming of the project was considered for the first project I contacted, since this may have better contextualized the research. But, the idea was dismissed in the interest of relative anonymity. Data storage via the Leuphana University's PubData service was included in the consent form, and discussed with a data security advisor from the university. Interviewees were asked to read and sign the consent form before the interview. The voluntary nature of participation and the opportunity to opt out were repeated at multiple points, including immediately prior to the interview (see Hesse-Biber, 2014).

Introducing the interview topic at multiple points also served to prime interviewees in thinking about time. Grauer et al. (2021) point out how exercises in reflecting time are unfamiliar to many, meaning it may be difficult to make temporality salient for participants. Therefore, giving them an idea of likely interview contents was useful for initiating reflections on time prior to the interview. In one case, an interviewee requested a rough interview guideline to read through for preparation. Also, because abstract temporal concepts (like 'project time') may have overwhelmed participants who had not thought about these issues before, questions were designed to ask about more concrete feelings or experiences.

3.3. Transcription and analysis

For the transcription of interviews, the free software aTrain was used. The software's transcription was checked for mistakes and edited to include non-verbal cues such as laughter or sighs, as recommended by Cope (2010) and McGrath et al. (2019). The transcripts were then imported to MAXQDA for further analysis. Here, open, line-by-line coding allowed for a detailed and rigorous investigation of the data. Open coding, in this case, is not understood the same as in 'grounded theory', which suggests the complete absence of theoretical preconceptions, and data collection up to the point of "saturation" (Deterding & Waters, 2021, p. 709). As explained, data collection was limited in this study, and the theory-informed inductive approach meant that theoretical insights sensitized the analytical process. For example, there was distinct attention given to potential temporal conflicts between social, ecological, and project rhythms, as discussed by Adam (1996) and Söderlund (2013).

Open codes were gradually developed into axial and selective codes (see Cope, 2010), thus condensing the analysis. Here, both the open codes' frequency and their intensity (i.e., whether an interviewee worded their response strongly) were considered for relevance in axial and selective codes (see Weston et al., 2001). Highly relevant codes from single interview cases were compared with other cases to examine "internal generalizability" (Weston et al., 2001, p. 394). As is common in qualitative interview analysis, memos were used to document hypotheses on inter-code patterns. McGrath et al. (2019) advocate an early start of analysis, and because the interviews were not all conducted in the same short time span, coding began before every interview was conducted. Indeed, Cope (2010) posits that data collection and coding intermingle frequently, and that codes from previous interviews can enhance subsequent interviews with topical awareness.

3.4. Member checking

Member checking is frequently used in qualitative data analysis as a tool for validation and to avoid misinterpretations (McGrath et al., 2019). It involves giving transcripts or parts of the data analysis back to participants and allowing them to make comments (Cope, 2010). Various authors caution the use of member checking, since it presents challenges on dealing with statements contradicting the analysis, and finding time for working with participants (Cope, 2010; McGrath et al., 2019). Importantly, member checking does not erase the interviewer's power to shape the research. Therefore, it should not be utilized as a "'feel good' measure" (Patai, 1994, p. 33) to gloss over potential power asymmetries. Yet, member checking retains the ability to discover disagreements in interpreting the data. Furthermore, while it does not, on its own, create a balanced and trustful relationship between researcher and participant, it at least allows the latter an insight into the research process, as well as the opportunity to engage in it.

In this study, member checking was implemented after initial axial codes had been established. Participants were sent a summarized code system of their respective interview's axial codes, as well as memos detailing the emerging patterns and hypotheses, and graphs which visualized code patters. I also asked for any comments or additions. Generally, participants voiced appreciation for the member checking, and affirmed the data analysis up to that point. The few additions which were given did not contradict or add entirely new aspects to the analysis.

3.5. Further methodological considerations

Finally, a number of methods were considered but ultimately not conducted. This was often due to a lack of resources within the Bachelor's thesis context. For example, action research in which the research 'problem' is constructed with participants from the start (Karlsen & Hildebrandt, 2023) was deemed too time intensive, and contacts with participants were too limited to implement this approach. Having a multi-stage interview process with repeated sessions was hindered by a lack of resources to compensate respondents for a longer process, even though more time to reflect may have made temporality more salient. Visioning exercises or even the design of a visioning workshop to imagine a more time-rich future had similar potentials of temporal awareness-building, but were again not possible due to low 'access' to participants and no means for compensation. Moreover, the format of the narrative interview (see L. M. Allen et al., 2024; Konopasky et al., 2021) showed potential due to the close link of narratives and temporal understandings (see Cheston et al., 2023; Ollerenshaw & Creswell,

2002). However, the narrative format proved to be inappropriate for directly investigating temporality, which is often unconscious and latent. Instead, a somewhat more conventional semi-structured interview was deemed most suitable to investigate the core topics of temporality and transformation.

4. Results

The analysis of the project contexts and interview responses provided a vast amount of data, which is summarized below. First, Table 1 illustrates the differences between Projects A and B to better contextualize the respondents' experiences. Second, I elaborate the results of the interviews themselves. The great density of information from these interviews, despite the small sample size, made it necessary to leave out more marginal topics and focus on recurring themes and patterns. Some of the most frequent themes include temporal tension, challenges of interdisciplinary collaboration, and personal work negotiations and agency. Participants also reflected on transformation, learning, and transdisciplinary research requirements. Finally, project longevity and flexibility, as well as the state of their research field, informed the interviewee's accounts.

4.1. Project contexts

Table 1

	Project A	Project B
Interviewees	Anne, David, Alva	Jana
Researchers involved	• [Over a dozen] • Plus [several practitioners and associated scientists]	• [Under 10], in the past 2-3
Research aim	• Understand [varied social-ecological restoration dynamics]	• Understand [social-ecological factors relating to ecosystem services] • Varying thematic foci throughout the years
Stakeholders	• [Distinct transdisciplinary approaches]	• Inclusion through interviews and similar methods

Spatial scale	• Several implementation sites throughout Germany	• Broad literature review; city-specific social-ecological research
Temporal scale	• [few years; project work completed recently]	• Ongoing [since over ten years ago] • [Multi-year] project cycle with possibility of a continuation
Funding structure	• [external, public funding]	• Collaboration with another research institution, as well as institute's own finances

Table 1: Comparison of contextual factors in Projects A and B.

4.2. Interview results

Temporal tension

From the coding process, several categories of interest arose (see Table 2). The most frequent code is 'Temporal tension'. Segments coded as temporally tense were very diverse and frequently overlapped with other categories. For example, interviewees struggled to arrange their own schedules in accord with outside demands, experienced difficulties in organizing the project work collaboratively, and noted that research would ideally need more time for transformative outcomes. Each of these sentiments correspond to other categories, which will be explored in the following. However, coding temporal tension separately shows how ubiquitous this experience has been in the research process. This is true for both projects, as each of the interviewees recounted experiences of time pressure. Though, not all instances of 'temporal tension' are to be understood as severe mental distress. Every interviewee at times voiced a certain acceptance for 'the way things are', and seemed to expect a level of tension inherent to research and interdisciplinary work. In no case were projects described as constantly urgent or stressful. Rather, Anne pointed out how there were repeated lulls in Project A in autumn after data collection, while Jana emphasized the stagnation of research due to the Covid19 pandemic. This slowness presented its own form of tension. Therefore, temporal tension in the interviews was diverse and depended on the participant and the issues they

discussed.

Table 2

Codes	Frequency
Total	337
Temporal tension	66
Challenges of interdisciplinary collaboration	53
• Project hierarchies A	15
Personal work negotiations and agency	32
• Humor	12
• Idea of ‘progress’ A	6
• Simultaneity of projects J	5
Transformation and learning	22
• Interdisciplinary enrichment	13
Ecological research requirements A, D	20
State of the research field	15
Project longevity & flexibility J	14
Transdisciplinary research requirements A, D	10
• Connection with local stakeholders	36
Funding difficulty A	9
Needing (more) flexibility A	9

Table 2: Summarized codebook. The above table shows the summarized codebook for all three interviews. Included are the axial codes for all interviews, sorted by frequency of the main code, excluding the amount of subcodes. If codes were not found in every interview, a capital letter denotes which interview(s) the codes emerged from (‘A’ for Anne, ‘D’ for David, ‘J’ for Jana). While much of the analysis was done with the more specific open codes, Table 2 provides an overview of central themes, their frequency, and how they are distributed among the interviews. The full codebook for axial codes can be found in Appendix 9.3.

Challenges of interdisciplinary collaboration

With similar frequency as temporal tension, interviewees reported challenges with coordinating project work, often with regard to interdisciplinary friction. Here, David and especially Anne discussed such challenges more often than Jana, possibly because Project B involved fewer scientists, and was generally less urgent. In coordinating Project A, participants noted that the simultaneous ecological and social-transdisciplinary research clashed in their requirements. Both ecologists and social scientists worked with local stakeholders, which created a serious challenge of stakeholder fatigue. The ecological data collection was furthermore determined by the seasons and weather. This presented a rigid temporal framework, meaning that ecologists sometimes had to work on weekends due to weather conditions. Social-ecologists, on the other hand, had to negotiate the timing of their workshops and [other methods] with both the ecologists' and the stakeholders' availabilities. While Anne and David struggled with this, Alva also found that the clear ecological time requirements provided a clarity of what needed to happen in the project.

Beyond scheduling, the friction between disciplines became apparent on an epistemological level, as well. From the apparent gap between social-ecological and strictly ecological practice in Project A, conflicts over the priorities of research types arose. Alva felt there was a "clash" of research cultures, and Anne observed a lack of flexibility among colleagues. Jana more generally noted that a main challenge in projects is to negotiate how many people and perspectives are needed to assure diverse expertise, but not inflate the work hours required for coordination. In Project A, the ecological work appears to have somewhat dominated transdisciplinary efforts […]. However, this assessment may be biased since neither Anne nor David are 'strict' ecologists. Thus, an ecology-focused perspective is lacking from this study. Both more time to implement the different types of research, as well as more time to negotiate interdisciplinary conflicts could have been beneficial to the project.

Interestingly, only Anne explicitly talked about the role of hierarchies in the project. She emphasized that some older colleagues lacked trust in newer researchers and transdisciplinary practice, with colleagues being "on the same book but at very different chapters" about transdisciplinary science. Moreover, she pointed out how younger PhD researchers were especially affected by scheduling conflicts, as their deadlines were more acute. Also, she faced prejudices as [non-German] woman and a significant language barrier. These both required additional time to cope with and assert herself against. Anne experiencing these hurdles is notable, as she has had over a decade of academic experience, whereas David has had fewer

years of experience and did not emphasize, for example, structural disadvantages for the younger researchers.

Personal work negotiations and agency

Negotiating the requirements of work, and finding agency in this, is another core category present in every interview. This was important to the interviewees since they each experienced academia as highly demanding, beyond the project work itself. Publishing papers constituted a significant work load, but was unaccounted for by the project framework, and thus unpaid. Teaching and communicating research results additionally demanded attention and time, in Jana's case. Each interviewee described academia as inherently demanding and difficult to balance with one's personal life. Though aware of this structural issue, the interviewees did not take a discouraged, helpless or blaming stance toward academia. But, they did not formulate comprehensive critiques or demands for systemic change, either. Nor did they construct utopian visions for the future of academia.

Instead, the interviewees asserted both the personal responsibility to find ways of coping, as well as a shared responsibility with project colleagues. Personal strategies include the different beliefs that were mobilized throughout the interviews. For example, David described a passion for human-nature relationships, Anne had faith in working towards a common goal, and Jana preferred to focus on positive narratives in social ecology. Anne also constructed a notion of progress – both of herself as continuously learning, as well as projects becoming gradually better at collaboration and tackling inequality. Furthermore, taking responsibility for their own schedules was important to Anne and David because they perceived academic work to be temporally 'loose', yet very demanding. To cope with this, David prioritized adapting his own work schedule to that of his spouse. In spite of this, he found that his work demanded a creative state of mind that was more accessible on the weekends. Finally, each of the interviewees showed humor or laughing when conveying difficult working conditions. This was done with varying frequency and could be explained by personality factors. But, the use of humor could also have been a way for the participants to self-determine with which seriousness they wanted to think (and talk) about their struggles. Thus, each of the interviewees exerted agency in the way they dealt with temporal tension practically, as well as how they thought and talked about it.

Transformation and learning

Transformation and learning were less frequent in the code system than other categories, but still of importance to the interviewee's accounts of project work. Notably, the challenges of interdisciplinary coordination mentioned above did not prevent each interviewee from appreciating interdisciplinary collaboration as an enriching learning experience. Anne and David claimed to have learned much about ecological restoration through Project A. Jana asserted that working in multiple projects at the same time generally ensured research quality and personal learning, despite her reported struggles with the simultaneity of projects. Though interdisciplinary enrichment was mentioned with less frequency than the accompanying challenges, it remains a consistent part of the participants' perspectives.

Further transformative experiences were almost always recounted in relation to others. Jana experienced a significant moment when presenting biodiversity issues to young students (outside of the project's core work). As she detailed near-hopeless ecological trends in the classroom, and students did not understand 'why nobody was doing anything', she came to question her research approach. With the students, and later with other stakeholders in research, she shifted her focus towards positive examples of social-ecological systems. She also connected this to a wider shift towards positive narratives in the research field. David similarly had a transformative moment while engaging with non-academic stakeholders when he felt they truly understood the research. Ultimately, these stakeholders […] became empowered to shape the research process, and David became more empathetic of their […] livelihoods, consequently changing his [consumption patterns]. For Anna, learning to shift perspectives between the different disciplines represented by her colleagues, while remaining steadfast in her core values, presented a crucial learning. Although each of these experiences are different, they have in common a transformative process through the exchange with others, and in relation to the research.

Transdisciplinary research requirements

This connection to others through research is equally apparent in the interviewees' accounts of transdisciplinary research, and its requirements. Project A had a more pronounced transdisciplinary approach than Project B, and thus Anne and especially David talked much about this issue. For David, who had been very active in [transdisciplinary methods], the connection with local stakeholders was the interview's core category. Again, temporal tension

arose because Project A's timeframe was too short to fully establish transdisciplinary science, and see deep changes in the stakeholders' valuation of nature. It took time to bring the project close to non-academic stakeholders, and involve them properly in decision-making. Their evaluation of the project was affected by a general skepticism towards outside scientists, English as an inaccessible research language, and setbacks experienced within the project. David deemed it crucial to get close to stakeholders on a personal level, without constantly following a research agenda. The project did not account for the amount of time this took, which led to a negotiation of how much personal time to 'invest'. Stakeholders' scarce availability for research was an issue faced by all interviewees. Jana noted that there simply was not enough time or personnel in many organizations to engage in, for example, workshops. She also understood this as a recent development. As a result, 'inside' contacts who could better mobilize stakeholders had to be found. This presented both a temporal extension, and an intensification of the research process.

Project longevity and flexibility

Though Jana faced such complications, it is notable that Project B had far greater flexibility and longevity than Project A. The comparatively long-term funding secured for Project B allowed for agency in addressing different themes. Jana emphasized that the longevity of the project cycle(s) and the resulting liberties made Project B an exceptional case. In contrast, Anne did not encounter enough flexibility in Project A. The inherently unpredictable nature of research, which Jana also pointed out, was in conflict with a highly rigid funding process. The initial funding application itself was very taxing and required night shifts from Anne's colleagues. Alva, herself involved in this process, affirmed this. Additionally, a second funding period was made impossible by the Russian war of invasion on Ukraine, because state funds were allocated away from research. This shows how state funding is highly susceptible to outside factors. During the project, funds had very specific uses, and Anne had to "spend crazy amount[s] of time […] to shift money from one cost category to another cost category" if the project's needs shifted. And, while Jana generally experienced flexibility and less stress in Project B, she noted that working in multiple projects at once meant that other projects' urgency quickly compensated for Project B's temporal liberties. It is apparent, then, that funding structure, longevity and the perceived flexibility of a project are closely linked.

State of the research field

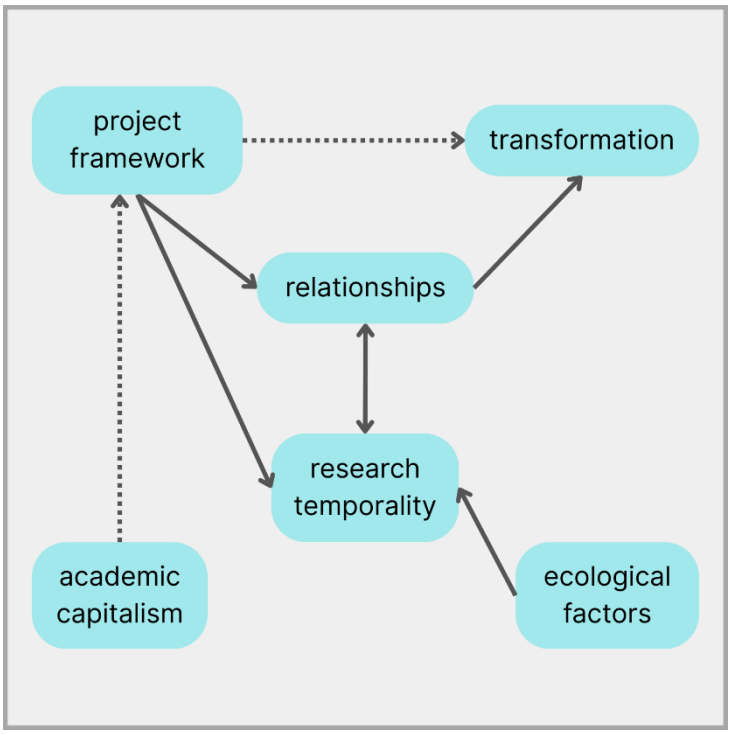
Each of the interviewees also considered the state of their research field, i.e. social ecology and transdisciplinary science. They recognized a trend especially in the latter field, Anne describing transdisciplinary science as a "buzzword." But, the growth of such research was still deemed slow; David mentioned that institutional change in this area was rather gradual. Also, climate science was perceived to dominate the environmental sector compared to biodiversity studies, though decreasingly so. Other sectors remain in competition with social ecology, Anne noting AI monitoring as a current trend that may push out social-ecological projects from funding agendas. The institutional framework around the interviewees' projects therefore appears somewhat slow and contested in its development.

Summary

In sum, the interviewees' accounts reveal a shared experience of temporally tense research processes. In each case, working in an interdisciplinary project under notable academic pressures presented a core challenge. This necessitated strategies for constructing one's own schedule, as well as developing approaches to cope with project tensions, such as humor, passion for research, or a belief in progress. The resulting temporality is one of limited time for intense research processes and a need to prioritize and find compromises. Funding and project structure played a key role in this, leading Jana to experience Project B with more flexibility than Anne and David experienced Project A. The interviews did not elicit visions of a radically different future, where academic or temporal pressures were resolved. However, interviewees did recount moments of positive change. Such moments of transformation were *relational*, meaning they emerged through interactions and relationships with others – stakeholders, colleagues, students – via the research. These transformative experiences were framed in a slowly developing and contested research field, leaving the future largely ambiguous.

A centrality of relationships within the projects' context is illustrated by Graph 1. While the model is not predictive, Graph 1 shows the broad patterns that emerge from the interview results. Overall, it appears that transformative processes in the projects were mediated by relationships, e.g. with colleagues and stakeholders. These relationships, in turn, interacted with the research temporality experienced by interviewees. The interaction was reciprocal, since the time taken for relationships affected the pace of research; but also, the rhythm of research affected how much time was given to relationships. The project framework and ecological

factors strongly influenced research temporality, as well. Aspects of academic capitalism like highly competitive funding were likely, though less definitive, factors in shaping the project framework and by extension research temporality. Graph 1 shows a highly simplified model and offers room for discussion, which will be explored below.



Graph 1: Model for the relations between research temporality, relationships and transformation.

5. Limitations

The interview results include several limitations that warrant mentioning. First, as previously described, only three formal interviews could be conducted. This means that the sample is unlikely to have fully "covered the phenomenon" (Hesse-Biber, 2014, p. 192) of research temporality, even within the projects. For example, a more detailed perspective from ecologists in Project A would have better illuminated the relationship between disciplines. Having more participants in general would have granted a greater understanding of project dynamics and hierarchies. Therefore, the results cannot be considered generalizable to any and all research projects. Second, the interview coding was done only by myself without other researchers. This necessarily carries a bias (see Positionality Statement, p. 4), although the member checking procedure was designed to compensate this to an extent. Third, the interview faces the challenges inherent in its methodology: Participants self-reported their own perspective, rather than an 'objective' version of events, and necessarily performed their subjectivity (see Rapley,

2001). This performativity means that participants' interview-specific descriptions of themselves as certain 'kinds' of people, or even their manner of speaking and interacting, may not correspond to how they behaved in the projects. Finally, the different phases of Projects A and B, the former having just concluded and the latter being ongoing, prohibits equating the projects or the interviewees' responses. Instead, it is important to consider contextual factors that influenced the participants differently. Yet, the interview retains its declared purpose of investigating personal experience, and thus serves the core interest of this study.

6. Discussion

Though the interview results face limitations, a few coherent themes emerge through the data, as will be discussed in the following. First, I examine how transformation occurs primarily through social relations, and question how the project framework affected these relations. Next, I discuss ostensibly external factors that affected the interviewees' temporality. As Graph 1 showed, the temporality analyzed here is mainly a *research temporality*; however, it is interdependent with temporalities of ecology and private life. I continue by assessing the issues of project time and academic capitalism. Lastly, I consider the interviewees' temporal agency in a context of labor precarity.

Transformation as relational

From the results, it becomes apparent that relationships are one of the main ways through which temporality affects transformative processes in research. Primarily, it was a lack of time that precipitated conflict or tensions. Anne phrased this quite poignantly while discussing the lack of opportunities to meet up with the entire project team, also outside of work. With few opportunities to get to know colleagues that worked on different parts of the project, she felt that "we kind of lost a lot of the essence of how we are as humans." Alva pointed out how relationships in the project team were strengthened through a single trip to a conference, but that there was only one such trip. Similarly, Jana's and David's relationships to stakeholders were informed by how much time was available to connect with them, and how different the stakeholders' rhythms and availabilities were to their own. Conversely, when David made compromises in his own time to build relationships with stakeholders, this positively affected how they viewed the research project, indeed transforming their outlook and role in the research. Rather than transformation arising from changes in the ecological environment, or

from individual reflection, the interviews suggest that it emerges largely from social relationships.

These findings closely resemble Rosa's conception of "resonance" (2017 p. 47), which he deems central to the idea of "a good life" (p. 49). The author conceptualizes a transformative, 'resonant' moment as a "dual movement of af←fection (something touches us from the outside) and e→motion (we answer by giving a response and thus by establishing a connection)" (p. 47). Resonance is therefore fundamentally relational. Though Rosa (2017) describes various forms of resonance, including existential or material resonance, its social dimension is most relevant here. Notably, resonance is not always harmonious, in fact "it *requires difference* and sometimes *opposition* and *contradiction*" (Rosa, 2017, p. 48). This means we must enter a connection with others and allow them to affect us in order to be transformed, sometimes in tense or unpredictable ways. Crucially, resonance cannot be accumulated or predicted. Still, Rosa notes a few conditions for it to emerge. One such condition is the absence of competition and an associated shortage of time: "[If] we have to outpace someone, we cannot resonate with [them] at the same time" (p. 51). The shortage of time described by the interviewees, and the at times competitive nature of project funding, are likely to have hindered resonant experiences in the research projects *through* their impact on relationships. This is underscored by how Jana and David both described their relationships with stakeholders to have been built partially outside of strict project time.

The relational nature of transformation mirrors much of the previously explored literature on embedded science. Not only are the interview participants "embedded" in wider society (Schneidewind et al., 2016, p. 15) through their transdisciplinary research with stakeholders. Indeed, the research team itself presents an intricate social framework with different groups (disciplines, career and gender diversities) that mirrors social hierarchies, as described by Anne. Moreover, interviewees acknowledged that the connection with non-academic stakeholders was difficult and needed more time than what was granted by the project. This shows a rift between Indigenous approaches to reciprocal scientific relationships (see C. Smith et al., 2023; L. T. Smith, 2021), and Western scientific projects. The latter appear to struggle to reserve time for such relationships even in a declaredly transdisciplinary framework.

Building relationships with stakeholders was further complicated by differences in language, as well as the stakeholders' availability, i.e. the time they had to engage with the research. Kenyon (2000) draws attention to how beyond social and spatial factors, temporality plays a key role determining community membership and community divisions. In analyzing a town's

student and resident communities, she found that they were each "united by their common understandings, expectations and experiences of time," but that differences in such understandings also marked the division between residents and students (Kenyon, 2000, p. 38). Applying this to the interviewees' accounts, divisions between ecologist, social-ecologist and stakeholder communities similarly seem to have been shaped by their temporalities. A clear difference here is that resident stakeholders likely have a far more long-term connection to the research site, but less time for research itself, than researchers in short-term projects. Understanding such temporal division may be central to empathizing with stakeholders and finding ways to successfully integrate them. Again, this affirms inviting stakeholders early on to shape the research aim itself (see Karlsen & Hildebrandt, 2023; Zonta et al., 2023).

'External' factors determining temporality

Beyond the projects' relevant stakeholders, research temporalities were influenced by various 'external' factors, i.e. factors outside the immediate project framework. The interviewees noted that political will determined much of the potential for project funding, and that wars and the Covid19 pandemic complicated standard research processes. A shifting institutional and discursive framework around transdisciplinary research was also relevant to the interviewees' outlook on the future. Rather than projects being 'frozen' in time, this affirms the notion of project contextuality (see Karlsen & Hildebrandt, 2023).

Furthermore, environmental factors like the seasons, unpredictable weather and climate change affected the research in both projects. For example, one of the ecological research sites in Project A was flooded, thus requiring more time spent on managing the area, and prompting skepticism from local stakeholders. In addition, the seasons determined whether ecologists would be busy with data collection or available for collaboration with other colleagues. These patterns evoke the "interpenetration of nature and culture" as described by Adam (1996, p. 90). While the researchers in Projects A and B engaged with and affected their 'natural' environments, their work was equally affected by the environment. At times, it was even troubled by environmental patterns that were themselves shaped by humans, like climate change. The interviewees did not consider themselves explicitly *as nature*. But, it is clear that through the interpenetration of social and ecological processes, the boundaries between human and more-than-human spheres became blurred, especially in Project A. This was not focal to the interviews, so further research could investigate how researchers in social ecology perceive

this interpenetration, and whether it affects their relationship to research or their ecological environment.

Project time and academic capitalism

The results indicate that both projects were indeed processual. Relationships were built slowly, and the research faced unpredictable setbacks as well as phases of conflict. These struggles clashed with aspects of 'project time' (see Ylijoki, 2014), such as the need to predict results for funding and having clear deadlines. As Anne described, such pressures prevented her project team from growing closer socially. This matches Söderlund's (2013) concern that project temporality may neglect interpersonal connection. Yet, moments of fruitful collaboration and learning persisted in each of the interviewees' accounts. The project framework therefore did not go so far as to exclude social relationships. Rather, social bonds, 'project time' and 'process time' existed simultaneously in Projects A and B.

Neither of the projects exhibited archetypal manifestations of academic capitalism. But, each interviewee did describe central aspects of their work which were unpaid, including the demanding process of publishing. Funding was similarly arduous. Even for Project B, which has a more long-term funding structure, initially securing this funding was highly competitive. And, while Jana's institute has its own funds to contribute, a considerable part of the financial means come from an external research institution. Rather than a private, profit-oriented organization, though, this institution is charitable. This may explain why an external, competitive funding source did not result in a short-term project. In Project A, funding [was public], but was still very difficult to attain. Anne was concerned that social ecology may be outcompeted by AI research for state funding calls. Like Slaughter and Leslie observed in 1997, public funds for research still appear to be scarce. In this case, however, it was not commercial funding bodies that contributed a competitive funding landscape. Rather, public funding itself seems to operate through acute competition and short-term financing periods. Since the key players here were not private and commercial, it is questionable to what extent 'academic capitalism' is an apt description of Project A. But instead, it is all the more notable that competitive logic and the related 'project time' permeated even a publicly funded project.

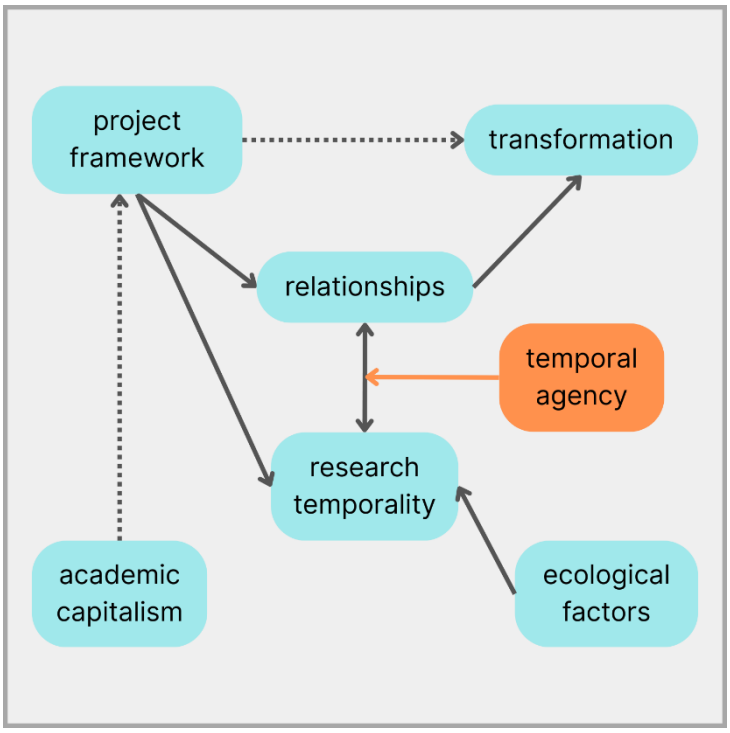
Precarity and temporal agency

Both short-term projects and an uncertain professional future indicate precarity for project researchers. Here, it is important to note that none of the interviewees explicitly described their work circumstances as precarious. As Millar (2017) emphasizes, 'precarity' carries connotations of acute material deprivation. Therefore, it may be uncomfortable to identify with precarity especially for workers in more esteemed professional fields, such as researchers (Millar, 2017). While I do not aim to diagnose a specific degree of precarity for the interviewees, I do seek to make explicit that precarious labor conditions – namely unpredictable employment and feelings of insecurity (McKenzie, 2021; Millar, 2017) – can and do proliferate in academia. This is not to say that traditional wage labor is an ideal of security, either. In her "critical politics of precarity", Millar (2017, p. 1) describes how precarity is neither new, nor an anomaly. She underscores that the dependence on wage labor for survival is itself the precarious condition of capitalism, and that 'precarious' circumstances have historically been the norm for many marginalized labor markets. Thus, although academic precarity does not present a morally exceptional case, understanding its patterns and their effect on temporality can illuminate ways to navigate and resist such working conditions.

Anne's doubts about the future funding landscape, which presumably relate to her own professional future, are notable considering her research career of over a decade. Jana, who has worked in academia for even longer, was perhaps less concerned about future professional opportunities, but still struggled with the intensity of work requirements. David, who has had the shortest academic career of the three, mentioned he would soon leave research itself and look for administrative (state) positions relating to research. These results affirm the notion of an "academic precariat" (Ylijoki, 2014, p. 102), but they also trouble the dichotomy of established, secure academics versus inexperienced, precarious project researchers. Further research, then, could shed light on the current state of precarity among researchers across different levels of experience.

Connected to a certain level of precarity, academic pressures affected the interviewees' personal time management. From David's perspective, it is generally difficult to distance oneself and one's time from research. In this, we can recognize a "colonization" of private time through project time as Ylijoki (2014, p. 98) describes. Yet, the interviewees were not passively victimized by this, but instead resisted it actively. This is represented on the one hand by personal strategies like David's effort to adapt his work schedule to his spouse's, or Anne's belief in research flexibility. Each of the interviewees having some humor about their working

conditions also suggests a certain level resistance to them (see Ylijoki, 2014). On the other hand, interviewees actively made time for those aspects of the work they deemed important – Jana trying to use every opportunity to engage with students, and David spending time with local stakeholders, even living with one of them for a short while. Whereas literature on project time posits that any 'inefficient' time uses will become marginal "shadow times" (Adam, 2004, as cited in Ylijoki, 2014, p. 99), the interviewees showcase that it is still possible to exercise agency and set priorities in research. These priorities affect how relationships develop across the project. As Graph 2 illustrates, it is thus the interviewees' temporal agency that moderates – to an extent – the interaction between relationships and research temporality. And, in the participants' commitment to transformative research experiences despite precarious conditions, there lies "political potential" (Millar, 2017, p. 8) to question ideals of 'secure', traditional wage labor.



Graph 2: Adapted model for the relations between relationships, research temporality and transformation, including the relevance of temporal agency.

Importantly, however, agency in projects is not unlimited. Though the interview participants set priorities in their work that somewhat diverged from their projects' framework, it is crucial to point out that none of them reported political engagement regarding academic structures themselves. It is unclear whether the interviewees were in fact not interested in such

engagement, or if they lacked exposure to movements like '#IchBinHanna'. Another reason could be that they altogether lacked the time to organize politically. Anne observed that she generally found little time to reflect deeply on her work, and that the interview thus offered a valuable opportunity to do so. Jana echoed this, saying she had never thought about the interview's themes in a structured way. It is possible, then, that the temporal limitations presented by academic working conditions prevent critical organizing around these same conditions. Researchers may have capacity for transformative science even in temporally tense projects. But, this capacity should be further analyzed to understand whether it conflicts with other struggles for change, such as organizing for a transformation of academia itself.

7. Conclusion

Temporality is a central part of the human experience; Barbara Adam (1996, p. 92) indeed understands humans as "biological clocks". Our varied, intersecting, simultaneous experience of time(s) – in short, our temporality – is determined by societal understandings of time and our social relations. Moreover, time entwines us with our ecological environment in a process of "interpenetration" (Adam, 1996, p. 90): Ecological patterns like the seasons necessarily affect us, while they are in turn affected by corporation-made climate change and pollution. The more specific temporality of social-ecological research is shaped by patterns of academic capitalism and "projectification" (Ylijoki, 2014, p. 94). Such patterns frequently necessitate a quick, predictable, and efficiency-oriented rhythm. In this study, I aimed to understand how this temporal context affects the social and transformative capacities of research, thus filling a corresponding knowledge gap in temporal studies.

From the interviews I conducted, it became clear that temporal tension troubled the ability of researchers to be "embedded" in their social-ecological environments in the spirit of "[transformative] science" (Schneidewind et al., 2016, pp. 6, 15). This tension was complex, not always acutely negative, and arose around issues of interdisciplinary collaboration, as well as the requirements of ecological and transdisciplinary research. Furthermore, a relative precarity of the interviewees' work was constituted by temporary contracts, an uncertain professional future, and intense workloads. This affected each of the interviewees' research experience. Interestingly, although two of the researchers had an academic career of over a decade, they were still in an arguably precarious position. Despite such challenges, they retained an ability to set priorities and experience transformative moments. Though moments like this often included a shift in the interviewees' own perspective, they were almost always social-

relational, arising through an exchange with others. The interviewees also had personal strategies of navigating temporal tension, such as arranging their own schedule, or, perhaps unconsciously, developing approaches of humor, passion, and progressive optimism. Ultimately, however, they seemed to develop such strategies on an individual level, and did not mention organizing collectively to change their temporal conditions. Whether this was due to a lack of time, a personal acceptance of their own conditions, or a lack of exposure to political initiatives is unclear. A remaining question, then, is how exactly priorities are found between the issues of project work, non-academic stakeholder connections, colleague relationships, and unionizing or political engagement. Are these priorities made consciously, or does a lack of time to reflect make it impossible to do so, as some of the interviewee responses suggest? Does labor precarity, understood as insecure and unpredictable employment, add an element of temporal scarcity and tension, a "narrowing of the cognitive map" (Tolman, 1948, p. 208)? These questions are relevant far beyond the sphere of research: As Kathleen Millar (2017) reminds us, dependency on wage labor under capitalism represents precarity for everyone. The pressing, urgent demands of labor may contradict our long-term – perhaps eternal – pursuit of social-ecological transformation. Therefore, we must ask how to craft new temporalities that enable us to navigate both.

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9. Appendix

9.1. Interview guideline

Prior to interview:

- Reiterate consent practices
- Introduce own relation to research
- Interview not as an 'evaluation' of the project (as a finished product), but an inquiry into the process of it & its long-term effects

1. Could you tell me a bit about yourself, what your profession is, and how long you've worked in the _____ project?
    - How long have you worked in academia / restoration? How has this evolved?
    - How did you get to participate in the project?
2. Considering the project is [ending soon / is ongoing], how is that going, how do you feel about it?
    - Satisfaction?
    - Any urgencies / stressors?
3. [Referring to how project is going currently] Are there other ways that you think the project has been successful?
    - (Personal, SES change, exchange w/ stakeholders, presentation of results, …)
4. The _____ project is a pioneer project in many ways, such as [project-specific parameters]. What do you think about the future of projects like this? (continuation / setting a precedent with the project?)
5. I understand the project was financed by [funding structure]. Could you elaborate a bit on the funding structure, if it's long-term, or if securing funding was very competitive?
    - How did this make you feel?
    - If mentioned before: Would you say this was connected to any of the time pressures?
6. You mentioned current [stress / lack thereof]. Did you experience time pressure throughout the project? If so, how?
    - Was there a pattern to stress/urgency? (recurring phases, continuity?)
    - How did this manifest in your day-to-day? (longer hours, minimizing waste time, thinking about it outside of work?)

- How did other members of the project experience stress? (newer vs. experienced academics, academics vs. practitioners)?
- How did this affect relationships with others in the project?

7. How were responsibilities organized in the project?
    - Did you perceive hierarchy in this? (e.g., academics vs. practitioners?)
8. You mentioned _____ time pressure. How do you think this affected how decisions were made in the project?
9. From what you said, the project seems to have had _____ time requirements. Did you ever feel tension between the project's time and responsibilities outside of work?
    - E.g. regarding friends & family, time for reflection
    - How did you set priorities?
    - What was 'lost' as a result?
10. Would you say ecological rhythms also had time requirements, did you have to compromise with, e.g., the seasons or extreme weather events?
11. Your project has [ecological research sites]. Do you feel the development of these project sites is or was predictable? On what timescale?
    - Were there any surprising moments?
12. Were there specific moments during the project in which you felt any profound changes (i.e. transformation)? (of the environment, of yourself, your relationships to colleagues, the project itself)
13. Alternatively, were there moments where you felt things stagnated or were very slow? How did that feel for you?
    - How did this relate to the _____ stresses/urgencies you described?
14. Do you think the project had an effect on how you view the past, present, or future overall?
    - (Refer back to general feelings towards project)
    - What about effects on your future? (e.g., professional)
    - Do you feel like the project and its results are temporary? How about relationships formed through the project? How does this feel?
15. So, knowing what you know now, if you could design a project like _____ yourself, or go back in time to adapt it, what would you change?
    - Where do you see unrealized potentials?
16. Is there anything you would like to add or talk about further?

9.2. Codebook

Table 3

Code system	Frequency
Total	473
Temporal tension	66
Challenges of interdisciplinary project collaboration	53
• Project hierarchies A	15
Personal work negotiations and agency	32
• Humor	12
• Idea of ‘progress’ A	6
• Simultaneity of projects J	5
Project context D, J	27
• Funding structure J	6
Miscellaneous codes	24
Personal academic trajectory	23
Transformation and learning	22
• Interdisciplinary enrichment	13
Ecological research requirements A, D	20
State of the research field	15
Project longevity and flexibility J	14
Transdisciplinary research requirements A, D	10
• Connection with local stakeholders	36
Funding difficulty A	9

Needing (more) flexibility A	9
Local stakeholders‘ evaluation of research D	9
Reflecting temporality D	9
• Reflecting time management D	4
Coping with interdisciplinary challenges A	8
Importance of project structure J	7
Temporal fluctuation A	7
Outside influences on project funding D	5
Limitations of project efficacy D	5
Academic pressures A	2

Table 3: Comprehensive codebook.

10. List of Tables

11. List of Graphs