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„Knowing Groundlessness: An Enactive Approach to a Shift from Cognition to Nondual Awareness“

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Daniel Meling, B.A.

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0 Introduction

Over the last few decades, the enactive approach has developed from an exotic outsider position in cognitive science to a much regarded and influential scientific paradigm (Di Paolo, Rohde, & De Jaegher, 2010). With their first proposal for the enactive approach, Varela, Thompson, & Rosch (1991) claimed "that without the key notions of the enactive approach, cognitive science will be unable both to account for living cognition and to build truly intelligent, cognitive artifacts" (Varela et al., 1991, p. 207). And indeed, many researchers followed the direction of this bold statement. In the following decades, the key notions of the enactive approach have been applied to education, human-computer interaction, autonomous robotics and consciousness studies (Di Paolo et al., 2010). However, the enactive approach, as outlined in *The Embodied Mind* has shown to be not static but vital. Twenty-five years after *The Embodied Mind* has been first published, Evan Thompson and Eleonor Rosch elaborated in its revised edition their correctives to the enactive approach. Those correctives have their roots in discussions that followed the first publication. This openness for correctives can be seen as "vital signs" or "indicators of the vitality of the evolutionary arc of thinking and praxis" inherent in the enactive approach (Kabat-Zinn, 2017, p. xiii). Accordingly, enactive cognitive science since then has been further developed (Di Paolo et al., 2010; Thompson, 2007). Moreover, it brought about a diversification of approaches all of which are called *enactive* (Vörös, Froese, & Riegler, 2016). All these developments are expressions of an increasing interest of researchers in the enactive approach.

0.1 The Enactive Approach and its Reply to Foundationalism: Groundlessness

But what makes the enactive approach so interesting and important for the mind sciences? In the *locus classicus* of enactive cognitive science, *The Embodied Mind* from 1991, Varela, Thompson, and Rosch so importantly pointed out the *project of foundationalism* in which current cognitive science might be yet stuck in: the search for an ultimate ground, whether in the self or in the world. This is to search for something that has inherent own existence and is thereby the basis for everything else to arise. This can show up in a notion of a pregiven subject and in a notion of a pregiven world.

Being aware of such a search for ultimate grounds in cognitive science, Varela, Thompson, & Rosch (1991) proposed their alternative approach, the enactive approach. This enactive approach rejects any search for an ultimate ground. From this point of view, a search for a location of cognition is pointless. Groundlessness is what is at the heart of the enactive approach. This is what is special and insightful about this approach to cognitive science. It relinquishes any assignment of location, any search for a substantial ground that may give rise to everything else (Di Paolo, 2009). It does so to the extent to which it appreciates that everything there is springs from a dynamic of

relations. As Varela et al. (1991) put it, "[e]nactive cognitive science […] require[s] that we confront the lack of ultimate foundations" (Varela et al., 1991, p. 233). This is what makes the enactive approach so unique in the landscape of paradigms in cognitive science.

0.2 Roots and Core Themes of the Enactive Approach

Thereby, it is to bring to the foreground that such an emphasis on the idea of groundlessness is not simply out of a clear blue sky, just another concept derived from some far-off philosophical analysis. Rather, the enactive approach puts this core theme of groundlessness at the heart of its non-reductive *naturalist* framework which encompasses many other ideas that support this notion (De Jaegher & Di Paolo, 2007). This framework consists in a meshwork of ideas about life, self-organization, experience, the living body, and the world, all of which respectively exemplify the codependent arising of life, mind, body, self, and the world. None of those implies any substantial ground. Furthermore, those ideas are not radically new. Rather, the enactive approach consists in a radical *combination* of several new as well as old ideas which mutually support each other (Di Paolo et al., 2010).

More concretely, those interconnected ideas can be summarized in five concepts (Di Paolo et al., 2010): *autonomy*, *embodiment*, *emergence*, *sense-making*, and *experience*. What those terms respectively signify will be elaborated at length in the following chapter. For now, it is to highlight however that the sources of those core ideas of the enactive approach are markedly diverse. These ideas stem from various disciplines and traditions which are rather untypical and exotic from a perspective of classical cognitive science (Walter, 2014). Their roots can be traced back to the autopoiesis theory by Maturana and Varela, Merleau-Ponty's *Phenomenology of Perception*, Hans Jonas' philosophy of life, dynamical systems theory and complex system science (Thompson, 2007), and Buddhist philosophies, such as Nāgārjuna's *Mūlamadhyamakakārikā* (Varela et al., 1991).

One result of interlinking the ideas of those approaches and traditions is the way the enactive approach renders cognition. Cognition in the enactive approach is understood as a deeply relational embodied action through which a cognitive system *enacts* a world of significance (Thompson, 2007, p. 13; Varela et al., 1991, pp. 205–207). Therefore, cognition is in its core to make sense of a world which is not pregiven but brought forth from within the living cognitive system's endogenous activity. Accordingly, the enacted world is always in relation to the way the living body is organized to maintain its identity. Neither is there a pregiven world out there to be recovered by a subject, nor is there a pregiven subject projecting its own world (Varela et al., 1991, pp. 172–173). Instead and as already mentioned, the enactive approach proposes a middle way: *groundlessness* (*śūnyatā*). Groundlessness can here be preliminarily defined as codependent arising: *whatever there is springs from a dynamic of relations, dialogically, without substantial ground*.

0.3 Groundlessness Can be Experienced

However, with regard to groundlessness, Varela et al. (1991) point out an important aspect to consider:

> all of our activities depend on a background that can never be pinned down with any sense of ultimate solidity and finality. Groundlessness, then, is to be found not in some far off, philosophically abstruse analysis but in everyday experience. (Varela et al., 1991, p. 144)

This points towards a crucial point of departure of this thesis. Groundlessness is not just another philosophical concept but rather something *experiential*. It can be directly experienced. More than that, it is not only possible but even crucial to experience groundlessness and to learn to live with groundlessness as Varela et al. (1991) point out: "our historical situation requires not only that we give up philosophical foundationalism but that we learn to live in a world without foundations" (Varela et al., 1991, p. 218).

Unless groundlessness is lived and experienced, there remains a strong tension between the *belief* in groundlessness (or philosophical position thereof) and what one *does*, i.e. grasping after a ground in the concept of groundlessness. This tension is elucidated in recognizing that the insight into an absence of an absolute ground alone does *not* necessarily change the deeply rooted habitual tendencies of the mind to grasp after grounds. This grasping mind can therefore also cling to the *absence* of an absolute ground. Thereby, it can regard everything else as just an illusion (Varela et al., 1991, p. 143).

This scenario of a mind grasping after groundlessness as just another ground can be prevented and overcome. One does so by learning to *live* in a world without foundations rather than just *knowing about* this lack of foundations. Rather than clinging to that knowledge *about* groundlessness, one lets go of clinging to *any* kind of knowledge. One learns to live with uncertainty.

This difference between knowing groundlessness as a philosophical idea and knowing groundlessness as a lived experience is beautifully put in Thompson's (2004) statement on Varela's view concerning the difference between scientific theory and direct experience:

> he never lost sight of this point that the mind–body problem is not only a philosophical problem, or a scientific problem, but also a problem of direct experience. The problem could be put this way. It's one thing to have a scientific representation of the mind as "enactive" – as embodied, emergent, dynamic, and relational; as not homuncular and skull-bound; and thus in a certain sense insubstantial. But it's another thing to have a corresponding direct experience of this nature of the mind in one's own first-person case. (Thompson, 2004, p. 382)

Accordingly, practicing to directly experience the world as groundless is not only possible but of utmost importance. This importance is even more the case for people who explicitly operate with the *idea* of groundlessness and who are thereby at risk of clinging to this idea of groundlessness. To great extent, this is a risk in operating with the enactive approach.

Therefore, a *form of practice* is required in which one becomes familiar with experiencing the groundless nature of all phenomena, including enactive ideas and the concept of groundlessness itself. In this regard, Varela et al. (1991) highlighted *Buddhist* mindfulness/awareness meditation as one potential means. The aim of this practice is to develop a direct and stable insight into forms of grasping and to let go of such tendencies to grasp (Varela et al., 1991, p. 144). Such a relation between a practice and a lived experience of groundlessness is pointed out once more by Varela et al. (1991): "it is said that emptiness is a natural discovery that one would make by oneself with sufficient mindfulness/awareness—natural but shocking" (Varela et al., 1991, p. 225).

What is referred to as emptiness in this case can translate into groundlessness or *śūnyatā*. This groundlessness as a natural discovery is to be seen as equivalent to the *lived experience of groundlessness* in contrast to a merely philosophical and abstract notion of it. Moreover, Varela et. al (1991) related this discovery of groundlessness to a specific element of mindfulness/awareness practices, namely non-grasping: "[b]y progressively learning to let go of these tendencies to grasp, one can begin to appreciate that all phenomena are free of any absolute ground and that such 'groundlessness' (śūnyatā) is the very fabric of dependent coorigination" (Varela et al., 1991, p. 144).

Not only is groundlessness the fabric of such codependent arising but it is also to be understood as a certain mode of knowing. This is well expressed by Varela et al. (1991): "[k]nowing śūnyatā (more accurately knowing the world as śūnyatā) is surely not an intentional act. Rather (to use traditional imagery), it is like a reflection in a mirror—pure, brilliant, but with no additional reality apart from itself" (Varela et al., 1991, p. 225). This exact point is beautifully stressed in Rosch's (2017) introduction to the revised edition of *The Embodied Mind*. She argues for groundlessness being a mode of enaction different from a usual sense-making. Eleonor Rosch distinguishes them in *phase 1 enaction* (sense-making) and *phase 2 enaction* (reflexive awareness).

This distinction between phase 1 enaction and phase 2 enaction is crucial to this thesis. In *phase 1 enaction*, the knowing of a world is related to performing actions relevant to the self-maintenance of the living body. This living body, in turn, is understood as a self-organizing system which co-dependently emerges. Moreover, phase 1 enaction is dualistic: it involves a distinction between subject and object, between observer and observed. It is purposive and related to getting the good, shunning the bad and ignoring the indifferent from the perspective of the subject pole of the dualism. *Phase 2 enaction*, on the other hand, is an alternative mode of knowing that is *not* based on an observer and an observed. It is groundlessness. In this phase 2 enaction the mind is "neither absorbed nor separated but simply present and available" (Rosch, 2017, p. xl). Furthermore, this experience is simple and self-known without any sense of an observer: "this is the mind that can actually know firsthand the groundlessness of the enacted edifice in which humans live

[…], thereby clearing the way for transformative wisdom to emerge" (Rosch, 2017, p. xl). Therefore, phase 2 enaction is a nondual mode of knowing that allows for a direct experience of groundlessness.

0.4 Research Questions and Aim

The most important ideas from this introduction can be summarized in three steps. First, groundlessness, as we have seen, is theoretically central for the enactive approach and for understanding cognition at large. Second, groundlessness can and also needs to be lived in one's own experience. One way to enable such experience is through certain forms of meditation that include a letting-go of one's tendency to grasp. Third, groundlessness appears to be a certain mode of knowing which is different from everyday usual sense-making: it is non-intentional, lacks any subject-object distinction, and is therefore nondual.

Regarding this, two crucial questions are still open.

(1) What is knowing groundlessness and how is it different from sense-making?

(2) What does a shift from adaptive sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing) require?

These two research questions will guide us through this explorative theoretical thesis. However, why do I address these two questions from the point of view of the enactive approach?

Compared to the beginnings of the enactive approach, those two questions can be approached today with a more elaborate set of conceptual tools. Since *The Embodied Mind* has been published in 1991, the enactive approach has been developed further in many ways as a vital active field of theory and research (Di Paolo et al., 2010; Rosch, 2017, p. xlviii). Accordingly, the conceptual repertoire of the enactive approach has been expanded and fine-tuned (cf. Di Paolo, 2005; Di Paolo et al., 2010; Thompson, 2007). However, to my current knowledge this rich conceptual repertoire of the contemporary stage of the enactive approach has not yet been applied to a description of this *mode of "knowing the world as śūnyatā"*. At the same time, this *knowing of groundlessness* is one of the deepest sources of the enactive approach. Therefore, such a description of a shift to knowing groundlessness which includes contemporary enactive concepts such as sense-making, autonomy, adaptivity, and dynamic co-emergence has the rich potential to contribute to the enactive approach as a theory.

The goal of this thesis is therefore to describe the process in which a mode of adaptive sense-making (phase 1 enaction; dual knowing) transforms into a mode of *knowing groundlessness* (recognizing phase 2 enaction; recognizing nondual knowing). This process is to be described in terms of the conceptual repertoire provided by contemporary enactive cognitive science.

This description may be valuable in two ways. First, it is a re-emphasis of groundlessness being at the heart of the enactive approach. Second and more importantly, it highlights the lived epistemological aspect of groundlessness. Groundlessness is not only an idea but an experience. From there, the lived process of a momentary shift from adaptive sense-making to knowing groundlessness is described. This description adopts ideas from the rich contemporary repertoire of the enactive approach.

The limitations of this approach, however, need to be made transparent at this point. The inner paradox of this approach lies in the nature of this thesis being a *theoretical* work. It is restricted to use *language* for theoretically pointing *within a dual mode of knowing* (phase 1 enaction) towards a *nondual knowing* (recognizing phase 2 enaction). Thereby, it is of utmost importance to keep in mind that this description is enacted and thereby context-dependent and observer-relative. It is from a *lived subject-object-dual point of view*. To put it with an allegory, this thesis is like a dream about what happens in the process of waking up from a dream. This is not the same as *actually* waking up: it does not give us a direct experience of being awake. It remains a dream. Accordingly, this thesis *describes* a transition from a dual knowing into a nondual knowing while the description itself remains stuck in a *dual* mode of knowing.

However, this is unproblematic to the extent to which the reader and the author are *aware* that this description is enacted from a certain lived subject-object-dual point of view. This awareness implies the articulate limited scope of this thesis. The aim of this thesis is to *theoretically* frame knowing groundlessness and the transformative process leading to it. By this, I most humbly hope to contribute to opening up theoretical cognitive science to at least *conceiving* a nondual kind of knowing via the enactive approach.

0.5 Structure and Purpose

I will tackle this aim with the following three steps which constitute the three chapters of this thesis. In the first chapter I will introduce the reader to the enactive approach. The aim is to provide the necessary conceptual tools that will be required for the enaction-inspired synthesis in the subsequent two parts. This first part is structured into three steps. In the first step we will depart from the ideas of autonomy and emergence. In a second step we will come to the central concept of cognition as sense-making while emphasizing on its dependence of autonomy and adaptivity. In a third step we will make a leap from autonomy, emergence, sense-making, and adaptivity to a detailed consideration of their implicit groundlessness.

In the second chapter I will provide the main contribution of this thesis. It is divided into two levels of analysis. On the first level of analysis I will answer the two research questions on the basis of the enactive approach as outlined in chapter 1. In approaching the first research question, we will see that the mode of *knowing the world as groundlessness* (recognizing phase 2 enaction) can be

translated into the overall enactive terminological repertoire as *recognizing a nondual reflexive mode of knowing*, and thereby as *non-adaptive experiencing*. In approaching the second research question, I will hypothesize that the according process of a momentary transition from adaptive sense-making (phase 1 enaction) to non-adaptive experiencing (recognizing phase 2 enaction) requires (1) a *"decrease" of adaptive activity* as well as (2) a *reflexive nondual knowing without sense-making*. On the second level of analysis, I will emphasize once again that the first level description is enacted from a lived subject-object-dual point of view arising with adaptive sense-making. In the light of the perspective-relativity of descriptions, I will explore one alternative: What is knowing groundlessness *from within* the point of view of knowing groundlessness?

In the third chapter I will evaluate to which extent the hypothesized ideas from chapter 2 make sense for both lived practice and cognitive science. First, I will explore how the ideas from the second chapter are related to practices that aim at directly experiencing knowing groundlessness: to what degree do the ideas from the second chapter correspond to practice instructions in (1) Buddhist meditation of the Mahāmudrā tradition and to descriptions of (2) the phenomenological reduction? In this step I will show how the enaction-inspired description in this thesis can enrich the theoretical embedding around those practices that aim at experiencing groundlessness directly in the first person. Second, I will explore how the ideas from the second chapter are related to cognitive science paradigms at large. Based on similarities between Buddhist philosophical paradigms and cognitive science paradigms on the one hand and on the conclusions from the second level of analysis in chapter 2 on the other hand I will derive implications for cognitive science: what does a cognitive science paradigm look like that can empirically account for knowing groundlessness?

The expected outcomes of this three-step approach concern insights into knowing groundlessness. First, I expect a principled account of groundlessness that is integrated as an *experience* into the framework of the enactive approach. This integration of knowing groundlessness into the enactive framework opens the discourse for an alternative mode of knowing that is beyond sense-making. Second, I expect a principled description of the requirements of a transition from sense-making to knowing groundlessness.

Why is this important? The purpose of exploring knowing groundlessness and the transition from sense-making to knowing groundlessness is two-fold. First, groundlessness is at the *core* of cognition. To open the discourse for knowing groundlessness has potential for illuminating the deeper dependency and relativity of cognition. It enables crucial insight and demands from scientific practice to become reflexively aware of itself. Second, knowing groundlessness is related to well-being. As "grasping after a ground […] is the deep source of frustration and anxiety", to release that grasp means to alleviate frustration and anxiety at its source (Varela et al., 1991, p. 143). This makes the investigation of knowing groundlessness a deeply ethical endeavor.

Eventually, this makes the knowledge about the *transition process* from sense-making to knowing groundlessness such an ethical endeavor. A principled description of the requirements of a transition to knowing groundlessness enables us to develop secularized practices that support people in *doing* this transition and hence in *reconnecting to knowing groundlessness*. Therefore, my hope is to lay the foundations of a secularized cultural practice that supports people in (1) gaining direct existential insight into the depth of their cognition and experience, and in (2) alleviating their emotional suffering.

To the humble extent to which this thesis may have an impact, I hope that it is another stepping-stone towards a cognitive science that is both, *insightful* and *responsible.* At this, I believe that exploring the experiential aspects of groundlessness contributes to both at the deepest possible source.

1 The Enactive Approach

Since its origin in 1991 with the book *The Embodied Mind* by Varela, Thompson, and Rosch, the enactive approach has been taken up, developed further, and applied to various domains. As a consequence thereof, the term "enactive" has been used in various ways by various researchers for various contexts and purposes. Therefore, there is a variety of views all of which are traded under the same label "enaction", "enactive approach", "enactment", or even "enactivism" (Vörös et al., 2016). Accordingly, it is helpful to clarify how the terms "enactive" and "enaction" will be used in this thesis.

In this thesis, when mentioning "the enactive approach", I will refer to the original work by Varela et al. (1991) and to its consistent further development by Di Paolo et al. (2010) and Thompson (2007) among others. Deliberately, the work by Hutto & Myin (2013, 2017) which the authors themselves refer to as "radical enactivism" is not taken up. Also, the specific approach regarding perception called "sensorimotor enactivism" by O'Regan & Noë (2001) is not covered in this thesis. Instead of going into a detailed argument about this choice of literature, I wish to simply make transparent which literature I will refer to as "enactive". For a detailed elaboration of the differences between the enactive approach by Varela et al. (1991) and "radical enactivism" by Hutto & Myin (2013, 2017) see Thompson (2018).

Furthermore, in reference to De Jaegher & Di Paolo (2007), I will understand in this regard the "enactive approach" as a framework close to the following five ideas: autonomy, emergence, sense-making, embodiment, and experience. Additionally, I will set a strong emphasis on groundlessness as co-dependent arising. Right those terms will turn out to be helpful in guiding us through this chapter on the enactive approach. Thereby, I will stress its implications for cognition and its notion of an enacted world.

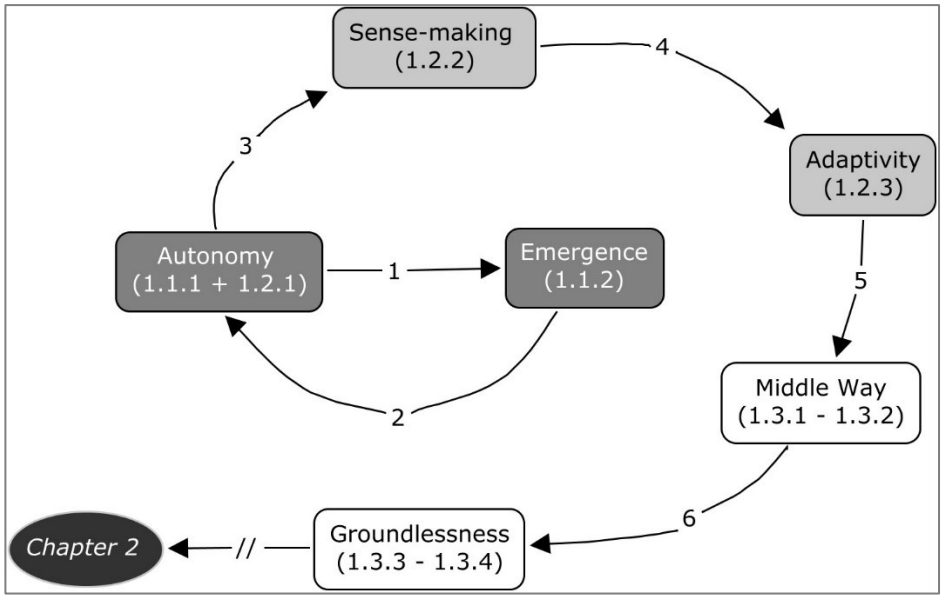

Figure 1. Overview of the key concepts in chapter 1, ordered by occurrence.

This aim I will approach in the following way (cf. *Figure* 1). First, I will explain in detail the concepts of autonomy and emergence. By doing so, I will go about the enactive approach from the usual central point of departure: autonomy. Furthermore, I will relate this to the crucial idea of emergence, understood as dynamic co-emergence (e.g. between parts and whole).

Second, with autonomy as a point of departure, we will, in the light of the *deep continuity thesis of life and mind* (Thompson, 2007), have an optimal basis for discussing what is at the heart of cognition in the enactive approach: sense-making. With regard to sense-making and its requirements, we will focus on the idea of adaptivity (as introduced by Di Paolo, 2005). Those first two sections pave the way for a view on groundlessness in a two-fold manner. On the one hand, they facilitate a closer understanding of the concept of groundlessness and accordingly of the research questions at large. This is the case as most of those concepts (e.g. autonomy, co-emergence, and sense-making) already exemplify aspects of groundlessness. They facilitate a convenient starting point for an introduction into the idea behind the term groundlessness. On the other hand, they provide the conceptual tools necessary for tackling the research questions. This enables a usage of those terms like *autonomy*, *co-emergence, upward- and downward-causation, sense-making,* and *adaptivity* for describing what a lived transformation from adaptive sense-making to knowing groundlessness could be from the viewpoint of the enactive approach.

Third and consequently, the enactive view of a *middle way* and of groundlessness is presented: what does the enactive framework refer to as a world? What is meant by groundlessness? Can groundlessness be experienced?

In this first chapter two goals are in the foreground. The first aim is to provide a profound and accessible introduction into the enactive approach. This will set the stage for the whole discussion. The second aim is to provide the conceptual tools required for applying the enactive approach to a description of the transition process from adaptive sense-making to knowing groundlessness. Thereby, this first chapter will provide the prerequisites for tackling the research questions in the second chapter of this thesis.

1.1 Autonomy and Emergence

The enactive approach has its point of departure in the ideas of autonomy and emergence. This is exemplified in Evan Thompson's following statement:

> [a]ccording to the Enactive Approach, the human mind emerges from self-organizing processes that tightly interconnect the brain, body, and environment at multiple levels. The key ideas on which this proposition is based are those of *autonomous systems* and *emergence* or *emergent processes.* (Thompson, 2007, p. 37)

Especially the role of autonomy in the enactive approach distinguishes it strikingly from other approaches in cognitive science. Again, in Thompson's words, "[a] distinctive feature of the enactive approach is the emphasis it gives to autonomy" (Thompson, 2007, p. 37).

At that point, the term *autonomy* is not to be understood in its conventional sense of independence or self-reliance. Instead, it signifies a particular feature of the way a cognitive system is organized. Accordingly, the emphasis on autonomy arises from a key question of the enactive approach: *how must a system be organized in order to be cognitive, i.e. to enact its own cognitive domain?* The answer of the enactive approach to this question is autonomy. Hence, autonomy is seen as crucial for understanding how a system can be cognitively related to the world (Thompson & Stapleton, 2009, pp. 23–24). Thereby, the concept of autonomy is the backbone of the enactive approach. However, what exactly is autonomy?

1.1.1 Autonomy

Generally speaking, *an autonomous process is a process through which a system generates and sustains its own activity and identity* (Thompson & Stapleton, 2009, p. 24). Thereby and with reference to complex systems theory, the term *autonomous* is understood in the enactive approach as referring to a generic type of organization (Thompson, 2007, p. 44).

This certain type of organization of an autonomous system becomes clear in contrast to a heteronomous system. While a heteronomous system is determined from the outside, an autonomous system is self-determining (Thompson, 2007, p. 37). A heteronomous system is "determined and controlled from the outside, in the realm of human design" (Thompson, 2007, p. 37). An autonomous system, on the other hand, "behaves as coherent, self-determining unity in its interactions with its environment" (Thompson, 2007, p. 37). This means that the state of a heteronomous system is completely in the hand of outside influence. What it does depends solely on what is done to it. In contrast, an autonomous system behaves completely different. Its state is not just determined by an outside influence but depends on the way it takes up this influence and integrates it into its own ongoing process of generating itself as an identity. This has major implications for the way such a system interacts with its environment. A heteronomous system operates in a classical input-processing-output manner. It takes up information from an outside world, processes it in a linear way and outputs the result back to the world. An autonomous system does not work like this. Instead of the input-processing-output scheme, its paradigm of interaction is closer to that one of a *dialogical conversation* (Thompson, 2007, p. 38; Varela, 1979, p. xii). The autonomous system and its environment mutually affect each other. They are meaningfully conceivable only together, inseparably.

This difference may yet be difficult to grasp completely but will hopefully become clearer as we will proceed further in this section. As the comprehension of this difference between heteronomy and autonomy is at the basis of the enactive approach, let us have a closer look on this particular phenomenon of autonomous organization.

Autonomy can be characterized in two ways, as “top-down” and as “bottom-up”. Both two approaches conceive autonomy as a *relational* property on system-level. This means that autonomy is not to be found in a particular location of the system but rather arises from the way all the parts of the whole system interact with each other and how this relates to the co-emerging whole. However, there is a marked difference between the top-down and bottom-up approach for characterizing autonomy. While the top-down approach describes the *type* of relational organization that is characteristic to autonomy, the bottom-up approach describes the “energetic and thermodynamic requirements for autonomy” (Thompson, 2007, p. 44). While the one is more abstract, formal, and generalizable, the other is more concrete and detailed (Thompson & Stapleton, 2009). Let us now have a closer look on those two approaches to autonomy.

The top-down approach to autonomy is taken by Francisco Varela in his 1979-book *Principles of Biological Autonomy* (as cited in Thompson, 2007). In this work, Varela equates autonomy with *organizational closure*: "[e]very autonomous system is organizationally closed" (as cited in Thompson, 2007, p. 48). This proposition is also called “Closure Thesis” (as cited in Thompson, 2007, p. 48) . Closure, however, does *not* refer to an autonomous system being independent or isolated of its environment in the sense that it would be thermodynamically or energetically closed. On the contrary, such an autonomous system needs to be thermodynamically open. This is the case as it is far from equilibrium and depends for its continuation on an ongoing exchange of matter and energy with its environment. Otherwise, it couldn’t sustain its activity and would fall apart (Thompson, 2007, p. 45).

In Varela’s later work, this term *organizational closure* has been renamed *operational closure* (Thompson, 2007, p. 44). Varela did not distinguish between the two and used those terms rather interchangeably (Thompson, 2007, p. 448). However, Thompson (2007) provided a distinct definition for each of the two terms. Despite their terminological difference, those definitions show their conceptual equation: “[o]rganizational closure refers to the self-referential (circular and recursive) network of relations that defines the system as a unity, and operational closure to the reentrant and recurrent dynamics of such a system” (Thompson, 2007, p. 45).

For the rest of this thesis, I will stick to the term “operational closure”. What exactly does this operational closure refer to? One way is to describe it in terms of the operations of those processes that constitute an autonomous system being a *whole*. Thereby, it is to emphasize that an autonomous system is constituted by interacting processes (e.g. neuronal firings in a group of neurons or metabolic reactions in a single cell) rather than by static entities (Thompson, 2007, p. 44).

Three conditions of these constitutive processes must be met in order to qualify the constituted system as autonomous. In an autonomous system, those constitutive processes (1) recursively depend on each other for producing and sustaining them as a network, (2) they constitute the system as a unity in whatever domain they exist (e.g. cellular or neural pattern), and (3) they determine

which kinds of interactions with the environment are possible (Thompson, 2007, p. 44; Thompson & Stapleton, 2009, p. 24; Varela, 1979, p. 55).

In other words, among the enabling conditions for any constitutive process in the autonomous system, there is always one or more other processes in the system. Every process in the system is conditioned by at least one other process of the system (De Jaegher & Di Paolo, 2007, p. 487). And taken together, all of those processes give rise to the system as a unity or a whole. There is no particular process or group of processes within the network that can be singled out for producing the whole.

Furthermore, this network of processes specifies how the whole autonomous system can relate to its surrounding environment. The system is not determined from the outside but all interactions with the environment are *structure-determined*. This means they are determined by the way the recursive network of relational processes is realized (Maturana & Varela, 1992, pp. 39–52). This last point is beautifully illustrated by Maturana & Varela (1992, pp. 51–52) in instancing the kind of autonomy that is realized in a single living cell: whenever a cell includes a molecule X into its processes, then the consequences are not determined by the molecule X but instead by the way the cell "views" the molecule X in including it. The consequence of this interaction with the environment is determined by the structure of the cell. This applies to every kind of autonomous system. The consequence of any interaction with the environment is determined by the particular way in which the autonomous system is realized through its recursively dependent constitutive processes.

This point concerning autonomous systems is important. It hints at the deep implications of taking this idea seriously and recognizing that we, as living beings, are ourselves autonomous systems interacting with an environment. Even in this moment of reading this sentence and, by that, of interacting with those characters, all that is encountered is only what the reader's constitutive processes enable to *count* as a world. They determine the set of possible interactions with the environment. This gives us a first taste of the deep implications of the enactive approach that are still ahead of us. We will have a look on this in a detailed manner in the section on sense-making (section 1.2) and in the section on the middle way and groundlessness (section 1.3).

Although the just presented top-down approach to autonomy is already sufficient for our purposes in this thesis, I will briefly highlight at this point also an alternative view to autonomy: the bottom-up approach.

The bottom-up approach to autonomy is taken by Ruiz-Mirazo & Moreno (2004). In this approach to autonomy, the question is not about the *type* of relational organization that is characteristic to autonomy. Rather, it is guided by the following question: what are the *thermodynamical requirements* for a system to generate and sustain its identity? This concrete question is to be answered case-by-case. Accordingly, Ruiz-Mirazo & Moreno (2004, p. 240) characterize basic autonomy in the following way:

> [t]his leads to the conception of basic autonomy […] as the capacity of a system to manage the flow of matter and energy through it so that it can, at the same time, regulate, modify, and control: (i) internal self-constructive processes and (ii) processes of exchange with the environment. Thus, the system must be able to generate and regenerate all the constraints—including part of its boundary conditions—that define it as such, together with its own particular way of interacting with the environment. This includes the capacity to manage the flow of matter and energy through it for regulating, modifying, and controlling". (Ruiz-Mirazo & Moreno, 2004, p. 240)

One important result of this line of research is that it precisely defines how physical constraints (e.g. thermodynamical requirements) make a living organism structure-determined. Therefore, research on this bottom-up approach suggests not to reduce autonomy to a substrate-independent formal view. Rather, it suggests to regard autonomy with respect to its material constraints (Di Paolo, 2005, p. 449).

Taking together the top-down approach and the bottom-up approach to autonomy, we can summarize that an autonomous system is a "thermodynamically open system with operational closure that actively generates and sustains its identity under precarious conditions" (Thompson & Stapleton, 2009, p. 24). What does *precarious* mean here?

The important term *precarious* refers to the notion that the system's constitutive processes tend to run down when the recursive organization of the system as a network of processes stops or dissolves (De Jaegher & Di Paolo, 2007, p. 487). Therefore, it once more emphasizes the recursive dependence of the constitutive processes. None of those exists independently in itself. They are precarious.

As *autonomy* refers here to a generic type of organization, according examples are manifold and diverse, for they cut across various levels of systems. They abound in the living world. Examples for autonomous systems are "single cells, microbial communities, nervous systems, immune systems, multicellular organisms, ecosystems" (Thompson, 2007, p. 46). Again, all of them are (1) generated and sustained by their recursively dependent constitutive processes, which (2) constitute them as unities. Moreover, (3) the affordances and constraints of their interactions with their respective environments are set by those constitutive processes. This is what makes all of them autonomous systems. At this point, let us have a closer look on how this is realized in some examples, beginning with the paradigm case of autonomy: the living cell.

In a living cell, the (1) constitutive processes are *chemical*. Those chemical metabolic reactions recursively depend on each other. This means that, in order to occur, one chemical metabolic reaction requires the products of other chemical metabolic reactions. For those other chemical metabolic reactions, the same applies so that they form an operationally closed network. Those reactions mutually depend on each other. By this, their whole network of relations (2) constitutes the living cell as a *unity* in the *biochemical domain*. Interestingly, this constitution of the living cell as a unity takes a special form as it not only involves an operational boundary between the system and its environment but even a *spatial boundary*. This spatial boundary is realized through the living

cell's membrane. That subclass of autonomy is called *autopoiesis*. Autopoiesis requires thereby the production and realization of a network of processes as a spatially bounded system (Thompson, 2007, pp. 97–101; Thompson & Stapleton, 2009, p. 24). Moreover, the way the constitutive processes bring forth the living cell as a unity (3) determines what kinds of interactions are possible with its environment. These processes set the domain for possible *structural couplings* (Thompson, 2007, pp. 46–47). In taking up the example of the "molecule X" from before, one can say that the interconnected web of self-generating biochemical processes determines the set of possibilities how the living cell can "view" the molecule X and how it can include it in its processes.

In taking the living cell as a paradigm case of autonomy, we can now contrast this realization of autonomy with the way autonomy is realized in several other domains. For this, let us have look on a detailed elaboration of such juxtaposition by Evan Thompson. Thereby, note that his reference to "bodily self" and "sensorimotor self" can here be read in terms of our preceding usage of the term of *unity*. It is the identity constituted through the recursive network of relational processes:

> [w]hereas autopoietic closure brings forth a minimal "bodily self' at the level of cellular metabolism, sensorimotor closure produces a "sensorimotor self" at the level of perception and action. In the one case the passage from network closure to selfhood (and correlative otherness) happens at the level of an active semipermeable boundary or membrane, which regulates interaction with the outside environment. In the other case it happens at the level of behavior and intentional action. In both cases we see the co-emergence of inside and outside, of selfhood and a correlative world or environment of otherness, through the generic mechanism of network closure (autonomy) and its physical embodiment (Varela 1997a; see also Moreno and Barandiaran 2004).
>
> In addition to these cellular and sensorimotor forms of selfhood, other forms of selfhood arise from other organizationally and operationally closed systems. The immune system, for instance-understood as an autonomous immune network that establishes a coherent somatic identity for the organism, rather than as a mere mechanism of defense-brings forth a dynamic, somatic identity at a distributed cellular and molecular level (Coutinho 2003; Varela and Coutinho 1991). The animate form of our living body is thus the place of intersection for numerous emergent patterns of selfhood and coupling. Whether cellular, somatic, sensorimotor, or neurocognitive, these patterns derive not from any homuncular self or agent inside the system organizing it or directing it, but from distributed networks with operational closure. In Varela's image, our organism is a meshwork of "selfless selves," and we are and live this meshwork (Varela 1991; Varela and Cohen 1989). (Thompson, 2007, pp. 48–49)

This passage illustrates various ways in which a unity can be constituted through an operationally closed network of constitutive processes. While autonomy in the case of a living cell or autopoietic system produces a *bodily unity*, the autonomy in the case of a sensorimotor system produces a *sensorimotor unity*. On the first glance, it may not be directly clear what a "sensorimotor unity" could refer to. Let us unpack this concept. While a bodily self may be easy to imagine as a body with boundaries which looks relatively stable for some time, we need a different image for the sensorimotor unity of the nervous system. This sensorimotor unity does not refer to a physical boundary but rather to a certain kind of *pattern* of interactions between neurons including sensory and effector neurons. In Evan Thompson's words again,

> any change of activity in a neuron (or neural assembly) always leads to a change of activity in other neurons (either directly through synaptic action or indirectly through intervening physical and chemical elements). Sensory and effector neurons are no exception because any change in the one leads to changes in the other, such that the network always closes back upon itself. (Thompson, 2007, p. 50)

In this, it is important to recognize that the set of interaction patterns available to the operationally closed nervous system is neither fixed nor arbitrary. Instead, it arises from its history of interactions with both, the rest of the body and the environment (Thompson, 2007, pp. 50–51). In contrast to the bodily unity that arises from autopoietic autonomy, the sensorimotor unity arises from a sensorimotor autonomy. It takes the form of certain patterns of behavior and actions.

A similar perspective applies to the autonomy realized in the immune system. Autonomy in the case of the immune system produces a coherent *somatic* identity. Rather than going into more detail of those different ways in which autonomy can be realized, it is sufficient for the purpose of this thesis to recognize that there are many levels of autonomy operating simultaneously in a living body. The living body is therefore a place of intersection for numerous patterns of *unity-making* or *identity-making*. Also, it is important to stress that all of this is not occurring by the means of an homuncular control center somewhere in this living body. Rather, it occurs through operational closure.

From this elaboration of autonomy, one crucial feature of an autonomous system is especially important in the context of this thesis: an autonomous system generates itself as a unity or *identity* (Varela, 1997).

With a focus on this identity-making, Varela's (1997) following proposition pointedly consolidates many of the aspects already mentioned before (except of "(d)" about *emergence* which we will address in detail in the next section):

> [p]roposition 1: Organisms are fundamentally a process of constitution of an identity.
>
> (a) By identity I intend here a unitary quality, a coherence of some kind. It is not meant as a static structural description (it is a process), nor as carrying a mentalistic or psychological connotations (it is identity in a generalized not a personalistic sense).
>
> (b) The nature of this process is always one of a operational closure (Varela, 1979), that is, a circular reflexive interlinking process, whose primary effect is its own production.
>
> (c) It is this operational closure which gives rise to an emergent or global coherence, without the need of a ''central controller,'' hence the identity I have in mind here is nonsubstantially localized, and yet perfectly able to generate interactions.
>
> (d) An essential key here is, of course, what we have recently learned about ''emergent'' properties in various complex systems.
>
> (e) Different organisms differ in the kinds of multifarious identity mechanisms they have, due to their unique evolutionary pathways. (Varela, 1997, p. 73)

To sum up, in an autonomous system, various mutually dependent processes actively produce and maintain an identity under precarious conditions. They do so, through their operational closure

(De Jaegher & Di Paolo, 2007, p. 487). This identity, however, is not reducible to its parts or its process. There is no localizable "control center" but mere self-organization.

This last point of self-organization prompts a crucial question *how* an autonomous system works: what is that *emergent* process through which an autonomous system as a whole is connected to the interaction of its parts? This question leads us to exploring the enactive understanding of emergence as *dynamic co-emergence* (cf. Thompson, 2007, p. 38).

1.1.2 Emergence

The term *emergence* is usually employed in order to describe the arising of collective patterns of behavior in complex systems, e.g. in cells, brains, ecosystems, and cities (Thompson, 2007, p. 38). In this, there is to notice that there are many different kinds of phenomena which are considered emergent. Accordingly, there are many epistemological and ontological criteria of emergence which are employed to classify whether a system is emergent or not (Thompson, 2007, p. 418). However, in relation to the previous section, we will here focus on one particular notion of emergence that is implicit in the idea auf autonomy. In that notion, emergence is closely related to self-organization and circular causality (Thompson, 2007, p. 38).

A formal definition of emergence which exhibits that self-organization and circular causality, can be found in complex systems theory as Thompson & Varela (2001, p. 420) show:

> Defn: A network, N, of interrelated components exhibits an emergent process, E, with emergent properties, P, if and only if:
>
> (1) E is a global process that instantiates P and arises from the nonlinear dynamics, D, of the local interactions of N's components.
>
> (2) E and P have a global-to-local ('downward') determinative influence on the dynamics D of the components of N.
>
> And (possibly):
>
> (3) E and P are not exhaustively determined by the intrinsic properties of the components of N, that is, they exhibit 'relational holism'. (Thompson & Varela, 2001, p. 420)

This definition suggests, although in an abstract and mathematical fashion, that emergence involves a reciprocal influence of both, a so-called *local-to-global determination* (or "bottom-up" process) and a so-called *global-to-local determination* (or "top-down" process) (Thompson, 2007, p. 38). This notion of emergence that involves not only local-to-global determination but also global-to-local determination is a central proposition in the enactive approach. Therefore, Evan Thompson emphasizes on this mutual determination through referring to emergence as *dynamic co-emergence*. Let us now unpack all these terms step by step, beginning with a quote by Evan Thompson:

> the whole arises not only from parts but the parts also arise from the whole. Part and whole co-emerge and mutually specify each other. A whole cannot be reduced to its parts, for the parts cannot be characterized independently of the whole; conversely, the parts cannot be reduced to the whole, for the whole cannot be characterized independently of the parts. (Thompson, 2007, p. 38)

This passage directs our attention to three basic propositions:

(1) the parts give rise to the whole;
(2) the whole gives rise to the parts;
(3) none of the two can be reduced to the respective other, they co-emerge.

These three propositions can be directly mapped to the already mentioned terminology:

(1) *local-to-global determination* refers to the first proposition that the parts give rise to the whole;
(2) *global-to-local determination* refers to the second proposition that the whole gives rise to the parts;
(3) *dynamic co-emergence* refers to the idea that both propositions apply simultaneously.

Taken together, this means that there is always a two-way relationship in self-organized emergence. On the one hand, there is *local-to-global determination* (or "upward causation") which gives rise to novel processes that have "their own features, lifetimes, and domains of interaction" (Thompson & Varela, 2001, p. 419). On the other hand, there is *global-to-local determination* (or "downward causation") through which "global characteristics of a system govern or constrain local interactions" (Thompson & Varela, 2001, p. 419).

Let us illustrate this abstract definition by taking up again the paradigm case of autonomy mentioned earlier: the living cell.

> Biological life, seen from the perspective of autopoiesis, provides a paradigm case of dynamic co-emergence. A minimal autopoietic whole emerges from the dynamic interdependence of a membrane boundary and an internal chemical reaction network. The membrane and reaction network (as well as the molecules that compose them) do not preexist as independent entities. Rather, they co-emerge through their integrative, metabolic relation to each other. They produce and constitute the whole, while the whole produces them and subordinates them to it. (Thompson, 2007, p. 65)

In other words, the mutual dependence between the metabolic reactions and the membrane (as the parts) give rise to the living cell (as a whole). However, the metabolic reactions and the membrane do not have existence independent of the whole living cell. Therefore, the living cell (as the whole) also gives rise to the metabolic reaction network and membrane (as the parts). Parts and whole co-emerge.

Although this example illustrates the notion of emergence in this context, it may not yet be entirely clear how emergent processes distinguish from those that are non-emergent. In complex systems science, two of those ways to distinguish emergence are outlined: non-linearity and non-decomposability.

The first way to distinguish emergent processes from non-emergent processes is to say that emergent processes exhibit non-linear interactions while non-emergent processes do not (Thompson, 2007, p. 419). According to this criterion, non-emergent systems follow linear interactions which means that they are "systems whose causal features derive from aggregating the properties of the components" (Thompson, 2007, p. 419). This means that in a non-emergent system the properties of the whole are simply a *sum of the properties of the parts*. Therefore, they are merely additive. In contrast, this is not the case for emergent systems. Emergent systems are based on non-linear interactions. Their features cannot simply be derived from the sum of the properties of the parts. In this way, the *sum is more than the parts*. That makes emergent systems non-additive. However, this criterion of non-linearity is not sufficient to account for the kind of co-emergence in autonomous systems. Autonomous systems, as we have seen previously, emerge from constituent processes which operate under operational closure. This means that every product of the network stays within this same network. This is the big difference between emergence in autonomous systems and many other examples of emergence cited in complex systems science: the emergent autonomous system is not merely a "formal identity through time but a formal self-identity" (Thompson, 2007, p. 420). Even more importantly, in autonomous systems this self-identity simultaneously emerges with a domain of possible interactions with the environment. In autonomous systems, a self-identity and a world *co*-emerge.

The second way to distinguish emergent from non-emergent processes is to say that emergent processes are non-decomposable whereas non-emergent processes are decomposable. This second criterion is especially useful in the context of autonomous systems. Let us have a look on this criterion of decomposability by differentiating four levels: (1) decomposable, (2) nearly decomposable, (3) minimally decomposable, and (4) non-decomposable (Thompson, 2007, p. 420).

(1) *Decomposable* and thus non-emergent system are strictly hierarchical in their organization. This kind of system matches our description of a heteronomous system in contrast to an autonomous one. Such a decomposable system can be unproblematically segmented into various modules as its components operate according to their respectively own principles independent of all the other components (Thompson, 2007, p. 420).

(2) *Nearly decomposable* systems, on the other hand, are those systems in which there is not only a bottom-up influence but also some sort of top-down effect or feedback. In those systems higher levels interact with lower levels (Thompson, 2007, p. 420).

(3) *Minimally decomposable* systems follow the same principle as nearly decomposable systems but with a stronger influence from top-down processes: the more component properties are determined by feedback from higher levels, the less decomposable the system is which reaches its low point in minimally decomposable systems. Therefore,

a minimally decomposable system is less governed by intrinsic principles but more by the whole system's organization (Thompson, 2007, p. 420).

(4) In *non-decomposable* systems "the connectivity and interrelatedness of the components give rise to global processes that subsume the components so that they are no longer clearly separable" (Thompson, 2007, p. 420). For such non-decomposable systems, Evan Thompson interestingly concludes a momentous impossibility to separate the system into modules: "[i]n such a system, the distinction between preexisting parts and supervening whole becomes problematic. Not only does the whole emerge from the components, but also the components emerge from the whole" (Thompson, 2007, p. 420). This is an important feature of non-decomposable systems: the parts and the whole cannot be distinguished in a meaningful way. This is even more important as we recognize that it applies to all autonomous systems including ourselves:

> [a]n autonomous system is at least minimally decomposable, if not nondecomposable. More precisely, when one adopts an autonomy perspective, one ipso facto characterizes the system as at least minimally decomposable. The reason is that an autonomous system is an organizationally and operationally closed network; hence it is the connectivity of its constituent processes that determines its operation as a network. (Thompson, 2007, p. 421)

Therefore, the view of living systems as autonomous systems has serious implications for our self-understanding. This view provides an alternative to locating various cognitive functions to separate modules of the brain (e.g. visual cortex, amygdala etc.). What if the brain is an autonomous system and thus non-decomposable or at least minimally decomposable?

This view of the brain as an autonomous system vividly illustrates the diversity of implications that the enactive approach brings to cognitive science. Besides a few exceptions, the brain is organized according the *principle of reciprocity*: "if area A connects to area B, then there are reciprocal connections from B to A" (Varela, Lachaux, Rodriguez, & Martinerie, 2001, p. 230). However, traditional neuroscience proceeds from here in treating the brain as a nearly decomposable system on which it maps a hierarchy of processing levels. By this and despite the principle of reciprocity, the sensory end is regarded as the starting point. Perception is seen as a bottom-up processing through several stages. Top-down processes from higher levels take thereby the role of backpropagation or feedback to lower levels. In contrast, the enactive dynamicist viewpoint does not assume such a process hierarchy. Also, the sensory end is not regarded as the starting point. Instead, "brain processes are always ongoing and do not start or stop anywhere" (Thompson, 2007, p. 421). Accordingly, a better starting point would be the brain's own activity, such as "preparation, expectation, emotional tone, and attention, which are necessarily active at the same time as the sensory inflow" (Varela et al., 2001, p. 230). Thereby, it is important not to confuse it with the kind of top-down feedback that we find in traditional neuroscience. Rather, the focus is on the large-scale network as a whole that integrates incoming and endogenous activity. In Varela et al.'s words,

"[b]ottom-up and top-down are heuristic terms for what is in reality a large-scale network that integrates both incoming and endogenous activity" (Varela et al., 2001, p. 230).

This brain example beautifully illustrates what applies to every kind of autonomous system, no matter in which domain: *dynamic co-emergence*. By taking this understanding of emergence as a kind of dynamic co-emergence seriously, the enactive approach rejects the search for the localization of specific cognitive acts in the brain or somewhere else. Also, it rejects boxology as a legitimate method for investigating the processes behind certain mental acts (De Jaegher & Di Paolo, 2007).

Moreover, this view of autonomous systems as non-decomposable or at least as minimally decomposable underpins the crucial notion of dynamic co-emergence which is relevant to the enactive approach: there is both, local-to-global determination and global-to-local determination. While the aspect of local-to-global determination in emergent processes might seem natural and relatively easy to accept, their aspect of global-to-local determination, however, is still "less frequently discussed" (Thompson & Varela, 2001, p. 419) or even confused with mere top-down control as mentioned before. Therefore, I will focus here on the notion of global-to-local determination. It is helpful to do so for the specific domain of co-emergence between neural networks and consciousness. To put this as a question, what is the efficacious role of consciousness to neural activity?

Let us start to tackle this question with the help of a quote by Thompson & Varela (2001):

> [w]e propose that there are two-way or reciprocal relationships between neural events and conscious activity. An attractive feature of this proposal is that it allows consciousness to be a causally efficacious participant in the cycles of operation constituting the agent's life. (Thompson & Varela, 2001, p. 425)

This quote brings it to the point. This notion of dynamic co-emergence allows for the view that consciousness is causally efficacious. How does the enactive approach come to this conclusion?

When compared with most of the traditional neuroscientific approaches to consciousness, enactive cognitive science takes a different approach to consciousness. Instead of assuming a one-way causality from local neural activity to consciousness, the enactive approach proposes a two-way reciprocal relationship: local neural activity and consciousness determine each other in a reciprocal (but not in a symmetrical) way (Thompson & Varela, 2001). This assumption is well expressed by Thompson & Varela (2001):

> [g]iven that the coupled dynamics of brain, body and environment exhibit self-organization and emergent processes at multiple levels, and that emergence involves both upward and downward causation, it seems **legitimate to conjecture that downward causation occurs at multiple levels in these systems, including that of conscious cognitive acts in relation to local neural activity**. Indeed, this point has been noted by authors concerned with the dynamical systems approach to cognition. (Thompson & Varela, 2001, p. 421, emphasis added)

This means that consciousness emerges from local neural activity but is not reducible to it. Instead of being just an epiphenomenal effect of the brain, consciousness has also an effect on the local neural activity from which it emerges. However, such efficacious role goes beyond mere top-down processes from higher levels to lower levels as in the traditional neuroscientific notion of a hierarchically organized brain. Also, in the case of consciousness and neural activity, to speak of top-down effects and bottom-up effects (even of downward causation and upward causation) might be misleading[1] (cf. Thompson, 2007, p. 426). Rather, what we find is conscious cognitive acts being a global characteristic co-emerging in relation to local neural activity.

Therefore, consciousness as an emerging global process must have its *global-to-local* determining effect on neural activity. It does so through constraining behavioral alternatives of neurons in their interaction with each other.

Consciousness is thereby, from the perspective of the enactive approach, no epiphenomenal side issue but a global process inseparable from but not reducible to local neural activity. In the process of dynamic co-emergence, consciousness gains its own characteristics and its way of limiting local neural activity. Hence, consciousness is seen as causally efficacious in the operations of the cognitive agent. This is an important view and will be of major interest for the exploration of how a cognitive agent can affect its mode of sense-making.

In summary, autonomous systems exhibit dynamic co-emergence. By means of their non-decomposability (or at least minimal decomposability), a two-way relationship between the parts and the whole arises. In local-to-global determination the parts give arise to the whole with its own features and domains of interaction. In global.to-local determination those global characteristics of the whole constrain local interactions. Neither the parts nor the whole exist independently. They co-dependently emerge.

1.2 Sense-making

1.2.1 From Autonomy to Sense-making

As we have seen in the previous section, autonomous systems involve dynamic co-emergence which includes both, local-to-global determination and global-to-local determination. In other words, "[a]utonomy is not a property of a collection of components, but the consequence of a new identity that arises out of dynamical processes in precarious operational closure" (Di Paolo et al.,

[1] Evan Thompson elaborates on the argument that the terms "downward causation" and "upward causation" are misleading: "[i]t is questionable whether this metaphor is a good one. Although there are clearly empirical differences in scale and logical differences in order between the topology of a system and its constituent processes and element, the two levels do not move in parallel, with one acting upward and the other acting downward, because the whole system moves at once. […] From this perspective, the term downward-causation is symptomatic of a partial recognition of system causation together than inability to shift completely to a system-causation perspective" (Thompson, 2007, pp. 426–427).

2010, p. 40). As this new identity arises, it gains an efficacious role on the processes on the local level of the components. The components and the identity co-emerge.

However, there is something more to autonomous systems: their constitutive processes determine the domain of possible interactions with the system's environment. This is crucial and links autonomous organization to cognition and *sense-making*. There is an entanglement between a system's organization constituting an identity and its interaction with its environment on the basis of enacted meaning (Varela, 1997).

This relation between autonomy (as identity-making) and cognition (as sense-making) is clearly expressed in Varela's (1997) following second proposition:

> [p]roposition 2: The organism's emergent identity gives, logically and mechanistically, the point of reference for a domain of interactions.
>
> (a) The living identities are produced by some manner of closure, but what is produced is an emerging interactive level. The interactions have relevance and consequences for the unitary identity, although mechanistically all interactions occur both at component level and unity's level.
>
> (b) The configurations of a level of interaction for the entire unit creates a perspective from which an interaction can occur. In other words, this is the source for informational, intentional, or semantic values to all living organisms.
>
> (c) This entails that living systems bring forth significance: organisms are autonomous, not heteronomously directed. (Varela, 1997, pp. 73–74)

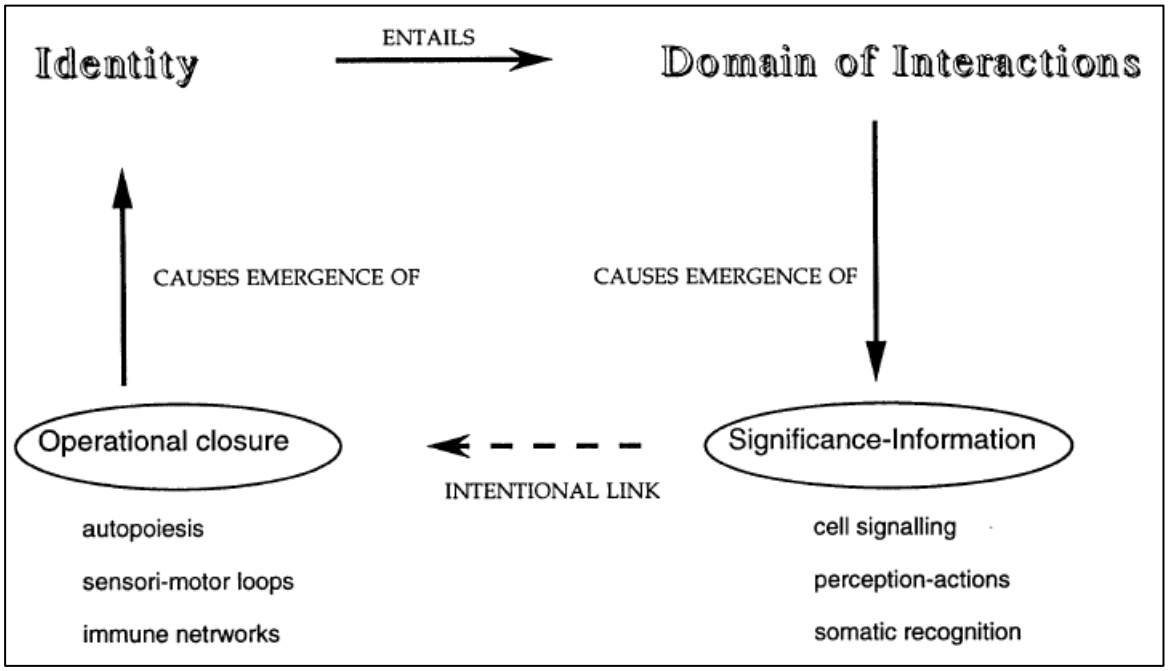

Figure 2. Illustration of the interrelation between the two key concepts "autonomy" and "sense-making". Reprinted from "Patterns of Life: Intertwining Identity and Cognition", by F. J. Varela, 1997, *Brain and Cognition*, *34,* p.74. Copyright 1997 by Academic Press.

The crucial interwovenness between autonomy and sense-making needs to be emphasized. The two propositions by Varela (1997) taken together, say that, (1) an organism is fundamentally an identity-producing process based on autopoiesis/autonomy, and (2) this identity establishes a

reference point for sense-making and an according domain of interactions (Varela, 1997). Those two propositions in relation with each other are illustrated in figure 1. The operational closure on the bottom left corner of the image gives rise to an autonomous system as an identity (upper left corner). This autonomous identity is thereby the reference point for any interactions with the environment as the constituent processes determine the domain of possible interactions (upper right corner). Finally, this domain of possible interactions sets what *counts* as significant for the autonomous system (bottom right corner). Therefore, there is a link from what is experienced by the system as a significant world to the way the autonomous organization of the system is realized.

In other words, an autonomous system generates and sustains its identity. By doing so, it establishes a perspective from which interactions with the world gain normativity: some interactions help for continuing the organism's autonomy, other interactions with the environment endanger it. This is the basis for all regulating activity of interactions with the environment. Therefore, autonomy is the root of sense-making and thereby of cognition.

1.2.2 Sense-making as the Core of Cognition

Sense-making is how an organism, based on the characteristics of its individuation activity, makes meaning and constitutes a world of significance for itself. In the enactive approach, cognition is exactly this creation and appreciation of meaning. Cognition is sense-making (Di Paolo et al., 2010, pp. 39–40).

In this way and as already shown, autonomy is deeply related to sense-making as it gives rise to a *reference point* or *perspective* to which interactions with the environment gain significance. Especially important at this point are the autonomy-perspective link and the perspective-normativity link. Together they lead to a deep connectivity between autonomy and normativity. This is another way to say that autonomous organization and cognition are deeply related. Thompson & Stapleton (2009) bring this to the point: "[s]ense-making is the interactional and relational side of autonomy. An autonomous system produces and sustains its own identity in precarious conditions and *thereby establishes a perspective* from which *interactions with the world acquire a normative status*" (Thompson & Stapleton, 2009, p. 25, emphasis added). In other words, the deep relation between autonomous organization and sense-making is realized via the *perspective* or *point of view* that autonomy provides.

This makes clear that all cognition (of phase 1 enaction at least) is deeply related to the *interaction* with the environment against the backdrop of a system's autonomy. To put it another way, with autonomy an identity arises; with an identity a perspective arises; with a perspective norms of good, bad, and irrelevant arise; with norms regulations of interactions arise; with the regulation of interactions autonomy is maintained (cf. Figure 3). Thus, this is not a chain of events but an interconnected network of co-arising processes from which sense-making emerges.

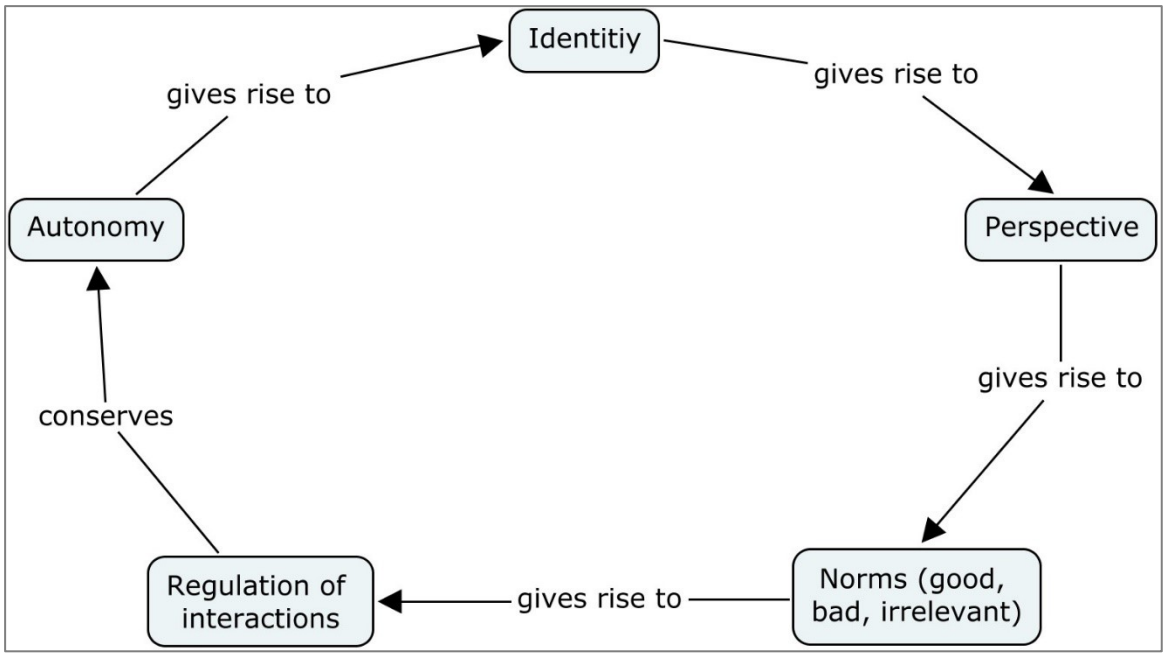

Figure 3. The circular relation between autonomy and sense-making via the perspectivity that is provided through autonomous organization.

This sense-making is at the heart of cognition: "[c]ognition is sense-making in interaction: the regulation of coupling with respect to norms established by the self-constituted identity that gives rise to such regulation in order to conserve itself" (Di Paolo, 2009, p. 19).

Therefore, cognition is not problem-solving based on representations. Instead, cognition is to enact a world of significance with respect to the norms that come along with the perspective of an autonomous system aiming at maintaining its identity. And moreover, cognition is also *acting* on this basis. This means that it regulates its interactions with the environment in order to continuously fulfill its aim of maintaining its identity.

This is exactly what Varela et al. (1991) pointed at in their definition of cognition as *embodied action*. The term "embodied" refers to "having a body with various sensorimotor capacities" which are in turn "embedded in a more encompassing biological, psychological, and cultural context" (Varela et al., 1991, p. 173). Therefore, to understand cognition as "embodied" means here to emphasize that every cognitive act occurs against the backdrop of the system's organization as being a living autonomous body. As specified by Varela et al. (1991) in the previous quote, cognition is not only relating back to the living body as a sensorimotor autonomy. Moreover, it also relates back to the living body as the intersection of numerous patterns of autonomous organization, including the biological, psychological and social domain. The term "action", in their definition of cognition emphasizes the notion that "sensory and motor processes, perception and action, are fundamentally inseparable in lived cognition" (Varela et al., 1991, p. 173). This might be at first a bit surprising. However, it is nothing else than to say that a world of significance is brought forth

through the *action* of the autonomous system as a whole. A world "out there" is not passively perceived by the system "in here". Rather, whatever the system encounters as a world is enacted in relation to its own activity as a self-sustaining autonomous system.

To summarize, an autonomous system constitutes an identity via its operational closure. This identity determines what sustains it, what endangers it, and what is irrelevant to it. Accordingly, with this identity norms are established. On the basis of those norms the couplings with the environment are regulated by the autonomous system. This is how the enactive approach arrives at the proposition that cognition is sense-making on basis of autonomy.

Let us take this as a point of departure for stressing the *relationality* of this concept. In cognition, an autonomous system enacts a world of significance. Furthermore, it regulates its interactions with the environment in order to continuously fulfill its aim of maintaining its identity.

However, in stating the "aim of maintaining its identity" this is of many kinds because the living body is a "place of intersection for numerous emergent patterns of selfhood and coupling". Those patterns include cellular, somatic, sensorimotor, and neurocognitive autonomy (Thompson, 2007, p. 49). Therefore, this comes along with a multitude of aims concerning the maintenance of identities (Di Paolo, 2009, p. 19). On every level of autonomy, sense-making is *relational*.

> As relational in this strict sense, cognition has no location. It simply makes no sense to point to chunks of matter and space and speak of containment within a cognitive system. Inspect a baby all you want and you'll never find out whether she's a twin. (Di Paolo, 2009, p. 19)

This is saying that meaning is "not to be found in elements belonging to the environment or in the internal dynamics of the agent, but belongs to the relational domain established between the two" (Di Paolo et al., 2010, p. 40). Therefore, cognition or sense-making is not in the brain "in here". It is not in the world "out there". Rather, it is relational and has therefore no location. From the enactive point of view, this non-localizable relational enaction of meaning is at the very heart of cognition (phase 1 enaction).

Due to this notion of the relatedness between autonomy and sense-making, the enactive approach regards even the simplest living organisms as cognitive. This becomes obvious with the paradigm example of the enactive approach: sense-making in bacteria. Motile bacteria usually tumble around until they come upon a trace of sucrose. Then they change their behavior. They start swimming up-gradient the sucrose level towards the area of highest sucrose concentration (Di Paolo, 2005, p. 437; Thompson & Stapleton, 2009, pp. 24–25; Varela, 1997, p. 79). At that point, it is to emphasize that the significance and valence is obviously not intrinsic to sucrose. Rather, sucrose gains its significance *for* the bacteria only in relation to the way the bacteria is autonomously organized (Thompson & Stapleton, 2009, pp. 24–25). This example illustrates that even the simplest living beings such as motile bacteria regulate their interactions with their environment. They regulate those interactions in such a way that they transform their surrounding world into a

place of meaning and value, into an environment or *Umwelt* (Thompson & Stapleton, 2009, p. 25). While the term "*world*" refers here to the physical surrounding of a living being in the sense of an "objective" state of the surroundings, "*environment"* or *"Umwelt*" refers to what the living organism *experiences* as its surroundings. It is where significance and valence exist. In this sense, the *world* is inaccessible in principle to the living being whereas the *environment* is what the living organism continuously enacts and lives in.

Based on this enactment of an environment as a place of meaning, sense-making is also the *behavior* in relation to the environmental significance. Sense-making is therefore an inherently active concept. Organisms do not passively take information from their surrounding world and process them as mental representations. They are simply not in the business of accessing the world in order to build accurate images of it (De Jaegher & Di Paolo, 2007, p. 488). Instead, living organisms actively participate in generating meaning. Through their autonomy, they enact significance on their world and transform it accordingly into an environment of meaning and valence. They regulate their couplings with their environment because they aim at the continuity of the self-generated identity. This initiates the regulation (De Jaegher & Di Paolo, 2007; Varela, 1997). Therefore, organisms establish a perspective on the world with its own normativity. This means that some interactions are experienced as good, others as bad, and the rest as irrelevant to its continuous self-generation. Accordingly, sense-making is always a relational and even *affect-laden* process on the basis of biological autonomous organization (De Jaegher & Di Paolo, 2007, p. 488).

In closing this general discussion of sense-making, let us come back to autonomy and relate it to sense-making once again. The relation between autonomy and sense-making is shortly summarized in Francisco Varela's statement "living is sense-making" (Varela, 1997; Weber & Varela, 2002). This so-called *deep continuity of life and mind* pointedly elaborated by Thompson (2007, p. 158). It is subdivided into the following five propositions.

(1) *Life is autopoiesis and cognition*. Every living being is also a cognitive being.[2]

(2) *Autopoiesis entails the emergence of a bodily self*: through its autonomy and operational closure, an autopoietic system produces itself in form of a living body.

(3) *Emergence of a bodily self entails emergence of a world*: the emergence of a bodily self necessarily involves the co-emergence of an environment, a domain of interactions with the world. The self and the world co-emerge and arise together inseparably.

(4) *Emergence of a bodily self and a world = sense-making*: what the system experiences as its environment is the sense it makes of the world. As the result of the system's global action, the environment is a place of significance and valence.

(5) *Sense-making = enaction*: significance and valence do not pre-exist out there but are enacted and constituted by living beings (Thompson, 2007, p. 158)

[2] Here Thompson (2007) uses "autopoiesis" widely to include cognition and adaptivity. This is important to note as we will later see that it takes not only autopoiesis (or rather autonomy) but also adaptivity for a living being to be cognitive.

Such understanding of sense-making and its deep continuity to autonomy has paved the way for turning now to the conditions of sense-making: what are the necessary and sufficient conditions for sense-making to arise? Is autonomy sufficient? This will lead us to the next crucial concept required for encountering the research questions in chapter 2: adaptivity.

1.2.3 Conditions for Sense-making

As we have already seen, sense-making means to enact an environment of significance based on the autonomy of the organism. Also, this is closely linked to the autonomous organism *regulating* its structural coupling with the enacted environment. What are the conditions for such sense-making to arise?

In this section we are going to have a look on the two conditions for sense-making: autonomy and adaptivity. First, we turn to autonomy as a necessary condition for sense-making. As we already addressed autonomy at length, I will focus here specifically on a particular argument why autonomy and not autopoiesis is necessary for sense-making. Second, we turn to another necessary condition for sense-making as proposed by Di Paolo (2005) and taken up by Thompson (2007) among others: *adaptivity*.

Necessary Condition 1: Autonomy vs Autopoiesis

Autopoiesis is a subclass of autonomy. All autopoietic systems are autonomous but not all autonomous systems are autopoietic. Autopoietic systems realize the operational closure in the biochemical domain and realize themselves as *spatially* bounded systems. Therefore, the following question is posed. Is this spatial boundary of autopoietic systems needed for sense-making or is the more general operational closure of autonomous systems already the crucial bridge to sense-making and thus to cognition?

The answer to this question strongly depends on the framing of autopoiesis. In this passage, Thompson elaborates whether autopoiesis entails cognition:

> [i]f autopoiesis is taken narrowly to mean internal self-production of the minimal sort that does not involve active interaction with the outside environment, then autopoiesis is not sufficient for cognition. But if autopoiesis is taken more widely to mean internal self-production sufficient for constructive and interactive processes in relation to the environment, then autopoiesis does entail cognition. (Thompson, 2007, pp. 126–127)

Rather than juxtaposing autonomy with autopoiesis, this passage asks about the sufficiency of autopoiesis for cognition. However, it illustrates the notion of what type of organization is required for cognition. The system has to be organized in a way that is sufficient for constructive and interactive processes to arise in relation with the environment. Accordingly, the preceding elaboration of autonomy has shown that autonomy can already include the determination of a domain of possible interactions. It may already come along with the enaction of significance. Therefore, in the

enactive approach, autonomy is already the crucial bridge to cognition. It does not require autopoiesis: "[t]hus it is adaptive autonomy that grounds the deep continuity of life and mind (Thompson 2007) and not autopoiesis as such" (Thompson & Stapleton, 2009, p. 25).

Therefore, "[w]hat is required is not autopoiesis but adaptive autonomy." (Thompson & Stapleton, 2009, p. 25). Accordingly, for sense-making autopoiesis is not required but mere autonomy is not sufficient. Rather, it requires a specific sort of autonomy: *adaptive* autonomy. This *adaptivity* can be regarded as the second condition for sense-making.

Necessary Condition 2: Adaptivity

In their classical framing of autopoiesis, Maturana & Varela (1980) explicitly identified living systems with machines and rejected the idea that autopoiesis involves anything teleological (Thompson, 2004, pp. 391–392, 2007, p. 146): "[l]iving systems, as physical autopoietic machines, are purposeless systems" (Maturana & Varela, 1980, p. 86).

However, Varela revised his view in one of his last articles, co-authored with Andreas Weber. They argue that autopoiesis comprises two complementary modes of immanent purposiveness – identity and sense-making(Thompson, 2007, p. 146; Weber & Varela, 2002):

> [i]n other words by putting at the center the autonomy of even the minimal cellular organism we inescapably find an intrinsic teleology in two complementary modes. First, a basic purpose in the maintenance of its own **identity**, an affirmation of life. Second, directly emerging from the aspect of concern to affirm life, a **sense-creation** purpose whence meaning comes to its surrounding, introducing a difference between environment (the physical impacts it receives), and world (how that environment is evaluated from the point of view established by maintaining an identity). (Weber & Varela, 2002, p. 117, emphasis added)

In this paragraph, Weber and Varela propose two kinds of intrinsic purpose in living systems. First, autopoiesis (but also autonomy in general) includes the *generation and sustainment of a dynamic identity* despite the constant material change going on in its surroundings and in itself (Thompson, 2007, p. 146). Second, an autopoietic (or autonomous) system makes sense of the world with the result that it remains viable. Sense-making transforms the physical world into an environment of significance and valence. In Thompson's words, "[s]ense-making is intentionality in its minimal and original biological form" (Thompson, 2007, p. 147).

In thematizing this type of teleology within the discourse of autopoiesis and autonomy, Weber & Varela (2002) reintroduced meaning, value, and subjectivity into the natural sciences:

> if we accept autopoiesis as embodied teleology, we reintroduce the subject into biology. The separation of the realm of pure natural science from the realm of values, so popular since neokantianism (Rickert 1920), has to be abandoned; instead a theory of embodied meaning has to be reintroduced into the science of the living, paying central attention to categories as value and subjectivity. By defining itself and thereby creating the domains of self and world, the organism creates a perspective which changes the world from a neutral place to an Umwelt that always means something in

> relation to the organism. Organisms can be said to transcend the neutrality of pure physics and to create their concern. Only this organic perspective actually has the status of "world," only this is real, because the living can only act in the form of such an intentional world. Life is thus always subjective in the strong sense of the word. (Weber & Varela, 2002, pp. 117–118)

From this point of view, the immanent purposiveness of living organisms is due to being alive. Living organisms do not live in the neutral physiochemical world. They don't have access to it. They transcend it. By defining themselves, they create a perspective from which this world is transformed into an environment of significance and meaning *to* the organism. Note here that Weber & Varela (2002) stress a deep relation between *autopoiesis* and sense-making. Against the backdrop of our previous discussion in which we concluded that autonomy (and moreover a specific kind thereof) is needed instead of autopoiesis, we can replace autopoiesis in this conception by the term *autonomy*.

However, there is also a deeper issue about this claim that autopoiesis (and autonomy in general) is sufficient for sense-making and intrinsic purposiveness. In an important article on the relation between autopoiesis and sense-making, Di Paolo (2005) challenged some aspects of this view and influentially contributed a second condition for sense-making: adaptivity.

Di Paolo (2005) argues that while autopoiesis is sufficient for the immanent purposiveness of identity-making (teleology in the first sense), it is not sufficient for the immanent projective purposiveness of sense-making (Di Paolo, 2005, pp. 433–434). He arrives at this conclusion through convincingly juxtaposing what autopoiesis[3] implies and what sense-making requires. Let us have a closer look on this argument by Di Paolo (2005).

Autopoiesis can only provide an *all-or-nothing conservation* of identity. An autopoietic system maintains its identity via material exchange and perturbations from the environment (Di Paolo, 2005; Thompson & Stapleton, 2009). In contrast, sense-making, on the other hand, requires an active regulation of the interactions with the surrounding environment. Therefore, it requires the enactment of *graded norms* of vitality (e.g. health, fatigue). Only those graded norms enable the system to actively regulate its activity for improving the viability conditions of its autonomy (Di Paolo, 2005).

However, such improvement of the viability conditions of self-production is not included in the definition of autopoiesis. This is the important gap between autopoiesis and sense-making. Autopoiesis in the sense of identity-conservation cannot provide this necessary condition of sense-making. Sense-making rather requires the capability to monitor and regulate the organism's internal processes so that the organism can generate the necessary responses. Only then, such autopoietic

[3] It is important to note that Di Paolo (2005) refers in this argument to autopoiesis, as also Weber & Varela (2002) did. However, against the backdrop of the preceding perspective that autonomy is needed and not autopoiesis as such, all the following references to autopoiesis in this context can be generalized to all forms of autonomy.

organism can appreciate the graded differences between otherwise equally viable states. Only then, it can enact *normativity* for itself within its range of possible conditions that are viable to it (Di Paolo, 2005):

> [i]f sense-making requires the acquisition of 'a valence which is dual at its basis: attraction or rejection, approach or escape' (Weber and Varela 2002, p. 117), a sense-making system requires, apart from the norm given by self-construction, access to how it currently stands against the all-or-nothing barrier given by that norm. (Di Paolo, 2005, p. 438)

In order to close this gap between what autopoiesis can provide and what sense-making requires, Di Paolo (2005) introduces the term *adaptivity*. Adaptivity covers exactly this second necessary condition for sense-making. In this, he emphasizes that making adaptivity an explicit second condition is "not simply an *addendum* but is essential (together with autopoiesis) to naturalize sense-making" (Di Paolo, 2005, p. 430). Let us now have a closer look on this second essential condition for sense-making. What exactly is *adaptivity*?

Adaptivity refers to the "capacity of an organism to regulate itself with respect to the boundaries of its own viability" (Di Paolo, 2005, p. 430). This means that an organism can avoid risky situations and can seek those that are preferable for its survival. In order to facilitate such sense-making, an adaptive-autonomous system must be able to (1) recognize the tendencies which relate it to a potential loss of its viability; this can be called *self-monitoring*; furthermore, it must be able to (2) (re-)act appropriately on those tendencies; this can be called *appropriate regulation*. Those are the two core elements of adaptivity which differentiate a merely autonomous system from one that is autonomous *and* sense-making (Di Paolo, 2005, pp. 437–439).

To conclude, sense-making requires both, autonomy and adaptivity. Autonomy provides an identity that is the center of a perspective. It does so by a precarious network of processes which generate an "either-or" normative condition. Adaptivity allows the organism to appreciate its encounters with respect to this "either-or" normative condition in a graded manner. It does so while it is still alive. This twofold condition of sense-making in autonomy and adaptivity is not only an interesting point but is moreover crucial for the synthesis in chapter 2. We will see how adaptivity is central for deriving how a cognitive system can transition from a mode of sense-making into a mode of *knowing groundlessness*. This leads us to the next crucial idea necessary for tackling the research questions in chapter 2: the middle way and groundlessness.

1.3 The Middle Way and Groundlessness

1.3.1 A Middle Way Between Realism and Idealism

What is at the basis of the ideas of autonomy, emergence, and sense-making? Interestingly, all those ideas have something in common. They comprise a notion of co-dependent arising: whatever there is springs from a dynamic of relations without substantial ground.

In *autonomy* and *dynamic co-emergence* there is no identity (whole) without the constitutive processes (parts) interacting with each other. Also, there are no constitutive processes (parts) without the identity (whole). The whole emerges from the parts and the parts emerge from the whole. Neither the parts nor the whole have substantial ground. Furthermore, the same applies to the *process* that connects the parts and the whole. It is a relational process of co-emergent autonomy between parts and whole which itself has no substantial ground either. It is likewise dependent of the parts and of the whole.

In *sense-making* the identity of the living organism co-emerges with the world of significance. Neither the embodied organism nor the world is pregiven. None of the two has substantial ground. They co-define each other. Furthermore, the same applies to the sense-making *process* that connects the embodied organism and the world. It is a relational process between the organism and the world. By this sense-making has itself no substantial ground. It is likewise dependent of the organism and the world.

In this, the enactive approach takes an interesting position that is unique in the landscape of paradigms in cognitive science: an explicit perspective of a *middle way* that is neither realist nor idealist. Let us spend here some time to unpack those notions of realism and idealism while contrasting them with the middle way of the enactive approach.

If cognition is sense-making or the enaction of meaning, we may ask what exactly this means with regard to the "location" of meaning: where does meaning originate? A middle way response to this question is beautifully illustrated by Varela et al. (1991) for the exemplary domain of vision while it is to be generalized to cognition at large. This illustration asks about the origination of meaning: what comes first, the world or the image?

As potential replies, Varela et al. (1991) distinguish two positions with which they contrast their middle way position. In reference to the so-called chicken-egg problem, they call those positions the "chicken position" and the "egg position".

The "chicken position" refers to a realist stance. This position includes the assumption that the world is out there and has pregiven properties. Those pregiven properties exist prior to the image. The cognitive system's task is to appropriately recover those properties. In short, the world is first, the cognitive system is second. This position appears very reasonable and it might seem that there is only one alternative, the "egg position" (Varela et al., 1991).

The "egg position" refers to an idealist stance. This position includes the assumption that the cognitive system projects its *own* world. The cognitive system exists prior to the world. The apparent reality is merely a reflection of what goes on in this system. In short, the cognitive system is first, the world is second (Varela et al., 1991, p. 172).

Varela et al. (1991) reject these two positions and suggest instead a *middle way*. In close link to the mentioned vision domain, they illustrate this view by the example of color vision. Contrary to the "chicken" view (realism or objectivism), color is not out there, independent of our perceptual

and cognitive capacities. Rather, color categories are *experiential* (Varela et al., 1991, p. 172). Contrary to the "egg" view (idealism or subjectivism), color is not in here, independent of our surrounding biological and cultural world. Rather, color categories belong to our shared biological and cultural world (Varela et al., 1991, p. 172). Therefore, "chicken and egg, world and perceiver, specify each other" (Varela et al., 1991, p. 172). This is the view of the middle way.

This mutual specification paves the way for a "middle path between the Scylla of cognition as the recovery of a pregiven outer world (realism) and the Charybdis of cognition as the projection of a pregiven inner world (idealism)" (Varela et al., 1991, p. 172). Both two positions build on representation. In the first case, representation is used to recover what is outside. In the second case, representation is used to project what is inside. However, the enactive approach intends to "bypass entirely this logical geography of inner versus outer by studying cognition not as recovery or projection but as embodied action" (Varela et al., 1991, p. 172). *Therefore, cognition is in its core to make actively sense of a world which is not pregiven but just what is knowable and known to the sense organs of the cognizing living system*.

Accordingly, the enacted world is always in relation to the way the living body is organized to maintain its identity. Neither is there a pregiven world out there to be recovered by a subject, nor is there a pregiven subject projecting its own world (Varela et al., 1991, pp. 172–173). Instead and as already mentioned, the enactive approach proposes a middle way: *groundlessness* (*śūnyatā*). Whatever there is springs from a dynamic of relations, dialogically, without substantial ground.

1.3.2 Enaction and its Consequences for Dualist Views

This position of the middle way comes along with a view about several otherwise unquestioned dualisms. Thereby, its rejection of dualistic notions on various levels is an important feature of the enactive approach:

> [t]he notion of 'enaction' becomes the central metaphor for expressing, in the field of cognitive science, a fruitful circularity at the heart of cybernetic dialectics, the role of a conceptual bridge for three main dualisms haunting the (post-)Cartesian metaphysics: self-world, self-body, and self-other. (Vörös & Bitbol, 2017, p.35)

This quote contributes a useful scaffold for exploring in detail some implications of the enactive view on common dualisms. What is an enactive response to the three dualisms of mind-world ("self-world"), mind-body ("self-body"), and self-other?

Dualism 1: mind-world

In the *mind-world dualism,* a world is assumed that is out there to be represented. The enactive view breaks with this inner-outer dualism as it takes the idea of embodiment very seriously. It relates the body to notions of autonomy and the generation of an identity. As we have seen, the way

in which an organism is realized in its dynamic autonomy determines the domain of possible interactions with the environment. The embodied mind and the world co-emerge. None of the two has substantial existence in its own. Whatever we encounter as a world is never separate from what we do. The world is not "out there" but enacted. It is always in relation to a sense-making and the inner dynamic of the observing and cognizing organism. In this co-dependence of the mind and the world, Varela et al. (1991) see a major challenge posed to cognitive science. It is required "to question one of the more entrenched assumptions of our scientific heritage—that the world is independent of the knower" (Varela et al., 1991, p. 150). As Varela et al. (1991) continue, they emphasize on this point of co-dependent arising between mind and world:

> [i]f we are forced to admit that cognition cannot be properly understood without common sense, and that common sense is none other than our bodily and social history, then the inevitable conclusion is that knower and known, mind and world, stand in relation to each other through mutual specification or dependent coorigination. (Varela et al., 1991, p. 150)

This passage shows very pointedly that the enactive view is inherently connected to leaving behind any notion of a mind-world dualism. To underpin this view, the oft-cited quote by Merleau-Ponty serves as an apt poietic summary: "[t]he world is inseparable from the subject, but from a subject which is nothing but a project of the world, and the subject is inseparable from the world, but from a world which the subject itself projects" (Merleau-Ponty, 2002, pp. 499–500).

In other words, there is no mind-world dualism anymore. But how is this relevant to cognitive science? Varela et al. (1991) reply to this question with the bold statement that "scientific progress in understanding cognition will not be forthcoming unless we start from a different basis from the idea of a pregiven world that exists "out there" and is internally recovered in a representation" (Varela et al., 1991, p. 150). Therefore, to let go of the mind-world dualism is of utmost importance in order for cognitive science to progress.

To summarize this enactive view on the mind-world dualism in Varela's words, "[t]he mind is not in the head; Cognition is enactively embodied co-determination of inner/outer" (Varela, 1999, p. 74).

Dualism 2: mind-body

Dynamic co-emergence implies that there is both, local-to-global determination and global-to-local determination. The parts and the whole co-emerge. In understanding the neural elements giving rise to cognition (through local-to-global determination), we need to be aware that cognition also gives rise to the neural elements (through global-to-local determination). Therefore, experience or consciousness is not an epiphenomenon. Consciousness has an efficacious role on the neural level (Thompson & Varela, 2001; Varela, 2002).

Accordingly, the enactive approach gains an interesting and even surprising insight into the classic philosophical mind-body problem. Classically, the mind-body problem is phrased by

Thomas Nagel as follows: [i]f mental processes are indeed physical processes, then there is something it is like, intrinsically, to undergo certain physical processes. What it is for such a thing to be the case remains a mystery (Nagel, 1974, pp. 445–446).

In taking the mentioned conception of dynamic co-emergence very seriously, the enactive approach reveals the original formulation of the mind-body problem as problematic. The explanatory gap is articulated as being between two opposed reified ontologies, "the mental" and "the physical". This framing restricts the diversity of possible responses to only two options: either mechanizing consciousness in order to reduce it to the brain or being a property dualist. From an enactive point of view and in the light of dynamic co-emergence, the physical and the mental are inseparable. The *physical living body* is always also a *lived body* (Thompson, 2004). Therefore, the radical embodiment reformulation of the mind-body problem is the so-called "body-body problem": "[w]hat is it for a physical living body (Körper/ leiblicher Körper) to be also a lived body (Leib/ körperlicher Leib)?" (Thompson, 2004, p. 384). With respect to this enactive view on the mind-body relation, two points are especially important to be emphasized:

> [f]irst, the gap is no longer between two radically different ontologies (mental and physical), but between two types within one typology of embodiment. Second, the gap is no longer absolute because in order to formulate it we need to make common reference to life or living being. (Thompson, 2007, p. 237)

Furthermore, this reformulation of the mind-body problem points towards an implication for methodology in cognitive science. It hints at *neurophenomenology* as a methodological remedy to the *hard problem of consciousness*. It does so as third-person methods alone are insufficient for overcoming the gap between the physical living body and the experiential lived body (Thompson, 2004). Therefore, phenomenology is methodologically important (Di Paolo et al., 2010, p. 45). It provides the required detailed and rigorous first-person descriptions. To the extent to which those first-person descriptions are mutually constraining with third-person investigations of cognitive science, the approach can be called neurophenomenological.

To summarize this enactive view on the mind-body dualism, neither the body nor the mind has intrinsic existence. Instead, "[c]ognition is enactively emergent co-determination of neural elements (local) and cognitive subject (global)" (Varela, 1999, p. 79).

Dualism 3: self-other

The enactive approach includes the view that cognition is not in the individual but deeply embedded in its biological and cultural environment. The operationally closed network that gives

rise to an autonomous system can extend beyond the brain or skin. In this way, the enactive approach is explicitly non-internalist[4] (Thompson & Stapleton, 2009, p. 25). Moreover, the social dimension of sense-making is to be emphasized. In this regard, De Jaegher & Di Paolo (2007) provided an enactive account of social cognition. It builds on the idea of *participatory sense-making*: sense-making is not an individual internal business but a distributed social matter.

To summarize this enactive view on the self-other dualism in Varela's words, "[t]his mind is that mind; Cognition is generatively enactive co-determination of Me-Other" (Varela, 1999, p. 81).

In conclusion of this exploration of the enactive view on the three different dualisms between the mind and the world, the mind and the body, and the mind and other's minds, we can see that the enactive approach goes beyond those dualistic views. It does so via its appreciation of co-dependent origination. This points to an important aspect of the enactive approach: groundlessness. However, this groundlessness is often confused with nihilism and regarded as a dangerous concept. Therefore, before exploring groundlessness in detail, the next section is devoted to cast a light on this objection against groundlessness.

1.3.3 The Danger of Misunderstanding Groundlessness

In its proposal for a middle way (cf. section 1.3.1) and in its nondualist stance (cf. section 1.3.2), the enactive approach exhibits a notion of "codependent arising" (Varela et al., 1991, pp. 220–221). This codependent arising is what the Buddhist Madhyamika school refers to as *śūnyatā* (Sanskrit) which is often translated as *emptiness* or *groundlessness*. Therefore, it is worthwhile to dive deeper into what groundlessness refers to or rather not refers to. However, before we go here into deeper implications of groundlessness, one remark needs to be made concerning potential dangers of dealing with the idea of groundlessness. Is this idea of groundlessness dangerous? If so, why?

In short, groundlessness can be easily misunderstood. Getting it right is liberating, getting it wrong is dangerous. Let me explain why this is the case. What we here referred to as the enactive approach argues with some precision that everything we encounter in our daily life is not as substantially existing as it may appear. Although we hold it for substantially and independently existent, it is rather plausible that it is necessarily dependently arisen. All appearances lack any foundation, whether inner or outer.

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[4] While being a non-internalist stance, the enactive approach is also explicitly *non-externalist*. This is an important difference between the enactive approach and the extended mind thesis: "externalists often accept the assumption that what goes on entirely inside the head provides a paradigm of what is a cognitive process, such that if factors outside the head can be shown to have a comparable or equivalent status (e.g., by playing the same role in the production of behaviour), then those external factors count as part of the cognitive process. (This is the so-called parity principle introduced by Clark and Chalmers 1998). The enactive approach does not accept these assumptions" (Thompson & Stapleton, 2009, pp. 25–26).

First, there is *no inner ground*. The self is a bodily identity arisen through an autonomous organization process. As a process of dynamic co-emergence, there is no executive center of control that guides the behavior of the parts. Instead, it is a self-organization of parts which interact in a way that they give rise to a whole, e.g. to the identity of a body. This whole in turn simultaneously gives rise to the parts. Accordingly, the self that we habitually hold for independently existing, lacks any foundation.

Second, there is *no outer ground*. The world that we encounter in any moment of our life is arisen in a sense-making activity with relation to us as self-organized autonomous systems. As we have seen, those self-organized systems lack any foundation. Furthermore, everything that is enacted in a process of sense-making is always in relation to the observing organism's autonomous organization. What therefore counts as significant and valent is inseparable from how the autonomy of the living organism is realized. Accordingly, the world, which we habitually hold for independently existing, lacks any foundation as well.

This twofold groundlessness has implications. A careful reader may raise the question on the consequences of groundlessness: "Does groundlessness mean that everything is just an illusion, and nothing really exists?" Such a confusion of the idea behind groundlessness with the concluded proposition that everything would be empty or illusory hints directly at the danger of misunderstanding groundlessness.

The mentioned beliefs in an inner or outer ground seem to be so deeply entrenched in our sense-making habits that we tend to overlook them. They are relegated to the blind spot. Moreover, it seems that it is habitually just not seen as being an option to question an inner or outer ground. However, when those beliefs are thematized and even questioned, we may initially lose orientation and certainty. This is one effect the enactive approach can have. It questions those beliefs in an inner and outer ground without providing an alternative foundation where to hang one's hat. By this, the enactive approach exhibits groundlessness. Exactly this groundlessness makes up for the big potential of the enactive approach for disorienting a reader in his or her current beliefs.

We can now turn again to the question concerning illusions: "if seemingly every foundation is questioned in the enactive approach, is then everything just an illusion?" According to the middle way, the assumption that everything is an illusion is merely another act of grasping. It is a grasping after a "factual" absence of a substantial ground. Therefore, the Madhyamika school proposes to reject this too, which differentiates it from a *nihilist* position (Varela et al., 1991, pp. 225–226).

What is nihilism and in what is the middle way different from it? Friedrich Nietzsche defined radical nihilism as "the conviction of an absolute untenability of existence when it comes to the highest values that one recognizes" (as cited in Varela, Thompson, & Rosch, 2017, p. 128). While the nihilist looks through the illusory character of an inner and outer ground, she is unable to let go of the habitual tendency to cling to such a ground:

> [t]he nihilist sees through the illusion of a real, independent self that would grasp a real, independent world, but he cannot find another way to be or live without the illusion. More generally, the nihilist sees that there is no absolute ground of meaning—for example, that meaning cannot be grounded on a transcendent God or a real, inner self—but he cannot find another way to be or live without the desire for such a ground. Eventually the nihilist mistakenly (and incoherently) concludes that even meaning is an illusion and that everything is really meaningless. (Thompson, 2017, p. xx)

With regard to the teachings on groundlessness, the Madhyamika tradition has recognized such a danger of falling into the "pitfall of nihilism". Therefore, the Madhyamika tradition "continually strived to distinguish rigorously between the groundlessness of nihilism and the groundlessness of the middle way" (Varela et al., 2017, p. 239). However, its founder Nāgārjuna acknowledged that a misunderstanding of this teaching on groundlessness could mislead towards a nihilist position. Therefore, with this danger in mind, Nāgārjuna recommended to not teach śūnyatā to everyone: "[e]mptiness misunderstood destroys the slow-witted, like a serpent wrongly held or a spell wrongly executed" (Mūlamadhyamakakārikā, chapter 24, verse 11; cf. translation by Siderits & Katsura, 2013, p. 274).

To their translation of this passage by Nāgārjuna, Siderits & Katsura (2013) added an interesting elaboration of this risk to teach groundlessness to the "slow-witted" in reference to Candrakīrti, an important Indian philosopher and Buddhist scholar from the 7th century CE: "Candrakīrti discusses two ways in which the "slow-witted" can go astray. The first involves seeing emptiness as the nonexistence of all conditioned things, while the second involves supposing that emptiness is a really existing thing with a real locus" (Siderits & Katsura, 2013, p. 274).

While the first way involves a nihilist reaction to emptiness or groundlessness, the second involves an absolutist reaction to groundlessness. The contrast between groundlessness and nihilism as well as the contrast between groundlessness and absolutism will be explored in more detail in the next section. For now, let us focus on the evaluation of such a risk for nihilism in the teaching on groundlessness.

While Nāgārjuna's warning was probably directed to a specific audience in a specific cultural context, it may require a re-evaluation for our current situation. The societal context in South India around the 2nd century CE was probably quite different from the current situation in which we find ourselves in Western societies of the 21st century. One difference is that nihilism has become a common issue:

> [t]o appreciate the resources offered by these other traditions, however, we must not lose sight of the specificity of our present situation. Whereas in Buddhism, as anywhere else, there is always the danger of individuals experiencing nihilism (losing heart, as it is called in Buddhism) or of commentators straying into nihilistic errors of interpretation, nihilism has never become full blown or embodied in societal institutions. Today nihilism is a tangible issue not only for our Western culture but for the planet as a whole. And yet as we have seen throughout this book, the groundlessness of the middle way in Mahayana Buddhism offers considerable resources for human experience in our present scientific culture. (Varela et al., 2017, p. 238)

In this passage, Varela et al. (1991, 2017) emphasize two important points. First, nihilism has become tangible and entrenched in societal institutions. Second, Mahayana and specifically the Madhyamika philosophy can help out as it provides a middle way.

Not only that it applies to general societal life, such nihilism finds also access to big parts of scientific life in cognitive science. Thompson (2015) for example describes a growing nihilist tendency in neuroscience and neurophilosophy. He argues that in those fields the realization that the brain is not inhabited by a substantial self increasingly led to a nihilist conclusion that "there is no self whatsoever and that our sense of self is a complete illusion" (Thompson, 2015, p. 322). He calls this tendency "neuro-nihilism":

> [n]euro-nihilism assumes that were the self to exist, it would have to be an independently real thing or indivisible entity. The problem is that there is no such thing or entity in the brain. So, if it seems to us that we have or are an independently real self, then our sense of self must be an illusion created by our brain. (Thompson, 2015, p. 322)

This form of nihilism insists on the role of the brain in creating illusions of the self or the world. That scientific discourse takes up a nihilist position. This is especially relevant regarding the influence that science has on the beliefs held in the general society. Thereby, science plays an important role in providing or removing foundations. As Hilary Putnam points out, "[s]cience is wonderful at destroying metaphysical answers, but incapable of providing substitute ones. Science takes away foundations without providing a replacement" (as cited in Varela et al., 1991, p. 218).

Accordingly, a nihilist tendency is already manifest in contemporary Western cultures. Moreover, such tendencies are even reinforced through the influence of science which removes foundations without substituting them. Therefore, we are in a situation in which we need to learn to live without such foundations. Varela et al. (1991) make a similar point: "our historical situation requires not only that we give up philosophical foundationalism but that we learn to live in a world without foundations" (Varela et al., 1991, p. 218).

Therefore, as the situation has changed, it is reasonable and even our responsibility to thematize groundlessness for a general public. It is important to counteract nihilist tendencies by a deep understanding of groundlessness. Therefore, it is necessary to place this topic of groundlessness at the center of cognitive science.

1.3.4 Groundlessness: The Deeper Message in the Enactive Approach

Groundlessness has already been present throughout the various parts of our exploration of the enactive approach. For example, the middle way between realism and idealism (chicken-egg metaphor) expresses this idea of groundlessness and marks a nondualist stance. The dualist separation between subject and object is incoherent. Accordingly, the enactive stance on the mind-world dualism ("dualism 1"; cf. 1.3.2) includes a rejection of an inner ground and of an outer ground. All of this communicates a hint towards groundlessness: whatever there is springs from a dynamic of

relations, without substantial ground. However, this "idea of groundlessness" shall not be just another foundation we can cling to. As Varela et al. put it, "[i]ndeed, most of Western philosophy has been concerned with the issue of where an ultimate ground is to be found, not with calling into question or becoming mindful of this very tendency to cling to a ground" (Varela et al., 1991, p. 144).

This exact tendency to cling to a ground can even pertain the idea of groundlessness itself. It shines through when groundlessness is seen as a "better" foundation. This exemplifies a misunderstanding of groundlessness. Instead, let us question the tendency itself of clinging to a ground. This is at the core of the enactive approach. As Varela et al. point out, "[e]nactive cognitive science and, in a certain sense, contemporary Western pragmatism require that we confront the lack of ultimate foundations" (Varela et al., 1991, p. 233).

This theme of questioning an ultimate ground is of major relevance to the enactive approach and to progress in cognitive science in general. Furthermore, it is at the center of this thesis' research question. Therefore, it is worth being elaborated in more detail at this point. What does this very special concept "groundlessness" refer to? As we are going to see, it may be rather appropriate to talk in terms of negations about groundlessness. Thereby, the more precise question may be "what does groundlessness *not* refer to"?

While *śūnyatā* (Sanskrit) or groundlessness can be paraphrased as co-dependent arising, Francisco Varela employed a vital plethora of terms to express this idea: ""co-emerging," "co-arising," "coimplication," "co-determination" […], "mutual determination," "circulation," being "engaged in a "non-dual relationship," and "mutually constrain[ing]"" (Vörös & Bitbol, 2017, p. 35). For expressing this idea in the context of the enactive approach, Varela et al. (1991) found inspiration in the Buddhist teachings by Nāgārjuna, an Indian philosopher who lived around 200 C.E. in Southern India. Out of his writings, the highly influential Buddhist school of *Madhyamika* evolved. Especially important for the Madhyamika school is the Sanskrit term *śūnyatā*, oft-translated as emptiness. We will here use the term "groundlessness" as a proper translation. In short, groundlessness refers to the idea that nothing has own independent existence:

> [s]unyata literally means "emptiness" (sometimes misleadingly translated as "the void" or "voidness"). In the Tibetan tradition, it is said that sunyata may be expounded from three perspectives—sunyata with respect to codependent arising, sunyata with respect to compassion, and sunyata with respect to naturalness. It is the first of these, sunyata with respect to codependent arising, that most naturally fits with the logic we have been exploring in the discovery of groundlessness and its relationship to cognitive science and the concept of enaction. (Varela et al., 1991, pp. 221–222)

With this being said, one has to keep in mind that śūnyatā does *not* mean that "things are nonexistent in an absolute way any more than to say that they are existent" (Varela et al., 1991, p. 223). Instead, things codependently originate without any foundation or ground.[5]

However, usually one does not experience the world as groundless. Rather it is experienced as solid and independently existing. Why is this? According to Madhyamika philosophy, we do not experience groundlessness because of a habitual tendency to grasp.

Grasping is a central theme in Madhyamika philosophy. Grasping is regarded as the motivation and pattern behind the attempt to find a ground. This grasping causes evitable problems. In this regard, Varela et al. (1991) pointed out that "our grasping after a ground, whether inner or outer, is the deep source of frustration and anxiety" (Varela et al., 1991, p. 143). Accordingly, when the source of frustration and anxiety is to be found in grasping then the investigation into this topic has big ethical value as it may enable to find ways for reducing this tendency to grasp.

Regarding this tendency to grasp after grounds, the Madhyamika school can contribute two important insights. First, it recognizes the search for an ultimate ground, the so-called *project of foundationalism*. This search for an ultimate ground is not limited to the notion of an ego-self or subject. Rather, it also includes the notion of a pregiven world. While in the first case one grasps after an inner ground, in the second case one grasps after an outer ground. Therefore, any ground is deeply related to grasping (Varela et al., 1991, pp. 143–144).

Second, Madhyamika recognizes the link between absolutism and nihilism. Although, they may appear to be completely contrary, they share the same root. Both, absolutism and nihilism are recognized as forms of grasping. Based on this *theoretical-philosophical* insight, some specific forms of awareness meditation are developed to gain direct and stable insight into absolutism and nihilism *as* forms of grasping (Varela et al., 1991, p. 144).

Initially, the grasping mind leads to search for an absolute ground which has its own substantial existence, whether inner or outer, and is the foundation for everything else. Therefore, the grasping mind can be regarded as the root of absolutism (Varela et al., 1991, p. 143). After it could not find an absolute ground the grasping mind clings to the *absence* of an absolute ground and regards everything else as an illusion. Therefore, the grasping mind can be regarded as the root of nihilism (Varela et al., 1991, p. 143). Thereby, it is recommended to not cling to groundlessness. Otherwise, groundlessness simply turns into just another thing we cling to as a ground.

This shows that the root of absolutism as well as of nihilism is a tendency to grasp. Thereby, it is an issue of what we directly do, not only what we philosophize about. Here we talk about an

[5] It is important to notice that one has to be cautious with such positive descriptions of śūnyatā as they may lead to confusing the concept of śūnyatā as something that would refer to something positively. Rather, it is necessary to see that this codependent origination must be applied to the *idea* of codependent origination itself. Therefore, the accounts of śūnyatā here (and not only of śūnyatā) are, per definition, ultimately wrong. However, they might be relatively useful.

embodied action of grasping that is for most of us a persistent habitual pattern. Moreover, what is of utmost importance is that the mere philosophical insight of an absence of grounds is simply not enough. It simply leads to nihilism when we do not also *practice* letting go of grasping. This means to let go of a deeply entrenched embodied-cognitive habit. This necessity is exemplified by Varela et al. (1991) in the following quote that has been already mentioned: "[b]y progressively learning to let go of these tendencies to grasp, one can begin to appreciate that all phenomena are free of any absolute ground and that such 'groundlessness' (śūnyatā) is the very fabric of dependent coorigination" (Varela et al., 1991, p. 144).

Accordingly, in groundlessness the aspect of *habitual* grasping is crucial. In the following passage Evan Thompson elaborates such a habitual grasping with the example of clinging to the self:

> [t]he problem, however, according to Madhyamaka and Buddhism more generally, is that **we don't usually experience our self this way—as a dependently arising process**. Instead, we habitually experience our self as if it were a unified agent that functions as the executive controller of what we think and do, and that has a permanent inner essence distinct from our changing mental and physical characteristics. **In this way, we're deluded about our nature. Our root error is to mistake something that's dependent and contingent—and hence "empty" of substantiality—for something that's independently existent.**
> Nāgārjuna compares our fundamental cognitive error with the images in a dream, mirage, or magical performance. Just as these images exist in one way—as illusory—yet appear to exist in another way—as real objects of perception, so the self exists as dependently arisen, yet appears to exist as independently real with its own inner essence. Notice that the point of the analogy isn't that there is no self at all and that any sense of self is completely mistaken. After all, dreams exist as genuine experiential phenomena, yet they lack the independent being that we take them to have when we do not realize we're dreaming. Similarly, we habitually experience our self as if it were an independently real entity when in fact it doesn't exist in that way or have that kind of being. Instead, it exists as dependently arisen and hence as empty of any independent reality. **The deep and penetrating experiential realization of this truth is like becoming lucid in a dream or waking up from the dream**—the subject of experience still exists but is no longer deluded about its nature. (Thompson, 2015, pp. 323–324, emphasis added)

For the purposes of this thesis two points are especially important. First, it is to emphasize the dissonance between the self and the world being empty of substantial independent existence on the one hand and our delusion about them as we habitually take them as independently existent. Second, the dream metaphor is useful to illustrate that the realization of the self and the world as dependently arisen and empty of substantiality does not remove something that has actually been there. Instead, we become aware that it has always already been this way. We become lucid in the dream and the dream is still there, but we know that it is a dream and *not* some actually independent reality. Furthermore, while taking up the dream metaphor, it is important to distinguish between dreaming *about* what it is like to become lucid and *actually* becoming lucid. In the first case one remains non-lucid and within the dream. In the second case one deeply realizes that it is a dream. This is an important difference. The realization of "knowing groundlessness" (recognizing phase 2

enaction; recognizing nondual knowing) refers to the second case. It is the *actual* noticing, not just a conceptual philosophizing *about* it (as I necessarily do in this thesis right now). Accordingly, to write about this issue of groundlessness *in* language (which naturally constrains us to "factual" statements) makes it remain a part of the "dreaming". We explore how it would be to notice the nondual nature of the mind while we *actually* remain in a subject-object duality. Everything else is beyond the scope of this thesis. However, remaining aware of this is crucial for not mistakenly taking the pointer as the thing pointed at.

This crucial difference between the *philosophizing about* groundlessness and the *direct experience* thereof is pointedly stated also by Varela et al. (1991):

> all of our activities depend on a background that can never be pinned down with any sense of ultimate solidity and finality. Groundlessness, then, is to be found not in some far off, philosophically abstruse analysis but in everyday experience. (Varela et al., 1991, p. 144)

This brings it to the point. Groundlessness is to be found not in intellectual, theoretical analysis but in *actual direct experience*. Varela et al. (1991) emphasize on this distinction between groundlessness in theoretical analysis and groundlessness in direct experience also in reference to the situation in Western science and Western philosophy:

> [w]estern science and philosophy have brought us to the point where we are faced with, in the words of the philosopher Hilary Putnam, "the impossibility of imagining what credible 'foundations' might look like," but they have not provided any way for us to develop direct and personal insight into the groundlessness of our own experience. Philosophers may think that this task is unnecessary, but this is largely because Western philosophy has been more concerned with the rational understanding of life and mind than with the relevance of a pragmatic method for transforming human experience. (Varela et al., 1991, pp. 217–218)

Exactly this is the challenge for contemporary modern cognitive science: finding a pragmatic method for transforming human experience. It builds on the insight that we need to look at *śūnyatā* or groundlessness not only from a philosophical point of view as an interesting idea. Rather, we need to acknowledge that groundlessness can be directly experienced. Therefore, we need to keep in mind that this also applies to every statement of the enactive approach: when saying that mind and world are not separate from each other but co-dependently arising, this may be taken as merely an aesthetical theoretical statement which we feel comfortable with. However, its deeper impact is realized when recognizing that this statement definitely is an insight that can be *directly experienced.*

This acknowledgment is a very important point. It is the crucial point of departure for this thesis: groundlessness is not just another abstruse philosophical concept. Instead, it is something experiential. Moreover, it is not only possible but even of utmost importance to experience and to learn to live with groundlessness. In Varela et al.'s (1991) words, "our historical situation requires

not only that we give up philosophical foundationalism but that we learn to live in a world without foundations" (Varela et al., 1991, p. 218).

Additionally, this is nicely put by Thompson (2004) in his statement on Varela's view on the role of direct experience:

> he never lost sight of this point that the mind–body problem is not only a philosophical problem, or a scientific problem, but also a problem of direct experience. The problem could be put this way. It's one thing to have a scientific representation of the mind as "enactive" – as embodied, emergent, dynamic, and relational; as not homuncular and skull-bound; and thus in a certain sense insubstantial. But it's another thing to have a corresponding direct experience of this nature of the mind in one's own first-person case. (Thompson, 2004, p. 382)

This passage by Evan Thompson brings to the point what kind of enactive approach I wish to take in this thesis: it is not enough to theoretically or scientifically conceive of the mind as "enactive" and insubstantial. Rather, I hold that a genuine enactive approach which unfolds much more of its potential is one that includes an emphasized pointer to that kind of direct experience into the mind as "enactive" and insubstantial. It is not only theoretical and descriptive but moreover instructive, educational, and pragmatic. Such an enactive approach that actualizes its full potential encourages readers to explore their minds in their own direct experience. Again, a theoretical understanding of the mind as enactive and groundless is not enough. A direct experience into the mind as enactive and groundless is required.

Therefore, practicing to let go of grasping and to directly experience the world as groundless is not only possible but important. This importance is even more the case for those who explicitly operate with the *theoretical idea* of groundlessness which brings with it an increased risk of falling into nihilism (cf. 1.3.3) This, of course, applies especially to the enactive approach.

In addressing this issue and thereby in order to appreciate that all phenomena are free of any absolute ground (including the enactive approach itself and the *concept* of groundlessness), Varela et al. (1991) emphasized, the need to practice a certain kind of "mindfulness/awareness". In this kind of practice, practitioners increasingly let go of tendencies to grasp. In this, they develop a direct and stable insight into forms of grasping and into attempts to find a stable ego-self or stable world. Here, it is to note that Varela et al. (1991) wrote this before the "mindfulness boom". Thereby, they refer to mindfulness in a slightly different way than the mindfulness movement of the last two decades did (cf. Thompson, 2017). However, while seeing "mindfulness/awareness" in close relation to nondualist forms of Buddhist practice, Varela et al. (1991) emphasize in the following previously mentioned quote the relation between such practice and moments of directly "knowing groundlessness": "[b]y progressively learning to let go of these tendencies to grasp, one can begin to appreciate that all phenomena are free of any absolute ground and that such 'groundlessness' (śūnyatā) is the very fabric of dependent coorigination" (Varela et al., 1991, p. 144).

Moreover, they equally emphasize that such appreciation of all phenomena as groundless is not something to be forced or grasped. As quoted earlier, it is rather held to be a "natural discovery that one would make by oneself with sufficient mindfulness/awareness—natural but shocking" (Varela et al., 1991, p. 225).

Let us now summarize those elaborations on groundlessness so far in the following four propositions.

(1) *Groundlessness is theoretically central for the enactive approach and for understanding cognition*. The ideas of the enactive approach (autonomy, emergence, sense-making, etc.) all taken together, show that the world and ourselves are dependently arising processes. They lack any substantial ground.

(2) *This groundlessness is in dissonance with our usual experience of the world and of ourselves*. Usually, we grasp for foundations, even me myself in writing those sentences as if they would point towards a truth out there that is independently existing.

(3) *But groundlessness can be directly lived in one's own experience*. There are practices (e.g. mindfulness/awareness) through which practitioners unlearn and let go of their tendency to grasp. This enables direct experiences of groundlessness.

(4) *Knowing groundlessness seems to be a mode of knowing that is different from usual cognition or sense-making*.[6] As this last point is at the center of the research questions of this thesis, let us have a preliminary look on it, already here. In the following already mentioned quote, Varela et al. (1991) provided a hint to groundlessness as being an alternative mode of knowing: "[k]nowing śūnyatā (more accurately knowing the world as śūnyatā) is surely not an intentional act. Rather (to use traditional imagery), it is like a reflection in a mirror—pure, brilliant, but with no additional reality apart from itself" (Varela et al., 1991, p. 225).

This insight is crucial. It refers to groundlessness as a form of knowing different from adaptive sense-making. This is analogous to the difference between phase 1 enaction and phase 2 enaction that we addressed earlier. All this points to the possibility of a form of knowing which is not intentional, not about anything. Thereby, it lacks any distinction between subject and object. It is nondual. The knowing knows itself without making it an object of its knowing process. We will tackle two questions concerning this nondual form of knowing:

(1) How can this knowing be described from within the rest of the terminological repertoire provided by the enactive approach?

(2) What happens in a moment of transition from a mode of adaptive sense-making (dual knowing) to a mode of "knowing groundlessness" (recognizing nondual knowing)?

[6] Knowing groundlessness is different from sense-making only from a point of view of "relative truth". From the perspective of "ultimate truth" there is no difference. Both two are mind: empty luminosity.

Those two questions concerning nondual knowing address a relevant point in certain Buddhist traditions and their respective philosophy and meditation. Furthermore, they are highly relevant for expanding the enactive approach to a form of knowing that has been mentioned preliminarily (e.g. phase 2 enaction; Rosch, 2017) but not yet elaborated to its full potential (to my current knowledge).

Therefore, the goal of the following chapter 2 is to utilize the rich conceptual repertoire of the contemporary enactive approach for describing the directly embodied process of a transition from an adaptive sense-making (*phase 1 enaction; dual knowing*) to momentarily embodying the mode of knowing groundlessness (*recognizing phase 2 enaction; recognizing nondual knowing*).

In bringing this chapter to a close, I wish to emphasize on an important point about the enactive approach and apply it to a brief evaluation of what this thesis can provide and what is out of its capacity. The enactive approach is *theoretical*:

> [e]nactive cognitive science and, in a certain sense, contemporary Western pragmatism require that we confront the lack of ultimate foundations. Both, while challenging theoretical foundations, wish to affirm the everyday lived world. **Enactive cognitive science and pragmatism, however, are both theoretical; neither offers insight into how we are to live in a world without foundations**. (Varela et al., 1991, p. 234, emphasis added)

As the enactive approach is theoretical, so is this thesis as well. The aim of this thesis is to provide a *theoretical* framework of what is happening in a moment of transition from the lived experience of usual sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing). Therefore, it can only suggest a theoretical notion of a nondual form of knowing while a direct lived experience, and thereby an actual knowing and understanding of it remain out of its possibilities. Such a direct potential insight would require a direct practice, as for example certain Buddhist traditions suggest with certain nondual forms of meditation. However, for the purpose of this thesis, we will constrain our exploration to a theoretical extension of the enactive approach to knowing groundlessness.

2 The Transition from Sense-making to Knowing Groundlessness

The main goal of this thesis is to describe the transition from adaptive sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing). In this we encounter three elements: (1) adaptive sense-making as the point of departure, (2) knowing groundlessness as the point of arrival, and (3) the transition process between the two.

Of those three elements, adaptive sense-making is the one we already explored at length in chapter 1. In contrast, *knowing groundlessness is yet to be explored*. A description of knowing groundlessness in relation to the whole enactive terminology (i.e. sense-making, adaptivity etc.) is to be contributed by tackling the first research question (RQ1). Also, the transition from adaptive sense-making to knowing groundlessness is yet to be explored. Preliminarily, we have seen that it requires to let go of grasping. A description of the transition from adaptive sense-making to knowing groundlessness in relation to the enactive framework is to be contributed by tackling the second research question (RQ2). Therefore, I am going to elaborate knowing groundlessness and the transition from adaptive sense-making to knowing groundlessness in enactive terms.

In order to approach those two research questions, a point of departure and a rough direction are required. The point of departure is adaptive sense-making. The rough direction is a decrease of adaptive sense-making. The following quote, which I already referred to earlier, provides an according hint why a decrease of sense-making might be required for a transition to knowing groundlessness: "[k]nowing sunyata (more accurately knowing the world as sunyata) is surely not an intentional act. Rather (to use traditional imagery), it is like a reflection in a mirror—pure, brilliant, but with no additional reality apart from itself" (Varela et al., 1991, p. 225).

This quote provides the crucial hint: What is present in sense-making is not present in knowing groundlessness. While sense-making is intentional, knowing groundlessness is not. While sense-making includes a perspective and a respective subject-object structure, knowing groundlessness does not. While sense-making is affect-driven with respect to adaptivity, knowing groundlessness is not. Thereby the most important features of sense-making are absent in knowing groundlessness. Therefore, a decrease of sense-making becomes the guiding direction: groundlessness can be known when sense-making has ceased.

This chapter tackles the two research questions on two distinct levels of analysis. (A) The *first level of analysis* (2.1) is structured into five parts. First, a brief reminder of sense-making as the point of departure sets the stage. Second, the first stage in approaching groundlessness is presented. Sense-making can be decreased via decreasing adaptivity. This comes with an important issue: adaptivity and sense-making must be known in order to let them go. This leads to the next stage. Third, the second stage in approaching groundlessness is presented. For their decrease, adap-

tivity and sense-making need to be known via phase 2 enaction. It is an alternative mode of knowing. It is nondual, reflexive, and self-known. This non-adaptive reflexive awareness of the current adaptivity and sense-making enables them to run down. In a gap of sense-making, nondual reflexive knowing (phase 2 enaction) can recognize itself. Fourth, the point of arrival is presented. Groundlessness is known when phase 2 enaction knows itself, nondually. Fifth and finally, the conclusion of the first level of analysis is presented. The answers to the two research questions are summarized. (B) The *second level of analysis* comprises a reflexive turn. The provided description is itself based on a lived state of adaptive sense-making. To describe the transition from sense-making to knowing groundlessness as provided in the first level of analysis is to describe it from a point of view that embodies adaptive sense-making. In the second level of analysis, I emphasize that an alternative view from the perspective of knowing groundlessness would contradict the description of the first level of analysis. Finally, the insights from this chapter are summarized.

2.1 First Level of Analysis

2.1.1 Point of Departure: Sense-making

The transition to knowing groundlessness starts from adaptive sense-making. As this notion of adaptive sense-making is crucial for the subsequent steps, let us summarize the key points from chapter 1. As shown in chapter 1, sense-making is the process by which an organism, based on the characteristics of its individuation activity (autonomy), makes meaning and constitutes a world of significance for itself. Cognition is exactly this creation of meaning.

Through its autonomy, a living system enacts significance on its world and transforms it accordingly into an environment of meaning and valence. It regulates its couplings with its environment as it aims at the continuity of its self-generated identity. This initiates the regulation (De Jaegher & Di Paolo, 2007, p. 488; Varela, 1997). Therefore, an organism establishes a perspective on the world with its own normativity. This means that some interactions are experienced as good, others as bad, and the rest as irrelevant to its continuous self-generation. Accordingly, sense-making is always a relational and even *affect-laden* process based on biological autonomous organization (De Jaegher & Di Paolo, 2007, p. 488). In this way, autonomy is deeply related to sense-making as it gives rise to a *reference point* or *perspective* to which interactions with the environment gain significance. On this basis, all sense-making (phase 1 enaction) is the enaction of norms with respect to the system's autonomy. Also, it is the according regulation with respect to those norms. Hence, sense-making always requires autonomy and adaptivity.

Adaptivity, as introduced by Di Paolo (2005), refers to the "capacity of an organism to regulate itself with respect to the boundaries of its own viability" (Di Paolo, 2005, p. 430). Hence, an organism can avoid situations that endanger its autonomy and can seek those that support its maintenance. While autonomy provides an identity as the center of a perspective, adaptivity allows the

organism to regulate its encounters in a graded manner with respect to what is better or worse from this provided perspective.

Three implicit assumptions need to be emphasized at this point. First, sense-making is based on adaptivity. This is to enact norms and regulate one's interactions with the environment for sustaining one's autonomous identity. This is a crucial point because it reveals that sense-making is the organism's *answer* to perturbations and potential threats. Accordingly, sense-making is what the organism applies as part of a *solution* in the face of a perturbation. In our case in which we are going to look for a *decrease* in sense-making, exactly this solution itself has become dysfunctional: the way the organism makes sense of a perturbation leads to additional perturbations. In other words, the solution has become a problem. The application of the same solution would consequently lead to a stronger manifestation of the same problem. Accordingly, we will see later how to go about such a decrease of sense-making without adding more of it. Second, sense-making does not only occur at one single level but on several different levels simultaneously. If one sense-making pattern ceases, another pattern may become salient and dominant. Third, sense-making is not static but dynamic. It involves a dynamic evolvement of transient and precarious patterns which are only semi-stable for a certain duration.

On the basis of this adaptive sense-making as the point of departure, we will now tackle the afore-mentioned research questions:

(1) RQ1: What is "knowing groundlessness" and how is it different from adaptive sense-making?
(2) RQ2: What does a shift from adaptive sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing) require?

Now that we are well prepared, let us turn to those research questions and synthesize an enactive framework of the transition from adaptive sense-making to knowing groundlessness.

2.1.2 Stage 1: Less Sense-making

In this first stage, we are guided by the following question: how can an autonomous adaptive system decrease sense-making?

As we have seen, sense-making requires both, autonomy and adaptivity. If there is no autonomy, there cannot be sense-making. Likewise, if there is no *adaptivity*, there cannot be sense-making as well. As autonomy constitutes the condition for the organism to be alive, a decrease of sense-making via decreasing autonomy would involve the death of the organism: a dead organism can't know, obviously. However, the aim is to decrease sense-making while keeping the system alive. Therefore, the better option is to decrease sense-making via decreasing adaptivity.

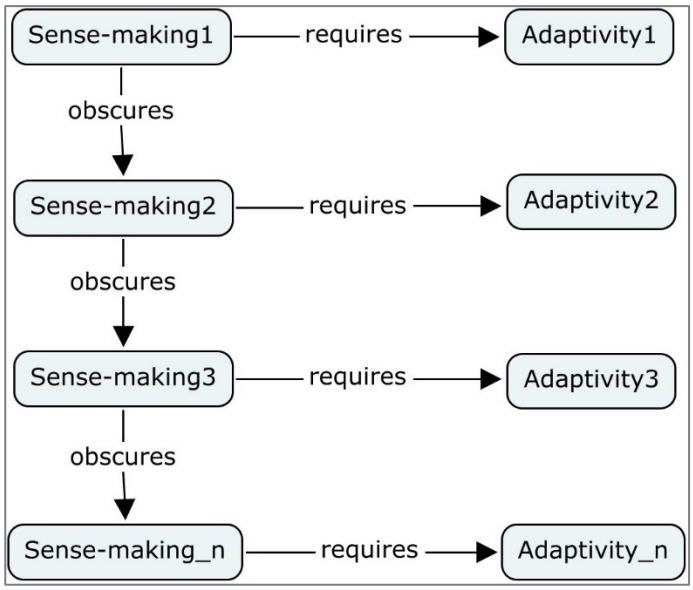

Figure 4. A simplified model of various sense-making processes that depend on respective acts of adaptivity. In this case, sense-making$_1$ is most apparent in the agent's experience.

What happens when a system decreases its adaptivity? This means it appraises less. It lets go of approach/avoidance tendencies. We have good reason to assume that the respective enacted meaning would also decrease as it is based in this particular appraisal and regulation activity.

To illustrate this, let us evoke a scenario with various sense-making processes. Remember that sense-making occurs on several different levels simultaneously: if one sense-making pattern ceases, another pattern may become salient and dominant (cf. section 2.1.1). For illustration purposes, the distinctness of those sense-making patterns will be highlighted by marking each of those with a respective index. Accordingly, we can distinguish sense-making$_1$, sense-making$_2$, and sense-making$_3$ as different patterns based on their respectively different adaptivity acts, namely adaptivity$_1$, adaptivity$_2$, and adaptivity$_3$ (cf. Figure 4).

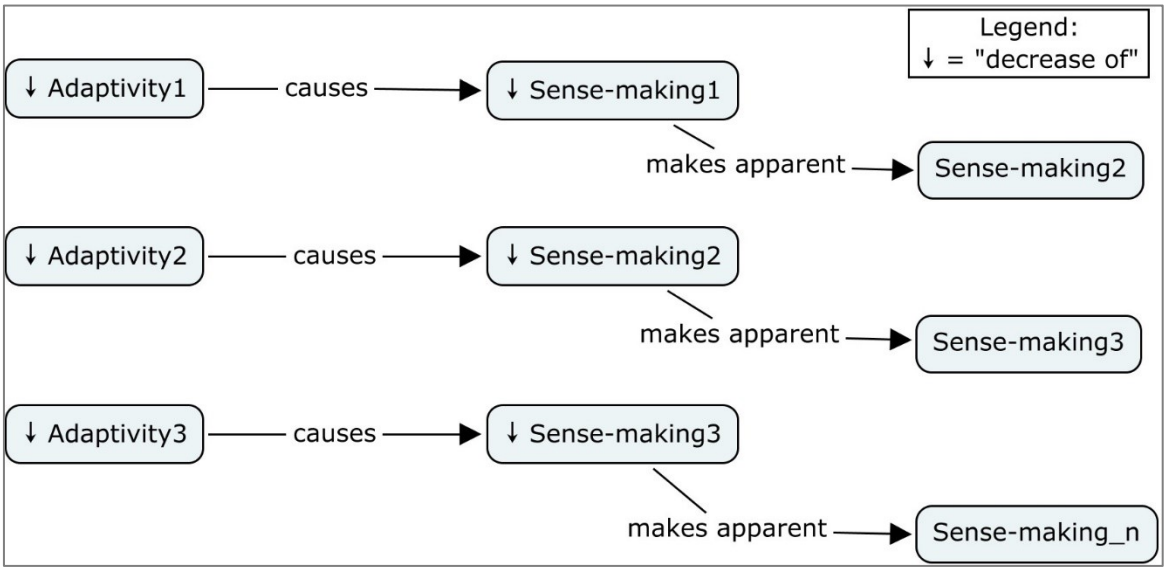

Figure 5. The decrease of an adaptivity act decreases the respective sense-making process to which it gives rise. As a result, a subtler sense-making act becomes apparent.

If adaptivity$_1$ is decreased, also its according sense-making$_1$ is decreased (cf. Figure 5). As a result, a more subtle sense-making$_2$ and its according adaptivity$_2$ can become apparent. If, in turn, this adaptivity$_2$ is then decreased, also sense-making$_2$ is decreased. Again, as a result, a more subtle sense-making$_3$ and its according adaptivity$_3$ can become apparent. This process can go on for quite some time while the living system encounters increasingly subtle sense-making activities and their according adaptivity. This process may continue until there is a gap of sense-making and adaptivity. In such a gap, the living system could then experience a moment of groundlessness unobscured by sense-making.

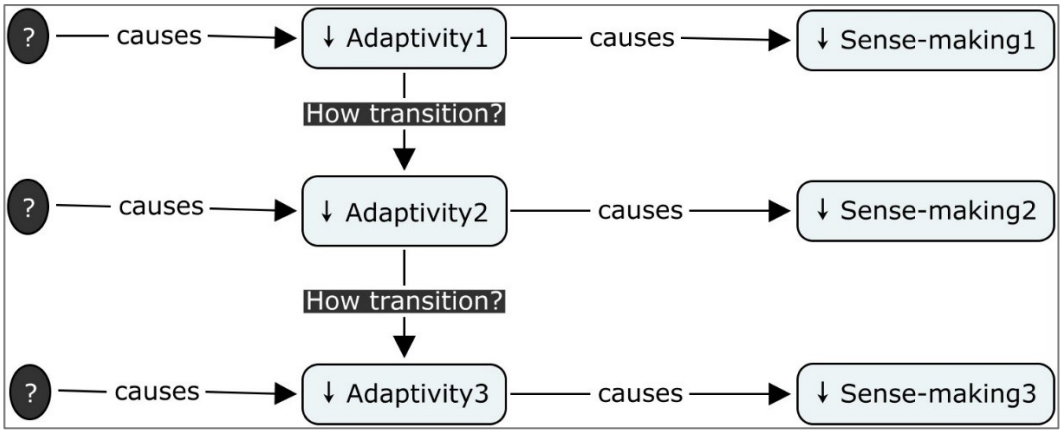

Figure 6. The main gaps of the "stage 1" approach as it is outlined in Figure 5.

However, there is a *problem* with this approach. While the overall approach makes sense, something is lacking: how can adaptivity and sense-making be decreased when they themselves are *unknown*? As we *are* in sense-making and in adaptivity, we are blind for them. We are blind for the current sense-making from which we are looking out. To know the sense-making itself is usually irrelevant for our getting-and-avoiding aims (adaptivity). Therefore, it is logically consistent that sense-making is usually ignored by sense-making itself. However, we have seen that two steps are necessary in order to decrease sense-making. First, we would need to decrease adaptivity. Second, we would need to transition from decreasing adaptivity$_1$ to decreasing adaptivity$_2$ to decreasing adaptivity$_3$ and so on. This is required for encountering more and more subtle sense-making activities and for dissolving them (as illustrated in Figure 5). At some point this may lead to a gap of sense-making. However, this comes with a problem which is highlighted in Figure 6: first, if we do not know the current sense-making and adaptivity, how could it then be decreased? Second, if we do not know the current sense-making and adaptivity, how could we then transition from decreasing adaptivity$_1$ to decreasing adaptivity$_2$ to decreasing adaptivity$_3$ and so on? Therefore, we need to expand this model: a living organism needs to *know* and *directly discover* its own current sense-making activity (not content) and the according adaptivity in order to decrease them!

2.1.3 Stage 2: Know Thyself

In stage 1, we came across the necessity to know the current knowing itself. This turned out to be required for reducing sense-making. But how can an autonomous adaptive system know its own adaptivity and sense-making?

In our current picture of the enactive approach, all cognition and respectively all knowing is sense-making (phase 1 enaction). Therefore, a first consequent intuition would be to propose a sense-making *of* sense-making itself. Accordingly, the current sense-making (and potentially also its underlying adaptivity) is thereby recognized by an additional act of sense-making$_{1+}$. This is illustrated in Figure 7.

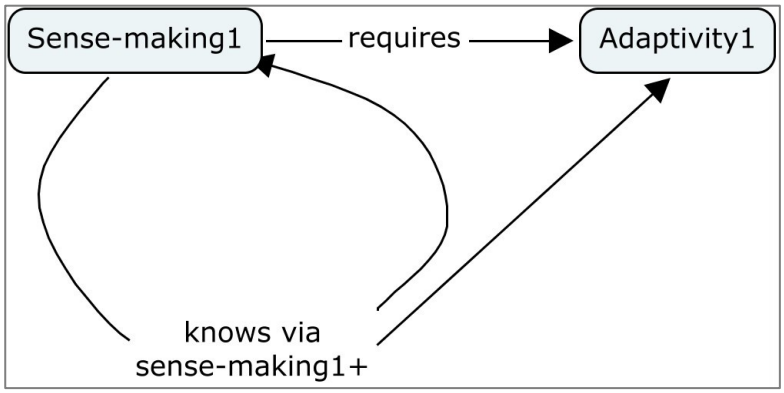

Figure 7. The "sense-making-of-sense-making" approach. The current sense-making act is recognized via an additional approach of reflexive knowing that uses

However, also in this approach we encounter an important *problem*: the subsequent act of sense-making also requires autonomy and adaptivity. Therefore, it brings with it a next act of adaptivity$_{1+}$. Those additional sense-making$_{1+}$ and additional adaptivity$_{1+}$ need also to be known. Therefore, it needs another act of sense-making, a sense-making$_{2+}$ and adaptivity$_{2+}$. Apparently, we gain more and more sense-making and adaptivity (cf. Figure 8). In principle, this approach of "sense-making of sense-making" leads to an *infinite regress*.

The result of this "sense-making-of-sense-making" approach is directly opposite to our aim of *decreasing* sense-making through via decreasing adaptivity. So, how does an autonomous adaptive system know its current adaptivity and sense-making if "sense-making of sense-making" does not work? The reply is simple: it requires a mode of knowing that is not sense-making: phase 2 enaction.

This nondual reflexive knowing (phase 2 enaction) is an alternative mode of knowing (Rosch, 2017, p. xxxix). Therefore, it is well characterized in its opposition to adaptive sense-making (phase 1 enaction). As we have already seen, usual sense-making is based on adaptivity. Its foundation is the normativity that arises from the system's aim to preserve its maintenance. Sense-making is based on tendencies of approach and avoidance. It is dualistic in the sense that it involves an experience of a subject-object separation. While being guided by the approach-avoidance tendencies inherent in adaptivity, the organism's experience is absorbed in the object. Its attention is biased. It

discerns between the good, the bad, and the irrelevant. The organism pays attention to the good and to the bad and ignores the irrelevant.

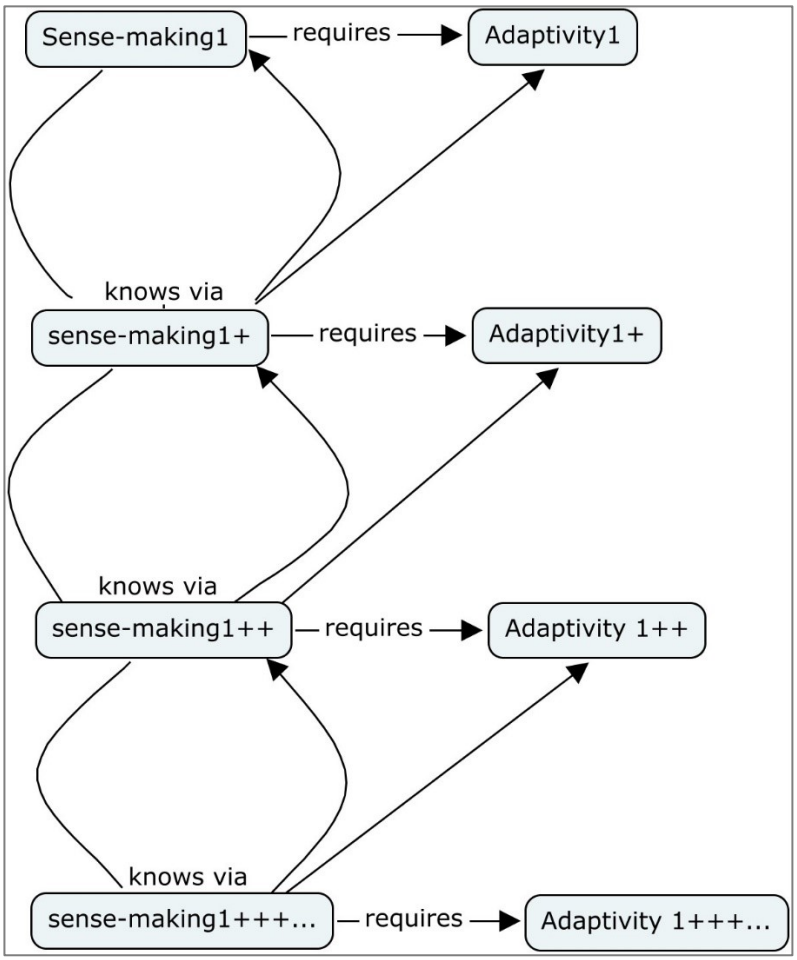

Figure 8. The "sense-making-of-sense-making" approach leads to an *in*crease of sense-making and adaptivity acts.

In contrast, nondual reflexive knowing (phase 2 enaction) lacks such discernment. Although sense-making and adaptivity might be present from a previous act of such phase 1 enaction, this "knowing groundlessness" would be initiated through an *experiencing* that just remains open for everything without any preferences. Such nondual experiencing does not discern between the good or the bad. It does not ignore the irrelevant. It is simple and open. Therefore, it must be effortless. It lacks any agenda or preferences. Even the preference of a nondual experiencing over a dual sense-making would simply add an adaptive act. This would lead to another sense-making act that obscures the already present nondual reflexive knowing. While it remains that open, it can also illuminate what is already there itself: if there is adaptivity and sense-making, it can experience them without being obscured by them.

As the nondual reflexive knowing (phase 2 enaction) is undiscerning and open for everything, it is non-adaptive. Therefore, with nondual reflexive knowing (phase 2 enaction) alone the *precarious* activity of adaptivity and sense-making cannot sustain. Accordingly, current acts of adaptivity

and their respective sense-making tend to run down. Consequently, sense-making and adaptivity activities decrease. What is left is nondual reflexive experiencing (phase 2 enaction).

Thereby, in a transition from adaptive sense-making to knowing groundlessness each moment's sense-making is recognized via nondual reflexive knowing (phase 2 enaction). The result is that adaptivity and sense-making cease. In this openness, the reflexive nondual knowing (phase 2 enaction) can recognize itself.[7] This is knowing groundlessness.

2.1.4 Point of Arrival: Knowing Groundlessness

Knowing groundlessness is phase 2 enaction knowing itself, unobscured by adaptive sense-making. This framing of knowing groundlessness is beautifully echoed by Eleonor Rosch:

> [w]hat Buddhist practices have to contribute to this conundrum is that there is a **different mode of knowing** altogether in which the mind is **neither absorbed nor separated but simply present and available**. There is no longer that observer claimed in the first
> er here; **experience is simple and self-known**. This is the mind that can actually **know firsthand the groundlessness** of the enacted edifice in which humans live (chapter 10), thereby clearing the way for transformative wisdom to emerge (hinted at in chapter 11). (Rosch, 2017, pp. xl-xli, emphasis added).

This passage clearly reflects the difference between nondual reflexive knowing (phase 2 enaction) and knowing groundlessness (*recognizing* phase 2 enaction). Nondual knowing is the kind of knowing that does not involve any sense-making or adaptivity. It is reflexive awareness. It might be already present in a moment of sense-making but unrecognized. In contrast, "knowing groundlessness" describes the experience in which this nondual reflexive awareness is *recognized*. In this knowing groundlessness the reflexive awareness is unobscured by any act of sense-making. It finally can recognize itself, nondually. This unobscured self-recognition of reflexive nondual experiencing is what I currently understand as the point of arrival we were heading to: a moment of knowing groundlessness.

2.1.5 Conclusion: The Research Questions Revisited

In the first level of analysis we explored a description of the transition process from adaptive sense-making to knowing groundlessness. Now we can summarize it with respect to the research questions.

The first research question RQ1 asked about the direct experience of groundlessness: what is knowing groundlessness and how is it different from sense-making?

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[7] This statement that reflexive nondual knowing recognizes itself needs to be treated with caution. The way it is articulated may imply that it is a knowing *of* something, *of itself*. However, it is nondual and therefore not separable in subject and object. Accordingly, in this mode of knowing there is no object to recognize. This reflexive nondual knowing simply illuminates itself without any subject-object distinction.

In the first level of analysis we arrived at a definition of knowing groundlessness: knowing groundlessness is phase 2 enaction knowing itself, unobscured by phase 1 enaction (adaptive sense-making). Thereby, knowing groundlessness is based on phase 2 enaction, not on phase 1 enaction. Phase 2 enaction is an alternative mode of knowing. While phase 1 enaction is intentional, phase 2 enaction is not. While phase 1 enaction includes a perspective and a respective subject-object structure, phase 2 enaction does not. While phase 1 enaction is affect-driven with respect to adaptivity, phase 2 enaction is not. Thereby, phase 2 enaction is non-intentional, self-known, and non-discerning. In a gap of sense-making, this phase 2 enaction is unobscured. In such a moment it can recognize itself. This unobscured self-recognition of phase 2 enaction is knowing groundlessness.

The second research question RQ2 asked about the process of a lived transition from sense-making to knowing groundlessness: what does a shift from adaptive sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing) require?

In the first level of analysis we arrived at a description of this transition process. It exhibits two requirements: non-adaptivity and nondual reflexive knowing (phase 2 enaction). Non-adaptivity is the first requirement. It means that a living organism refrains from regulating itself with respect to the boundaries of its own viability. It does not appraise its experiences as good, bad, or irrelevant. Accordingly, it does not approach, avoid, or ignore anything. Closer to experiential terms, this can be understood as unconditional acceptance. Nondual reflexive knowing (phase 2 enaction) is the second requirement. It means that a living organism taps into its capacity for phase 2 enaction. Via this phase 2 enaction, it recognizes its current acts of sense-making and adaptivity. Closer to experiential terms, this can be understood as effortlessly becoming aware of one's thought and affect. One recognizes one's current thought *as* a thinking act. Likewise, one recognizes one's current affect *as* an affective act. Importantly, this recognition lacks a sense of observer and observed. It is nondual.

Those two requirements are met in the transition process from adaptive sense-making to knowing groundlessness. In this transition process the current acts of adaptivity and sense-making are experienced. Simultaneously, there is mere acceptance through which no adaptivity is added. Therefore, sense-making is decreased. Accordingly, when this is continued, acts of adaptivity and sense-making progressively decrease. Thereby, there is progressively less obscuration of the already present nondual reflexive experiencing (phase 2 enaction). This may lead to a gap of sense-making in which phase 2 enaction can recognize itself. Experience experiences itself, nondually. This is a moment of knowing groundlessness.

2.2 Second Level of Analysis

In the first level of analysis we arrived at a description of knowing groundlessness and of the transition process leading to it. In the second level of analysis we will now turn our attention reflexively to this description itself: it is enacted. First, the provided description is context-dependent and observer-relative. Second, it comes from *within* acts of adaptive sense-making (phase 1 enaction). Third, this description is inappropriate from *within* the "perspective" of knowing groundlessness. Fourth, none of the two perspectives is ultimately true. They are useful in different contexts.

2.2.1 The Enacted Description is Context-dependent and Observer-relative

In the first chapter we have seen that cognition is sense-making. To cognize is to enact a world. This world-making is based on the cognizing system's autonomous organization and its history of structural couplings. As this applies to the encountered world it also applies to any statement about the world. Thereby, any statement about the world is observer-relative and context-dependent.[8] No description whatsoever can be true independent of its observer and its context. This itself is a statement. Accordingly, it cannot be ultimately true either.

This observer-relativity and context-dependency of any statement can be illustrated by revealing each statement's incoherence. This incoherence of statements can be rationally shown by means of the so-called *neither-one-nor-many* argument. In certain Buddhist contexts, this argument is used to *rationally* reveal the *irrationality* of statements. It is applied to statements of various domains. However, for the context of the enactive approach, its application to part-whole relationships is especially interesting. As shown, autonomy and dynamic co-emergence exhibit a notion of relational co-origination between the parts and the whole (cf. section 1.1). The incoherence of this notion of relationality can be shown by applying the neither-one-nor-many argument as is done by John Dunne with reference to Dharmakīrti's philosophy:[9]

> Dharmakīrti relies on a "neither-one-nor-many" argument to make his point, and his argument moves back and forth across a central question: if a relation is a real thing, then is it one with iths relata, or is it different from them? […] Dharmakīrti's point is that, if a relation is different from the relata, then it must still somehow be distributed over them in order to serve its function as a relation. Hence, one may ask whether, by virtue of being distributed over the relata, the relation is thereby one with the relata, or different from them. If it is one, then there can be no relation, since relations presuppose multiplicity or plurality. And if it is different from the relata, then we must argue that there is some second-order relation that connects the relation to its relata. We can thus

[8] From an enactive point of view, the context-dependency and observer-relativity of statements applies to information in general: "[f]or enactive theorists, information is context-dependent and agent-relative; it belongs to the coupling of a system and its environment" (Thompson, 2007, p. 51).

[9] Although the following chapter is specifically dedicated to draw comparisons between the synthesis of this thesis and Buddhist philosophies, this preliminary reference to an ancient Buddhist argument is already here useful for evaluating the coherence of the notion of relationality.

> again ask: is this second-order relation one with its relata or different from them? The infinite regress from this point should be obvious. (Dunne, 2004, pp. 43–44)

Let us have a look on that argument step by step. As mentioned, the main assumption in relational approaches is that there are two or more things and a relation that ties them together. In case of co-emergence there are, for example, parts, the whole, and a relation between them (local-to-global determination and global-to-local determination). The key question of the neither-one-nor-many argument is whether the relation is the same as or different from the things it relates to each other (e.g. parts and whole).

Let us start with the assumption that they are the *same*. Is the relation the same as the things it ties together, i.e. is it connected to them? If it is the same, then the relation collapses into its relata. Then there is no relation anymore as it is the same as the things it is supposed to connect (Dunne, 2004, pp. 43–44).

Therefore, if it is not the same, it is plausible to assume that the relation is different from the relata. Is the relation different from the things it ties together, i.e. is it unconnected to them? If it is different, the relation and the relata are *not* connected. Hence, there is a gap between the relation and the things it is supposed to connect. Accordingly, we need a relation that relates the relation to the relata. Otherwise, we get the gap again. Thereby, one needs to keep adding relations. This results in an infinite regress of relations. This is an inevitable problem with relationality.

In conclusion, the neither-one-nor-many argument deconstructs the idea of relationality. In this context, relationality appears to be incoherent. Relations mean that the relata and their relation in between would need to be the same (connected) and yet different (unconnected). From this perspective, relationality is paradoxical (cf. Dunne, 2004, pp. 43–44).

Importantly, this argument does *not* prove relationality to be ultimately wrong. Rather, it illustrates a rational context in which this otherwise valid notion of relationality appears to be i*nvalid*. Therefore, statements are never ultimately true but context-dependent and observer-relative. Again, this applies not only to the enactive approach but even to this sentence itself!

For the context of this thesis, it is particularly interesting to emphasize this context-dependency and observer-relativity of the first level of analysis. The description of the first level of analysis (cf. section 2.1) cannot be ultimately true. All statements that I made concerning knowing groundlessness (RQ1) and concerning the transition process leading to it (RQ2) are necessarily context-dependent and observer-relative. They make only sense from a certain perspective. Furthermore, all statements in the first level of analysis are *arisen from within* a certain perspective. From which perspective has this first level of analysis arisen?

2.2.2 The Enacted Description Arises from within Adaptive Sense-making

As every statement is context-dependent and observer-relative, we may ask now about the context and the observer of the statements in this thesis: in which context and relative to which observer has the description of the first level of analysis arisen?

The description of the transition process from sense-making to knowing groundlessness is itself *from the perspective of sense-making*. It is clearly not from the perspective of knowing groundlessness which it tries to describe. This description is necessarily a description *of something*. Thereby, it is dual with a sense of a separation between the observer and the observed.

Remember the importance of recognizing the perspective from which this description has arisen. The aim of this description is to capture two different modes of knowing, namely sense-making and knowing groundlessness, and the transition between the two. However, the description itself is only from within *one* of the two perspectives. It has arisen *from within* sense-making.

To recognize this relativity of the description is highly insightful. It reveals this description's bias. Through this reflexive act, we can now recognize the enacted description itself *as* an *act of enaction*. This makes one refraining from the sense that this description captures a perspective-independent reality. It does *not*. And that is alright. Finally, this opens the horizon and enables a shift of our perspective: what is knowing groundlessness *from within* knowing groundlessness?

2.2.3 The Enacted Description from the Perspective of Knowing Groundlessness

For gaining insight into knowing groundlessness, a description thereof from within knowing groundlessness seems important: what is knowing groundlessness *from within* knowing groundlessness? What is the transition process from sense-making to knowing groundlessness *from within* the "perspective" of knowing groundlessness?

The answer is simple but complicated: there is no meaningful answer to give. Why is this? Language is a certain tool. Necessarily, it comes with capabilities and constraints. One constraint is that descriptions involve the sense that they are descriptions *of something*. Thereby, language is intentional. It implies a subject-object duality. This ties language to sense-making (phase 1 enaction).

However, knowing groundlessness is *non*-intentional. It lacks any subject-object-duality. This unties it from sense-making (phase 1 enaction). Thereby, from within knowing groundlessness there is no object to describe and no subject that describes. Knowing groundlessness is mere unobscured nondual knowing.

Therefore, in the context of the "perspective" from within knowing groundlessness, language is an inappropriate method. Any use of language reintroduces sense-making. This necessarily interrupts a moment of knowing groundlessness. Therefore, language and knowing groundlessness are mutually exclusive.

At this point, we have reached an end of linguistic description. Here, philosophical analysis is not useful anymore. From *within* this "perspective" of knowing groundlessness this exact knowing groundlessness can only be explored further when conceptual thinking is left behind.

2.2.4 Both Perspectives are Context-dependently Useful

The aim of this thesis is to describe the transition from sense-making to knowing groundlessness. The first level of analysis provided a description from *within* the perspective of sense-making. The second level of analysis provided the insight that this description is invalid from *within* the perspective of knowing groundlessness. Those two perspectives contradict each other.

However, this is not problematic at all. The contradiction simply exemplifies that there is not "one single" true view of reality. Rather, every view is context-dependent and observer-relative. Accordingly, the two views from the first and the second level of analysis can co-exist. They are *meaningful* in different contexts for different observers.

In the next chapter, I will explore exactly those contexts in which each of the two descriptions can be meaningful.

2.3 Summary of the First and Second Level of Analysis

In this chapter 2 we explored knowing groundlessness (RQ1) and the transition process leading to it (RQ2). We did so from two different perspectives: a first and a second level of analysis.

The first level of analysis provided a description from *within* the perspective of sense-making. In tackling the first research question, this first level of analysis resulted in a definition of knowing groundlessness: knowing groundlessness is phase 2 enaction knowing itself, unobscured by phase 1 enaction (adaptive sense-making). Thereby, knowing groundlessness is based on phase 2 enaction. Phase 2 enaction is an alternative mode of knowing that is non-intentional, self-known, and non-discerning. In a gap of phase 1 enaction, this phase 2 enaction is unobscured. In such a moment it can recognize itself. This unobscured self-recognition of phase 2 enaction is knowing groundlessness.

In tackling the second research question, the first level of analysis resulted in a description of this transition process. It exhibits two requirements: non-adaptivity and nondual reflexive knowing (phase 2 enaction). Non-adaptivity is the first requirement: the living organism refrains from regulating itself with respect to the boundaries of its own viability. It does not appraise its experiences as good, bad, or irrelevant. Also, it does not approach, avoid, or ignore anything. Nondual reflexive knowing (phase 2 enaction) is the second requirement. Via this phase 2 enaction, the living organism recognizes its current *acts* of sense-making and adaptivity. Those two requirements are met in the transition process from adaptive sense-making to knowing groundlessness. In this transition process the current acts of adaptivity and sense-making are experienced. Simultaneously,

there is mere acceptance through which no adaptivity is added. Therefore, sense-making is decreased. Accordingly, when this is continued, acts of adaptivity and sense-making progressively decrease. Thereby, there is progressively less obscuration of the already present nondual reflexive experiencing (phase 2 enaction). This may lead to a gap of sense-making in which phase 2 enaction can recognize itself. Experience experiences itself, nondually. This is a moment of knowing groundlessness.

The second level of analysis provided the insight that this first level description is invalid from *within* the perspective of knowing groundlessness. The description is revealed as enacted. First, the provided description is context-dependent and observer-relative. Second, it comes from *within* acts of adaptive sense-making (phase 1 enaction). Third, this description is inappropriate from *within* the "perspective" of knowing groundlessness. Fourth, none of the two perspectives is ultimately true. However, they are valuable in different contexts. Now we can pursue in the next chapter the precise contexts in which those two perspectives may be valuable.

3 The Value of an Enactive Approach to Knowing Groundlessness

The aim of this chapter is to describe two contexts in which the two levels of analysis from chapter 2 make sense. This aim has its roots in the conviction that every statement is context-dependent and observer-relative. Thereby, the quality of this thesis cannot be measured in terms of its degree to which it *represents* a context-*independent* and observer-*independent* reality. Rather, its quality appears to be tied to the meaning it has in certain contexts for certain communities of observers. Therefore, the aim here is to evaluate in which contexts and for which observers those synthesized statements from the first and the second level of analysis are meaningful or even valuable.

Two specific contexts and communities of observers are selected in this regard:

(1) *Meditation* p*ractitioners* who practice to experience groundlessness in their direct embodied lived experience;

(2) *Cognitive scientists* that are willing to develop/innovate cognitive science by providing a next paradigm.

Accordingly, the more specific aim is to evaluate how the first and the second level of analysis can be meaningful in those two contexts and for those communities of observers: meditation practitioners and cognitive scientists. The respective questions in this context are the following:

(1) How can the first and second level of analysis support *meditation practitioners* in directly knowing groundlessness?

(2) How can the insights from the first and second level of analysis support a next generation of *cognitive scientists* who are willing to develop cognitive science further? What does this thesis hint at for a meaningful and responsible next paradigm in cognitive science?

This chapter is structured into two sections. In the first section (3.1) I am going to evaluate the plausibility of this thesis' synthesis for the context of embodied practice of knowing groundlessness. This is done for two different practice contexts: (1) *Mahāmudrā* (Sanskrit), a nondual style of Buddhist practice of great importance in later Indian Buddhism and Tibetan Buddhism; and (2) *Phenomenology*, a philosophical method and school of philosophy founded by Edmund Husserl. The choice of those two traditions will be explained. Specifically, each step of the first level of analysis is compared to ideas and practice instructions from Mahāmudrā and Phenomenology. I will evaluate to which extent the lived practice matches with the provided theoretical framework from chapter 2. This will provide a hint for the value that this thesis' descriptions can have for theoretically underpinning practice instructions. This may support the direct lived embodied practice of knowing groundlessness. Moreover, the insights from the second level of analysis will be compared to Buddhist Madhyamika philosophy which is an important pillar of *Mahāmudrā*.

In the second section (3.2) I am going to evaluate the value of this thesis for the context of a progressive paradigmatic development of cognitive science. It is structured into two subsections. The first subsection (3.2.1) provides a comparison of paradigms. Three cognitive science paradigms (cognitivism, connectionism, and the enactive approach) are compared to three Buddhist paradigms of philosophy (the so-called first, second, and third "turning of the wheel of Dharma"). The purpose of this is to find inspiration from a different tradition with a (partially) similar aim: an investigation of the mind. The second subsection (3.2.2) derives from this thesis some pointers to a vision of a meaningful next paradigm in cognitive science.

3.1 The Value in the Context of Lived Practice

This thesis started from the premise that groundlessness can be experienced. Also, we explored theoretically the transition process from sense-making to knowing groundlessness. It appears that this transition process can be practiced by human beings. Indeed, there are practices in several human cultural traditions that aim at exactly this momentary transition from sense-making to knowing groundlessness.

Accordingly, the guiding question of this section concerns the plausibility of the results from the first and the second level of analysis for the context of those lived practices that aim at knowing groundlessness: does the description of knowing groundlessness (RQ1) and of the transition to it (RQ2) make sense in a respective *context* of such practice and for its practitioners as *observers*?

Where do we find those experts and their practice instructions which are required for that comparison? In this thesis, we are going to focus on two different traditions: (1) *Mahāmudrā* and (2) *Phenomenology*.

Mahāmudrā practice instructions are especially designed for guiding a practitioner into a "recognition of the nondual" which is equivalent to our term of "knowing groundlessness". Therefore, those instructions can indicate the extent of our theory's plausibility from an explicitly practice-oriented point of view. This is crucial for evaluating the description of the transition process from the second research question (RQ2): how does one transition from adaptive sense-making to "knowing groundlessness"?

A philosophy that underlies the *Mahāmudrā* practice is a *nondual* philosophy ("the third turning of the wheel of Dharma"). The key guiding question in the philosophy of the third turning is about the experience of groundlessness: what does it mean to experience śūnyatā (groundlessness)? This guiding question of Yogacara philosophy is of interesting similarity to the first research question (RQ1): "what is 'knowing groundlessness'?" Moreover, this nondual Buddhist philosophy can be regarded as being grounded in the lived experiences of actual practitioners. Therefore, the answers from various strands of this nondual Buddhist approach, can provide a hint at the context-

dependent plausibility of the conclusions from our first research question on "knowing groundlessness" (RQ1).

Phenomenology, on the other hand, is interesting in this context as it aims at investigating experience from within the scope of experience itself. Moreover, it contributes a method for investigating such experience: the phenomenological reduction . Accordingly, such investigation of experience requires an experience "of" experience and thereby some form of nondual awareness. Therefore, it is worth it comparing what the phenomenological method emphasizes (in Husserl's and Fink's framework) with our description of the transition process from sense-making to "knowing groundlessness". This is mainly relevant for evaluating our answer to the second research RQ2: how does one transition from adaptive sense-making to "knowing groundlessness"? On the other hand, we will also highlight a limitation to this comparison by referring to Eleonor Rosch's statement that in exploring groundlessness "we have gone beyond phenomenology" (Rosch, 2017, p. xxxix). Therefore, phenomenology in this framing *cannot* provide a further hint for evaluating the plausibility of the conclusion which we arrived at regarding the first research question on "knowing groundlessness" (RQ1).

Accordingly, the guiding question is specified and operationalized: is there a correspondence of the descriptions of knowing groundlessness (RQ1) and of the transition to it (RQ2) to practice instructions from the contexts of Mahāmudrā and Phenomenology?

3.1.1 First Level of Analysis

The aim of this subsection is to compare each stage of the first level of analysis to analogous instructions in the context of Mahāmudrā and of the phenomenological reduction. The comparison is divided into the same four parts as the synthesis in chapter 2: (1) the point of departure: adaptive sense-making; (2) stage 1: less sense-making; (3) stage 2: reflexive knowing; (4) the point of arrival: knowing groundlessness.

3.1.1.1 Point of Departure: Sense-making

In the transition process towards knowing groundlessness we have chosen adaptive sense-making as the point of departure. It is what the enactive approach refers to as general cognition. This sense-making is always based in its underlying activity of approach and avoidance that is coined "adaptivity".

In Buddhist contexts, a corresponding notion is the one of *samsara*. The conceptual correspondence between adaptive sense-making (or phase 1 enaction) from the enactive approach with the Buddhist notion of *samsara* is summarized by Eleonor Rosch in her introduction to the revised version of *The Embodied Mind*:

> [f]rom the Buddhist point of view, both phase 1 enaction and the skandhas are portraits of the confused and ignorant body, mind, and world that is called samsara, that is, the wheel of life through

> which sentient beings cycle in ignorance and suffering (see chapters 4 and 6). The good news is that there is an alternative. There is another mode of knowing not based on an observer and observed. This ushers in phase 2 of enaction, what in the book we call groundlessness (chapter 10). (Rosch, 2017, p. xxxix)

This short passage also already hints at the correspondence between "knowing groundlessness" or "recognizing phase 2 enaction" and a Buddhist view of an experienceable nondual awareness that lacks a separation between observer and observed. However, from a certain Buddhist view this underlying nondual awareness is usually obscured by a dualistic mind and its conceptualizations (i.e. by adaptive sense-making). This point is reflected in the following statement by Chökyi Nyima Rinpoche, a much-respected contemporary Buddhist teacher in the Mahāmudrā and Dzogchen tradition:

> [u]nless we allow every single kind of conceptualization – of forming a notion of something, whether it is in a coarse way or a subtle way, shallow or profound - unless we allow all of that to dissolve, to simply evaporate, we do not clearly see our innate nature. (Rinpoche, 2002, p. 41)

The term "innate nature" in this quote translates into our previously used term "knowing groundlessness". Thereby, this quote once again exemplifies the notion that "knowing groundlessness" is a recognition of an underlying nondual mode of knowing. This nondual awareness can only be recognized when one lets go of conceptualizations (i.e. of ordinary intentional sense-making).

What is important for now is that phase 1 enaction or adaptive sense-making translates directly into the notion of *samsara*. In order to transition to "knowing groundlessness" one is simply required to let go of phase 1 enaction. This directly corresponds to the direction that we proposed: decreasing sense-making.

This sets the stage for a comparison between the transition process as described in this thesis to Buddhist practice instructions. What are some notions from the Buddhist literature and practice for transitioning from samsara to that other mode of knowing or nondual awareness? How is it related to our previous synthesis of a procedural structure of such a transition with relation to ideas from the enactive approach?

3.1.1.2 Stage 1: Less Sense-making

With respect to the inner logic of the enactive approach, I hypothesized that "knowing groundlessness" is a moment in which an underlying mere experiencing is recognized when there is a gap of adaptive sense-making. Therefore, we explored how an according decrease in sense-making could occur. As sense-making is described as being dependent of adaptivity, I hypothesized that a decrease in adaptive activity necessarily leads to a decrease in sense-making activity. Adaptivity, in this context consists in the judgment whether something is good, bad, or irrelevant. Furthermore, it comprises to regulate as an active agent one's inner dynamic and behavior on this basis.

This corresponds to seeking the good, avoiding the bad, and ignoring the irrelevant. Hence, a decrease in adaptive activity means that the organism decreases the extent to which it appraises its experiences and acts on them as an active agent. The hypothesis is that when such adaptivity activity ceases, sense-making ceases. Does this hypothesis make sense in the context of *actual* practice? Is there a correspondence to (1) Mahāmudrā practice instructions or (2) the phenomenological reduction?

Mahāmudrā

Mahāmudrā instructions emphasize that in this particular practice context nothing is to be abandoned and nothing to be accomplished: "one important rhetorical theme (and an explicit instruction in formal practices) is that Mahāmudrā does not involve anything to be abandoned (heya) or anything to be accomplished or adopted (upādeya)" (Dunne, 2015, p. 262).

The reason for such a need of non-abandoning and non-accomplishing is that judgments of that kind lead to further thought: "the typology of negative mental states to be abandoned and virtues to be cultivated has been set aside, since in this context judgments of that kind will simply proliferate and ensnare the practitioner further in thought" (Dunne, 2015, p. 265).

This quote clearly reflects a standpoint in which tendencies of approach and avoidance are a requirement of thought. Moreover, the meditation practitioner is given tools to inhibit those tendencies in order to allow those thoughts to vanish: "[t]o aid in cultivating present-centered awareness, the novice is given other tools that also **inhibit** another requirement for thought to operate, namely, the **approach/avoidance stance** of an agent acting in the world" (Dunne, 2015, p. 264, emphasis added). It is astonishing how directly this translates into the hypothesis that sense-making requires adaptivity. Moreover, it also recognizes that inhibiting adaptivity makes sense-making cease. This hints at a clear correspondence between the first requirement "non-adaptivity" and Mahāmudrā practices which aim at recognizing the nondual. By inhibiting the "approach/avoidance stance", thoughts can cease. In enaction speak, by inhibiting adaptivity, sense-making can cease. This decay of thought shall "aid in cultivating present-centered awareness" (see above) which is central to "knowing groundlessness". Therefore, Mahāmudrā practice involves an inhibition of appraisal. One simply sustains awareness that is not goal-oriented or structured by any approach/avoidance tendency:

> [t]he task is not to evaluate what is occurring in the mind, nor to focus on an object. One simply remains undistracted in the present, where "mere non-distraction" in part means that one sustains an awareness that is **not caught by the goal-oriented, approach/avoidance structures that pull one into a chain of** thoughts. (Dunne, 2015, p. 264, emphasis added)

This statement exemplifies that the shift to knowing groundlessness not only requires non-judgment (or non-adaptivity) but also that one remains "undistracted in the present" (Dunne, 2015,

p. 264). This refers to a sustainment of awareness. Accordingly, it is an equivalent to the second requirement that we have explored in chapter 2, nondual reflexive knowing (phase 2 enaction).

In enaction speak, the transition process towards knowing groundlessness requires an experience of the current sense-making act. One needs to experience the current sense-making itself *as* an act without adding sense-making or adaptivity. This allows sense-making to cease.

The necessity for this nondual reflexive knowing (phase 2 enaction) is reflected in another crucial tool of Mahāmudrā practice, the "self liberation of thought": "[i]n Mahāmudrā terminology, this is known as the "self liberation" (*rang grol*) that occurs when one "looks intently" (*cer gyis lta*) at a thought" (Dunne, 2015, p. 264). The term "self liberation" already implies that those thoughts vanish by means of this practice. In this practice, phenomenal contents are experienced "just as a facet of mind", rather than as somehow representing an actual object 'out there' (Dunne, 2015, p. 264). This is a very important point. Not only are the current contents of thought (sense-making) experienced but they are experienced *as actions of the mind*. They are seen not separately but, most importantly, in their context of being *in* experience. Thereby, the practitioner enhances a kind of background awareness which enables her to recognize this nondual reflexive awareness itself.

Two aspects are to be emphasized at this point. First, the Mahāmudrā practice of "self liberation of thought" (*rang grol*) aims at allowing thoughts to vanish. This corresponds to the outset aim of the first stage in transitioning from adaptive sense-making to knowing groundlessness: *decreasing sense-making*. Second, in order to make those thoughts vanish (i.e. to decrease sense-making), the Mahāmudrā instructions emphasize on two mental gestures that are directly equivalent to those two from the enactive synthesis in chapter 2: non-adaptivity (inhibiting an approach/avoidance stance of being an agent in the world) and nondual reflexive knowing ("looking intently", *cer gyis lta*). Those are important hints that the theoretical insights from this thesis' synthesis (chapter 2) indeed make sense in the context of *actual* practice of shifting to knowing groundlessness.

Phenomenology

Also, in the context of the Western philosophical tradition of phenomenology, the conclusion from chapter 2 appears plausible: a shift towards knowing groundlessness requires both non-adaptivity and reflexive knowing. As phenomenology aims at investigating direct lived experience, it necessarily requires some method for accessing that lived experience from within the experience itself. It requires to become aware of one's lived experience in a direct manner. Accordingly, such a method requires a kind of nondual awareness in which the structure of experience is itself experienced.

The phenomenological method for this kind of investigation of lived experience is termed "phenomenological reduction" (Varela & Shear, 1999). The core of its procedure are *suspension* and *redirection*. This means that participants suspend habitual thought and judgment. Also, they redirect their attention from the exterior to the interior (Varela & Shear, 1999). Those two gestures

of the phenomenological reduction are to a large extent corresponding to the active ingredients "non-adaptivity" and "reflexive knowing" from chapter 2. Suspension and non-adaptivity share the emphasis on non-judgment. Redirection and reflexive knowing share the emphasis on a form of awareness to the process of awareness itself. Here the correspondence between suspension and non-adaptivity seems relatively unproblematic whereas the correspondence between redirection and reflexive knowing opens a debate due to a slight but important difference. Let us have a look on those correspondences and differences step by step.

Suspension refers to Husserl's conception of *epoché* (Greek: *ἐποχή*). He introduced a variety of terms for this act of suspension, such as *Ausschaltung, Einklammerung, Urteilsenthaltung,* and *Umwertung* (Ideas I, §31-32; Husserl, 1982, pp. 57–62). The core of this act of suspension is a neutralization of the value associated to any activity. This neutralization involves the phenomenologist to relate to an object in a non-judging way:

> [w]ith regard to *any* positing we can quite freely exercise this peculiar ἐποχή, *a certain refraining from judgment which is compatible with the unshaken conviction of truth, even with the unshakable conviction of evident truth*. The positing is "put out of action," converted into the modification, "parenthesized positing;" the judgment simpliciter is converted into the "parenthesized judgment. (Husserl, 1982, pp. 59–60)

In my interpretation of the epoché, this non-judgmental attitude necessarily involves what Depraz, Varela, & Vermersch (2003) termed the gesture of "letting-go". This non-judgmental attitude includes to accept one's experience as it is. By this, the quality of attention is moved from an active search to an accepting letting-arrive (Depraz et al., 2003). This quality of attention includes that a person does not experience herself as the actor of the act but rather as the space through which the action unfolds. The sense of being an agent dissolves. This opens the space for an experience of simply *receiving* those actions rather than *doing* them. It appears to be plausible that the non-judgmental aspect of this gesture of suspension includes such an element of acceptance in which one simply lets experiences arrive without appraising them.

From this point of interpretation, we find a very strong emphasis on non-judgmental acceptance beyond the stance of acceptance and avoidance of an active agent in the world. Thereby, this again confirms our conception of non-adaptivity as being one of two requirements of the transition from adaptive sense-making to knowing groundlessness.

Moreover and as already mentioned, the phenomenological reduction comprises not only an act of suspension but also a redirection of attention which is equivalent to a form of reflexive awareness. This redirection process which is also called *reflexive conversion* (*Umkehrung des Blickes*) is that through which a person turns her attention (*Zuwendung)* towards the *way* she is experiencing. Accordingly, the attention is shifted from the object of experience towards the lived modality of experience. In other words, the attention is drawn from the "what" to the "how" of experience. Simultaneously, this act of redirection is in mutual dependence to the previously mentioned epoché.

Suspension requires redirection and redirection requires suspension. This mutual requirement of epoché and redirection (also called "reduction") is especially emphasized in Eugen Fink's *Sixth Cartesian Meditation*: "epoché and the action of the reduction proper are the two internal basic moments of the phenomenological reduction, mutually required and mutually conditioned" (Fink, 1995, p. 41).

At a first glance this act of redirection may correspond directly to the previously introduced notion of "reflexive knowing" as the second requirement of a shift towards knowing groundlessness. However, on a second glance a slight difference in rhetoric constitutes an important distinction between "reflexive knowing" and the redirection in phenomenology. This is going to be explored in a detailed manner in the following subsection on the second stage of the first level of analysis.

For now, it is sufficient to recognize that also in the phenomenological reduction we find the principle of non-judgment (as equivalent to non-adaptivity) and redirection (as equivalent to non-dual reflexive knowing). Thereby, their approximate correspondence confirms that the two synthesized requirements of shifting to knowing groundlessness make sense in the context of the phenomenological reduction.

At this point we may ask about the conclusions from stage 2 of the first level of analysis: how are those practices of "looking intently" (Mahāmudrā) and "redirecting" (phenomenology) performed? Do they involve a form of intentional sense-making or another mode knowing which is rather non-intentional? In the next according step, I am going to evaluate the plausibility of our hypothesis that such a non-adaptive reflexive knowing ("looking intently" or "redirection") must be performed by another mode of knowing that is non-intentional rather than by intentional sense-making. This leads us to the analysis in stage 2.

3.1.1.3 Stage 2: Know Thyself

As we have seen, Mahāmudrā practice instructions and the phenomenological reduction both reflect our conclusions from chapter 2: for transitioning from an adaptive sense-making to knowing groundlessness, one needs both, non-adaptivity and reflexive knowing. The current sense-making and adaptivity are to be recognized without adding adaptivity or sense-making.

The key question here concerns the kind of knowing involved in this required act of reflexive knowing: is the current sense-making activity recognized through sense-making or somehow differently? By means of the inherent logic of the idea of sense-making from the enactive approach, I concluded in chapter 2 the following. The form of knowing that is required for a transition towards knowing groundlessness does *not* involve adaptive sense-making but another mode of knowing: mere nondual reflexive experiencing. The reason for this is simple: sense-making in this context would lead to an infinite regress resulting in constant additions of sense-making acts. Sense-making would be increased, not reduced. Therefore, another mode of knowing needs to be introduced to the enactive approach: nondual knowing which is recognized in knowing groundlessness. Does this

correspond to or rather contradict (1) Mahāmudrā instructions and (2) the phenomenological reduction?

Mahāmudrā

In the main Mahāmudrā practices, the key goal is to practice abiding in a form of mindful meta-awareness that lacks subject-object duality. The nonduality aspect here is much emphasized. Thereby, in Mahāmudrā meditation manuals on a so-called *gradual* approach one begins by directing the mind to an object of attention (e.g. to breathing sensations) as an anchor (Dunne, Thompson, & Schooler, 2019). However, this anchor is not a meditation object but merely a "'reminder' (*dran rtags*) that minimally captures attention so as to inhibit capture by distractors" (Dunne et al., 2019, p. 308). Eventually, one increasingly lets go of the 'reminder'. Accordingly, one remains in a purer form of mindful-meta awareness (i.e. nondual reflexive knowing).

How exactly is this performed? While the attentional resources are directed toward that anchor, the most resources are used for monitoring distractions and off-object features, e.g. vividness of attention or proprioceptive states (Dunne et al., 2019). This important point reflects the aim of Mahāmudrā practice for recognizing *nondual* awareness. It is emphasized in the following description of this practice by Dunne et al. (2019): "[a]s one gradually learns to drop attention to the anchor, one sustains meta-awareness, such that one is instructed to persist in the awareness of these off-object features of awareness without turning awareness itself into an explicit object of introspection" (Dunne et al., 2019, p. 309).

Most importantly, that sustained meta-awareness of off-object features is apparently nondual. It is a form of awareness *of* awareness yet this awareness is not made an *object* of attention. Therefore, this exemplifies the form of reflexive awareness or mindful meta-awareness that is required for "looking intently". Thereby, those Mahāmudrā instructions on sustaining a form of nondual meta-awareness directly corresponds to the second requirement in the first level of analysis in chapter 2: nondual reflexive knowing *without* adaptive sense-making. This mode of knowing must lack a subject-object duality or intentionality ("aboutness"). Instead, it is mere experiencing.

What else can be said about that form of reflexive awareness from the point of view of Mahāmudrā? What we called in chapter 2 "nondual reflexive knowing" and "phase 2 enaction" can be directly translated into the Mahāmudrā concept of "reflexive awareness" or *svasamvitti*:

> [k]nown by the technical term "reflexive awareness" (svasamvitti), this aspect of consciousness is nondual in the sense that when information is obtained through reflexive awareness, it does not mean that a phenomenal sense of subjectivity is focusing on that information's source as an object. (Dunne, 2015, p. 261)

This nondual aspect of reflexive awareness is of utmost importance. In this style of philosophy, it is argued that an attentional turn towards subjectivity is not necessary because some aspect of consciousness is already constantly aware of the subjective features of awareness:

> [t]he claim here is that one has a capacity to make a reliable report without turning inward and observing the features of the experience that concerned oneself as a subject. One need not make this turn because, even without having introspected in a way that makes one's own subjectivity an object of observation, some aspect of consciousness was already aware of those subjective features. (Dunne, 2015, p. 261)

The capacity for reflexive awareness that does not require making subjectivity an *object* of awareness is exactly what I tried to point out in the concept of "nondual reflexive knowing" (phase 2 enaction) as the second requirement of shifting towards knowing groundlessness. This correspondence is important as the Mahāmudrā practice here can back up a line of thought that is rather uncommon in Western philosophy including phenomenology (as it will be shown in the phenomenology part of this section).

Those preceding descriptions of Mahāmudrā practice are summarized in the following quote. This quote pointedly demonstrates the correspondences between Mahāmudrā practice and the description of the transition from sense-making to knowing groundlessness:

> clearly, Mahāmudrā formal instructions require one to be "**non-judgmental**," in that one is not to engage with any conceptual evaluation during formal practice. Instead, **one releases all expectations or evaluative paradigms**, and when distracting thoughts occur, one does not judge them as virtuous or non-virtuous. Instead, one simply "**looks intently**" at the thought in the present moment and, having been **experienced as just a feature of mind itself**, the **thought "self liberates" or dissipates on its own**. (Dunne, 2015, p. 266, emphasis added)

This passage on Mahāmudrā formal instructions clearly reflects both two requirements from the first level of analysis in chapter 2: (1) non-adaptivity, and (2) nondual reflexive knowing (phase 2 enaction). Those two requirements are analogue to (1) being "non-judgmental" (releasing evaluative paradigms) and to (2) "looking intently" (*cer gyis lta*) by reflexive nondual awareness (*svsamvitti*). Those lead to self-liberation of thought (*rang grol*). At this, (1) the first requirement "non-adaptivity" translates into being "non-judgmental"; (2) the second requirement "nondual reflexive knowing" (phase 2 enaction) translates into "looking intently" by reflexive nondual awareness (*svsamvitti*). These two elements lead a decrease of sense-making which translates into the self-liberation of thought (*rang grol*). Those apparent matches clearly show that the conclusions from the enactive theory make sense in the context of Mahāmudrā practices which aim at directly recognizing nondual awareness.

Phenomenology

As mentioned before, the notion of nondual reflexive awareness can be compared to some extent to the gesture of redirection in phenomenology. However, in the precise formulation of the phenomenological concept of redirection, a subtle but important difference is to be revealed: the redirection is precisely described as a process through which one is *turning the attention* from the "what" to the "how" of experience (*Zuwendung*). Although this can be interpreted in various ways, one interpretation of it implies that the attention is drawn to experience as a kind of *object*. The attention is directed *somewhere*. It is directed *to* the structure of experience.

From this, an important distinction arises to this thesis' notion of "nondual reflexive knowing" and to *svasamvitti* in Mahāmudrā practice. In the phenomenological reduction the redirection gesture is dualistic or intentional (i.e. *about* an object). In contrast, we have seen in stage 2 of the first level of analysis (section 2.1.3) that it must be done by another mode of knowing that is *not* dualistic sense-making. Rather, that mode of knowing must lack any subject-object distinction. It needs to be non-intentional. Otherwise, an infinite regress is elicited through which sense-making is increased, not decreased. This is also reflected in Mahāmudrā instructions, as already shown. From this distinction between the redirection in the phenomenological reduction on the one hand and the presented notion of nondual reflexive knowing and *svasamvitti* in Mahāmudrā practice on the other hand, necessarily a divide concerning knowing groundlessness arises.

Knowing groundlessness is the core of this thesis as well as of Mahāmudrā practice. However, phenomenology, at this point, cannot account for this kind of recognition of nondual awareness. More importantly, the phenomenological reduction may not explicitly aim for knowing groundlessness. In the following passage, Eleonor Rosch elaborates why the Buddhist understanding of knowing groundlessness goes beyond phenomenology.

> There is another mode of knowing not based on an observer and observed. This ushers in phase 2 of enaction, what in the book we call *groundlessness* (chapter 10).
> At this point we have gone beyond phenomenology. Yes, this is a controversial claim given Heidegger's account of Being-in-the-World (*in-der-Welt-sein*) where there is no split between subject, object, consciousness, and world, followed by Merleau-Ponty's psychology that extends this foundational idea. Added to these are the new interpretations of Husserl based partly on material of his not available when our book was originally written. But there is a **difference between such ideas as philosophy or scientific theory and what results from the actuality of a mind in the nondual awareness** that can be brought about (*uncovered* is probably a better term) by Buddhist meditations, contemplations, transmissions, and other practices.
> Here is the difference. In foundational European phenomenology (for convenience I will use Heidegger's terminology), the central image of a mind that does not make distinctions between subject and object, that is,of a mind in the pre-reflective natural state, is of a **person actively engaged in the world, a person with interests, cares, concerns, and goals who is vigorously pursuing those goals using whatever comes before him as a tool**. It is when there is some breakdown in that state (something doesn't work) that the person will draw back, assume the abstract attitude, reflect on experience, and give birth to those distinctions. From the Buddhist point of view, this is a romanticization of samsara. What that actively engaged person is engaged in is vigorously trying

> to grasp and cling to what he wants, flee from or attack what he does not want, and ignore what he feels is irrelevant to himself—all while using objects, other people, and the environment only as instruments to foster his desires. The opposition between self and other is not a matter of abstract reflection but is built into the engagements of a consciousness birthed via the skandhas or, in our terminology, *enacted* without awareness of its nature. When the unaware person is actively, even skillfully or harmoniously, engaged in his life, he is generally in a state of absorption, his mind cushioned by a cloud of fragmented perceptions, attentions, intentions, fantasies, thoughts, efforts, feelings, and memories that give him the sense of who he is and what he is about, but do not make him fully present (in Buddhist terms he is in "the ghostly confusion of phenomenal existence"). And when that person attempts to stop and look at his experience, the shadow of an ever present but slippery separate observer already present in the cloud comes to the fore, another kind of fragmented duality that makes it difficult to look. There is no first person here and only a ghostly sense of any second or third person. (Rosch, 2017, pp. xxxix–xl, emphasis added)

This passage highlights the opposition between the "pre-reflective natural state" from phenomenology and "knowing groundlessness" from the Buddhist tradition. While the pre-reflective natural state still includes a subject acting in the world regarding its concerns (i.e. an approach/avoidance stance), knowing groundlessness lacks exactly this subject-object duality and a respective sense of a need to approach or avoid anything. This aspect of knowing groundlessness is reflected in the concept of "non-adaptivity" regarding its requirements (cf. section 2.1.2). Due to its rather intentionality-focused view on redirection, the phenomenological tradition may not yet account for knowing groundlessness, as far as I currently know. Therefore, I agree with Eleonor Rosch's statement concerning phase 2 enaction or groundlessness that "[a]t this point we have gone beyond phenomenology" (Rosch, 2017, p. xxxix).

Now that we have compared the two requirements of a transition from sense-making to knowing groundlessness (RQ2), we are ready for asking about the point of arrival: knowing groundlessness. In alignment with the statement that knowing groundlessness goes beyond phenomenology, the following search for hints of plausibility of knowing groundlessness can at this point only be provided by comparisons to Mahāmudrā practice but not to Phenomenology. Therefore, the question for the following section concerns knowing groundlessness in Mahāmudrā practice: what is knowing groundlessness in the context of Mahāmudrā practice? Does the synthesized description from the first level of analysis (section 2.1) make sense in the context of Mahāmudrā?

3.1.1.4 Point of arrival: Knowing Groundlessness

Is reflexive awareness (Tibetan: *rang rig*, Sanskrit: *svasamvitti*) the same as "knowing groundlessness"? From within the coherence of the enactive approach, we discovered in chapter 2 the following distinction between nondual reflexive knowing and knowing groundlessness: while nondual reflexive knowing is already present *during* sense-making but is obscured by it, knowing groundlessness is the *recognition* of this nondual reflexive knowing during an *absence of sense-making*.

Interestingly, the Mahāmudrā tradition makes a similar distinction:

> first, reflexive awareness does not employ a subject–object structure, and second, it is present in every moment of ordinary, dualistic consciousness. On this view, it must be present because it is what accounts for the fact that dualistic experience always includes a sense of subjectivity. In the context of contemplative practice, this means that inducing a nondual state does not require developing some new capacity of awareness. Rather, it involves **enhancing an innate feature of consciousness** while also using techniques that make the dualistic structures subside. (Dunne, 2015, p. 261, emphasis added)

This passage shows that nondual reflexive awareness in Mahāmudrā is not seen as a new capacity of awareness. Instead, it is already present in every moment of ordinary dualistic consciousness. However, knowing groundlessness involves in Mahāmudrā practice the enhancement of this nondual awareness while enabling the subsidence of dualistic cognition (i.e. subsidence of adaptive sense-making). Even this point of Mahāmudrā is in fascinating correspondence to the previously applied juxtaposition between nondual reflexive knowing and knowing groundlessness: nondual reflexive knowing is constantly present but is only recognized in a moment of knowing groundlessness when adaptive sense-making has ceased.

However, the Mahāmudrā tradition also provides insights which the enactive theory alone cannot give account of. Those insights concern *experience descriptions* of knowing groundlessness: what is it like to experience groundlessness? The traditional Mahāmudrā response to that question highlights two experiential aspects of groundlessness: *emptiness* and *luminosity*. In other words, realizing groundlessness is to see that the flow of experience itself is nothing other than the *empty luminous mind*. "Luminosity" in this regard denotes the "knowingness" aspect of consciousness whereas "emptiness" means that it is devoid of the structures that constitute subject and object, and even time and space: "[n]ot only is everything from the aggregate of forms to omniscient enlightenment unreal, empty and devoid of mental constructs; in addition, everything is luminosity" (Rinpoche, 2002, p. 13).

In summary, the first level of analysis in this thesis is well reflected by Mahāmudrā practice instructions. In the first level of analysis in chapter 2 I derived from the enactive approach a theoretical description of what a practitioner would need to do in order to enable her a transition to knowing groundlessness. In Mahāmudrā, we find a tradition in which this exact transition to knowing groundlessness is actually practiced in a direct embodied way. Most interestingly, there is a surprisingly close correspondence between this thesis' theoretical derivation of what is needed for such a transition and what Mahāmudrā practitioners in fact *do* in order to know groundlessness. This strong correspondence is taken as a clear hint that the conclusions from this thesis' first level of analysis are indeed plausible in the context of lived practice.

3.1.2 Second Level of Analysis

The second level of analysis provided the insight that the first level description is invalid from *within* the perspective of knowing groundlessness. The description is revealed as enacted.

First, the provided description is context-dependent and observer-relative. Second, it comes from *within* acts of adaptive sense-making (phase 1 enaction). Third, this description is inappropriate from *within* the "perspective" of knowing groundlessness. Fourth, none of the two perspectives is ultimately true. However, they make sense in different contexts.

In the context of the "perspective" from within knowing groundlessness, language is an inappropriate method. Any use of language reintroduces sense-making. This necessarily interrupts a moment of knowing groundlessness. Therefore, language and knowing groundlessness are mutually exclusive. At this point, we have reached an end of linguistic description. Here, philosophical analysis is not useful anymore. From *within* this "perspective" of knowing groundlessness this exact knowing groundlessness can only be explored further when conceptual thinking is left behind.

Is there a similarity of those conclusions to some forms of Buddhist philosophy? First, the most obvious correspondence is due to our direct use of a traditional Buddhist argument in this second level of analysis. The neither-one-nor-many argument, which we applied to reveal the incoherence of the idea of emergence, has its roots in Buddhist philosophy, namely in Dharmakīrti's *Saṃbandhaparikṣhā* (Analysis of Relations) (cf. Dunne, 2004, p. 43). Even more importantly, the core of the second level of analysis is very similar to the endpoint of Nāgārjuna's philosophy who influentially introduced the idea of groundlessness (*śūnyatā*) to Buddhist thought in the first place. Those similar conclusions are expressed in several passages of his *Mūlamadhyamakakārikā*. Let us have a look on some of those passages in detail.

First, Nāgārjuna offers a similar criticism concerning the idea of relationality or circular establishment. Thereby, it is translatable to a criticism against the idea of co-emergence in the enactive approach. In chapter 10, verse 10, Nāgārjuna addresses this idea of co-dependence: "[i]f an entity x is established in dependence [on something else y], and in dependence on that very entity x there is established that y on which x's establishment depends, then what is dependent on what?" (*Mūlamadhyamakakārikā*, chapter 10, verse 10; cf. translation by Siderits & Katsura, 2013, p. 115). The translators Siderits and Katsura added an elaboration of this argument in the form of an example:

> [i]f fire truly depends on fuel, then fuel must first exist before there can be fire. But if fuel in turn depends on fire, it cannot exist prior to fire. The mutual dependence that the opponent claims to hold between fire and fuel (or between person and skandhas) appears to be incoherent. (Siderits & Katsura, 2013, p. 115)

This is the striking point. The mutual dependence between fire and fuel (or of membrane and metabolism in the case of an autopoietic cell) turns out to be incoherent. From Nāgārjuna's point of view, this is not a circular establishment but a failure to establish. If this argument by Nāgārjuna is accepted, all the enactive accounts of circular emergence (e.g. co-emergence, autonomy etc.) are failures of establishment. In order to establish them, those ideas prompt to talk about something else. It renders a form of avoidance to say that one simply does *not* know. Rather, it is required to

understand those incoherent ideas of the circular causality as pointers to the need for recognizing those things and processes as being empty or *śūnya*. They need to be experienced as groundless.

Second, in the second level of analysis we arrived at the conclusion that descriptions of groundlessness are necessarily groundless themselves. Therefore, conceptuality needs to be overcome in order to enable an experience of groundlessness in a more direct manner. This claimed necessity for overcoming the theoretical description of groundlessness is also reflected in Nāgārjuna's endpoint of his philosophy: "[d]ependent origination we declare to be emptiness. It [emptiness] is a dependent concept; just that is the middle path" (*Mūlamadhyamakakārikā*, chapter 24, verse 18; cf. translation by Siderits & Katsura, 2013, p. 277). This is one of the most famous verses from Nāgārjuna's *Mūlamadhyamakakārikā*. However, the translators call for caution concerning this verse as it can easily be misunderstood. They elaborate on this relation between interdependence and emptiness in the following way:

> [t]o say of emptiness that it is a dependent concept is to say that it is like the chariot, a mere conceptual fiction. […] That is, emptiness is itself empty. Emptiness is not an ultimately real entity nor a property of ultimately real entities. Emptiness is no more than a useful way of conceptualizing experience. (Siderits & Katsura, 2013, p. 277)

Accordingly, emptiness is seen as empty itself. In our terminology, groundlessness is itself groundless. Therefore, to say that groundlessness (*śūnyatā*, emptiness) is a "dependent concept" does not mean that interdependence ultimately exists but rather that there is no possibility for an ultimate reality where things have an *independent* essence. Therefore, *śūnyatā* has no ultimate meaning, it is groundless itself: "[i]f something that is non-empty existed, then something that is empty might also exist. Nothing whatsoever exists that is non-empty; then how will the empty come to exist?" (*Mūlamadhyamakakārikā*, chapter 13, verse 7; cf. translation by Siderits & Katsura, 2013, p. 143). This is a very important point. If nothing exists that is not groundless, then also the groundlessness itself cannot exist in and of itself. Therefore, it is a major mistake to make *śūnyatā* into *something* one can know or experience. It is a mistake to make it into an object. In Nāgārjuna's words, "[e]mptiness is taught by the conquerors as the expedient to get rid of all [metaphysical] views. But those for whom emptiness is a [metaphysical] view have been called incurable" (*Mūlamadhyamakakārikā*, chapter 13, verse 8; cf. translation by Siderits & Katsura, 2013, p. 145). In this verse, Nāgārjuna importantly warns against turning emptiness into a metaphysical view. Those who do it are "incurable" because they turn groundlessness to their ground. Since groundlessness is the cure, they turn the cure into the illness. That is why this view in groundlessness is so dangerous if one overlooks that the view of groundlessness is itself groundless. Therefore, groundlessness is merely a metaphor that shall nudge one into a state *free* of views.

This is the reason why this philosophy is explicitly *not* nihilistic. A nihilist dedicates oneself in the *view* that nothing exists. By this, nihilism provides a place to hang one's hat: nothingness. It is a *belief* in the absence. The Madhyamika but recognize that this is a view. As *śūnyatā* is a place

from which one abandons *all* views, one also abandons the view that *śūnyatā* exists. This is why the term *śūnyatā* (groundlessness) shall nudge us into a state free of views.

Third, in the second level of analysis, we proposed that any use of language reintroduces sense-making. This necessarily interrupts a moment of knowing groundlessness. Therefore, language and knowing groundlessness are mutually exclusive. Accordingly, language keeps a practitioner from *actually* experiencing what this thesis tries to investigate: groundlessness. Also, this point is clearly reflected in Nāgārjuna's endpoint of his philosophy (verse 9 of chapter 18): "not to be attained by means of another, free [from intrinsic nature], not populated by hypostatization, devoid of falsifying conceptualization, not having many separate meanings—this is the nature of reality". (*Mūlamadhyamakakārikā*, chapter 18, verse 9; cf. translation by Siderits & Katsura, 2013, p. 202). This verse concerns the problem of language. As the translators explain, "[t]o say that the nature of reality is not to be attained by means of another is to say that one must apprehend it directly for oneself" (Siderits & Katsura, 2013, p. 202). Groundlessness cannot be conveyed to you. Language is at this point insufficient. Language cannot refer to knowing groundlessness because one cannot refer to non-referring without immediately obscuring it. This is in close alignment to our conclusion from the second level of analysis: an actual direct understanding of knowing groundlessness requires us to see that the description from the first level of analysis is itself groundless. It is merely context-dependent and observer-relative. Any further application of language as a method for investigation keeps us away from directly knowing groundlessness. Through language we arrived at the endpoint of the capabilities of language. Through rationality we arrived at the irrationality of rationality itself: rationality is always context-dependent and observer-relative. This is clearly reflected in Nāgārjuna's middle way.

In making this step we are enabled to see an interesting split in the levels of philosophy by Nāgārjuna. There are two levels. On the one hand, Nāgārjuna stated positively that groundlessness (*śūnyatā*) is a dependent concept. On the other hand, groundlessness does not have an ultimate meaning. To say that it is a dependent concept is therefore also wrong since it is a statement concerning its existence. What does that mean? At this point, it is important to have in mind Nāgārjuna's conception of truth. He and the Madhyamika philosophy distinguish two levels of truth, the *relative* and the *ultimate.* Those two truth levels are also mentioned by Varela et al. (1991):

> [r]elative truth (samvrti, which literally means covered or concealed) is the phenomenal world just as it appears—with chairs, people, species, and the coherence of those through time. Ultimate truth (paramartha) is the emptiness of that very same phenomenal world. The Tibetan term for relative truth, *kundzop,* captures the relation between the two imagistically; *kundzop* means all dressed up, outfitted, or costumed—that is, relative truth is śūnyatā (absolute truth) costumed in the brilliant colors of the phenomenal world. (Varela et al., 1991, p. 226)

While the relative truth is the way things appear with clear properties, the ultimate truth goes *beyond* all descriptions and concepts. It consists in deconstructing every statement without becoming itself a positive statement on what exists.

On the relative truth level one can say that everything is groundless. It lacks any own existence. Therefore, also groundlessness itself is groundless, it must be understood as a dependent concept that does not ultimately exist in itself (cf. *Mūlamadhyamakakārikā*, chapter 24, verse 18; cf. translation by Siderits & Katsura, 2013, p. 277). This is a crucial statement. It already leads to the ultimate level: if it is true that everything is groundless, it is only coherent to apply it to itself by unfixing the fixation, even on groundlessness as an idea itself.

Therefore, on the ultimate truth level, one simply cannot say that this is true either. To say that something is true is again to solidify the unsolid. Even this can't be said. On ultimate level, any form of linguistic reference simply fails, including this one. However, this thesis does not aim for accounting for an ultimate truth level which would be silly and mere contradiction. Instead, we will continue to explore this on the relative truth level within language.

This contrast between the relative and the ultimate truth level is directly analogue to the distinction between the first level of analysis and the second level of analysis in chapter 2. On the first level of analysis, I stated that the transition from adaptive sense-making to knowing groundlessness is realized through non-adaptivity and the simultaneous sustainment of nondual reflexive knowing. However, on the second level of analysis, I showed that this first level description is context-dependent and observer-relative. Moreover, it reflects the perspective from *within* sense-making. From *within* the "perspective" of knowing groundlessness, the first level description is invalid and unrelated to that which it tries to describe. From this point of view, language as a method is inappropriate. It is inexplicable. While the first level of analysis relates to Nāgārjuna's notion of relative truth, the second level of analysis refers to his notion of ultimate truth.

Thereby, on this second level of analysis I arrived at an end of capabilities of theory and analysis. This corresponds to Chökyi Nyima Rinpoche's statement that clearly reflects this view: "[t]he ultimate result of the scholarly approach is to go beyond analysis." (Rinpoche, 2002, p. 183). It leaves me with the impression that the second level of analysis can be regarded as successful.

To summarize, it is interesting and surprising how corresponding those views arising from within the enactive approach are in relation to Mahāmudrā practice and to Nāgārjuna's philosophy of the middle way.

In this section, we have explored to which extent this thesis' enactive theoretical description of the transition from adaptive sense-making to knowing groundlessness corresponds to Mahāmudrā practice on the one hand and to phenomenological reduction on the other. Thereby, we discovered striking correspondences between what our theory predicted to be effective for shifting into knowing groundlessness and what practitioners in the Mahāmudrā tradition actually practice in order to shift into this exact felt state of knowing groundlessness. Those correspondences between

the conclusions from the first level of analysis and Mahāmudrā practice are summarized in Table 1.

However, regarding the phenomenological reduction the similarity regarding the aspect of "non-judgment" is accompanied by an important distinction between the Phenomenological gesture of redirection and our idea of nondual reflexive knowing from chapter 2.

Table 1

Summary of correspondences between the enactive approach to the transition from sense-making to "knowing groundlessness" and Buddhist Literature

Stages of Exploration in Chapter 2	**Enactive Approach to Knowing Groundlessness (Chapter 2)**	**Corresponding ideas from Mahāmudrā instructions**
1) Point of departure	Adaptive sense-making	Samsara: confused and ignorant mind that is dualistic on the basis of its habitual approach/avoidance tendencies
2) Stage 1	**Aim**: decrease sense-making **Method:** decrease adaptivity **Gaps**: (1) There is no decrease of adaptivity without *knowing* the current adaptivity and sense-making. (2) There is no transition from decreasing one adaptivity act to another one without *knowing* the respective adaptivity act.	**Aim**: inhibit thought (as an aid to cultivating present-centered awareness): self-liberation of thought (*rang grol*) **Method**: inhibit a requirement of thought: inhibit the approach/avoidance stance of an agent acting in the world **Purpose**: supporting present-centered *awareness*
3) Stage 2	**Aim**: reflexive knowing of current sense-making acts and adaptivity acts **Method and problem**: the "sense-making-of-sense-making" approach leads to an infinite regress. Sense-making is then *in*creased. **Alternative**: nondual reflexive knowing (phase 2 enaction)	**Aim**: reflexive awareness **Method and problem**: the so-called "spy of mindfulness" approach leads to an infinite regress (*anavastha*) **Alternative:** "looking intently" (*cer gyis lta*) via nondual reflexive awareness (*rang rig*; *svsamvitti*)
4) Point of Arrival	Knowing groundlessness is phase 2 enaction knowing itself, unobscured by adaptive sense-making.	Reflexive awareness (*rang rig*; *svsamvitti*) is constantly present but is only recognized in a moment of knowing groundlessness when adaptive sense-making has ceased. Groundlessness is experienced as *empty luminosity*.

At this point I will highlight the correspondences between this thesis' enactive theory of what a shift to knowing groundlessness requires and what Mahāmudrā practitioners in fact practice for facilitating such a shift. Especially interesting is that those correspondences occurred on both of the two levels, on the first level of analysis and on the second level of analysis. On the first level of analysis I derived from within the enactive approach two main ingredients that are necessary for sense-making to cease and to know groundlessness: (1) non-adaptivity and (2) nondual reflexive knowing. Both two predicted requirements for a shift from sense-making to knowing groundlessness find their direct equivalent in the nondual Mahāmudrā practice and in its underlying philosophy: (1) non-judgment and (2) reflexive awareness (*svasamvitti; rang rig*).

On the second level of analysis, I expounded that from within knowing groundlessness there is no object to describe and no subject that describes. Thereby, language and knowing groundlessness are mutually exclusive. From *within* this "perspective" of knowing groundlessness this exact knowing groundlessness can only be explored further when conceptual thinking is left behind. This is clearly reflected in Nāgārjuna's endpoint of his philosophy.

The correspondences on the first level of analysis I interpret as a sign of plausibility: the derived predictions of the enactive theory regarding the transition from sense-making to knowing groundlessness make sense in the context of Mahāmudrā practice. The correspondences on the second level of analysis I interpret as an additional sign of plausibility: the conclusion that those descriptions of the transition process are themselves context-dependent, observer-relative, and accordingly groundless make also sense in the context of Mahāmudrā practice and its underlying Madhyamika philosophy. Again, this is pointedly stated in Chökyi Nyima Rinpoche's words "[t]he ultimate result of the scholarly approach is to go beyond analysis" (Rinpoche, 2002, p. 183). However, as the groundlessness of this approach is attempted to be kept in mind, this whole approach remains open for context-dependent and observer-relative discussion.

3.2 The Value in the Context of Cognitive Science

What does all of this mean for investigating the mind? This core question will guide us in approaching the aim of deriving the larger implications of this thesis for cognitive science methodology. Concretely, this aim will be approached in two steps: (1) step back and zoom out, and (2) step forward and zoom in. First, we will zoom out and look at the cognitive science paradigms at large. Moreover, we will do so from an unconventional point of view: with respect to paradigms in Buddhist philosophy. Precisely, cognitive science paradigms are compared to those of Buddhism. This first step provides two benefits. On the one hand, it enables seeing cognitive science paradigms from a fresh perspective: what does cognitive science currently aim at and what can it aim at in the future? On the other hand, it provides a bigger picture and a frame of reference through which we can assess this thesis' contribution in a larger paradigmatic context. Second, we will zoom in and

assess this thesis in the context of cognitive science paradigms: where is it located within cognitive science? More importantly, we will explore what this thesis, by its second level of analysis, points at for a potential future development of cognitive science.

3.2.1 Convergence of Paradigms: Cognitive Science and Buddhist Philosophies

In the previous section we have discovered some striking correspondences between this thesis' enactive theory of what an effective shift towards knowing groundlessness requires and what Mahāmudrā practitioners in fact practice for facilitating such a shift. At this point, it is important to recognize that this comparison is made between this thesis' enactive approach as a *certain* paradigm in cognitive science on the one hand and Mahāmudrā practice and its underlying philosophy as a *certain* paradigm in the Buddhist tradition. Two specific paradigms from respectively heterogenous traditions were compared. However both, cognitive science and Buddhist practice not only comprise one line of thought but many. Therefore, it is worth to expand the perspective towards a paradigm-oriented comparison: are there similarities between various paradigms from cognitive science to various approaches within Buddhism?

Table 2

Comparison of paradigms between cognitive science and Tibetan Buddhism

Cognitive Science Paradigm	**Buddhist Paradigms**	**Common Themes**		
		Self	**World**	**Remarks**
"Ordinary view"		Fixed self	World is pregiven	Cognition comprises representation
Cognitivism & Connectionism	First turning of the wheel of Dharma	Disunified self	World is pregiven	Cognition comprises representation
Enactive Approach	Second turning of the wheel of Dharma	Disunified self	World is enacted	Śūnyatā (groundlessness)
[*To be explored*]	Third turning of the wheel of Dharma	Interdependence of self and world points to a state of *experientially* realizing the nondual. Two aims: (1) what is *śūnyatā* like? (2) Overcome subject-object duality in lived experience		

Accordingly, the aim of this subsection is to look at the cognitive science paradigms from an unconventional point of view: with respect to analogue paradigms in Buddhist philosophy. This is done by comparing those paradigms of cognitive science with Buddhist paradigms of thought. In particular, I will analyze to which extent the three cognitive science paradigms *cognitivism*, *connectionism*, and *the enactive approach* plausibly correspond to the *three turnings of the wheel of Dharma* in Tibetan Buddhism. The choice of cognitive science paradigms is inspired by Varela et al.'s (1991, pp. 6–9) overview of cognitive science. The choice of Buddhist paradigms is inspired by the *three turnings of the wheel of Dharma* . It is a framework for classifying the various Buddhist teachings. This framework was originally postulated by the Yogacara school and is especially prevalent in a modified form in the Tibetan Buddhist tradition (Dunne, 2016; Gyatso & Jinpa, 1995, pp. 9–30).

An overview of the comparison between the paradigms in cognitive science and the paradigms in Buddhist thought is provided in

. Let us walk through it step by step.

3.2.1.1 A Unified Self and a Represented World: An Ordinary View

The background from which cognitive science and Buddhism set themselves apart is in both cases an "ordinary view" of the self. This ordinary view consists in the presupposition of a fixed self that is independently existing in and of itself. This is the view from which cognitive science and Buddhism arise as approaches contradicting this ordinary view.

3.2.1.2 A Disunified Self and a Represented World: Cognitivism, Connectionism, and the First Turning of the Wheel

Cognitivism was for a long time treated as the core of cognitive science. Its main metaphor for a cognitive system is the digital computer: "simplifying for the moment, we can say that cognitivism consists in the hypothesis that cognition—human cognition included—is the manipulation of symbols after the fashion of digital computers. In other words, cognition is mental representation" (Varela et al., 1991, p. 8).

Accordingly, the cognitivist paradigm hypothesizes that the mind operates by (1) computation (i.e. manipulating symbols) on the basis of (2) representations of a pregiven world. By this notion of representation, the cognitivist approach runs out to adopt a realist perspective. However, although it is not the main point of the cognitivist approach, it yet "uncovers the nonunity of the cognizing subject" (Varela et al., 2017, p. lxv). Thereby, the cognitivist paradigm proposes the disunity of a self. On the other hand, it presumes an independent world out there that is represented by this disunified cognitive system (Varela et al., 1991, p. 57).

The connectionist approach, however, has arisen from the critique that symbol processing may not be the appropriate mechanism through which cognition operates on representations (Varela

et al., 1991, p. 8). In connectionist models this critiqued symbolic processing is substituted by *distributed* operations which result from emergent processes:

> [c]onnectionist models generally trade localized, symbolic processing for distributed operations (ones that extend over an entire network of components) and so result in the emergence of global properties resilient to local malfunction. For connectionists a representation consists in the correspondence between such an emergent global state and properties of the world; it is not a function of particular symbols. (Varela et al., 1991, p. 8)

Accordingly, the connectionist paradigm hypothesizes that the mind operates by (1) emergent distributed processes still on the basis of (2) representations of a pregiven world. Despite its renunciation from the cognitivist idea of symbol processing as the key mechanism of how human minds operate, connectionism yet inherits its central notion of representation and the underlying realist stance. However, concerning the notion of a self the connectionist approach highlights its disunity in an even more pronounced way than the cognitivist paradigm. Instead of being caused by localized and symbolic processes, the mind is caused by a distribution of various processes that interact with each other in a complex dynamical manner that gives rise to emergent properties. To conclude, cognitivism as well as connectionism include a notion of a disunified self on the one hand and an independent pregiven world that is internally represented on the other hand.

How is this notion of a disunified self related to the so-called "first turning of the wheel" in Tibetan Buddhism? A first hint is already provided by Varela et al. (1991,2007): "the disunity of the self and of conscious awareness, which modern-day cognitivism has uncovered, is in fact a focal point of the entire mindfulness/awareness tradition" (Varela et al., 1991, p. 57).

The first turning of the wheel illustrates the perspective of early Buddhism. Early Buddhism started with a similar point as the one we have highlighted for cognitivism and connectionism: the disunity of the self. While being so prevalent in everyday experience, when it is reflected upon, the self cannot be found: "[t]he tension between the ongoing sense of self in ordinary experience and the failure to find that self in reflection is of central importance in Buddhism" (Varela et al., 1991, p. 61).

In the first turning of the wheel this failure to find that self in reflection is put in relation to the dualistic mind. It is that dualistic mind that clings to a self and therefore causes its suffering: "[s]imply put, the Buddha's message in the first turning of the Wheel of Dharma is that anyone with a dualistic frame of mind suffers. The dualistic mind entertains selfish emotions, creates karma, has worries, hope, fear and pain" (Rinpoche, 2002, p. 10).

Chökyi Nyima Ronpoche concludes on the first turning of the wheel by presenting its typical emphasis on selflessness: "in a nutshell, then, the realization of egolessness is the quintessence of the Buddha's first turning of the Wheel of Dharma" (Rinpoche, 2002, p. 12).

As reflected in this preceding quote, the central point of the first turning of the wheel is selflessness. In summary, cognitivism and connectionism share with the first turning of the wheel

of dharma in Buddhism the idea of the disunity of a self or a kind of selflessness: there is nor fixed stable identity to be found in human cognition.

3.2.1.3 A Disunified Self and a Groundless World: the Enactive Approach and the Second Turning of the Wheel

In opposition to the cognitivist and connectionist view, Varela et al. (1991) proposed in their book *The Embodied Mind* the enactive approach which we explored at length in chapter 1. The motivation behind the enactive approach is shortly summarized by Varela et al. (1991) in the following quote: "[the enactive approach is] "born from a deeper dissatisfaction than the connectionist search for alternatives to symbolic processing. It questions the centrality of the notion that cognition is fundamentally representation" (Varela et al., 1991, p. 9).

As already seen to some extent in chapter 1, the enactive approach questions three notions that underly such an idea of representations. First, the enactive approach questions the notion of a pregiven world with particular properties. Second, from the enactive point of view there are no representations of those pregiven properties. We do not pick up those properties by representing them. Third, it dissolves the separation between subject and that pregiven world. There is no separate subject who does such representations. In opposition to those three notions that underlie the idea of representation, the enactive approach emphasizes the enaction of mind and world based on the living being's history of actions:

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

Therefore, the enactive approach hypothesizes that the mind operates by (1) emergent distributed processes through which it (2) enacts worlds rather than representing them (see chapter 1 for a detailed overview of the enactive approach).

How is this notion of enaction related to the so-called "second turning of the wheel" in Tibetan Buddhism? The correspondence between the enactive approach and the second turning of the wheel is relatively obvious given that Varela et al. (1991) in their development of the enactive approach, explicitly referred to Nāgārjuna and Madhyamika philosophy. They represent the main position of the second turning of the wheel. Accordingly, the main emphasis in the second turning of the wheel is on *śūnyatā* (groundlessness, emptiness): "[i]n the second turning of the Wheel of Dharma, the Buddha went deeper. He taught that not just ego, but all phenomena; are empty and devoid of true existence" (Rinpoche, 2002, p. 12).

Therefore, from the point of view of the second turning of the wheel it is necessary to let go of essentialism about reality itself. Not only the self is not existent ultimately but even *all* things are

empty of any kind of fixed identity. They are empty of essence. They are groundless. Even groundlessness itself is not really groundlessness. Rather, groundlessness expresses the need to let all those reifications go and abide in the flipside of it: interdependence.

The commonality between the enactive approach (by Varela et al., 1991, and Thompson, 2007) and the second turning of the wheel is clearly visible concerning their perspective on foundationalism: both two approaches emphasize that there is neither any foundation in the self, nor any foundation in the world. While "[e]nactive cognitive science […] require[s] that we confront the lack of ultimate foundations" (Varela et al., 1991, p. 234), also the second turning of the wheel sees "that not just ego, but all phenomena; are empty and devoid of true existence." (Rinpoche, 2002, p. 12). Importantly, this critiqued foundationalism is not substituted by anything else. Even *śūnyatā* is not something, but it just marks that there is no ground, not even in groundlessness. The flipside is an emphasis on interdependence: while groundlessness is to be understood as a codependent concept, also the enactive approach emphasizes on co-dependent arising and proposes to establish this even in scientific practice itself (Varela et al., 1991, pp. 9–12): "[t]he fundamental insight of the enactive approach as explored in this book is to be able to see our activities as reflections of a structure without losing sight of the directness of our own experience" (Varela et al., 1991, p. 12).

At this point, we arrived now at the enactive approach that underlies this thesis. However, in Tibetan Buddhism a third turning of the wheel is prevalent that builds on but goes beyond Nāgārjuna's philosophy of groundlessness.

3.2.1.4 What is Beneath the Disunified Self and the Groundless World? The Third Turning of the Wheel

In the Tibetan Buddhist framework of the Buddhist teachings, there is also a third turning of the wheel, the view of nonduality. Two questions drive this paradigm of nonduality in Buddhism. First, what does it mean to directly experience *śūnyatā* or groundlessness? As it cannot be an object or thing that is experienced, what is that experience of the world as groundless then? Second, the problem of subject and object is pointed out in the third turning of the wheel: the sense of subjectivity appears to constitute objects while at the same it appears that the sense of objects constitutes subjectivity. This exact interdependence between subject and object points to a state in which the nondual is realized (i.e. "knowing groundlessness") (Gyatso & Jinpa, 1995, pp. 23–26; Rinpoche, 2002, pp. 13–19).

The third turning of the wheel does not only comprise the question what an experience of groundlessness is like but moreover, it contributes a respective answer based in nondual meditation experiences. From their point of view, to realize *śūnyatā* (i.e. "to know groundlessness") is to see that the flow of experience itself is nothing other than the *empty luminous* mind. Luminosity in this context refers to the knowingness aspect of consciousness. Emptiness shall articulate that experience is devoid of the structures that constitute subject and object or even time and space:

> [d]uring the third turning of the Wheel of Dharma, the Buddha explained in a way that is even more clear. Not only is everything from the aggregate of forms to omniscient enlightenment unreal, empty and devoid of mental constructs; in addition, everything is *luminosity.* (Rinpoche, 2002, p. 13)

Most interestingly in the context of this thesis, it appears that there is no approach in cognitive science yet that matches those important features of the third turning of the wheel. At this point one could argue that this alignment is neither necessary nor helpful to be approached since cognitive science and Buddhism have strikingly different aims. However, if we understand cognitive science as a science aiming at a genuine understanding of the mind it is worth looking for inspiration in other cultural traditions that aim for a similar target. Therefore, I see a high potential value in following this track of the third turning of the wheel for envisioning a next paradigm in cognitive science that progresses even beyond the enactive approach in its understanding of the mind.

3.2.2 Pointers to a Future Cognitive Science: This Thesis and a Next Paradigm

Two points of the previous comparison of paradigms are especially important in the context of this thesis. First, this thesis is to be located within the enactive approach. Second, this thesis has similarities to the third turning of the wheel from Buddhist philosophy: it asks about groundlessness as an experience. However, it does so from *within* the theoretical frame of the enactive approach. Therefore, this thesis is to be located at the edge of the enactive approach. From there, it can provide some hints at a next potential paradigm for cognitive science. Let us explore those two points in more detail.

Accordingly, I will explore two questions that guide us to a vision for a meaningful future development of cognitive science: first, where is this thesis located in the landscape of the presented paradigms? Second, what could the next cognitive science paradigm for progressing a genuine understanding of the mind look like?

Let us start with the first question: where is this thesis located in the landscape of paradigms in cognitive science and Buddhist philosophy? This thesis clearly refers to the enactive approach. Furthermore and as already mentioned, its first research question (RQ1) is close to the guiding question of the third turning of the wheel in Buddhism: “what is it to know groundlessness?” Thereby, this thesis asks on a *theoretical level* about the experiential realization of the nondual. However, in the third turning of the wheel the exact same question is asked but on an explicitly *experiential level*: “what is it like to know groundlessness?”

The second research question (RQ2) of this thesis concerns the processes that are required for an *experienced* transition from adaptive sense-making to knowing groundlessness. This question points towards theory-driven predictions of what a practice should look like that induces a recogni-

tion of the nondual. Therefore, this points to the *practice* that is required to *experience* the recognition of the nondual. This is an important pointer for a future development of cognitive science methodology.

From this point of view, those two research questions indicate that this thesis can be located at the bottom end of the enactive approach while pointing at the need for a next paradigm.

First, via the enactive approach we have seen that all cognition is groundless. Thereby, the "basis" of cognition is groundlessness. If we are interested in the deepest roots of cognition, we need to investigate groundlessness. Moreover, groundlessness can be experienced. However, in the second level of analysis we have seen that knowing groundlessness and language are mutually exclusive. Knowing groundlessness cannot be conveyed to anyone. Thereby, we arrived at an end of the capabilities of the enactive approach. Although it might be considered the most coherent approach in cognitive science so far due to its strongest emphasis on interdependence, it is still incoherent. We have seen that those accounts of groundlessness are themselves groundless.

Second, this conclusion of the second level of analysis already points towards the next step in the development of a cognitive science about groundlessness. If knowing groundlessness cannot be conveyed to anyone via language, a meaningful direction of a future paradigm in cognitive science consists in developing alternative methods: *how else can researchers investigate knowing groundlessness*?

This thesis provides a hint. investigating groundlessness as nondual experiences requires to realize the nondual *within* one's experience. This is a step from theory to a form of *empirical* investigation of groundlessness including nondual awareness. Not only that this thesis pointed towards the methodological need for experiencing it, it also pointed out an according practice derived from the theoretical view of the enactive approach which has been shown to be largely corresponding to Mahāmudrā instructions.

Accordingly, this thesis contributes two pointers to a next paradigm in cognitive science. The *first pointer* arises from within the enactive analysis: a method is required that accounts for *experiences* of the nondual. In the second level of analysis, we have seen that the description of groundlessness is itself context-dependent and observer-relative. It comes from *within* acts of adaptive sense-making (phase 1 enaction). However, from a "perspective" of knowing groundlessness this description is invalid. From within knowing groundlessness there is no object to describe and no subject that describes. As any use of language reintroduces sense-making, it interrupts a moment of knowing groundlessness as a lived experience. Therefore, language is an inappropriate method. Hence, we reached at this point an end of philosophical and linguistic capabilities. Taking this seriously, I concluded that knowing groundlessness can only be explored further when conceptual thinking is left behind. This begs for a radically different method in the cognitive science of groundlessness.

The *second pointer* arises from the comparison to the third turning of the wheel in the Buddhist tradition. In alignment with the first pointer, also the second pointer hints at the investigation of the *experience* of groundlessness. This lived experience of groundlessness is understood as realizing the nondual nature of the mind which is *beyond* subject-object duality. This realization of groundlessness in direct experience is enabled through extensive meditation practice as the Mahāmudrā instructions indicate.

In following those pointers, what could the next cognitive science paradigm for progressing a genuine understanding of the mind look like? At this point, I will allow myself to humbly envision some recommendations for a progressive paradigmatic development of cognitive science.

First and foremost, what is the overall aim of a genuine cognitive science? From my perspective, this envisioned future of cognitive science does not aim for technological artifacts or models of neural networks. Instead, it aims at a (1) most *fundamental understanding* of the mind (2) in *direct experience*. First, a *fundamental understanding* of the mind implies that it is *really* about the *mind* and *consciousness* and not about something else which is confused with them (e.g. brains, computer programs, psychological models, philosophical theories). This point concerns the subject-matter of future cognitive science. This thesis humbly contributed to that direction in tackling the first research question (RQ1): *what* is knowing groundlessness? Second, the *direct experience* of this subject-matter of *mind* and *consciousness* implies that it is *empirical*. Instead of theorizing about an abstracted notion of what *mind* and *consciousness* are (which this thesis is guilty of), they are directly *experienced*. This point concerns the method of future cognitive science. This thesis humbly contributed to that direction in tackling the second research question (RQ2): *how* does one shift from sense-making to knowing groundlessness?

In this regard, the here envisioned paradigm of cognitive science builds on the strong emphasis on the importance of directly experiencing what we are interested in: mind and consciousness. Accordingly, it is in close alignment with the previously cited quote by Evan Thompson which beautifully summarizes this point:

> It's one thing to have a scientific representation of the mind as "enactive" – as embodied, emergent, dynamic, and relational; as not homuncular and skull-bound; and thus in a certain sense insubstantial. But it's another thing to have a corresponding direct experience of this nature of the mind in one's own first-person case. (Thompson, 2004, p. 382)

How could such a radically different vision of cognitive science be implemented? How can we facilitate those required *direct* and *unobscured experiences* of *consciousness*? My current vision of a *genuine science of mind and consciousness* builds on two methodological pillars that are radically different from classical cognitive science: (1) practicing to directly experience nondual awareness and (2) communicating those experiences. First, it is required to investigate experiences of the *nondual* from *within* experience. This means that such a vision for cognitive science includes the

embodied transformation of the scientists who practice realizing the nondual in their direct experience. This is a high aim as this kind of nondual meditation practice requires extensive training. However, it may not require more training than what is required for enabling research in artificial intelligence or neuroscience. Therefore, the requirement for training in meditation practices is considered a minor hurdle.

Second, those experienced realizations of the nondual need to be made *intersubjectively accessible*. In my current conception this can take two forms. On the one hand, those experiences are communicated as *direct descriptions of the nondual*. On the other hand, *instructions* on *how* to realize the nondual are communicated. This enables others to "empirically" test those experience descriptions within their own experience. In short, those experiences are communicated in the form of direct descriptions and of practice instructions.

In summary, my vision of a genuine cognitive science requires the direct involvement of the cognitive scientist's experience. The scientist becomes a practitioner: someone who trains to experience unobstructed experience itself and shares this intersubjectively with other members of his community. The aim is to build a cognitive science that is, first, *indeed* about the mind and consciousness and, second, *empirical* to the extent that it involves the direct unobstructed experience of the "object" of interest: mind and consciousness. Furthermore, since this "object" of interest is *not* an observed "object" but the observing mind itself, this genuine cognitive science is to be envisioned as a science that goes *beyond* subject-object duality. It cannot be satisfied anymore with tackling something other than the intimate and immediate *experiencing* that gives rise to any knowledge. Therefore, this vision of a new cognitive science paradigm consists in a *nondual turn*. Instead of an abstract notion of a mind, the interest is concerning the mind or phenomenality that in which the current experiences are happening "here right now". Instead of pointing towards an abstract mind out there it investigates that which points. Thereby, this future cognitive science investigates the mind without making it an object. It investigates in a nondual manner. And yet it shares those observations with others via experience descriptions and via practice instructions. To the best of my knowledge, this is what I envision as a genuine progress towards a science of consciousnesses and the mind.

4 Conclusion

This thesis started off by highlighting the openness of the enactive approach for correctives. Understood as vital signs, such correctives indicate the vitality of the enactive approach. With this in mind, this thesis aimed at contributing to the vitality of the enactive approach by unfolding its central notion of groundlessness towards the domain of lived experience: what is it to *experience* groundlessness and how can a living system get in touch with such an experience?

In *chapter 1*, I introduced some of the key ideas of the enactive approach and stressed that they exhibit a notion of groundlessness: whatever there is springs from a dynamic of relations, dialogically, without any substantial ground. Therefore, groundlessness is central for the enactive approach. Moreover, a crucial point of departure for this thesis is that this exact groundlessness can be *experienced*. From there, the two research questions have arisen:

(1) What is knowing groundlessness and how is it different from sense-making (RQ1)?
(2) What does a shift from adaptive sense-making (phase 1 enaction; dual knowing) to knowing groundlessness (recognizing phase 2 enaction; recognizing nondual knowing) require (RQ2)?

In *chapter 2*, this knowing groundlessness (RQ1) and the transition process leading to it (RQ2) have been tackled on two levels of analysis. For the first research question (RQ1) the first level of analysis resulted in a definition of knowing groundlessness: knowing groundlessness is phase 2 enaction knowing itself, unobscured by phase 1 enaction (sense-making). Thereby, knowing groundlessness is based on phase 2 enaction, not on phase 1 enaction. Phase 1 enaction and phase 2 enaction were defined in opposition to each other: phase 1 enaction is intentional, includes a perspective and a respective subject-object structure, and is affect-driven with respect to adaptivity while phase 2 enaction is non-intentional, self-known, and non-discerning. In a gap of sense-making, this phase 2 enaction is unobscured. In such a moment it can recognize itself. This unobscured self-recognition of phase 2 enaction is knowing groundlessness. For the second research question (RQ2) the first level of analysis resulted in a description of the transition process from sense-making to knowing groundlessness. In this transition process two requirements are met: non-adaptivity and nondual reflexive knowing (phase 2 enaction). Non-adaptivity means that a living system refrains from regulating itself with respect to the boundaries of its own viability. It does not approach, avoid or ignore parts of its experience. On the other hand, via nondual reflexive knowing (phase 2 enaction) the living system recognizes its current acts of sense-making and adaptivity in a manner that lacks a sense of observer and observed. When those two requirements are momentarily met, sense-making is momentarily decreased. If this is endured for some time, the obscuration of nondual reflexive experiencing (phase 2 enaction) progressively decreases. Then, in a potential gap of sense-making (phase 1 enaction) it becomes possible that phase 2 enaction recognizes itself. Experience experiences itself. This is a moment of knowing groundlessness.

The second level of analysis resulted in a reflexive act. We have seen that any description of groundlessness must be itself context-dependent and observer-relative. Then we asked about the perspective from which this description has arisen. It comes from *within* acts of adaptive sense-making (phase 1 enaction). However, from a "perspective" of knowing groundlessness this description is invalid. From within knowing groundlessness there is no object to describe and no subject that describes. As any use of language reintroduces sense-making, it interrupts a moment of knowing groundlessness as a lived experience. Therefore, language and knowing groundlessness are mutually exclusive. Hence, we reached at this point an end of philosophical and verbal capabilities. Taking this seriously, I concluded that knowing groundlessness can only be directly explored further when conceptual thinking is left behind. In case we aim at exploring groundlessness, this demands a radically different method in cognitive science. Thereby, the first level of analysis and the second level of analysis contradict each other. This exemplifies that all statements are context-dependent and observer-relative. None is ultimately superior. Instead, they may be meaningful for different contexts and for different observers.

In *chapter 3*, two of such contexts and communities of observers were evaluated with regard to the extent to which the statements of this thesis' two levels of analysis may be meaningful to them. Two contexts were chosen: lived practice (as in Mahāmudrā and phenomenology) and cognitive science. For the context of lived practice we have seen a close correspondence between this thesis' enactive prediction of what a shift to knowing groundlessness requires and what Mahāmudrā practitioners in fact practice for enabling such a shift: on the first level of analysis, we encountered that (1) non-adaptivity matches the emphasis in Mahāmudrā instructions on non-judgment. Also, (2) nondual reflexive knowing matches the emphasis in Mahāmudrā instructions on reflexive awareness (*svasamvitti; rang rig*). This is considered preliminary evidence that the provided description of the transition process makes sense in the context of a *lived practice* that aims at knowing groundlessness. In contrast, the correspondence to the phenomenological reduction turned out to be limited to the requirement of non-adaptivity as, with Eleonor Rosch's words, in exploring groundlessness "we have gone beyond phenomenology" (Rosch, 2017, p. xxxix). Interesting is also that the provided description from the second level of analysis is reflected in Nagarjuna's Madhyamika philosophy which is an important source of Mahāmudrā practice.

For evaluating the extent to which this thesis' contribution makes sense in the context of cognitive science, I aimed at deriving its larger implications for cognitive science methodology. First, cognitive science paradigms were compared to those of Buddhism. In this comparison, we encountered similarities of cognitivism and connectionism with the first turning of the wheel. Also, similarities of the enactive approach with the second turning of the wheel were presented. The third turning of the wheel turned out to be informative for envisioning a new paradigm in cognitive science. Second, I assessed this thesis in the context of cognitive science paradigms and derived point-

ers for a future development of cognitive science. This vision of a future of cognitive science implies a *nondual turn*. It requires the direct involvement of the cognitive scientist's experience. The scientist becomes someone who "trains" to experience unobstructed experiencing itself and shares this intersubjectively. The aim is then to build a cognitive science that is both, *indeed* about the mind and consciousness and *empirical* as it involves the direct experience of what it is interested in: mind and consciousness. This vision includes two methodological aspects that are radically different from most of contemporary cognitive science: (1) practicing to directly experience nondual awareness (e.g. in meditation) and (2) communicating those experiences.

This envisioned way of doing cognitive science could embody and constitute the kind of reflexive cognitive science that is proposed by Varela, Thompson, and Rosch:

> rather than adding layers of continued abstraction, we should go back where we started, to the concreteness and particularity of our own experience—even in the endeavor of reflection. The fundamental insight of the enactive approach […] is to be able to see our activities as reflections of a structure without losing sight of the directness of our own experience. (Varela et al., 1991, p. 12)

With this thesis I hope that I could contribute, at least with a small or even indirect step, to a meaningful redirection of cognitive science. I believe that with an emphasis on *direct experiences of groundlessness* cognitive science can develop towards an *authentic science of the mind.*

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6 Appendix

6.1 Abstract in English

The enactive approach has become an influential paradigm in cognitive science. One of its most important claims is that cognition is sense-making: to cognize is to enact a world of meaning. Thus, a world is not pregiven but enacted through sense-making. Most importantly, sense-making is not a fixed process or thing. It does not have substantial existence. Instead, it is *groundless*: it springs from a dynamic of relations, without substantial ground. Thereby, as all cognition is groundless, this groundlessness is considered the central underlying principle of cognition.

This thesis takes that key concept of the enactive approach and argues that it is not only a theoretical statement. Rather, groundlessness is directly accessible in *lived experience*. The two guiding questions of this thesis concern that lived experience of groundlessness: (1) *What* is it to *know* groundlessness? (2) *How* can one *know* groundlessness? Accordingly, it elaborates (1) how this knowing of groundlessness fits into the theoretical framework of the enactive approach. Also, it describes (2) how it can be directly experienced when certain requirements are met. In an additional reflexive analysis, the context-dependency and observer-relativity of those statements themselves is highlighted.

In a next step, the provided theory of a transition to knowing groundlessness is compared to practice instructions of the Buddhist Mahāmudrā tradition and to the process of the phenomenological reduction. As a result of this comparison, this thesis' theoretical predictions of what a shift to knowing groundlessness requires turns out to be in close alignment with what Buddhist Mahāmudrā practitioners in fact *do* in order to enable experiences of groundlessness.

Through those steps, this thesis exhibits the importance of knowing groundlessness for a cognitive science discourse: this underlying groundlessness is not only the "ground" of cognition, but it also can be investigated *empirically* through lived experience. However, it requires a methodology that is radically different from classical cognitive science. This thesis ends with envisioning a future praxis of cognitive science which enables researchers to investigate not only theoretically but empirically the "foundationless foundation" of cognition: groundlessness.

6.2 Abstract auf Deutsch

Der *Enactive Approach* hat sich in den letzten Jahrzehnten zunehmend in der Kognitionswissenschaft etabliert. Seine zentrale Grundannahme ist, dass Kognition ein Prozess ist, in dem ein Lebewesen eine Welt hervorbringt. Bedeutung ist somit nicht „da draußen" in einer bereits vorhandenen Welt, die lediglich abgebildet wird. Vielmehr wird Bedeutung erst hervorgebracht im Prozess der Kognition eines Lebewesens. Hierbei ist zu betonen, dass Kognition keine substanzielle Eigenexistenz hat. Kognition ist „leer", ohne Fundament: Sie entspringt einer Dynamik von wechselseitigen Beziehungen zwischen vielen interdependenten Prozessen. Somit ist jeder Prozess der Kognition fundamentlos. Diese Fundamentlosigkeit, *Leere* oder *Bodenlosigkeit* liegt jeder Kognition „zugrunde".

Als Ausgangspunkt der vorliegenden Masterarbeit wird dieses zentrale Konzept der Bodenlosigkeit aus dem *Enactive Approach* aufgegriffen und gezeigt, dass es nicht bloß ein philosophisch-abstraktes Konzept darstellt. Vielmehr verweist diese Idee der Bodenlosigkeit darüber hinaus auf eine bestimmte *gelebte Erfahrung*. Diesem Ausgangspunkt folgen die zwei Leitfragen dieser Masterarbeit: (1) *Was* ist das Erkennen von Bodenlosigkeit? (2) *Wie* kann Bodenlosigkeit erkannt werden? Zur Beantwortung dieser beiden Fragen wird zum einen erläutert, wie dieses Erkennen von Bodenlosigkeit im Zusammenhang zum *Enactive Approach* zu verstehen ist. Zum anderen wird der Prozess beschrieben, durch den dieses Erkennen von Bodenlosigkeit ermöglicht wird. In einer zusätzlichen reflexiven Analyse werden die Kontextabhängigkeit und BeobachterInnen-Relativität von Aussagen transparent gemacht und deren weitreichende Implikationen diskutiert.

In einem nächsten Schritt wird die aus dem vorausgehenden Schritt resultierende theoretische Beschreibung eines Übergangs von Kognition hin zum Erkennen von Bodenlosigkeit verglichen mit Übungsanleitungen aus der buddhistischen Mahāmudrā-Tradition sowie mit der phänomenologischen Reduktion. Aus diesem Vergleich geht die Schlussfolgerung hervor, dass die aus der Theorie abgeleiteten Vorhersagen darüber, was ein Übergang von Kognition zum Erkennen von Bodenlosigkeit erfordert, in enger Übereinstimmung damit steht, was Mahāmudrā-Praktizierende *tun*, um dieses Erkennen von Bodenlosigkeit in ihrer direkten Erfahrung zu ermöglichen.

Auf diese Weise stellt die vorliegende Masterarbeit die Relevanz heraus, die das Erkennen von Bodenlosigkeit für einen kognitionswissenschaftlichen Diskurs hat: diese „zugrundeliegende" Bodenlosigkeit ist nicht nur das „Fundament" von Kognition, sondern wird darüber hinaus auch *empirisch* zugänglich gemacht durch die hier beschriebene Möglichkeit, sie direkt zu erkennen. Jedoch erfordert eine solche empirische Erforschung von Bodenlosigkeit eine Methode, die sich radikal von derjenigen der klassischen Kognitionswissenschaft unterscheidet. Abschließend stellt diese Masterarbeit die Vision eines zukünftigen Paradigmas in der Kognitionswissenschaft vor, welches eine empirische statt rein-theoretische Erforschung des „fundamentlosen Fundaments" von Kognition ermöglicht: Bodenlosigkeit.