PRISMAtic Sustainability

Exploring the practicability of an enactivist research paradigm within environmentalism

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Abstract:

The climate crisis is one of the most challenging issues of our time. This work aims to contribute to combating this problem by mobilizing a research method from the cognitive sciences. Inspired by various thinkers advocating that we need to change the way we, as humans, relate to the more-than-human world, we set out to adapt the PRISMA method, an enactivist research paradigm to study the experience of social interaction, to investigate this relation. Orienting on the question of whether and to what degree the PRISMA method can be meaningfully extended and applied to study the experience of interaction between humans and their natural environment, we designed and conducted a piloting research workshop testing our adapted version of the method. In this report we start by presenting the enactivist foundation of the PRISMA method, followed by an introduction into the method itself and the ways we adapted it to our purpose. The subsequent thorough account of how we conducted the research workshop can be used to implement follow up workshops and is concluded by the results we obtained. We conclude that we can, indeed, utilize the PRISMA method to investigate the ways humans relate to their natural environment and, consequently, can utilize it as one tool to make meaningful contributions in facing the challenges of the climate crisis.

The project PRISMAtic sustainability is the result of a collaboration between students of the study projects “Situated Affectivity and Cognition and their application” and “Anthropogenic climate change from an interdisciplinary cognitive science perspective”.

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Climate Change, Cognitive Science, Enactivism, PRISMA, practical phenomenology

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> *"Even among ecologists and environmental activists, there's a tacit sense that we'd better not let our awareness come too close to our creaturely sensations, that we'd best keep our arguments girded with statistics and out thoughts buttressed with abstractions, lest we succumb to an overwhelming grief – a heartache born of our organism's instinctive empathy with the living land and its cascading losses."*
> (Abram, 2010, p. 7)

1 Introduction & Background

What if you would experience walking through a forest not only as a stroll outside to alleviate your thoughts from work but what if you would perceive it as an act of care for the relationship between you and the forest? How would that change the way you view your walking and the forest? How might that change how you structure your day and your actions?

There is a twofold motivation to this project. The first is the deranged status of our climate and the devastating outlooks into the near and far future (IPCC, 2021, 2018). The second is a growing frustration with the seeming inefficacy of gathering more and more factual knowledge about climate change, as science has mostly done in the past, while failing to deliver a thoroughgoing analysis and, most importantly, an actual *transformation* of the dynamic and enfolded relationship with our environment.
We know, on a factual level, since over 40 years now that the climate is changing in detrimental ways caused by human activity and will continue to do so in ever worsening ways if we do not stop our harmful actions and change our way of life in significant ways towards sustainable life practices. Still, we fail to act. In fact, it has ever since been getting worse. Even the global Covid-19 pandemic, while causing a global CO2 emission decline of about 6% at the initial lock down phase, could not put a halt on rising emissions with emission levels now again being at record breaking all-time high (International Energy Agency, 2021).

There is clearly something wrong with the way we relate to our natural environment. The overall question we are facing in this study project (and as humanity) is how to better understand this problem and more crucially how to finally find and adopt transformative practices that bring about the required changes.

1.1 The traditional cognitive science way of doing things – and why it's not enough

As students of cognitive science, we are especially confronted with the question of what our discipline can contribute to tackling the climate crisis. Recently there have been various endeavors to identify the potential in the cognitive sciences to contribute to those questions. The very project work you are reading, after all, is itself partially a result from a study project seminar at our institute which aimed to investigate anthropogenic climate change from an interdisciplinary cognitive science perspective. And in recent years more and more publications have addressed this topic (e.g. Aron, 2019; Dubey & Peterson, 2021).

To the best of our knowledge, however, cognitive scientists have, in their attempts to contribute to the topic of the climate crisis, been sticking closely to the cognitive paradigm. There has been a strong focus on the working of the mind from a representational perspective assuming an agent with an internal representation of the world acting on external stimuli based on those representations and internal rules for action such as believes, desires, motivation etc. This results in cognitive scientists asking questions like "What are effective methods to reduce climate change denial?", "What are the psychological barriers that

impede mass action on the climate crisis?", "What are factors that can lead to long-lasting changes in motivating action against the climate crisis?" (Dubey & Peterson, 2021, p. 1). From this perspective it has been shown by Norgaard (2009) that "exposure to information" is neither sufficient for humans to be adequately concerned nor to take action towards implementing actual effectious response to the problems of climate change, both on the personal and on the social level. Similarly Gifford (2011) identified several psychological barriers that inhibit humans capacities to act on factual knowledge. In most cases those questions are addressed with quantitative methods, relying on logic, numbers, and statistics.

We do not want to devalue this approach. We think it has had an immense importance in certain areas and can greatly contribute to our understanding of the problem. But we want to problematize the seeming limitation to those methods and their epistemological prioritization. We follow thinkers who argue that the societal internalization of those approaches to knowing, which Schuetze and von Maur summarize as "rationalist attunement" (Schuetze & Von Maur, 2021), might, in fact, itself be an inherently limiting factor to our ability to act upon the knowledge we have gained on climate change.

Schmitt and colleagues (2020), for example, criticize Giffords concept of psychological barriers for its sole focus on locating the cause for our incapacity to act in the psychological "nature" of humans thereby not properly taking into account the embeddedness of humans in, and their being shaped by, the physical and social environment. Besides disregarding important factors, a theoretical account like this might undermine the potential to act by implying a deterministic fatalism.

Some authors even think that the rationalistic attunement played a significant role in navigating us into the current predicament. They argue that the sense of distance and separation fostered by this attunement has contributed a great deal to creating a society which regards the "material" world as inanimate, unworthy of ethical consideration, and inevitably a mere resource for our flourishing ultimately resulting in a extractionist and destructive culture of consumption (e.g. Marchand in Braidotti & Hlavajova, 2018, pp. 291–295).

We argue that cognitive science, staying true to its interdisciplinary outset, must broaden its scope of perspectives in the endeavor to combat the climate crisis.

1.2 How it might be done differently – a short introduction to PRISMA

Perspectives which are attempting to figure knowledge, knowing, and acting differently are bubbling up in various disciplines. One of them is the enactivist approach in the cognitive sciences, which is the basis for the experimental work we are doing. To some extend enactivism with the questions it is asking has for a long time been at the very heart of cognitive science but at the same time it has always taken a strange place on the fringe of cognitive science research. We argue in this work, however, that enactivism with its focus on experience and with viewing the mind as always already entangled and in connection with the world, can contribute a valuable perspective in the endeavor to combat the climate crisis.

Hanne De Jaegher is a cognitive scientist and philosopher who has developed an enactivist account of knowing. According to her, knowing is not to be regarded as an individualistic process. Instead, she developed the term *participatory sense-making*, together with Ezequiel Di Paolo, to emphasize that knowing always arises out of intersubjective relations and interactions. Crucially, she also argues that the interaction processes themselves can have a certain degree of autonomy (De Jaegher & Di Paolo, 2007). That is, knowing cannot simply be understood as a process of interaction between independent entities,

but must - to a certain degree - be understood to be inseparable from the interaction. Consequently, to really grasp processes of knowing and acting one must closely study the interaction, not only its participants. Building on this thought, De Jaegher and her colleagues adopted an experimental paradigm called PRISMA. This paradigm attempts to calibrate researchers to use themselves as a scientific instrument to study the *experience of interacting* (De Jaegher et al., 2017).

While the work of De Jaegher and her colleagues in this regard has been groundbreaking in many ways we see an interesting gap within their research. De Jaegher and her colleagues focus on the bodily experience of interacting because they assume that "[t]hese bodily experiences […] are the stuff of understanding each other and of understanding the world together" (De Jaegher et al., 2017, p. 492). To the best of our knowledge, however, PRISMA has so far been exclusively used to study interactions between humans. With the tragedy of the climate crisis in mind, we chose to conduct our study project from the perspective that *understanding is not only a participatory process involving humans but that non-human entities are just as much involved in this process of understanding – or at least have the potential, and perhaps the need, to be.*

1.3 A call for a post-anthropocentric twist in the PRISMAtic approach

We think that there is a lurking potential behind the ideas of the PRISMA method to study not only human intersubjectivity but the *interrelating between humans and non-human entities*. Our inspiration and our call for this expansion of the scope comes from different authors and disciplines that question the atomistic view of the "human" as it has traditionally been applied in many sciences. They put an emphasis on the interrelation and interdependence of subjects with the environment and other non/human entities.

Ecophilosophers such as David Abram (1996, 2010) and Robin Wall Kimmerer (2013), have noted the way in which we materially and experientially have removed ourselves from the natural environment, creating a realm of culture and the human that is removed from nature. Authors such as Karen Barad (2007) and Donna Haraway (2016), who might variously be labeled as critical post-humanist, queer theoretic, or new materialist philosophers, argue that our stance towards the material, non/human world as inanimate and deprived of agency is not only unjustified from an intellectual point of view but plays a detrimental role in producing a human self-image that caused us to adopt an extractionist, resource oriented attitude towards the more-than-human world. Various voices from the indigenous studies are advocating a reconsideration of animistic perception of the world and nature. They argue that a mechanistic, reductionistic perception, as opposed to the animistic perception, is part of the root cause of our destructive relation to nature and ourselves. They argue that a re/turning to animistic perception should be part of the much needed change in the relation to the land that we need in order to change our life practices to the better (Kimmerer, 2013; Rosiek et al., 2020; Weber et al., 2020).

What all of them have in common is that they point towards a trend, or a certain outlook on things. In one way or another all of them argue that, to confront and tackle the issue of climate change, we must reevaluate our anthropocentric tendencies and radically transform the way in which we relate to "nature". To us it seems that the goal of PRISMA – to develop a systematic approach to study the experience of interaction – could be fruitfully adapted to approach the interrelating between humans and their non/human environment and to contribute to the related research and endeavor in novel ways.

1.4 What we did in our study project

Making the turn back to the starting point of this introduction, De Jaegher and her colleagues emphasize that ”to investigate experience is to investigate its transformation” (De Jaegher et al., 2017, p. 498). In our view this transformation of experience is a crucial aspect which we need to study in the context of climate change to begin to understand how we might start to change our relation to the world in meaningful and healing ways.

Our overarching *research question* for this study project, arising from those thoughts, is *whether and to what degree the PRISMA method can be meaningfully extended and applied to study the experience of interactions between humans and their natural environment*. We addressed this question in our study project by first doing some literature research on the PRISMA method and its enactivist foundation. Then we started gathering experiential insights into the workings of the method and finally we designed and conducted a research workshop to pilot this new approach to studying the relation between humans and their environment.

During the work on our project, we were confronted with the question what we actually mean with the term “nature” and how to adequately address the relation we find ourselves in. Some of the above-mentioned authors advocating a new relation to nature argue that the term “nature” itself is already problematic since it implies a cultural sphere of the human that is separate from nature. It views humans as some external part to nature and thereby suggests not only that they are not fully part of nature but also that they are somehow above it. Therefore, we decided to adopt a multiplicity of terms for our object of study to make the fuzzy outline of the concepts visible and to provoke a conscious engagement with them. We will variously refer to the relation between humans and the…

1. …“natural environment” (following Werner & Kiełkowicz-Werner, 2021)
2. …“non/human environment” (following Karen Barad (2007) who uses the slash/ to signify how dichotomies always imply each other and are always entangled in inseparable ways and specifically argues that the nonhuman always also contains the human and the other ways around)
3. …more-than-human world (following David Abram (1996) who introduced this notion to bring into awareness that there is a world that is more-than-human, but also that the human realm is always also more-than-human)

In the following we will first elaborate the foundations of the PRISMA method by introducing crucial concepts of the enactivist approach, then we will describe the PRISMA method and the way we adapted it to our research question. Finally, we give a thorough account on the workshop we conducted followed by the results we obtained.

2 Enactivism

[C]ognition is not the representation of a pregiven world by a pregiven mind but is rather the enactment of the world and a mind on the basis of a history of the variety of actions that a being in the world performs. (F. Varela et al., 1991, p. 9)

The following chapter will address crucial questions around enactivism which are relevant within the scope of this project. It will introduce the theoretical background as well as experience founded methods of investigation which can promote sustainable transformation of human relation to their non/human environment. We will summarize the key characteristics of enactivism, contrast them to other theories

about cognition and relate them to the issue of representationalism, address how human interaction with the environment is viewed by enactivism, and write about what phenomenology within enactivism proposes for possible enactivist practices. In the final section of this chapter, we will address research concerning alternative ways of approaching knowledge and learning which have so far been explored with the enactive approach and one recent approach which draws a connection between enactivism and environmentalism.

2.1 What is enactivism?

Within the cognitive sciences, the 4E approach to cognition is a growing research topic. 4E cognition denotes the embodied, extended, embedded and enacted approaches to cognition which form a group of alternative ways of viewing cognition, which do not rely solely on mental representations in the brain to explain cognition, but rather make out additional structures which to different degrees are said to contribute to, or constitute cognition[1]. Enactivism distinguishes itself from the other 4E approaches to cognition because of its origin (and the radicality of its claims). In contrast to the approaches stemming from the core disciplines of the cognitive sciences (philosophy of the mind, neuropsychology, computer science, etc.…), enactivism has its origins in the phenomenology of Merleau-Ponty (1982), the concept of autopoiesis by Maturana and Varela (1980) and a "Philosophy of Life" by Hans Jonas (1966) (also see Kyselo, 2013 and Gallagher, 2017). Despite the different historical backgrounds, the enactivist approach is compatible with the embodiment paradigm which currently finds great scientific interest, and is even described as an "embodied approach to cognition" (Gallagher, 2017). But enactivism goes beyond the embodied approach and rethinks cognition as involving not only the body but also environmental factors. Miriam Kyselo explains that the name enactivism, coming from *to enact*, reflects one of its basic assumptions namely that mental processes are dynamically produced by the embodied interaction of a cognitive system with its environment (Kyselo, 2013). This means that the person interacts with their environment and in the process of the interaction their mental processes are shaped just as much as they again shape the interaction and so forth. This circular creation of mental processes is one key aspect in the understanding of enactivism[2].

Although we are aware that differentiations are made between different strands of enactivism, such as autopoietic enactivism, sensorimotor enactivism and radical enactivism (Ward et al., 2017), we will not go into detail on their differences here as they "are united by a common commitment to understanding cognition as rooted in our engaged, bodily lives" (Ward et al., 2017). In our project we follow this claim and other general claims of enactivist theory. In the enactivist approach to cognition, cognition is not reducible to brain processes and is therefore strictly non-representationalist. In this line, enactivism rejects functionalism and instead claims that "the material specifics of bodily processes shape and contribute to the constitution of consciousness and cognition in a way that is irreducible to representations" (Gallagher, 2017). Including the bodily and environmental processes into our understanding of cognition means that their relations must be described to meaningfully grasp cognition

[1] although the contribution/constitution issue is a central issue in making out the differences of for example extended and enacted cognition, it is not helping the argument and will therefore be left at that here. Further reading on this topic can be found in e.g.: Sterelny, 2010;

[2] Varela, Thomson and Rosch describe this circularity to be even more fundamental: "organism and environment enfold into each other and unfold from one another in the fundamental circularity that is life itself" (F. Varela et al., 1991)

in a scientific way. This has historically been troublesome, because enactivism has and is often understood as excluding brain process from cognitive processes altogether or putting too much focus on extracranial processes. We want to emphasize here that in the enactive theory brain processes are relevant processes, they are just not the only relevant processes. Subsequently follows the question which position and form environmental and bodily processes can take, if they are not simply represented in the brain, or understood as an extension of cognitive processes. In the enactivist view, bodily and environmental processes inherently contribute equally to emerging cognitive processes (De Jaegher & Di Paolo, 2007). They can constrain and modulate which processes might arise and which processes are not likely to arise.

Having addressed the general understanding and key claims of enactivism, we want to come to five key concepts which build the foundation for the enactivist framework. These entangled and mutually supportive concepts are the basis for experiments and the development of enactive methods (E. Di Paolo et al., 2007; Kyselo, 2013; Thompson, 2005). Although all five, i.e., autonomy, embodiment, emergence, experience, and sense-making, are relevant in the enactivist framework, our focus will be on sense-making and experience. Sense-making and understanding the meaning of something is not only important for knowing and defining objects that we encounter but is also highly relevant for the interpretation of sensations in social encounters and for making sense of our dynamic relations to other entities. Such other entity can be your neighbor's dog, sometimes barking at you at the fence and other times wanting to be petted but it can also be the birch tree next to your house giving you hay fever attacks in spring and brightening your mood in autumn when it changes its leaves to shades of orange and red. "Exchanges with the world are inherently significant for the cogniser" (De Jaegher & Paolo, 2007, p. 488), which makes sense-making an inevitable relational process in which the cogniser finds itself. During the sense-making process, action and perception are not to be understood as separate phases but they are closely intertwined which means that one would not be without the other. This can be illustrated if you imagine to test for the softness of a sponge. Its softness cannot be assessed through mere reasoning or simply looking but only becomes accessible through active squeezing and touching. This encompasses the enactive idea of sense-making, as the experience of softness becomes available you through the physical characteristic of your hands, their movement, and the response of the sponge (for an ant the sponge would be not respond in the same way and would also be solid as a rock) (De Jaegher & Di Paolo, 2007; Myin, 2003). The experience arising from our interaction with anything is therefore a cyclic back and forth of acting upon something and perceiving its re-action and thereby creating a meaning for us.

The concept of enactivism is the foundation for this project because it reconfigures our conception of cognition not only including the environment as playing some role in bringing about meaning but in giving it a substantial part in it. Reframing cognition as being necessarily entangled with the environment and conceptualizing sense making as an inevitable process which the cogniser engages in brings forward the importance of the choice *how* to interact with the environment (assuming that meaning is created out of the interaction). The question of how we interact and what immediate felt experiences arise thereof will be one of major interest in our research.

2.2 Enactivism about human environment interaction

To be able to develop a research paradigm that is oriented on analyzing human-environment interaction from an enactivist perspective, we now want to go over the claims that are already made on their interaction from the enactivist perspective. As already addressed above, the relation between organism and environment is one of structural coupling. This means that processes outside the system can have a

triggering but not a formational effect on the organism and the other way around. Meaning that processes can initiate processes in the organism, but since organism's, according to enactivism, are also autonomous themselves (see 5 key concepts), it is not determined in which way the initiating process will have an effect on the organism. This point is emphasized by Shaun Gallagher who describes that "brain, body and environment are said to be dynamically coupled in a way that forms a system, and the coupling is not equivalent to the identity of material parts; rather it involves physical relational processes" (Gallagher, 2017, p. 8). He points towards the importance of the interactional process between organism and environment. In this process of interaction changes can occur in cognition and environment. But it is not a change in the environment that produces a change in cognition, nor the other way around, but it is the interactional process between them that produces the change. "[I]f we are in possession of all the relational facts between organism and environment, this knowledge will not suffice to predict with certainty how the internal dynamics of the organism will unfold" (E. A. Di Paolo, 2018, p. 83). These notions bring forward the idea that the interesting factor in researching human-environment relation, is not only the definition of the relation as such, but the dynamic and the interactional processes between humans and their environment. Furthermore, Di Paolo points out that the organisms internal processes have to be coherent to the environmental processes, in order to render the relation coherent (E. A. Di Paolo, 2018, pp. 71–73). These notions of coupling and coherence emphasize again that in order to research the interactional processes between humans and our natural environment we need to make a step into the interaction first and be open to how it might affect us.

2.3 Enactivism and phenomenology

Phenomenology, as the study of consciousness through experience, has been a major point of interest in the enactivist approach. The idea that the world is not a static, specified realm which we make sense of through mental representations, but that it is instead through the way that the subject interacts and relates with the environment, that a sense-making process is enacted, makes clear that enactivism is inherently entangled with phenomenology (Thompson, 2005, p. 1). Due to the involvement of phenomenology in the PRISMA research paradigm and our own project, we will here address what enactivism and phenomenology have to offer for the creation of a new way of researching human interaction with their non/human environment.

Froese and Spiers take the example of sensory substitution devices and make a case for phenomenological pragmatics, meaning that researcher need to "move beyond making use of a purely third-person methodology" (Froese & Spiers, 2007, p. 8) and instead find ways in which researchers can describe their own experiences with the object of investigation. They argue that "[i]t is because of our own first-person experience of being conscious subjects that it is possible for us to even conceive of investigating how other subjects undergo a certain experience and pick out the relevant third-person data" (Froese & Spiers, 2007, p. 5). Therefore, they propose that we should not ask if first-person experience plays a role at all, but instead ask what kind of role it plays and how it can be described accurately. They take this thought from Varela (1997) who engaged in this question already in the early enactivist times, proposing that the first person experience of the researcher bears a "responsibility of making a concerted effort to engage in disciplined training to describe experience accurately" (Froese & Spiers, 2007, p. 6 taken from Varela, 1997).

In *The embodied Mind*, Varela dedicates a chapter to "Human Experience" and makes a thorough point on why he thinks experience is an important, but often neglected part of science. He points towards Asian

philosophy, particularly to the buddhist method for examining experience, called "mindfulness mediation" (F. Varela et al., 1991, p. 21).

> *Mindfulness means that the mind is present in embodied everyday experience; mindfulness techniques are designed to lead the mind back from its theories and preoccupations, back from the abstract attitude, to the situation of one's experience itself. (F. Varela et al., 1991, p. 22)*

As Varela describes, being mindful is not exactly a question of willpower but also of training. Through the practice of mindfulness meditation, one realizes "how disconnected humans normally are from their very experience" (F. Varela et al., 1991, p. 25) before gaining insights into the nature of the mind. In order to analyze the experience which we have when being mindful, Varela proposes a *mindful, open-ended reflection* which he describes as a form of reflection which is experience itself (F. Varela et al., 1991, p. 27). For Varela this method brings mindfulness mediation, phenomenology and cognitive science together and can "cut the chain of habitual thought patterns and preconceptions" (F. Varela et al., 1991, p. 27).

The PRISMA research paradigm is a mindfulness practice of its own, but we include additional mindfulness exercises to prepare ourselves for experiencing ourselves in interaction with our natural environment and in a consecutive step bring our experiences together and reflect upon them. For our project it is important to not only record experiences of individuals and evaluate tendencies within the group, but also see in how far the experience as well as the reflection itself might have a formational effect in the participants. This makes the actual concrete experience of the PRISMA research practice such as in our research workshop an important element for re-evaluating our relation to our natural environment and how we habitually act within it.

2.4 Enactivism and learning and knowing

> *To understand knowing only 'coldly', abstractly, objectively is either not to see the loving involved, or not to know fully. (De Jaegher, 2019, p. 19)*

After having laid out the fundamentals of enactivism, its claims about human-environment interaction and the implications of its relation to phenomenology, we now want to approach the last theoretical part in the context of enactivism, namely its relation to practices of learning and knowing. This part is central in the context of this project because the project does not only try to bring human – non/human environment interaction into an enactivist research paradigm, and therefore create knowledge, but also tries to create a learning experience for and with the participants engaging in the project. This is ultimately connected to the motivation of why we engage in an enactivist research practice specifically.

The quote above already introduces Hanne de Jaegher's view of knowing and knowledge, but there are more implications of rethinking knowledge from her perspective. If we acknowledge that abstract and objective knowing does not suffice to understand fully, it means that scientist must engage with their research projects as well. De Jaegher claims that "objectivity understood as disengagement would not suffice anymore to know life, to know human knowing. We would have to think science anew" (De Jaegher, 2019, p. 7). Due to the narrow focus on factual knowledge-oriented practices which science is currently deploying in the topic of climate change, and this favoring an objective understanding of it, we follow De Jaegher's line of thought and rethink science and the creation of knowledge as engagement with the topic of interest. Therefore, in our research project we propose an active engagement with our natural environment to find out how this changes our perspective on making research as well as the nature of possible results that we may be able to obtain.

In *Loving and knowing: reflections for an engaged epistemology,* De Jaegher draws connections from the current mostly rationalistic and reductionistic theories on sense-making and conception of knowledge and concludes that yet there is little scientific background backing up what practitioners call "self-evident" (De Jaegher, 2019, p. 10). She elaborates that both knowledge (in the sense of what we think knowledge to be within cognitive sciences) and the practice of *participatory sense-making* (focused on how people make sense together through movement and living together (De Jaegher & Di Paolo, 2007)) seem to be evident in the eye of most people only that the latter seldomly finds its way into research practices. According to de Jaeger "this lack in the scientific discourse influences the ways we treat each other" (De Jaegher, 2019, p. 10). Therefore, the current ways of conceptualizing knowing and knowledge do not suffice and a different approach to knowing needs to be established. De Jaegher shows that the reduction of human knowing to rational thinking cannot provide a full picture of human knowing resulting in negative impacts in structures of dementia care, digitalization and the carceral system (De Jaegher, 2019). As others before her (e.g.: Barad, 2007) she argues that rationalizing and objectifying science is only one side of the picture. In order to fully understand, acknowledgement of and engagement with the subject at hand is indispensable (De Jaegher, 2019). In our project we take on this perspective and set our relationship/interaction with the environment as our subject. We investigate how our deeper engagement with the environment and the interaction itself (e.g., through taking different perspectives) changes our understanding and acknowledgment of the relationship itself.

Other researchers have been investigating in this direction as well. For example, Dominguez takes the enactive approach to cognition und unites it with pedagogical practices focused on *doing*. She shows that situated learning leads to a greater motivation and affective engagement with the material and commitment of learning (Dominguez, 2021). Additionally, Dominguez writes that learning differently implies teaching differently, that is, developing new ways of approaching content, inviting students to relate to the environment from a less passive position, giving value to what they have around them and recognizing their own resources (Dominguez, 2021). In the development of the PRISMA research workshop we acknowledge that our guidance as researchers, the wording that we use and the invitation to engage with the more-than-human world is a learning experience for the participants.

Di Paolo gives additional reasons to why enactivism is the theory about the mind, which we want to turn to in the context of sustainable living. He describes that the concept of enactivism, how we understand cognition, is not a detached endeavor, but projects on cognition itself (E. A. Di Paolo, 2018, pp. 71–73), meaning it changes cognition. Therefore, in this project, our aim is not only to get closer to a realistic and dynamic approach to cognition and understand human-environment relations, but we are aware and also make use of that an enactivist approach to research inherently has a formational and transformation factor of the participants cognition.

2.5 Enactivism and Environmentalism

Although the enactive paradigm offers itself to investigate the human-environment relation, there has, to the best of our knowledge, been little to no research connecting environmentalism with enactivism explicitly. There is one very recent paper by Werner & Kiełkowicz-Werner (2021), however, which analyses environmental ethics and its relation to enactivism. Their research is motivated by the possibilities they see in the structure of enactivism. They argue that the damage of separation between humans and environment has been done but "[e]nactivism provides the tools to apprehend, understand and in a sense accept this fact due to its inherent tendency to emphasize looped rather than linear processes" (Werner

& Kiełkowicz-Werner, 2021, p. 13). A loop beneficial for the human-environment relation is created through enactivism because it conceptualizes the subject as entangled in relation from the get-go.

Werner & Kiełkowicz-Werner argue that “first, values emerge from interactions between at least two living creatures, thus they cannot reside in just one individual; second, values are not things or objects; instead, if articulating their ontological status is of any significance, they are "events" brought forth as part of the processes or interactions between living creatures.” (Werner & Kiełkowicz-Werner, 2021, p. 6). Based on their work on the enaction of values we want to follow up and want to test to what extend we can adopt a practical research method from enactivist philosophy to investigate the nature of the relationship between humans and their natural environment and the formation of values within this relation. Crucially we want to investigate how this relationship is changing, can be changed and ultimately transformed with the goal to achieve a sustained transformation of this relation and by extend the relating human subject.

3 PRISMA

In the following sections we will first explain PRISMA, the central method we used in our Study Project and then address how we adopted and adapted this method for our own research.

3.1 General introduction to the method

PRISMA in its original form was developed by Dr. Barbara Pieper and Daniel Clénin in 2001 as a method to systematically qualify the work of Feldenkrais practitioners. Since 2008 their method has increasingly been refined and adopted as a research tool in different scientific disciplines. In their article from 2012 Pieper and Clénin describe PRISMA as a “Research Perspective Combining Theory and Practice” that can be used to study the “Embodied Perception of Self and Others in Social Action” (Pieper & Clénin, 2012). In 2017 they published a seminal paper together with enactivist philosopher Hanne De Jaegher and psychiatrist and phenomenologist Thomas Fuchs in which they introduce PRISMA as a research methodology for investigating the “bodily experience of interacting” (De Jaegher et al., 2017) and to grasp the embodied dimensions of intersubjectivity from an enactivist point of view.

De Jaegher and her colleagues argue in this paper that there is a need for a practical and systematic phenomenology of the experience of interacting. While there exist approaches of such an empirical phenomenology for individual experiences, the specificities of experiences that arise when one engages with other beings in the world have been mostly overlooked, according to them. They propose that PRISMA can provide exactly this “*systematic unfolding of interactive experience”* (De Jaegher et al., 2017, p. 495) due to three central characteristics:

- The usage of a *systematic protocol* for investigating the experience of interacting.
- Its being based on an *embodied methodology*.
- Its invitation for researchers to view and use themselves as both *research instrument and subject* of their own study.

A PRISMA experiment, as described in the papers named above, usually takes the form of a research workshop with around six to twenty participants that might last anywhere from an hour to two days. The workshop is usually structured in such a way that there are some introductory warm-up exercises which are thought to attune the participants to the specific setting. This might include, for example, Feldenkrais, Yoga, or other mindfulness practices. In the main part of the workshop the participants engage in short,

clearly specified interactions (e.g., helping someone into a coat). Directly after each interaction they are given a prompt instructing them to write down very concise statements about a specific element of their experience on small a post-it note. The interactions are repeated multiple times and during those repetitions the participants take on different roles (e.g., giving/ receiving the coat or observing the interaction). Participants are also instructed to adopt different perceptual perspectives across trials. Those perspectives include *self-perception, other-perception*, and *in-between-perception*. Additionally, the mode of perception can be varied between sensing, feeling, and thinking. Each role, perspective and mode combination has its own specific prompt (De Jaegher et al., 2017, pp. 495–499; Pieper & Clénin, 2012, pp. 11–17).

After a block of interactions, participants exchange their experiences in small groups and are instructed to search for similarities or tendencies, sticking closely to what they wrote down before. At this point the moderators might decide to enter what De Jaegher and colleagues call a "*conFiguration"*, namely choosing a salient notation and entering the interaction again with this notation as "perceptual filter" to investigate this aspect of the experience in further detail (De Jaegher et al., 2017, p. 496).

All notations produced during the workshop are collected in a matrix, which helps to differentiate the notations of each perspective in a structured way. At the same time, it visualizes their relation and shows that they are all part of the same interaction (See **Error! Reference source not found.**).

The data produced in the workshop is later transcribed and anonymized for further analysis by the participants or the moderators.

Group No. …	**Perceptions (Sensing) regarding…**	
	a) Self-perception, **SP**	**b)** Other-perception, **OP**
1) **Interactor 1**	1a) SP 1 *During the practice sequence I perceived myself* *and sensed in myself ….*	1b) OP 1 *During the practice sequence* *I put myself in interactor 2's shoes.* *It seemed to me that s/he sensed …*
2) **Interactor 2**	2a) SP 2 *During the practice sequence I perceived myself* *and sensed in myself…*	2b) OP 2 *During the practice sequence I put myself in interactor 1's shoes.* *It seemed to me that s/he sensed …*
3) **Observer**	3a) SP 3 *During the practice sequence I perceived what happened between the two interactors* *and sensed in myself…*	3b) OP 3 *During the practice sequence I put myself in what happened between the two interactors.* *With regard to sensing, it seemed to me that between them….*

Figure 1: "An example of a PRISMA matrix for recording references of perception. Horizontally, the rows indicate the roles: interactors 1 and 2 (rows 1 and 2 respectively), and the observer (row 3). Vertically, the columns indicate the reference of perception, self-perception (SP, column 1) or other-perception (OP, column 2). This simplified matrix allows to gather the

approximations made in two rounds of interacting, in which each participant stays in one and the same role (interactor 1, 2, or observer). In the first round, they sense in the mode of self-perception, and fill out their prompt (shown in column 1), and in the second round, that of other-perception (shown in column 2)" (De Jaegher et al., 2017, p. 498)

The PRISMA method unravels or unfolds the experience of interacting. It invites participants to become aware of, and isolate, specific aspects of this experience which are usually entangled and pass below awareness. To do so, PRISMA employs the concept of *perceptual references* introduced by Pieper and Clénin (2012, pp. 9–15). This term denotes perceptual directedness, its quality of being directed from somewhere towards something (refer to the "workshop report" section for a guided exercise that allows you to experience this concept at home). The most obvious and most commonly investigated perceptual references in social interactions are self-perception (SP, self to self) and other-perception (OP, self to other). For Pieper and Clénin in 2012 this meant mainly to investigate how an interactor perceives themselves (SP) and the other interactor (OP) in a social interaction. Their idea is that those perceptual references are to some extent always part of the interactive experience even though they are not consciously attended in everyday awareness (De Jaegher et al., 2017, p. 501; Pieper & Clénin, 2012, p. 15). In 2017 De Jaegher and her colleagues added the perceptual reference of "in-between" as a crucially participating in interactive experiences (De Jaegher et al., 2017). They investigated the "in-between" as a relevant aspect of perception based on the concept of *participatory sense-making* which identifies intersubjectivity - what happens between interactors - to be an autonomous process on its own that is more than just the sum of the two interactors actions, and which plays a central role in the constitution of the interaction and consequently the interactive experience (De Jaegher & Di Paolo, 2007). This "in-between" can also be attended as an "other" (self to "in-between", OP) and is, following the hypothesis that perceptual references are always already given in an experience, directly participating in the genesis and orchestration of the interactive experience.

While the perceptual references are *per se* given and are always part of our lived experience, it differs from interaction to interaction, setting to setting, and person to person which of those perceptual references participate more prominently in perception and which are rather in the background. Crucially the concrete way those perceptual references participate in perception has a central and constitutive role in what we perceive and consequently what we experience. Or as Pieper and Clénin put it simply: "*what* I perceive depends on *how* I perceive" (2012, p. 10). And as they are quick to follow up *how* we perceive also depends on *what* we perceive which means that perceptual references develop in a circular, iterative manner. Pieper and Clénin argue that therefore the specificities of the organization of our perceptual references has a tremendous effect on the overall orchestration of the experience of interacting and consequently on social action which is why investigating them is a crucial part to investigating social interaction and intersubjectivity.

Like an optical prism refracts light into its constitutive parts, PRISMA refracts the interactive experience by focusing the participants attention onto a specific perceptual reference. Since multiple participants simultaneously participate in the same interaction and repeat it with different roles, perspectives, and modes, a host of perceptual references are covered and start - over the course of a PRISMA workshop - to paint a larger picture of the interaction as a whole and as a process of its own. Each statement produced in the process can be considered an *approximation* of an aspect of interactive experience. And the sum of approximations, further worked on in the group process, refined and later analyzed can reveal *tendencies* or regularities in the interactive experience.

De Jaegher and colleagues introduce the terms of "approximation" and "tendencies" to make clear that the PRISMA experiment does not produce "data" in the conventional, quantitatively associated way (De Jaegher et al., 2017, p. 503). They are also careful to note that PRISMA obviously does not constitute a neutral investigation device that attempts to understand intersubjectivity from the outside or the objective "view from nowhere" (Nagel, 1986). Instead PRISMA is an attempt at *grasping* intersubjectivity – a situated research process/practice in which there is a direct contact with the object of investigation and in which the object is also subject to change. Or as the authors put it: "to investigate experience is to investigate its transformation – and perhaps all the more so in social interactions" (De Jaegher et al., 2017, p. 498).

To summarize those reflections on the nature of the empirical investigation conducted with PRISMA it can be said that the results of a PRISMA experiment can be both an insight into *tendencies* or *regularities* of interactive experiences and a *transformation* of the participating subjects.

3.2 (Challenges of) Adapting PRISMA for interactions with non-humans

We decided that PRISMA could be an apt method for investigating the (transformation of the) relation between humans and the more-than-human world for multiple reasons. Firstly (1), the enactivist foundation of the method allows for an investigation of relations as autonomous processes partly constitutive of its relata. We consider this an important precondition to seriously investigating the human-environment relation as participating in the materialization of the world and as transformable. Secondly (2), PRISMA is a method of empirical phenomenology. Driven by a frustration originating from the current situation of having accumulated enormous amounts of factual and theoretical knowledge on climate change but seemingly not being able to get this theory in accordance with our individual and collective actions, it was clear for us from the beginning that we do not want to stay in a purely theoretical realm, that we want to interweave theory and practice in a systematic way. Additionally, we embrace a practical phenomenology because we consider the concrete experience of our relation to the natural environment a severely understudied area in cognitive science considering its potential relevance in identifying pathological structures and transforming this relation. Thirdly (3), PRISMA is dedicated to investigating social interactions. As spelled out in the introduction, we were inspired in our approach by researchers who propose that one of the reasons why we ended up in the current climate crisis is that humans for centuries figured nature as a passive, material realm which is separated from culture and sociality. We decided that we wanted to take a radically different approach and ask the question what knowledge we can gain if we start our research from the perspective that the relation between humans and their natural environment is always already a social one. Crucially, however, this is not only a question of gaining additional knowledge on a subject from an additional perspective, but a question of constituting the relation differently. As Barad (2007) compellingly argued, the material-discursive research apparatuses we deploy to do science *matter* in the sense that they are not simply descriptive but constitutive of realities. That's why we regard the choice of using PRISMA not only as an epistemological necessity but as an act of environmental activism.

Based on those considerations we decided that the research question for our study project should be *whether and to what degree the PRISMA method can be meaningfully extended and applied to study the experience of interactions between humans and their natural environment*. Since PRISMA was developed for social interactions this research question implies the additional question of whether the interaction between humans and the natural environment can be meaningfully understood as a social one. In the

context of pondering this question in our research we adopted both the phenomenological intuition of social interactions as intersubjective encounters and a technical definition from enactivist research. De Jaegher and Di Paolo write that

> *[s]ocial interaction is the regulated coupling between at least two autonomous agents, where the regulation is aimed at aspects of the coupling itself so that it constitutes an emergent autonomous organization in the domain of relational dynamics, without destroying in the process the autonomy of the agents involved (though the latter's scope can be augmented or reduced). (De Jaegher & Di Paolo, 2007, p. 493)*

We utilized this technical definition when formulating the questions for the questionnaire which participants filled out at the end of our research workshop.

To the best of our knowledge this approach has never been taken before. While PRISMA has been used to study the behavior of non-humans in a video analysis, such as in an analysis on the navigation behavior of Amoebae (Pieper, 2015, p. 6), it has never been used in any setting – neither video analysis nor live - to study the interaction of humans and non-humans.

With our focus settled on PRISMA as our research method and object of study we started to be faced with more concrete questions and challenges. For us it was clear that we wanted to experiment with using PRISMA in interactions of humans and non-humans. But what might be a consistently reproducible "social interaction" with "nature" that we could use for the experiment? We sought inspiration in different fields like wilderness pedagogy, garden therapy, contact improv dance, and "Waldbaden" (Shinrinyoku/ forest bathing). An interview with Björg Dewert (wilderness pedagogist from Osnabrück), resulted in the example of the "seated practice", an exercise from wilderness pedagogy which includes the participant silently sitting at a calm spot in the forest for a least 30 min in a mindful state and repeatedly returning to that same spot over the course of multiple days (described in Pfisterer & Stark, 2018, pp. 89–91), as a potential option for our interaction.

Another question we spend quite some time wondering about was the ontological status of the participating subjects participating in our experiment. Do we have to convincingly show that trees are actual subjects before we can do a PRISMA experiment with them? The first advance in clearing our doubts was made when one of our collaborators, Christian Dingkuhn, took our thoughts and questions into the wild to engage in a practical conversation with our object/subject of study. He went to a close-by forest and tried the "seated practice" and documented it with the PRISMA table. He tried out simple self-perception and other-perception with the forest as his interaction partner and reported that he had intelligible and quite different experiences in both perspectives. For us this indicated that PRISMA could produce meaningful experiences and results thereof in an interaction with an abstract agent such as the natural environment. Christians experience also showed us that we could find some answers to our problems only *in the doing*, rather than merely by staring at symbols on a screen and thinking thoroughly about them. In line with PRISMA's research agenda we decided to leave the question of the ontological status of the subject aside for a while and to focus on trying out PRISMA in the wild and to concentrate on the phenomenological experience during interactions with our environment and the insights we can gain from them. Another insight we gained from Christian's experimentation was that the "seated practice" would not be a suitable interaction for a full PRISMA workshop due to its requirement to have rather long periods of sitting still. Either one would have to disrupt those to write something down or the writing down would only happen after a long time of simply experiencing, putting the writer in a mode of

remembering and reflecting the experience rather than sticking with the immediate impressions of what was given in experience.

A third practical concern for us was how to deal with the fact that for our use case we could only expect one of the participating subjects – independent of their ontological status – to contribute to the collection of notations on the interaction. The live interaction experiments described in the PRISMA papers usually include two interactors and an observer, all of which write down short impressions of their experience. But while pondering the subject status of a tree was one task, getting a tree to write something down on our post-it notes seemed like an endeavor beyond the scope of this study project. We considered doing our experiments with a one-sided account of self- and other-perception. And we think that this would have already proven interesting since we still have a group of participants engaging in the same interaction which would have resulted in several approximations of the intersubjective space and perhaps tendencies which could have become apparent in them. But inspiration for an interesting addition to the method came when we got in contact with Dr. Barbara Pieper, one of the main developers of the PRISMA method.

Dr. Pieper agreed to join our study project for a seminar session as an expert to present the PRISMA method to the group – including a practical exercise. Together with her we designed a small PRISMA demonstration that could be conducted via online video meeting. Orienting on our research question we decided to have the participants walk through their rooms at home and use “the space” as interactor to attend to. With Dr. Pieper we also decided to apply the concept of perceptual references and take it a step further by including two new perspectives. Besides the usual self- and other-perception participants were asked to place their origin of perception in the space and first perceive the space as the space (SP, space to space) and then perceive the person walking through the space from the perspective of the space (OP, space to walker). While perceptual references which don’t take the self as origin of perception have been used before in PRISMA settings, to the best of our knowledge this was restricted to video analyses (one interactor in the video perceiving the other interactor) but never in an actual life interaction and never with a non-human as interaction partner.

The PRISMA setting in the seminar was already a pre-pilot experiment in the sense that we could at once present the method to the other seminar participants and at the same time find out whether the perspectives we developed were intelligible and would result in meaningful and distinct experiences. The main result of the seminar session for us was, that the perspectives “work” and that they produce experiences distinct from simple self- and other-perception which could reveal interesting structures. And importantly, as one participant put it, “the perspectives ‘work’ independent of once intellectual stance regarding the agential status of the room” (the table with results from the seminar session can be found in the Appendix). This result motivated us to continue with our practical experimentation and taking it one step further and into the wild.

We decided to conduct a full PRISMA research workshop based on the insights we had gained to this point. This workshop was to be conducted in a forest with “the forest” as interaction partner and utilize, besides the simple self- and other-perception, the new perspectives developed with Dr. Pieper. The details of how we conducted the workshop will be explained in the next section.

4 Workshop report

We wrote this workshop report with the intention to both give a detailed account of how we obtained the “data” we work with in the results and to give readers the possibility to reproduce, reuse, and extend parts of the workshop concept and process we developed.

4.1 Setting

We conducted the workshop with five participants and two moderators on an October afternoon. Following the Corona regulations of our university, we only accepted participants who were either vaccinated, tested, or recovered and instructed all participants to keep a distance of at least 1.5 meters and to wear masks if that’s not possible. All selected participants were students at the University of Osnabrück. Four of them were Cognitive Science students and one studied Psychology. One participant reported an additional background in Bodywork and another in Sociology.

We took the participants to a patch of forest close to the Limberg in Osnabrück. The location was rather remote. During the 3h workshop no other human passed our spot. Still, it was not an exceptionally “wild” forest. It was obvious that the forest was planted by humans and its main purpose was to produce wood. The biodiversity was average to low. During our workshop we were the only visible larger animals. The ground vegetation was sparse. The trees were mainly beeches and oaks with scattered spruces and birches. The fungi and insects were prolific. Occasionally birds were audible from the trees. In the distance the sound of a construction site and a street was rather prominent from time to time. In the middle of the workshop there was a short period of subtle rain which left the leaves dripping, creating sounds of falling droplets all around. We consider it a rather average forest experience in post-industrial Germany.

We arranged a circle with seating pads for the participants to sit on. Since it was rather cold, we served tea and cookies throughout the workshop. With consent by all participants, we documented the workshop with pictures and voice recordings of the reflection sessions.

Figure 2: Setting

4.2 Procedure

We began the workshop with a short welcome introducing the schedule and our Corona regulations. After that we began with a mindfulness exercise.

Mindfulness exercise

Intention: Creating a calm but attentive atmosphere. Subtle encouragement to start to consciously perceive the situatedness in the forest.

To arrive with our attention and awareness in this space and at the practice we are going to do, we want to start with some exercises to tune into a deeper sense of awareness. Come to stand in a circle with enough space around you that you can freely swing your arms without touching each other. Close your eyes, make sure you have a stable standing position, feet hip-wide apart, straight back and shoulders relaxed. You can begin to arrive in the space by noticing what is around you, sounds (wind, branches, leaves, cars, birds, …), sensations of wind putting pressure on the surface of your skin, some sensations of temperature, feeling of weight standing on the ground. You can guide your attention from each of these sensations to the next by just noticing that they are there and moving on, without judging them.

Move you attention from the sensations you perceive as further away to the sensations you perceive inside of you. Maybe you can feel some sensation of temperature inside of you, areas where there is space or lightness or others where there is a more restricted, heavy feeling. Here you also just move from one sensation to the next just noticing what is present for you and then moving on.

We followed with a theoretical introduction to the concept of perceptual references interlaced with practical exercises to experience those different perspectives. The theoretical input was an important part of setting the stage for the participants and attuning them for our main exercise.

4.2.1 Theoretical introduction

The theoretical input and especially the exercises are inspired by the paper on PRISMA by Pieper and Clénin (2012) and are in parts paraphrasing their work. We decided to present the text in the form we used during the seminar since it was central in framing the participants experience during the following experiments and therefore is also in parts constitutive of the results we obtained.

“Today we are going to dedicate ourselves to researching how our perception works and to doing research *with* our perception.

To do so we want to start by bringing some aspects of perception to the forefront of our consciousness. We already did some mindfulness exercises before. During those we could probably all experience that our perception usually does not encompass the entirety of what’s there at once, but that perception is always directed to particular aspects of the world. And we experienced that this directedness does not just happen but that we can direct our perception. Meaning that we can change the focus of our perception through external or internal impulses and through specific methods or practices.

Another aspect of perception that will be central for this research workshop is that our perception is not only directed towards something but that it also has a point of origin. That means that it is directed *from* somewhere *to* something.

Perception can happen from right to left, it can be directed downwards from above or upwards from below, from inside to outside or outside to inside and so on.

That might sound a little abstract now, but we can start to approach and experience this idea with a little example:

Perceptual references within the self

Intention: Start experiencing the concept of perceptual references within oneself because it is very accessible and easy to grasp

[This exercise can be done alone, and in front of a screen. Take it as an invitation to experience the concept of perceptual references for yourself]

Close your eyes. Now place the surface of your right hand on the back of your left shoulder. Start moving your right hand across your shoulder. Your right hand starts to investigate your left shoulder. Pay attention to the sensations in your hand. Feel your shoulder through your hand…

Now change your focus of perception. Try to feel your hand through your shoulder…your shoulder senses your hand. Observe what happens in your perception. Does something change? You are probably less familiar with this direction of perception. How does that feel? And does that unfamiliarity express itself in your perception and action? Did you maybe slow down your movements to be able to better adapt to this unfamiliar task?

In this example I hope you all could directly experience that our perception is directed and not only directed towards something but also from somewhere. And crucially**:** How we perceive changes what we perceive. This already changes quite something about the way we usually think about perception. Perception is often described like the light beam of a flashlight. It can be directed towards something and then passively illuminates that object. But if we assume that perception has multiple reference points it becomes more of an action situated in spacetime. And it's a dynamical action that has an iterative feedback relationship with the world. Because how we perceive changes what we perceive and what we perceive changes how we perceive.

In everyday situations those different references of perception are usually interwoven, entangled and inaccessible. But we think it is important to investigate the differences in experiences that arise from how exactly we perceive. As the researchers who developed our research method point out, this change in experience is mostly overlooked in research so far but is a crucial aspect to understand how people interact.

Now since we introduced the basic concept of perceptual references - the idea that perception is directed from somewhere to something – we want to take this a step further and take a look at how those perceptual references function in social interactions. How we might understand this is again best approached via a concrete experience. For this we can do another example:

Perceptual references in social interactions

Intention: Loosen and extend the concept of perceptual references. Encouraging and guiding the participants to bring the more subtle dynamics of intersubjectivity to the forefront of their perception

Get together in groups of two. Due to Corona please put on your masks and disinfect your hands and forearms. Does anyone feel uncomfortable with being touched at the forearm by another participant? If so, you can of course skip this exercise.

Now the larger person of the two of you holds out their forearm in front of you. And the other one starts touching the forearm with the surface of their hand. Slowly move your hand across the forearm and investigate its surface. And now adopt a conscious perspective of your perception again. Start by perceiving yourself. Perceive the sensations within you. How does it feel being touched or touching? Observe how you perceive the hand or arm of the other person with your arm or your hand. …. Now change your perspective of perception. Put yourself in the shoes of the other person and perceive how it might be for the other to be touched by you or to touch you. Perceive yourself through the other. Perceive your hand or your arm through the touch of the other. And again observe: What happens in your perception? What changes? Did something change between the two of you? Stop touching and talk about what you experienced for 2 minutes each.

In this exercise you could again observe that your experience changes when you change the reference point of your perception. And that this is not only true when you are in contact with yourself but also in social interactions. And again, we can notice: How we perceive changes what we perceive and the other way around.

Now we have told you some basics about perceptual references or perspectives of perception and you already experienced some aspects of them in practice. In the main part of the workshop, we want to use a structed method that is based on those aspects of perception and uses them to gain insights into the experience of interacting. This method is called PRISMA.

This method is usually used to study the experience of social interactions between humans. But we want to do something new and different with this method. We want to experiment with the question to what extend this method can be meaningfully transferred to interactions with non-human entities. That's why we didn't meet in a lab but why we took you to this place in the forest.

Before we finally start with the method, we want to do one more perceptual exercise from wilderness pedagogy to get you to „tune in" to the forest as a multi-scale environment and eco-system."

4.2.2 Tuning into the forest

Framing the forest

Intention: Allow participants to notice the multitude of agents and the different scales making up the forest.

Gather four sticks of roughly one meter. Using those sticks create a square on the forest floor alike a picture frame. Now put your pad next to the frame and lay onto it. Bringing your head close to the frame. For the next ten minutes we will occupy ourselves solely with observing this particular spot on the ground.

[During the ten minutes occasionally bring back the participants attention with instructive questions]

What can you see?

What things are familiar, and which have you never seen before?

What's the largest object you can see in your frame?

What's the smallest object you can see in your frame?

[Be attentive to the participants. Usually, it does not need a lot of questions. The method tends to draw people in very well.]

Figure 3: Framing the Forest: Participants are attentively looking at small patches of forest floor for 10 minutes

After this long period of resting, we did two warm up exercises:

WUP (with masks due to Corona)

Intention: Fun, loosen atmosphere, quick high-intensity action

Come together standing in a large circle. Now secretly choose one of the others in your mind. On my sign everyone starts to run trying to surround their target three times. Whoever is done first wins. (We did three rounds of this which proved to be very effective for warming up)

Shaking Exercise

Intention: Getting into a more mindful state again. Decreasing social inhibition to make strange sounds in the presence of others which was important for our second PRISMA setting

Come together in a circle. You can close your eyes if you want or leave them open. Start shaking with your feet on the ground, from the knees, loosening up your shoulders and upper body. Shake up some of the tightness that has been there. Shake, leaning to the front, letting your head drop loosening your

neck, …to the back, …to the right, …to the left, …come back to the center letting sounds come out with the breath. …

[While at first people tend to shy away from letting sounds come out with the breath, with time they seem to relax more into it, experiment with the sound while shaking and the sound of the group gets louder.]

4.2.3 The PRISMA experiments

We entered this main section of the workshop by shortly introducing the steps of the PRISMA process as detailed in the paper by De Jaegher and colleagues (2017). Then we started with the first setting.

First Setting – Sitting in the forest and listening

We consulted Dr. Pieper regarding potential interactions and settings we could use for our purpose. She suggested to use a very simple interaction and to focus on one sensory domain since the forest is such a rich perceptual environment and the setting is probably rather unfamiliar for participants. We settled on the sense of hearing since we assume it to be less influenced by perceptual habitualization than vision in a forest setting and since it works at a distance. We also chose to focus solely on *sensing* and to not include feeling and thinking as perceptual domains due to temporal constraints in our workshop.

The first interaction in the end indeed was a very simple one. Participants were instructed to simply sit in the forest and listen attentively for one minute. We did four interaction rounds with different perceptual references with an increasing level of unfamiliarity:

1) Listener's perception
   a) The Listeners perceiving their own sensations (Listener – SP)
   b) The Listeners putting themselves into the shoes of the forest and perceiving its sensations (Listener – OP)
2) Forest's perception
   a) The participants were asked to fully identify as the forest and perceive themselves and their sensations as the forest (Forest – SP)
   b) The participants were asked to fully identify as the forest and put themselves (as forest) into the shoes of the Listener to perceive the sensations of the Listener (Forest – OP)

The observer perspective from the original paper was excluded due to temporal and methodological constraints.

The adoption of the specific perspective for each interaction was instructed with a pre-formulated guiding phrase (see Table 1 below). After each interactions the participants were instructed with a pre-formulated priming phrase to write down their perceptions of the interaction on a small post-It note.

After the four perspectives were taken, we stuck the post-Its onto a whiteboard with the PRISMA matrix drawn onto it and entered a short reflection session. For each perspective all notes were read out loud by one moderator and the participants were instructed to attend to similarities. Then the participants were asked to participate as researchers and to identify tendencies or essences in their notations. We restricted this to three minutes per perspective and encouraged the participants to stick closely to the notes.

Figure 4: Sitting and listening: Participants during one of the interactions in the first setting

Second Setting – Sitting in the forest and reproducing/imitating forest sounds

We chose the second setting because we wanted to stick with the limitation to hearing and the sparseness of perception, but we wanted to also include an active, participatory interaction rather than the more passive act of simply sitting and listening from the first setting. We also wanted to find a setting where the participants could get a sense of entering into a contact or exchange with the forest. In this second interaction the participants were asked to listen to the sounds of the forest in an initiation phase and to choose a sound that captures their attention, knowing that they would later be asked to replicate that sound. The participants were sitting in a circle like in the first setting, but they faced outwards as to not disturb each other to much with their different sounds.

Sit and listen attentively. Notice the sounds around you…Does one capture your attention in a particular way? Find a sound that is salient to you, tune into it and try to hold onto it so that you can reproduce it later.

Following this initial phase, we entered four interaction rounds with the equivalent four perspectives from the first setting. For the interaction the participants were asked to close their eyes and start making their chosen sound on a sign by the moderator and to continue making their sounds at a frequency which seems appropriate to them until asked to stop. Each interaction lasted one minute again and afterwards participants took notes on their perception. (The exact guiding and priming phrases can be found in Table 2 below).

Figure 5: Results collected on a whiteboard for the reflection session

After the four rounds we did another reflection session with the notes from this setting.

At the end of the workshop participants were asked to complete a final questionnaire (find the questionnaire with answers in the Appendix).

[OPTIONAL – Not performed] Third Setting – Perceiving the intersubjective space of a human making contact with the forest

We planned and prepared a third PRISMA setting which we could not conduct since we did not have enough time in the workshop. This setting would have increased the focus on the autonomy of the interaction process or the "in-between" of the participants and the forest during the interaction. While this setting, to us, was getting at the most interesting questions, we placed it as optional at the very end of the workshop since we deemed it necessary to slowly build up a familiarity of the participants with the environment, the task, and the rather unfamiliar perspectives. Even though we did not end up performing this interesting last setting, it ended up being the right choice in our eyes since we got feedback from many participants that they had some difficulties adopting the new perspectives in the beginning but that they could ease more and more into it after the first and second setting.

In the third setting we would have paired up the participants in groups of two. One as the interactor and one as the observer. The interactor was supposed to be sitting facing the forest and the observer sitting facing the interactor, both with their eyes closed. The interactor would have been instructed to reconnect to the sound they made in the setting before and to start making that sound on a sign of the moderator. The observer's task was to simply sit and listen to what's happening between the forest and the interactor making sounds. We would have again done four interaction rounds with the perspectives:

1) Interactor and observer are both instructed to perceive their own sensations during the interaction (SP)
2) Interactor and the observer are both instructed to perceive what's happening between the forest and the interactor, perceiving the "in-between" (OP – In-between)
3) 1) with switched roles
4) 2) with switched roles

(More and different combinations of perspectives would have been possible but due to time constraints we chose to only include those).

Afterwards we would have again entered a final reflection round.

Table 1: PRISMA Workshop results for sitting in the forest and listening

Listener's and forest's perception (sensing) during sitting in the forest and listening.

Role	a) Self-Perception (SP)	b) Other Perception (OP)
1) Listener's perception	**1a) Listener refers to himself/ herself** **Guidance phrase:** Sit still for one minute and listen attentively. During that time your perception refers to yourself. What do you sense in yourself? **Priming phrase for writing down:** While sitting and listening I perceived myself and sensed in myself… **Results:** P1: …raindrops on the leaves, roaring of the working machines, leaves rustling P2: …that my thoughts are wandering back & forth a lot P3: …thoughts and emotions about past events. From time to time bodily sensations and sprinkled throughout where the sounds of rain… P4: I felt and perceived waves, a wide soundspace, raindrops on a large space P5: I perceived myself stressed out, quiet, safe (geborgen), cold **Essences/Tendencies**: thoughts, sound of raindrops, particular sensations	**1b) Listener refers to the Forest** **Guidance phrase:** Sit still for one minute and listen attentively. During that time your perception refers to the forest. You put yourself in the shoes of the forest. What does it seem to you the forest is sensing while you listen? **Priming phrase for writing down:** While sitting and listening I put myself into the forest's space. It seemed to me that the forest sensed… **Results:** P1: …relief of thirst from the rain, calmness but also a slight disturbance by the machinery, lightness because of loosing leaves P2: …it hurts when the machines work inside of him, he is stressed by the streets that are being build in him + the noise that's on them P3: …the forest felt the little droplets of rain washing through the leaves. The trees are happily lavishing the wet soil. The insects are cautious but undisturbed. P4: …that the wideness is opening upwards and something deep and warm downwards (…sich nach oben die weite öffnet und anch unten etwas tiefes warmes) P5: …that it rains, that he has borders (Fields, Streets), that there is a construction site close by, he is carrying weight (us). **Essences/Tendencies**: Human technology hurting/restricting, the rain as meaningful, emotions in relation to particular sensations
2) Forest's perception	**2a) Forest refers to itself** **Guidance phrase:** Sit still for one minute and listen attentively. Now your perception is solely focused on the forest. In your perception the forest refers to itself. While the person is sitting and listening what are you, the forest, sensing in yourself? **Priming phrase for writing down:** While the person was sitting and listening, I perceived myself (the forest) and sensed in myself... **Results:** P1: …aliveness, complex-wide-ranging connectedness, Age, many layers P2: …peace, gentleness, someone with rather good than bad intention for me, connection P3: …rain, water, cool temperatures. Noises in the distance. Pressure on the ground because of the people sitting there, Quiet sounds of breathing, the presence felt by my many eyes P4: …a peaceful swarming (Gewimmel) P5: …joy about the rain, Annoyed by the asphalt at my edge, wondering about the people **Essences/Tendencies:** connectedness, complexity, distant and abstaract feelings like peace/quiet, age and presence	**2b) Forest refers to the Listener** **Guidance phrase:** Sit still for one minute and listen attentively. Now your perception starts from the position of the forest again. This time the forests perception refers to the listener. While the person is sitting and listening you, the forest, put yourself in their shoes. What does it seem to you that person is sensing? **Priming phrase for writing down:** While the person was sitting and listening I (the space) put myself in the walker's shoes. It seemed to me that the person sensed... **Results:** P1: …tiny funny body, isolation, small but in a good way and embraced by the forest P2: …disconnection, non full presence, a bit calm, a bit anxious, longing for sth. deeper & beyond P3: …my quiet, but also itself. The strange creatures are full of themselves! I wonder why they are sitting there. P4: …playfulness P5: …my roots, the uneven ground, the other persons, being dry but hearing the rain anyways **Essences/Tendencies:** disconnection, alienation, separation, isolation, fullness vs non-fullness, presence

Table 2: PRISMA Workshop results for replicating forest sounds

Replicator's and forest's perception (sensing) during sitting in the forest and replicating forest sounds.

Role	a) Self-Perception (SP)	b) Other Perception (OP)
1) Replicator's perception	**1a) Replicator refers to himself/ herself** **Guidance phrase:** On my sign start making the sound you chose to replicate for a few times. I will tell you when to stop. During that time your perception refers to yourself. What do you sense in yourself? **Priming phrase for writing down:** While sitting and making sounds I perceived myself and sensed in myself… **Results** P1: The image of a breaking branch, the "force" of the explosive sound in my body P2: Manly thoughts in my head rather away from perceiving physical sensations P3: A little weirdness and discomfort but concentration and relaxation at the same time P4: Relief P5: Discomfort, fun, happiness, open, openness **Essences/Tendencies:** turning inwards, discomfort, relaxation(softness)	**1b) Replicator refers to the Forest** **Guidance phrase:** On my sign start making the sound you chose to replicate for a few times. During that time your perception refers to the forest. You put yourself in the shoes of the forest. What does it seem to you the forest is sensing while you make the sound? **Priming phrase for writing down:** While sitting and making sounds I put myself into the forest's space. It seemed to me that the forest sensed… **Results** P1: Tiny bit of movement besides that not really moved by the sound P2: A child that is trying to imitate adults P3: A very regular sound, something that might have been picked up by its inhabitants but was not paid any special attention to P4: healing P5: astonishment about the heavy bird **Essences/Tendencies:** sublimity of the forest
2) Forest's perception	**2a) Forest refers to itself** **Guidance phrase:** On my sign start making the sound you chose to replicate for a few times. Now your perception is solely focused on the forest. In your perception the forest refers to itself. While the person is making sounds what are you, the forest, sensing in yourself? **Priming phrase for writing down:** While the person was sitting and making sounds, I perceived myself (the forest) and sensed in myself... **Results** P1: At the most fundamental level: calmness, on a surface level I am mainly concerned with machinery and giving some attention to the funny humans P2: Deep grief P3: nothing special, it was either a branch breaking or a droplet of water falling down P4: Wonder, something new P5: Sun on my leaves, I felt light and open, felt how the rain dropped from my leaves **Essences/Tendencies**: abstract feelings, distance to the more particular sensations	**2b) Forest refers to the Replicator** **Guidance phrase:** On my sign start making the sound you chose to replicate for a few times. Now your perception starts from the position of the forest again. This time the forests perception refers to the person. While the person is making sounds you, the forest, put yourself in their shoes. What does it seem to you that person is sensing? **Priming phrase for writing down:** While the person was sitting and making sounds I (the forest) put myself in the walker's shoes. It seemed to me that the person sensed... **Results** P1: Randomness, maybe the person is trying to connect with me P2: A bit alienated, loss, laughter, connection P3: Themselves but also my own chaotic harmony, he felt a part of me P4: A longing for understanding, a desire to come back to what drives it(?) P5: Helpless, desperate, courtship behavior **Essences/Tendencies**: intention/drive to connect, helplessness in the act of connecting,

5 Results

Our research workshop was designed as a pilot study to test the possible extension of the PRISMA paradigm to interactions with the more-than-human world with the major research questions of whether this extension is possible and meaningful, and if so, how it can be done effectively and what important factors should be considered when designing a bigger workshop with a more concrete question. Therefore, we have divided our result into general insights into the workings of the method which are oriented on our research question and more specific experiment insights which are tendencies we noticed while conducting the workshop and analyzing the data and which could server as hypotheses for further investigation of the human-environment relation. We will also point out shortcomings of our workshop with ideas for improvements for future research workshops.

We obtained our results by transcribing all the PRISMA data from the workshop, reading through it multiple times, studying the answers to the questions the participants filled out at the end of the workshop, brainstorming associations on post-it notes, clustering them according to topics, and finally arranging the topics in the following order. We suggest the keen reader to at least take a glance at and skim through the result tables Table 1 and Table 2 above to get a feeling for the answers before diving into the results.

5.1 Research method insights

From our experience in the workshop and the resulting PRISMA matrices we can conclude insights into the general working of the research method.

PRISMA works for interactions with non-humans

As in the seminar session with Dr. Pieper, we found that all used perspectives successfully produce phenomenologically distinct and epistemologically valuable experiences for all participants when relating to the space they are in. Our tentative observation from the seminar session was that this seems to work independent of the intellectual stance of the participants towards the agential status of the room. This result was confirmed and solidified in our PRISMA workshop where the forest took the place of the room as abstract agentic entity.

From this we conclude that the concept of perceptual references, as introduced by Pieper and Clénin (2012), can be meaningfully applied to, and used in order to research the interaction of humans with non/human entities. This was one of our main research interests and the major innovation we contributed with our approach. As pointed out above, the next closest thing the PRISMA method has been used for was for a study to investigate the behavior of Amoebae on a video recording. But, to the best of our knowledge, it has never been used to study the actual live *interaction* between human and non/humans “in the wild”.

Wild perspectives

Another novelty in our approach were the two perspectives in which the participants were asked to move the origin point of their perception outside of themselves and perceive *as* the forest (Forest-SP and Forest-OP). Those perspectives have not been described in any other paper on PRISMA before. Usually, they only include the simple other perception (Listener-OP). We developed and tested those perspectives with Dr. Pieper in the Seminar session and decided to include them in our workshop. We found that those perspectives, which required the participants to fully identify with the (non/human) other and start their

perception from there, "work" in the sense that the reported experiences differed in meaningful ways from the simple other-perception and allow for novel insights into the relation of the participating humans to the forest. As an overall insight into the method, we conclude from this that the concept of perceptual references can be meaningfully extended beyond what it has been used for in the past and constitutes itself an interesting field of potential future research. While here we addressed our insights into the method for potential future use, we will come back to the "wild perspectives" in the experiment insight section where we will address in how far switching between perspectives resulted in different experiential tendencies.

Social interaction

A central question we had before entering the workshop was whether we could meaningfully investigate the interaction between the participants and the forest as a *social* interaction (following the technical definition by De Jaegher and Di Paolo[3] (2007). We conclude that our collected data suggests that the preconditions for understanding the interaction as a social one are given and that, in fact, about half of the participants experienced the interaction as social in our PRISMA settings. In the final questionnaire there was a univocal agreement between participants that they perceived the forest as perceiving them (5/5 agree or strongly agree) which suggests to us that it was experienced as a perceptual agent. Many of the participants (3/5 agree or strongly agree) perceived the forest as autonomously acting and stated that they perceived a coupling between them and the forest. Most participants (4/5 agree or strongly agree) experienced the interaction between them and the forest "to have a life of its own". We take this as an indication that the main characteristics of a social interaction proposed by De Jaegher and Di Paolo were met in our PRISMA settings and that the interaction between the participants and the forest can be understood, and hence investigated, as a social interaction.

The fact that only few (2/5 agree or strongly agree) participants reported perceiving their interaction with the forest as a social one in our final question could be explained by the fact that the individual definitions of a social interaction differ across participants with different backgrounds. This was also indicated by one participant in the questionnaire.

An important caveat is of course that our "sample size" is very small here. But we don't take our results as psychological results indicating generalizable insights into the workings of the human mind but as isolated phenomenological reports in relation to our specific setting which can nevertheless prove informative for conceptualizing new questions and directions in research.

Asking the participants about their understanding of the interaction as social or at least having a tendency and openness to do so is an important part of the investigation because PRISMA fundamentally rests on the assumption that the interaction that is investigated is a social one, as we have already elaborated in the chapter on PRISMA. Because social interactions are a condition for the process of participatory sense-making and thereby take a crucial part in how we approach our knowledge of the world, this question gave us insights into the potential transformative value of the method.

[3] "Social interaction is the regulated coupling between at least two autonomous agents, where the regulation is aimed at aspects of the coupling itself so that it constitutes an emergent autonomous organization in the domain of relational dynamics, without destroying in the process the autonomy of the agents involved (though the latter's scope can be augmented or reduced)." (E. Di Paolo et al., 2007, p. 493)

The next section presents specific experiment insights. Our results are all tentative due to the small number of participants and the pilot nature of the workshop but can be seen as a basis for hypothesis generation.

5.2 Specific experiment insights

Second Setting creates connection – Active engagement/ making contact with the agent changes experience

In the participants individual statements and in the extracted tendencies from the reflection session we found a clear distinction between the first setting (sitting and listening) and the second setting (making forest sounds). While in the first setting the forest and the person are phenomenologically co-existing without many points of reference towards each other, in the second setting there is a strong sense of (a craving of) connection (see Table 2: PRISMA Workshop results for replicating forest sounds, 2b)). This suggests to us that our intention, that the reproduction of forest sounds in the forest would be experienced as "making contact" with the forest was successful and that it produced an enhanced sensibility to a sense of connectedness.

This is also in line with the enactive conception of cognition we embrace in this work in the sense that sense-making is inherently connected to action. The *act* of entering into a contact seems to be a catalysator for actually producing phenomenologically distinct experiences of connectedness and to potentially reconfigure habitual affective structures. Or as Werner & Kiełkowicz-Werner put it: "when it comes to the shift from the fixation on individual autonomy to genuine interest in the other, we argue that it must be, indeed, a *move*—thus that the change in focus is predicated on a specific activity, a special thing we do" (2021, p. 10).

Wild perspectives continued

The addition of our two new perspectives (Forest-SP and Forest-OP) proved to be interesting since they allow to compare the perception of the same object from different perspectives. The perspectives in which the participants were asked to perceive the forest (Participant-OP), for example, differed significantly from the Forest-SP in both settings even though both perspectives are directed to the subjective experience of the forest. In the second setting of the experiment (making sounds) in the Replicator-OP the human point of reference highlights a feeling of sublimity of the forest and expresses a feeling of smallness in the person when putting themselves into the place of the forest. In the Forest-SP this aspect is highlighted from a different perspective. The point of reference being in the forest, the greatness of the forest is expressed in the notation of abstract feelings and a distancing and non-attachment to particular sensations. Additionally, we observe in the results that the Participant-OP (as well as Participant-SP) shows a stronger focus on the experience of physical sensations while the Forest-SP shows a stronger tendency towards emotional states. Similarly, the Participant-SP and the Forest-OP (both directed towards the subjective experience of the participant) show significant differences. The Participant-SP is rather occupied with thoughts and physical sensations whereas the Forest-OP has a tendency towards complex emotions like "alienation", "connectedness", "understanding", "desire". One participant noted in the questionnaire that "From forest perspective perceiving me [Forest-OP], I allowed myself to express feelings I don't do on my own" which serves as a suggestion to us why this emotional taint might arise in the Forest-OP.

We here want to mention again that we asked consistently for *sensations* in the prompts for the exercises. Nevertheless, we did not differentiate sensations from feeling and thinking in the input and the instructions and therefore participants did not seem make a clear distinction between those, as suggested in the PRISMA paper and rather mixed them up a bit. In one sense this is unfortunate and could be improved next time. At the same time this also resulted in the interesting patterns described in the previous paragraph which could be purposefully used in another workshop in order to engage participants for example with a deeper sense of feeling by taking a perspective that enhances this tendency.

Disidentification

We observed in the phenomenological reports that the successive taking of different perspectives in the PRISMA settings proved to be very effective at disidentifying the participants with their own self and their insecurities. In the first perspective (Participant-SP) there was in both settings a focus on self-directed thoughts, feelings, and a sense of awkwardness, which completely ceased in the other perspectives. This is most obvious in the second setting. There was a sense of awkwardness due to the unfamiliar task of making forest sounds in the Participant-SP. This, however, was washed away and became irrelevant to the self-understanding of the participants in all successive perspectives.

5.3 Critical reflection and potential improvements

Separation from the natural environment

In all perspectives we could observe a sense of alienation or separation of the human participants from the forest. The participants did at no point perceived their human selves as part of the forest but as something different entering the forest, perhaps even intruding. While this might be an expression of our discursive separation of nature and culture or the human and the non/human, we think this might also be related to the way we framed the task and the perspectives. The way we framed our perspectives suggest that both the participant and the forest perceive each other as “other” (Participant-OP, Forest-OP). It could be interesting to conceptualize a PRISMA setting which does not presuppose this separation of agents but suggests a phenomenological experience of immersion of the human into the natural environment.

Time

There was a univocal agreement between participants that their ability to tune in to the interaction and to perceive the forest and themselves from different perspectives increased over time and that more time would have yielded yet different results. Firstly, this confirms to us that perception is habitual and can be trained (and transformed) over time. Secondly, this suggests that a longer workshop would be better and/or that perceptually trained researchers would arrive at different insights during such a workshop.

6 Conclusion

In our study project we chose to conduct a PRISMA workshop in a rather different setting and with a different focus than it has been done before. Starting from practice we gained insights into the relation between humans and their natural environment. For the first time we included non/human interaction partners in a live PRISMA experiment. In this context we chose to approach a forest as interaction partner for our participants, which would usually not be approached as a subject but perhaps rather with methods of “practical phenomenology” focused on human’s individual experience of objects in their awareness (De Jaegher et al., 2017, p. 494). With this setting we are probing the edges of what a (social) interaction can

be, driven by the conviction that if we probe those edge cases, we can learn something valuable about the concepts at work. In our approach we took the concept of a perceptual reference to the edge too, playing on the idea the not only the direction of perception can change but also setting the point of origin changes.

In doing so we addressed our central research question of whether and to what degree the PRISMA method can be meaningfully extended and applied to study the experience of interactions between humans and their natural environment. This brought with it the implication that this interaction could be understood as a social one. The central result from our research workshop is, that, yes, we can use the PRISMA method to study interactions of humans with their natural environment, and consequently that we can understand this interaction as a social interaction. This does not mean that the interaction *is* a social one per se, but that we can have meaningful interactions with the natural environment which fulfill concepts of sociality.

Therefore, we conclude that PRISMA can be a valuable addition to the toolkit of researchers investigating the relation of humans to the more-than-human world. In future research it might be used as a tool to assess hypotheses of current theoretical accounts of nature perception and to generate novel questions and hypotheses in this area. Concretely it might be used to systematically investigate the ways in which we do relate and the ways in which we *can* relate to the natural environment.

Additionally, inspired from experiences in the PRIMSA workshop, we suggest that the methodology at the basis of the PRISMA workshop might also be valuable not only as a research tool but as a transformative practice to change the participating subject's relation to the natural environment and themselves.

Based on the conviction that the specificities of the relation between humans and the more-than-human world play a central role in the genesis but also the potential mitigation of the climate crisis we think that both the practical, as well as the theoretical aspects of this phenomenological research on intersubjectivity can have a very real and very relevant role to play in our wrestling with the climate crisis, it's causes and finding effective responses.

Individual Contributions:

Both of us, Marlena Napp (MN) and Matthias Richter (MR) claim full responsibility for all of the content of this project work. MN had primary responsibility for writing the literature research part on enactivism. MR hat primary responsibility for writing the part on PRISMA. We designed and conducted the workshop together. The analysis of the data and compilation of the final project report with introduction and conclusion was also a joint effort. Christian Dingkuhn contributed by trying out the PRISMA method and writing a report about his experiences.

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8 Appendix

8.1 Results from the seminar session with Dr. Pieper

<table>
<tr><td></td><td colspan="2">Walker's and spatial perceptions (sensing) during the walking from desk to door.</td></tr>
<tr><td>Role</td><td>a) Self-Perception (SP)</td><td>b) Other Perception (OP)</td></tr>
<tr><td rowspan="2">Spatial perception</td><td>1a) Space refers to itself</td><td>1b) Space refers to the walker</td></tr>
<tr><td>While the person was walking from the desk to the door, I perceived myself (the space) and sensed in myself...

P1: calmness, uninvolved
P2: Weight of the person. Pressure. Resistance.
P3: I felt that a living body moved through me and I warmed up. I feel liquid, like "soup" through which the body softly glides. I open to let the body through and close behind it again.
P4: nearly unchanged, used (in a neutral way)
P5: Volume of human body, (inter)action</td><td>While the person was walking from the desk to the door I (the space) put myself in the walker's shoes.
It seemed to me that the walker sensed...

P1: Boredom and repetition
P2: Obstruction to the person.
P3: It seemed to me the walker felt shy, as if she did not dare to walk through me.
P4: contemplative
P5: Gravity, friction? Simple but limited move</td></tr>
<tr><td rowspan="2">Walker</td><td>2a) Walker refers to himself/ herself</td><td>2b) Walker refers to the space</td></tr>
<tr><td>While walking from my desk to the door I perceived myself and sensed in myself…

P1: Heaviness, calmness, and a little embarrassment
P2: Balancing my weight from one leg to the other
P3: My body becomes less stiff, more flexible.
P4: damp feet, light lower back pain
P5: Myself as a complete object/organism easy movement but need for suppression of “go” for interaction</td><td>While walking to the door I put myself into the room's space.
It seemed to me that the space sensed…

P1: Disturbance, a strange shifting, movement
P2: My slippers dragging on the floor
P3: The space sensed itself when I walked through it. It started vibrating and moving around me.
P4: weight
P5: A little disturbance in the static space/air</td></tr>
<tr><td rowspan="2">Observer</td><td>Not included</td><td>Not included</td></tr>
<tr><td>While the person was walking from the desk to the door I perceived what happened between the space and the walker and
sensed in myself…</td><td>While the person was walking from the desk to the door I perceived what happened between the space and the walker
With regard to sensing, it seemed to me that between them...</td></tr>
</table>

8.2 Workshop final questionnaire results

Course of Study and/or research field(s) you identify with:

P1	Cognitive Science MSc.
P2	Cognitive Science, Bodywork
P3	Cognitive Science
P4	Cognitive Science

P5	Psychology, Sociology

What was your overall impression of the workshop (concise)?

P1	Nice, nice being outside, good balance between introspecting alone and sharing in group
P2	Nice to be in the nature/forest, enjoy fresh air/people, not sitting in front of screen, funny alternating perceptions and getting to know perceptions of others
P3	Very good, something new and different, I learned a lot!
P4	The openness towards subjective states of perception was amazing
P5	Exiting, funny, surprising how good one can take the perspective of non-human entities

During the PRISMA exercises I perceived…

…myself as autonomously acting:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
				■
	■			
		■		
			■	
				■

…the forest as autonomously acting:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
			■	
		■		
				■
		■		
				■

…the forest as perceiving me:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
				■
			■	
			■	
			■	
			■	

…a coupling between me and the forest:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
			■	
		■		
			■	
	■			
			■	

…the interaction between me and the forest to have a life of its own:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
				■
			■	
			■	
		■		
			■	

…the interaction between me and the forest as a *social* interaction:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Did your perspective on those questions change throughout the workshop? If so, when, and how did it change?

P1	Most stayed the same because I often go into the forest and try to feel into those/some of those different perspectives. Maybe the last question changed because I strongly felt myself embraced by the forest. That is where it differs from a social interaction for me
P2	I was shortly before a meditative state, where I can imagine to strongly agree to the last 2 questions, but time to sense and [darauf einlassen] was too short.
P3	Probably not on a rational level, but feeling it makes a larger difference. I will probably feel this emotional impact next time I'm in the woods!
P4	-
P5	I got more aware about the differences and the similarities between me and the forest, so now I can answer the questions more easily.

What was a key moment for you? Describe it shortly and state why it struck you as special.

P1	After the first complete round I felt like I got an insight into how beings perceive other beings in reference to them. → perception of forest by people is very different to forest of forest because each entity uses a different point of reference
P2	From forest perspective perceiving me, I allowed myself to express feelings I don't do on my own. But from the outside perspective it was normal, simply being there and visible and ok
P3	Being able to sense touch from another person on both sides (from my view and the other persons), feeling this barrier wash away was quite intense and beautiful.
P4	The forests perception of the person and what it perceived struck me most. The forest in my perception was synonymous for nature. This last perspective felt like nature (the basis of our being), observing the part of myself, that mentally tries to uplift itself from nature
P5	Replicating the sound from my perspective with reference to myself, because I thought, that it would be very uncomfortable but it was fun and felt good.