

**Enacting Enaction-Enaction Enacted:  
Experiments With and Through Enactive Ontologies**

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## Abstract

Over the last three decades the enactive approach to life, mind and nature has exerted an impressive amount of influence across a broad range of disciplines and varied research topics. At the core of the enactive approach is a thorough rejection of a number of modernist ideals and tenets; from anthropocentrism, determinism and reductionism to a host of deeply entrenched dualisms found across academia and beyond. This work brings this rejection of certain modernist tenets – *qua* ‘enactive matters of concern’ – into dialogue with Bruno Latour’s analysis of modernity. This is done primarily as a means to explore, to think-with and through, how and where certain enactive theorists not only reject these modernist tenets but also often reproduce them. Drawing from work in science and technology studies (STS), feminist science studies and anthropology, this work then attempts to ‘bring to light’ the different contrasting worlds enacted by certain enactive theorists. It explores how, in and through the development of ‘autopoietic enactivism’, these contrasting worlds are enacted in relation to key aspects of modernist thought and practice.

## Acknowledgements

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## Introduction

### 1 Storying an introduction

This introduction tells three different but entangled stories by way of tentatively illustrating what this work is about and how I go about it. After Haraway (2016), these are three stories to help me tell other stories with. The first story is about the enactive approach to cognition, its relation to enactivism and how these are cast in this work. The second story is about how two different pasts cross paths, become entangled and help create alternative futures. The third story is about a desire to do research differently, to avoid critique and embrace difference and multiplicity.

### 2 To begin (somewhere) *in the beginning*

How does one begin a work which has had so many births, lived so many lives and died so many deaths? How can one even begin at *the beginning* when all beginnings, as Karen Barad (2010) so eloquently reminds us, are “always already threaded through with anticipation of where it is going but will never simply reach and of a past that has yet to come” (p. 244). This beginning is certainly no exception. But, in “anticipation of where” we are going and in recognition of a “past that has yet to come”, I will tentatively begin with the main protagonist of this entire story. That which bound, entangled, folded and enfolded everything which follows; namely, the enactive approach to cognition.

The enactive approach can be said to have its genesis in the seminal book *The Embodied Mind* by Francisco Varela, Eleanor Rosch and Evan Thomson. In it the authors proposed a bold alternative to the then prominent cognitivist hegemony which cast cognition as essentially disembodied computation over internal, brain bound, mental representations. The authors draw on a number of resources from a variety of different areas of research to convincingly argue that cognition is not disembodied computation or representational but rather, a rich, experientially embodied, process of engagement and dynamic interaction with the world and others within it.

For over three decades now, this initial proposal, as fleshed out in the book, has had a tremendous impact not only on the intellectual landscape of cognitive science, but also



many areas of research far beyond it. And its popularity and influence simply continues to grow unabated. It has spread and influenced multiple disciplines, from philosophy and the social sciences to the biological and natural sciences and in so doing has addressed an impressive number of topics from within a distinctively enactive key. Here is but a very selective example to give the reader a sense of its influence and breadth: aesthetics (Carvalho 2018), affective science (Colombetti 2014), AI and robotics (Vernon 2014), anthropology (Loaiza 2019), archeology (Malafouris 2013), ethics (Colombetti and Torrence 2009), linguistics (Cummins 2018), gender studies (Brancazio 2019), pedagogy (Stapleton 2021), psychology (McGann et al. 2013), psychiatry (de Haan 2020), social neuroscience (Di Paolo and De Jaegher 2012), music cognition (Van Der Schyff 2015).

However, for some (cf. Vörös 2016), this increase in influence and popularity has come at the cost of not only theoretical unity, but also the watering down of the original (radical) ideas proposed by Varela et al. So, from the initial enactive proposal gradually emerged a number of distinct but loosely connected theoretical ‘approaches’ which, more or less selectively, took up some of its core tenets and developed them in their own idiosyncratic ways towards their own specific needs (see Ward et al. 2017). These approaches have come to be known under the umbrella term of ‘enactivism’, the most influential and well known are: autopoietic enactivism, sensorimotor enactivism and radical enactivism (see Hutto and Myin 2013).

Evan Thompson (2018) has however taken issue with this proliferation of ‘enactivisms’ and puts into question their purported theoretical connections to the “enactive approach” as proposed by Varela et al. Reviewing Hutto and Myin’s (2017) book on radical enactivism, Thompson points out that the enactive approach to cognitive science as originally proposed, is “based on two interconnected pillars”. The first pillar, already noted above, is the rejection of disembodied representationalist computationalism and the embracing of the idea of embodied organism-environment sensorimotor couplings and dynamic worldly interactions as constitutive of cognition. The second pillar is the “concept of biological autonomy”; the idea that living organisms are self-creating/self-individuating and self-sustaining *agents* which are always in a constant meaningful relationship with their environment. Thus, according to Thompson (ibid.), “[f]or an

account to be ‘enactive’ in the full and precise sense of the term, it *must* include both theoretical projects” (emphasis added).

The upshot of Thompson’s strict demarcation criterion is that both radical enactivism and sensorimotor enactivism are no longer understood to be truly enactive. Implicit in Thompson’s remarks is the intuition that the enactive approach is a well defined framework with distinct nonnegotiable principles and clearly defined and fixed borders which need to be maintained, and any position which wants to legitimately be considered as enactive, must necessarily align with these.<sup>1</sup> Thus, if we follow Thompson here, it would be inappropriate to speak about “enactivism”, and consequently, of “approaches to enactivism” in the manner stated above. As Vörös et al. (2016) point out, Varela et al. never used the term “enactivism” in their original proposal but instead referred to the “enactive approach/perspective” or simply “enaction”.

I tell this ‘polemical’ story, which is somewhat at the fringes of the enactive literature, not out of a desire to enter into the debate but rather as one very specific, and at this point tentative, illustration of what is the central concern of this work. Namely, *how the enactive project is variously enacted and done*. In this example, Thompson very clearly enacts the enactive project as a research programme within cognitive science committed to two core theoretical tenets. In so doing Thompson partakes in a boundary-drawing exercise which at once both includes and *excludes* various figures and resources. So, whereas most current discussions of the enactive project revolve around the different *approaches* to the enactive proposal of Varela et al., this work casts these as *different enactments of* said proposal. This however is not merely a terminological idiosyncrasy, but rather a means to ask a different set of questions and tell different types of stories.

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<sup>1</sup> However, and this counterpoint is important for this work, it should be noted that Thompson *also rejects* these intuitions regarding (enactive) theory. In a webinar presented in 2021 commemorating the life and work of Francisco Varela, Thompson argues that enaction “is not a theory or a model, it’s an approach and it can encompass different theories and different models”. Moreover, Thompson also clarifies that the issue with the term “enactivism” is that “it fixes things (...) once you have an ‘ism’ then you have to defend it against other ‘isms’ (...) it reifies ideas”. Here Thompson effectively troubles and disrupts the very idea of fixed boundaries and frozen static principles and ideas which can be easily transported from place to place without transformation. Elsewhere however, Thompson himself (with Di Paolo) repeatedly uses the term enactivism and stages it as a distinct position with fixed boundaries and nonnegotiable principles to be defend against other positions (see Di Paolo and Thompson 2014). The point is that Thompson is thus *doing both at the same time*; enacting two very different understandings of enaction and its relation to enactivism. This work is concerned with these sorts of directly opposed enactments. See <https://www.youtube.com/watch?v=0vSulZA7EWg> for Thompson’s talk (streamed live on 14 Jun 2021; accessed April 2022).

Thinking in terms of enactments *of* rather than approaches *to*, offers a rather interesting shift of focus. While the latter opens up a space for questions regarding adequacy, accuracy and sameness: how well or accurately does this approach correspond to the initial proposal? Or a way to apply these ideas and concepts to a host of different issues and problems. The former opens up a space for questions regarding how, where and with what resources, *different version are being made*: how and where, in its own right and on its own terms, are these being done? It is not only concerned with continuations and applications but also opens the door for “interruptions and reformulations” (Haraway 2004, p. 128). To put it slightly differently, thinking in terms of enactments is helpful in telling others stories about and with difference and multiplicity.

A core premise of this work then is the suggestion that we can understand and thus study the enactive approach as a phenomenon which is *variously done* and thus *enacted* along two different paths. Along one path it is enacted as different versions of the approach originally proposed by Varela, Thompson and Rosh. Here, as noted above, we find the enactive approach enacted as autopoietic enactivism, radical enactivism and sensorimotor enactivism. Along the other path, each of these *versions* – for lack of a better word, these *enactivisms* – enact some of the respective ideas, concepts and arguments initially proposed by Varela et al., in their *own idiosyncratic ways*. Autopoietic enactivism for example takes up and further develops a strong life-mind continuity thesis, while radical enactivism proposes to rid basic cognition of all remnants of internal mental representation and so on.

In this work I am specifically interested in how and where autopoietic enactivism is enacted. Very broadly conceived, we can say that some enact it as a philosophy of nature (e.g. Gallagher 2017), others enact it as a scientific research programme within cognitive science – an Enactive Cognitive Science (e.g. Stewart et al. 2010) – while others enact both at the same time (e.g. Thompson 2007). More narrowly conceived, we can also say that some of the same arguments, concepts and ideas used within each version of the enactive approach, are often enacted in ways which lead to multiple, often mutually exclusive, outcomes. This work explores these more narrowly conceived

enactments and some of their intended *and* unintended implications. Some of these implications are recognised, rendered visible and praised within the enactive literature, while others remain in the margins, seldom recognised and if acknowledged are instantly made to recede into the background.

Now, having told a first story about what this work is about, we need to go back to the past(s) to tell a different story about how we might have gotten here and provide a different glimpse of where we are going.

### **3 Autobiographical note: Entangled pasts, diffracted futures**

Allow me, if you will, to tell a different story by way of a brief autobiographical note. For most of my adult life I have been employed in the field of psychiatry. For over two decades I have worked in several acute mental health inpatient wards caring for people with ‘severe’ mental health conditions. For most of this time I have also been a student. Doing a BA in philosophy, an MPhil in the philosophy of psychology and eventually the Ph.D which the reader now holds in their hands. Cognition and mentality was thus a guiding theme in both my day job and my academic interests. As I slowly progressed with my studies I became convinced that cognition was essentially deeply embodied, situated and *enactive*. A conviction which also trenchantly eschewed computationalism, representationalism and various forms of subjectivism/internalism and neuro-centrism.

While on my day to day working life, my life within an acute psychiatric ward, I would routinely come across many different accounts and different understandings of mind and cognition which had very little in common with my preferred philosophical understanding. Doctors would tell neuro-centric stories about “imbalances of neuro-chemicals” and the neuronal mechanisms which have gone awry and caused mental disorders. Nurses would tell internalist-cum-behaviourist stories about how the patient’s “mental states” are the “causes” of their abrupt “behaviours”. Psychologists would tell subject centred stories about how, if we wanted to truly understand our patients we needed to be aware of past relationships, particularly those in “early childhood”. Patients would tell computational stories about having “broken computers in their brains” that “needed to be fixed”. Many of these stories, but by no means all, were often

highly neuro-centric, subjectivist-cum-internalist and representationalist in character.<sup>2</sup> Armed with my academic training and informed by my understanding of cognition as enactive, I was led to the conclusion that these stories were just that; *mere (fictional) stories*.

The problem, I somehow convinced myself but never dared utter explicitly in my place of work, was with how psychiatrists, patients, nurses, psychologists and so on, understood mentality. Surely they were just *wrong*, they had been led astray by cognitivists/neuro-centric modes of thinking and therefore simply needed to be corrected with a more accurate position. What was needed, was a new approach to cognition which would set the record straight and thus help shift how mental health professionals and indeed patients themselves understood mind and cognition. An integrative framework which would bring together disparate threads of research into a unified account (see de Haan 2020). For over a decade this was my default position. And my aim, although somewhat indirectly (I was not specifically working on issues within psychiatry), was to positively contribute to this shift.

But, at some point in time (and space), this general outlook started to come undone. Although these two lives did not really intersect in an obvious way, it is nonetheless the case that my default position was one where my academic work *informed* my job: I understood much of what was happening within psychiatry through enactivism and never the other way round. In retrospect, I now recognise that this was largely due to my initial training in analytic philosophy. This training convinced me that there was a fundamental nature to things and encouraged me to always try and get to this ‘true nature’. In various ways, I was thus taught that in order to truly understand any worldly phenomenon all we need is more knowledge, better concepts and a solid explanatory framework to bring all of these together.

Note what happens, what did happen to me specifically, when one adopts this sort of position. One is now forced to, insofar as it diverges from ones own position, confront,

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<sup>2</sup> All these comments are reconstructions from conversations and various engagements I have had over the years with mental health professionals and patients. They appear here simply as a means to convey a sense of the nature of some of the *different ways* these professionals and patients understand *and* practice cognition and mentality.

dismiss, oppose, negate and generally find flaw in what one is being told cognition *is*. This might not bother some, but it certainly bothered me. My particular setting, the acute psychiatry ward, no doubt amplifies this discomfort in a very acute manner. After all, I am now forced into a position where I either dismiss or have to deftly conceptually reconstruct what I am being told cognition is, so as to fit my enactive understanding. I am forced into enacting a particular asymmetrical power dynamic where I am not only distinct from the Other, but impose on them my specific understanding of the issue. I no longer allow for nor value and/or dignify their views on the matter.

But, what if the tables were reversed? What if, rather than letting my philosophy dictate my understanding of cognition, I let my work (my day to day job in the ward) inform how to think about and with cognition? What if I did not start with a preconceived conception of cognition, but instead let the multiple psychiatric practices I was routinely engaged with and a part of, inform my understanding of cognition? It then occurred to me that maybe cognition *is* enactive, but maybe it is *also* brain-bound, computational, internal, ghostly, supernatural and much more besides. And this, eventually, led me to start thinking about *worlds and world-making*: The worlds made within the walls of the psychiatric ward. The worlds that I had made, was making and wanted to make. It also got me thinking about the worlds that enactive theorists have made, are making and want to make. Now back to the present.

#### **4 So many births, so many lives and so many deaths...**

My first story began somewhat hyperbolically with the rather dramatic claim that this work has had many births, lives and deaths. Although certainly, and perhaps excessively, hyperbolic in tone, the sentence nonetheless does capture some of the drastic metamorphoses that this work has undergone over the years. Here is a final story about how some of this came about and some of its subsequent manifestations. To continue, but only for a brief moment, in the autobiographical register of the above, my initial research proposal for this thesis was concerned with the question of basic cognition: what makes any process cognitive and what are the minimal (necessary and sufficient conditions) to instantiate and thus materially realise such a process?

My initial work, specially that which has appeared over the years in print form, attempted to answer this question by threading enactivism and biosemiotics together. Although an ostensibly constructive project, it was nonetheless shot through with an overly critical tone. Underpinning the general core of that research was a conviction that, although the enactive approach was theoretically best placed to address my specific research question, it nonetheless lacked some of the resources to do so adequately. The point I wish to make here however is not only that this work has had many diverse iterations, but also that all of them have in some way or another revolved around scrutinising the enactive project for its potential flaws and inadequacies and then attempting to improve on them by developing a better and more coherent proposal.<sup>3</sup>

But, at some point in time (and space), two mostly embryonic intuitions crossed paths, intersected and become deeply entangled in a manner that began shifting the overall foundations of my approach. Both of which, it can now be said, are mutually supportive: On the one hand, there was/is a desire to move away from critique, opposition, negation and *exclusion*. On the other hand, and directly motivated by this particular desire, there was/is an ambition to do research *differently*. Of course, cognitive science is by its very interdisciplinary nature inclusive. And so too is the enactive project. However, this is an inclusivity which is: (a) done principally in a progressive key and (b), also just as exclusive and excluding as it is inclusive. With regards to (a) the enactive approach is guided by the modernist scientific ideal of continuous progress whereby the central aim of the sciences is to produce increasingly more accurate forms of knowledge about as many phenomena as possible. This ambition in terms feeds-back into and shapes the character of (b) such that only resources which can help in this particular goal are admitted into the picture.

Now, having just noted that I am attempting to avoid the seductive pull of critique, I am not about to criticise these ambitions or this particular way of doing research. Rather, I point these out explicitly simply to emphasise the fact that I wanted to do something different. Over the years, for a number of different reasons, I had become increasingly dissatisfied not only with what I was doing but also with *how* I was doing it. And with

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<sup>3</sup> I would of course like to say from the outset that this does not apply to the current iteration. But, I am going to have to leave it to the reader to make the final judgement.

this dissatisfaction and ambition gradually emerged the current project. One which neither seeks to critique nor improve the enactive project. This, perhaps, places the current work in a somewhat precarious position since, due to these motivations, it is not guided by a specific research question (or set of research questions) which it then seeks to address.

I do not think it is an exaggeration to claim that most work done within, with or generally around the enactive approach, primarily centres either on developing/elaborating/improving or critiquing it (often a combinations of both). This work, perhaps unusually, does not attempt either. This work is instead tentative and experimental: it is tentative insofar as it is openly vulnerable, inherently fragile, often operates within and through the margins of uncertainty and ambiguity and without having a specific endpoint or clear-cut target. It is also a work done in the acknowledgement that its potential value, effect, meaning and implication(s) are not only unpredictable but also by and large in the hands of possible future readers. Whilst as an experiment, it is not so much a method or technique for acquiring and documenting new knowledge about the enactive project specifically or the world more generally, but rather a means to *intervene* in and through enactive worlds. Here I am thinking more along the lines of experimental art forms, such as experimental music for example, where normativities are played with, disrupted and variously unsettled, rather than perpetuated and stabilised. I thus see this work in a similarly experimental light; playful in places and a bit mischievous in others.

I do this tentative experimental work by way of exploring what in this work I refer to as enactive “dual enactments”. More specifically, I attempt to bring to light how enactive theory becomes entangled with key modernist tenets in a dual, often directly opposing, fashion. On the one hand, it actively rejects these key tenets. On the other hand it – and I must admit, rather counterintuitively – reproduces these very same tenets. Let me say a few extra words on these dual enactments.

This work is situated at the intersection between three different areas of research: enactivism, science and technology studies (henceforth STS) and feminist science studies. It uses a diffractive methodology (more on which shortly) in order to bring to



light how certain enactive ideas, concepts and arguments relate to what Bruno Latour (1993) calls the “modern Constitution”. The modern Constitution, according to Latour, is a particular arrangement which emerged with the development of modernity and is effectively responsible for the myriad of dualisms and objectivist modes of thinking we still encounter within academia and beyond.

Now, anyone remotely familiar with the enactive project and enactivism more generally, knows that one of its central aims is precisely its ambition to overcome modern dualistic modes of thinking. As Sebastjan Vörös and Michel Bitbol (2017) point out, one of the core aims of the enactive approach “was to help the researchers in the field [of cognitive science] avoid falling prey to various dichotomies (mind/body, self/world, self/other) bedeviling modern philosophy and science” (p 31).<sup>4</sup> This rejection of dualism writ large puts the enactive approach into direct dialogue with Latour and his discussions on the developments of modernity. This “dialogue”, in various shapes and guises, forms the backbone of much that is to follow.

So this work is at its core about enactments and I take enactments to be about *different world-making practices*: different ways in and through which enactive theorists create different, entangled and co-existing, worlds. But in this work I am also deeply entangled with some of these practices: both in the sense that I am exploring the multiple worlds made and remade by enactive theorists (*enacting enaction*) and in the sense that, in and through this very explorative process, I am also helping to create, to make and remake multiple worlds (*enaction enacted*). Following Casper Bruun Jensen (2021), we could therefore say that this work is a “a small-scale experiment in world-building”. Let me finish with a few more words on method.

## **5 Remarks on method(ology) and the tools we think-with and through**

But how to render such worlds visible in a way which not only eschews critique but is also more inclusive? Three ‘tools’ forms the methodological backbone of this entire work: (i) the modern Constitution, (ii) diffractive methodology/reading and (iii) “re-turning”. A few brief remarks on each.

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<sup>4</sup> The main title of this thesis is, in part, directly inspired by the paper from which this quote is taken. I would like to thank Sebastjan Vörös for kindly agreeing to let me use part of this paper’s title.

The notion of the “modern Constitution” is discussed extensively in Chapter two, and I will therefore have very little to say on it here. It will suffice to point out that this notion doubles as both trope and methodological tool. It figures as a recurring trope thematically knitting the various chapters together whilst in the process opening up a space in which we can contrast, juxtapose and diffract enaction with and through insights and ideas from STS, feminist science studies and anthropology which address similar concerns to the enactive project. It is a particular good tool to think-with in the context of this work because it is very helpful in both rendering explicit aspects of the enactive approach which are not easily made apparent and in bringing to the fold other resources.

Karen Barad (2007) who, developing work originally proposed by Donna Haraway, suggests that diffraction is about *creating* new and unexpected patterns, ideas, insights through processes of entanglement. In this work diffraction thus figures not only as a tool which helps us bring various dual enactive entanglement to light, but also as a method which helps render these as different *worlds* rather than simply different *knowledges*. The difference between which will only become apparent as this work unfolds. For now, it will suffice to point out that, “[m]aking knowledge is not simply about making facts but about *making worlds*” (Barad, p. 91).

At the core of a diffractive *reading* more specifically is a proposal for reading texts “through one another”. But what exactly does this mean in the practical terms of this work? In the work which follows, the bringing to light of different dual enactments, is a direct result of reading enactive texts through and alongside selective works from STS, feminist science studies, anthropology and Latour’s discussions on modernity. This involved paying special attention to particular contrasts and similarities between these literatures which would perhaps remain absent were they not brought together. These contrasts and similarities are thus brought to the fore by virtue of being read through each other. So, key insights and provocations from two or more approaches to particular issues/matters/phenomena are brought together and read through each other while being attentive to the possible tensions and insights which might emerge and become visible as these intersect and become entangled.

Thus understood, diffraction does not pit different theories, ideas, texts and strands of thought *against* one another, but rather encourages a reading of texts through one another as a means to generate creative, and unexpected outcomes (ibid., p. 30). What is particularly important here is how this engagement with different texts and theories can lead to new insights and ideas. In so doing the process effectively erodes the superficial boundaries erected between different disciplines and theories in order to generate new ideas and concepts and provoke new ways to examine how these boundaries emerge in the first place. At its core, diffraction is about *difference and entanglement*. Whilst it demands an attentiveness to continuities, it also *interrupts* and *interferes*.

As such, diffraction is not concerned with representation and replication, but rather, it is a process which, through its very enactment, engenders a continuous displacement which materialises the indeterminacy of the very attempt to accurately capture and represent phenomena. Instead of examining texts to excavate their true underlying intrinsic meaning, diffraction encourages us to ask “[w]hat ‘patterns of resonance and dissonance’” (Barad 2007, p. 195) are produced when we encounter and produce different texts. Thus, diffractive readings problematise the very idea that texts, ideas and concepts are fully finished or fixed phenomena, and suggests that these are always co-productions. Indeed, if texts, ideas and theories are not fixed entities out there to be used and represented as accurately as possible, then any direct engagement with these cannot but transform them – as they indeed also transform you – in significant ways. The following chapters will reiteratively expand on the key themes of diffraction and the role(s) they play in this work.

Finally, a central recurring motif throughout this work, one which again I take from Barad (2014), is the notion of “re-turning”. This is another theme which emerged naturally and rather organically throughout the development and assembling of this work. Not only due to this specific iteration but specially between various iterations of this work. All these different iterations began to be diffracted with and through each other as I continually went back-and-forth not only between previous iterations of this work but also between my published papers, unpublished manuscripts, notes, critical

comments and so on, trying to be more attentive to new connections, unexpected implications, background assumptions etc.

Barad (2014) introduces the term “re-turn”, with a hyphen, as a means to distinguish it from the verb ‘return’. Unlike return, re-turning is for Barad not simply a means to go back to what was previously done. It is not a request to revisit and then reflect on what was done/written. Rather, “re-turning” requires a careful “turning over and over again” such that one can create or be attentive to, new connections, new diffractive patterns and in the process make different differences. Barad (2014) likens this process to composting: “We might imagine re-turning as a multiplicity of processes, such as the kinds earthworms revel in while helping to make compost or otherwise being busy at work and at play: turning the soil over and over – ingesting and excreting it, tunnelling through it, burrowing, all means of aerating the soil, allowing oxygen in, opening it up and breathing new life into it” (ibid., p. 168).

So, by re-turning, one turns something “over and over again – iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetime-mattering), new diffraction patterns” (ibid., p. 168). For Barad, re-turning is deeply entangled with diffraction and can be used as a tool with which to do research differently. It suggests a slowing down in research practices; to re-turn is to also slowdown and carefully turn over and over the ‘same’ arguments, concepts, ideas, theories and so on, as a means to make and remake new connections, provide richer understandings and descriptions, and thereby also help create different, multiple interesting, worlds.

As Karin Murrin and Weili Zhao (2021) point out, the “[i]nclusion of the ‘small’ hyphen makes a ‘gigantic’ difference for research practices as it expresses the indeterminate entanglements of doing, knowing and being. Barad explains the difference between ‘returning’ and ‘re-turning’ through the familiar visual metaphors of a reflection and diffraction” (p. 112). Barad aligns returning with reflection and argues that re-tuning is always about diffraction. And as such, it is not only about difference, but more importantly also about *making different differences*. By re-turning, one necessarily becomes implicated in the making of difference and is no longer merely reflecting and

then reporting on a fixed given. Thus the successive *re*-introduction of key concepts throughout this work is done so from a position of such re-turning. Both in the manner in which the text was assembled over space and time and in its persistent reminding and encouraging of the reader to re-turn to this or that section, concept argument and so on.

## **6 Enacting an overview**

Let me start with something of a precautionary/clarifying note regarding the overall structure of this work. This work is presented in a straightforward linear fashion; successive chapters follow each other and each with conventional subsections. However, within this linearity there is also a nonlinear dimension. On the one hand, some chapters are deliberately punctuated by subsections which function as “interludes” which disrupt the linear flow of the text. On the other hand, there is a recursive undercurrent throughout the work which constantly urges the reader to “re-turn” (re-turn to previous section) back to previous chapters and subsections.

This nonlinearity, in part, simply reflects the fact that the planning, assembling, development and subsequent writing of this work was inherently nonlinear in character and, in part, an underlying commitment to the STS/feminist science studies insistence that both matter and meaning are inherently ambiguous, vague and *indeterminate*. There is thus a big chance that the central thesis of this work will only begin to make adequate sense once *all* the various concepts introduced throughout the work are able to interfere with each other. This means that some ideas, concepts and arguments will retain a certain amount of ambiguity throughout the work and should only be made determinate by the reader once *completely* read through.

I should, however, also point out here that, although (partially) deliberate, the exact form some of this nonlinearity takes here was not. Initially this work contained an extra final chapter, which, for bureaucratic reasons, had to be cut from the ‘main’ text. Consequently, this extra chapter now takes the form of an Appendix. Regardless, and rather ironically, the work included in the appendix turns out to fit rather well into the overall structural arrangement of the thesis. Thus, although the chapter was not intentionally written as an appendix, it nonetheless functioned in a somewhat similar fashion. An appendix is traditionally supplementary work added to a document in order

to give it further support. In retrospect, it has become clear that the chapter was, in many respects, written *as if* it was an appendix. This means that, although the main text can be read without reading the appendix, I would nonetheless strongly urge the reader to do so. Here I will merely point out that one's understanding of the main text will vary dramatically depending on whether or not one reads the appendix.

With these clarifications out of the way, I can now suggest that the reader is free to read this work linearly, or jump back-and-forth from chapter to chapter. The choice will no doubt emerge naturally in the development of the reader's particular reading practices. Whichever way this does happen, I remain hopeful that a sense of coherence will organically emerge. The reader might think that I am being too demanding here. However, I think this is valid only insofar as the act of reading is conceived as a very passive phenomenon, where the reader simply takes everything from the text. Here the reader is cast as a passive recipient of the intrinsic meaning contained within the text. But this is not the only way to think of reading and readers.

One could also think of reading and readers as processes of co-creation and co-transformation. This, of course, significantly changes the relation between the reader and the text. Reading gets reconfigured into an active rather than mere passive phenomenon. It is in this light that I am thinking about the reader. Not as a passive recipient of what I have to say in and through this text but as an active participant in its meaningful materialisation(s). Put differently, one could say this is my idiosyncratic way of ensuring the reader is inextricably woven *into* the text; incorporating, entangling, folding and re-folding the reader into the very fabric of this work such that its meaning cannot but be a co-creation and co-production. This is also, lest we forget, very much in the spirit, if perhaps not exactly in the letter, of the enactive project. After all, meaning is said to not be intrinsic to the organism nor the environment, but what emerges in the interaction between the two. Now, a few words on the following chapters.

The first chapter begins with a general introduction to the enactive approach and its eventual metamorphosis into different varieties of enactivism. We focus and highlight themes which will be important for what follows. We briefly explore the different

approaches to enactivism and suggest that these could also be understood as different enactments of enaction. In Chapter Two we introduce Latour's discussion of modernity in terms of a modern Constitution and explain how this notion figures within this work. Here we also (re-)introduce the notion of diffraction and present a general outline of and provisional motivations for the central thesis of this work. Namely, that enactive theorists both reject and reproduce key modernist tenets vis-à-vis the modern Constitution.

Chapters Three and Four explore these dual enactments with regards to the enactive "phenomenologisation of nature". Chapter Three brings to light how the arguments, concepts, ideas and the general resources used by enactive theorists to reconfigure the concept of nature as inherently agentic, creative and lively, enacts a thorough rejection of many of the tenets (anthropocentrism/determinism/dualism) at the heart of the modernist project. By contrast, in Chapter Four, we explore how some of these resources are also entangled with and subsequently re-enact some of these modernist tenets.

Chapters Five and Six likewise follows a very similar trajectory. In these chapters however the discussions pivots around what I call the enactive "dual thesis". The dual thesis, at least as I understand it, suggests that (i) organisms do not encounter a pregiven static world but rather (ii) bring forth or enact *worlds*. Chapter Five thus explores how this dual thesis is enacted with and through four different themes, all of which enact different rejections of a pregiven world *qua* foundational modernist tenet. While Chapter Six attempts to bring to light how these different enactments of the dual thesis are not only entangled with and reproduce the conviction that there is a pregiven world but also versions of individualism and representationalism.

We conclude this work with a few thoughts on the possible value of this work.

The Appendix provides 'supplementary material' with which to understand the preceding analysis in an 'ontological' register. We introduce various resources from STS and feminist science studies to help us make this particular case.

# Chapter One

## Enacting Enactivism(s)

### Overview

The aim of this chapter is twofold: (i) to introduce the enactive approach and (ii) begin laying some of the preliminary groundwork for what is to follow in subsequent chapters. With regard to the former we will first introduce the work of Varela, Thompson and Rosch (1991) followed by some of the different approaches to enactivism it inspired. With regard to the latter we begin to gently ease the reader into what is to follow by proposing that these different approaches to enactivism could be understood as heterogeneous multiple enactments rather than mere ‘branches’. We conclude by honing in on the theme of multiple enactments and briefly introduce and begin further motivating the core thesis of this work. Namely, that distinctive enactive ideas, concepts and arguments can and are themselves enacted in multiple, often directly opposing, ways.

### Motivations and aims of this chapter

In this chapter we introduce the enactive approach by concentrating on its most influential ‘branches’ and some of their central concepts and arguments. However, as a means of motivating and easing the reader into the central thesis of this work, I will do so by emphasising the *heterogeneously enacted multiplicity* of the enactive project. Multiplicity is generally acknowledged and much discussed within the enactive literature at large, but it is almost exclusively cast in terms of the different ‘approaches’, ‘schools’ or ‘branches’ of the broader enactive genus (e.g. Hutto and Myin 2013; Ward et al. 2017). A central concern within these discussions is with identifying how these various branches relate to one another and how they theoretically (or sometimes historically) overlap and diverge (see Degenaar and O’Regan 2017). Often there is an explicit and deliberate drawing of boundaries around one or other branch to the exclusion of others.

Although part of this chapter shares some of these concerns, the ‘multiplicity’ which is of interest here is also somewhat different. Indeed, I will suggest that as well as



partaking in the more common project of individuating these branches, we could equally understand these as *distinct enactments* of the enactive project in their own right. This would allow one to sidestep ‘border’ disputes and issues of authenticity, for example. We can instead turn our focus to *how* enactivisms are done: here they are done as *radical enactivism*, there they are done as *autopoietic enactivism*, while all the way over there they are done as *enaction*. Each of these will be situated practical affairs, with its own set of heterogeneous practices, resources, ideas and concepts. Each will have their own inclusive histories, stories, figures of interests as much as their exclusions and negations. Such are the heterogeneous enactments of the enactive approach.

These types of enactments are however *not* the central focus of this work. I highlight them here partly because it helps me introduce the broader enactive project and partly because it helps ease the reader into the type of enactments which form part of the central thesis of this work. In a nutshell, the enactments which are of concern for this work relate to how (and where) these different enactments (the different branches) of enactivism themselves enact their own arguments, ideas and concepts. With this distinction in mind, we can say that there are at least two different, although very closely related ways that we could plot how enactivism is enacted: (i) the first is briefly explored in the first half of the chapter and roughly aligns with the individuating project of identifying different branches of enactivism; (ii) the second plots how different enactive arguments, ideas and concepts are themselves enacted within these different branches. The latter thus explores how a specific approach to enactivism is itself not a fixed framework but rather a continuously shifting and contingent configuration and reconfiguration of ideas, concepts, arguments and practices always open to *other* multiple, often radically divergent, enactments.

The first part of the chapter will focus on (i) and the second will be dedicated to further elaborating (ii). The chapter begins by introducing the pioneering work of Francisco Varela, Evan Thompson and Eleanor Rosch as presented in *The Embodied Mind: Cognitive Science and Human Experience*. This section introduces a cluster of ideas, arguments and themes which forms the core of what eventually coalesced into what many now call “enactivism”. We then proceed by introducing what is generally

regarded to be the most influential approaches to enactivism. It is suggested throughout that these approaches could (also) be fruitfully understood as enactments of enactivism. In the final part of the chapter we then begin to introduce and attempt to further clarify the central thesis of this work.

### **1 Origin Stories: Enacting the ‘Enactive approach’**

There is no denying the ever increasing popularity and influence of enactivism both in philosophy and cognitive science. With a steady flow of important publications and regular conferences it now deservingly demands serious attention as a theoretical alternative to mainstream cognitivist accounts of mind and cognition. But, with this increase in influence and popularity, there has also been an increase in a number of distinct yet related approaches to enactivism: an increase in what we might call *different enactments of enactivism*. This increase in diversity in turn makes it difficult to speak of “enactivism” as if it were a unitary approach. Indeed, in this chapter and the chapters that follow, it will be argued that the enactive approach is not a unitary project but a multiplicity; what we can call the *enactive multiple*, to borrow from the STS scholar and anthropologist Annemarie Mol. Let us then provisionally say that there is no enactivism in the singular but rather *multiple enactivisms in the plural*. However, before we can begin exploring enactive multiplicity and its various forms, we first need to introduce the enactive project.

A good entry point is the work introduced by Varela, Thompson and Rosch (1991). The aim here is not however to provide an exhaustive exploration of this original proposal. I will instead focus on a number of key themes within it which I take to be important both as a means to understand the enactive approach more broadly and the particular concerns of this work more specifically. As a somewhat unintended consequence, this will also render historical lines more visible and highlight commonalities and differences within and between the different enactments of enactivism along the first ‘path’ identified above.

The general consensus is that what is now commonly referred to as the ‘enactive approach’ can historically be traced to Varela, Thompson and Rosch’s (hence VTR)

1991 book *The Embodied Mind*.<sup>5</sup> It is here that we first encounter the terms *enaction* and *enactive cognition*. Although the terms “enactive” and “enaction” were first introduced into cognitive science by Jerome Bruner (1964)<sup>6</sup> and Stellan Ohlsson (1983)<sup>7</sup> respectively, these terms are now more commonly associated with the work inaugurated by VTR. This work presented a rich synthesis of mutually complementary ideas with roots in a variety of disciplines such as early cybernetics, second-order cybernetics, systems biology, continental phenomenology and Buddhist epistemology, to name but a few. It is this groundbreaking book which provides us with the very first enactment of what will eventually become known as the ‘enactive project’, the central core of which is the claim that cognition is a form of *enaction*. But what exactly does it mean to say that cognition *is* enaction?

This notion of cognition as enaction is perhaps best understood when contrasted with the more standard cognitive science approach which casts cognition as *computation*. Within traditional cognitive science cognitivist approaches generally tend to model cognitive processes as a type of computation over internal representations within the cognitive system. As an alternative to cognitivist computational representationalism the authors “propose as a name enactive to emphasise the growing conviction that 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” (VTR, p. 9).

VTR argue that computational representationalists’ accounts need to be challenged and replaced because, amongst other things, they generally neglect the crucial mutually dependent dynamic interaction between a cognitive agent and its environment. The

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<sup>5</sup> All reference to VTR in this work will hence be to this specific book.

<sup>6</sup> The term “enactment” also has a history in psychoanalysis (see, Jacobs 1986), organisation theory (e.g. Weick 1969/1978) and science and technology studies (e.g. Law 2004a). The use of the term enactment in this work directly aligns with its use in STS, however, I leave it to the Appendix to explore these connections in more detail. Nothing further will be said on how the term is used within psychoanalysis and organisation theory. For now it will suffice to simply keep in mind the *performative* dimension of enactment which is implied in the enactive use of the term.

<sup>7</sup> Somewhat curiously and seemingly unbeknown to Varela and colleagues, the cognitive scientist Stellan Ohlsson (1983) proposed a few years earlier that Newell and Simon’s (1972) computational representationalist theory of cognition be called “*enaction theory*”. Thus, according to Ohlsson (ibid.), “[t]he basic tenet of the Enaction Theory is that to think is to run a simulation of the world in one’s head. More precisely, thinking proceeds by the application of *operators* to *mental models* under the guidance of *heuristics*” (p. 75, emphasis original).

authors argue that, if we take this dynamic interaction between agent and environment seriously, then cognitivism's insistence that cognitive structures are internal static representations loses much of its appeal. The enactive proposal "instead emphasises *emergent* cognitive structures that *self-organise* as a result of interactions between organism and environment" (Ward et al. 2017, p. 368 emphasis original). Cognition as enaction thus depends on the embodied interactive activity of the cognitive agent and not merely on computational/representational processes in the head. In many respects the notion of cognition as enaction is the most important and influential theme of the original enactive proposal. However, it is by no means the only one.

This is, perhaps, most evident when we take into account the far reaching influence it has had across a number of different disciplines. It has provided a diverse array of researchers, in many different fields, with a number of ideas, concepts and insights which go well beyond a 'narrow' focus on cognitive processes alone (see Durt et al. 2017; Stewart et al. 2010). These include, for example, important insights about: the nature of human embodied experience and how one could and ought to scientifically study them; autonomous agency; scientific practice and methodology; the nature of sociality and culture; the nature of self and the ontological status of nature itself and our relation to and within it. Indeed, as we will see in the next chapter, some theorists (e.g. Gallagher 2017) have argued that once we take its extensive breadth into account, the enactive approach is best understood as a broader *philosophy of nature* rather than merely a strict scientific research programme within cognitive science.

The initial enactive proposal was therefore as bold and ambitious as it was insightful, and with a daring extensive scope to boot. It not only rejected traditional accounts of cognition and the deep-rooted philosophical commitments underpinning our understanding of both subjects and objects but also proposed an alternative with far-reaching consequences. Fred Cummins and I put this as follows: "the psychological subject was largely undermined and argued to be a non-unified entity. Cognition was recast as embodied action; the relationship between subject and object was seen as arising in a dynamic process of sense-making, and all such sense-making was understood as tied to the continuous lived history of coupling between subjects and worlds. A strict distinction between subject and world was robustly rejected in favour

of a strongly Buddhist sense of groundlessness, and the explanatory domain addressed by the enactive view extended ambitiously from the biological, through the psychological, cultural, social and ecological” (Cummins and De Jesus 2016, p. 151).

VTR themselves recognised from the outset that their ambitious alternative proposal to mainstream cognitive science had equally important and far-reaching philosophical implications. Perhaps most important, at least with respect to scientific practice, is that this conception of mind significantly problematises standard understandings of objectivism.<sup>8</sup> That is, the widespread idea that scientists acquire and secure objective true facts about the natural world with appropriate rigorous scientific methods and practices and “are not, or should not be, influenced by particular perspectives, value judgments, community bias or personal interests” (Reiss and Sprenger 2020). This general conviction is problematised by VTR because the enactive conception of mind and cognition they propose calls into question one of its core underpinning premise.

As I will explain in more detail in the next chapter, the scientific method is grounded on the assumption that there is a world ‘out there’, which is ‘pregiven’ and fixed independently of any observational practices. It is this fundamental assumption that the authors challenge. VTR note that, although this is a common assumption guiding the natural sciences, including cognitive science itself, it nonetheless needs to be rejected. This particular rejection is one of the two core themes around which this work pivots and will be the central focus of Chapters Five and Six. Here I will therefore merely provide a brief outline of two motivating reasons underpinning this rejection for VTR.

The first motivation stems from VTR’s observation that the belief in a pre-given world is underpinned by a dualist schema which, when transported into the cognitive sciences, gives rise to a distinction between “external” objects on the one hand and “internal” *mental representations* on the other. The core intuition here being that there is a pre-given world ‘out there’ which is then represented ‘in here’. Thus, for VTR,

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<sup>8</sup> The notion of objectivism often comes hand in hand with that of realism, such that the rejection of the former implies a rejection of the latter. However, in this work, these two notions are not understood to be equivalent in meaning. This observation is particularly important for those scholars who want to reject objectivism yet maintain that there is a ‘real world’. We will re-turn to these points in subsequent chapters.

rejecting and overcoming cognitivist (mental) representationalism and the realist/idealist epistemologies which support it, goes hand in hand with the rejection of scientific objectivism. Again, I will leave it to Chapter Five to explore this point in more detail. For now I want to explore the second motivating reason, which is especially important in this context, because it also serves as a bridge to the other enactive themes discussed in this work.

For this particular task it will be helpful to visit one of Varela's early texts. Largely inspired by Buddhist philosophy, Varela (1979) takes issue with the common-sense view that there is a solid and stable pre-given world out there waiting to be discovered. According to Varela, "although the world does look solid and regular, when we come to examine it there is no fixed point of reference to which it can be pinned down; it is nowhere substantial and solid. The whole of *experience* reveals the co-dependent and relative quality of *all knowledge*" (1979, p. 275, emphasis added). This quote is illuminating because it not only highlights a further central motivation for VTR's subsequent rejection of objectivism but also for providing clues as to how the authors would later come to deal with this counterintuitive insight. Following Varela's earlier work, VTR go on to make two interrelated arguments which are not only crucial for their rejection of objectivism but also for the broader proposal in general: these are that (i) our lived experiences reveal to us that there is no substantial foundation (ground) to the world since (ii) it is "brought forth" by the agent such that world and agent "co-determine" one another. Let us unpack these points.

The first point to note is that VTR are acutely aware that this rejection of objectivism and the "groundlessness" (see Meling 2021) it engenders will lead most to nihilistic despair and anxiety, but they nonetheless maintain that nihilism is problematic only if it is not pursued to its logical conclusion. VTR draw from Buddhism to motivate their claim that groundlessness is indeed a good thing and that the nihilist impulse stems from our tendency to always search for a nonexistent fixed and stable objective common ground. With this in mind, the authors advise us to embrace groundlessness rather than treat our experience of the inexistence of stable objects as itself providing an objective ground.

Furthermore, recognising and embracing groundlessness will not only relieve us of much anxiety and suffering as it allows us to “shed the constant anxiety and irritation of egoistic concerns” (p. 234), it will also help us lead a more compassionate and ethical life. As VTR point out, in “Buddhism, we have a case study showing that when groundlessness is embraced and followed through to its ultimate conclusions, the outcome is an unconditional sense of intrinsic goodness that manifests itself in the world as spontaneous compassion” (p. 253).

Groundlessness, moreover, is also not only a feature of the world but also of the self. For VTR, the groundlessness of mind and self can be revealed to us through mindfulness meditation. According to the authors (p. 23), meditation-induced experiences, reveal that the self is indeed nothing more than a disparate aggregate of experiential events. It is the conviction of the authors that the Buddhist tradition provides a richer and deeper appreciation of the non-existence of the self and all the right resources to enable us to learn to experience ourselves as fundamentally ego-less. All of this leads the authors to two very important conclusions: (i) that Buddhist epistemology (and indeed continental phenomenology) and the mindfulness meditative traditions give us all the right resources for properly researching first-person lived experience and (ii) that doing so will in turn also provide us with crucial insights into the very nature of the third-person, “objective”, scientific “point of view”.

The first conclusion is largely underpinned by VTR’s ambition to introduce into scientific discourse an account of subjective human experience. According to the authors (pp. 9-14) there needs to be a “fundamental circularity” between human experience and the sciences of the mind. A “productive back-and-forth” is required between the third-person scientific method and first-person phenomenology/Buddhism analysis/investigations. As Varela (1996) insists, “we need cutting edge techniques and analyses from the scientific side, and very consistent development of phenomenological investigation for the purposes of the research itself” (p. 343). The central idea, then, is that our subjective lived experience and sense of self can be better understood if we bring together resources from phenomenology and Buddhist-based epistemology and mindfulness mediation into an active dialogue with contemporary work within

cognitive science. Hence the subtitle of the book: *Cognitive science and human experience*.

This circularity is especially needed because, according to VTR, when cognitive and neuroscientists exclusively concentrate on the underlying brain structures and information-processing mechanisms of cognition they at best overlook, and at worst dismiss as mere fiction, the subjective phenomenological experiences of subjects. For VTR, subjective experiences cannot be ignored if we are to have an adequate understanding of mind and cognition. Fundamental circularity can therefore both help prevent behaviour and experience from being dismissed as fictitious and also prevent objective scientific descriptions from becoming the sole and authoritative voice on ‘what’s really going on’. At the same time, our understandings of experiences and behaviour also become strengthened by actively bringing them into circulation with the scientific enterprise. To put the general idea in other words, what the authors are arguing for here is essentially a *methodological stipulation* which requires the mutual engagement between phenomenological (first-person) and scientific (third-person) *levels of description* (cf. Bechtel 1994; Roberts 2018).

Taking into account the groundlessness of the world, VTR emphasise that there is another form of “circularity” in play when cognition is itself scientifically studied. This circularity is especially evident, according to the authors, when scientists attempt to connect a particular behaviour or experience with specific brain structures. As they point out, “[t]he basic assumption [of cognitive/neuro science], then, is that to every form of behavior and experience we can ascribe specific brain structures (however roughly). And, conversely, changes in brain structure manifest themselves in behavioral and experiential alterations [...] Yet upon reflection we cannot avoid as a matter of consistency the logical implication that by this same view any such scientific description, either of biological or mental phenomena, must itself be a product of the structure of our own cognitive system” (ibid., p. 11). It is this insight which allows VTR to reach conclusion (ii) above: that groundlessness and first-person phenomenological methodologies also provide us with crucial insights into the very nature of the third-person, “objective”, scientific method.



Furthermore, as Vörös and Riegler (2017) note, circularity is always constituted by “recursive self-referential processes”. Vörös et al. (2016, emphasis original) capture the central point rather succinctly by noting that, for the enactive approach, there is an always-already “ineradicable *reflexivity* underlying all our epistemic practices”. Thus, even though scientific research inevitably turns behaviour and experience into mere objective mechanism, the authors argue that we cannot overlook the fact that this activity is *itself* constituted by behaviour and experience. Investigating and explaining cognition is itself a cognitive process. There is, as such, no stable point (ground), no room for a neutral view from nowhere (cf. Haraway 1988), because one’s specific position in the world necessarily influences what one perceives and understands. For VTR, the inevitable reflexivity underpinning all scientific practice is simply a manifestation of the inherent groundlessness of the world. In turn, this “discovery” of reflexivity provides further support for VTR’s insistence that there is no fixed, stable and pregiven world. We can therefore say that, from an enactive standpoint, reflexivity and groundlessness are but two sides of the same epistemic coin.<sup>9</sup>

As we saw above, rather than dwell on the problematic and paradoxical nature of the phenomena or negate it altogether, the authors embrace it and push it to its full logical conclusion. As Vörös and Bitbol (2017, emphasis original) point out, “it is *circularity all the way down*”. Evidently, the notion of circularity plays a number of important, interrelated roles within the enactive proposal. One important role which we have not mentioned yet, though certainly implicit in our discussion so far, is how it functions as a *bridge* between objectivism and idealism. For VTR, positing the circulation between lived experiences and scientific method offers us the best possible way to deal with the groundlessness/reflexivity of experience. This, in turn, provides us with the necessary resources for plotting a “middle path” between the excesses of objectivism and idealism (ibid., p. 4).

This should now allow us to better appreciate and understand VTR’s insistence that, “[f]rom the standpoint of enactive cognitive science, this circularity is central; it is an *epistemological necessity*” (p. 9, emphasis added). It is an epistemological necessity

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<sup>9</sup> See Chapters Five and Six for further discussions on the topic of reflexivity.

because (i) it provides the enactive theorist with the necessary means to recognise the inherent groundlessness/reflexivity of our experiences, (ii) it helps overcome the reductive commitments of traditional scientific research and in the process, (iii) subjective experiences are legitimately recognised on their own terms. Moreover, it is also this circularity which helps (iv) provide a bridge between objectivism on the one hand and idealism on the other, thus paving the way for a middle path between the two.

Before moving on to explore other enactments of the enactive approach, I would like to conclude this section by briefly highlighting one last theme; namely, that of autopoiesis. The most important antecedent to enaction is, without a doubt, the theoretical biology of Humberto Maturana and Francisco Varela. Varela and Maturana (1980, 1987) are best known for their influential account of the basic nature of living systems. According to Maturana and Varela (1980) all living systems are what the authors call “autopoietic” by virtue of instantiating a distinctive set of systemic *organisational properties*. An autopoietic system is constituted by a set of interdependent processes of self-generation, self-transformation and destruction of components, whereby these processes continuously regenerate and sustain themselves as an individuated dynamic entity. Such systems are said to be “organisationally closed” in that the processes constituting the system depend on at least one other component and support at least one other. Such systems are also “structurally open”, in that they must engage in regulated, energetic exchange with the surrounding environment. Finally, the set of processes constituting the system must also generate its own boundary – a membrane – which individuates the component processes from their surroundings and within which the system realises itself.

Although the term “autopoiesis” itself does not figure within *The Embodied Mind*, the theoretical underpinnings of the concept, expressed through the notion of *autonomy* (VTR, p. 139),<sup>10</sup> informs much of the discussion therein. In other words, and as we will soon see, it is a central theme of the enactive approach more broadly. Indeed, a new generation of theorists have explicitly taken up the notion of autopoiesis, modified it in significant ways, and made it an integral part of an enactive account of mind and

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<sup>10</sup> See Barandiaran (2017) for a detailed discussion on the role of autonomy within enactivism more broadly conceived.

cognition. Going back to and revisiting the enactive approaches' autopoietic roots has allowed these theorists to enact an extremely productive and influential variant of the enactive proposal. It is to this that we now turn.

## **2 Enacting autopoietic enactivism**

While *The Embodied Mind* has been and continues to be hugely influential, it would be fair to say that very few have in fact full-heartedly embraced all the central tenets and ideas presented therein. Indeed, what has tended to happen is that diverse researchers and theorists have mined its pages for insights and ideas, and then have gone on to 'appropriate' these towards their own distinctive ends – ends often largely inconsistent or even contradictory to the original proposal (see Thompson 2018; Vörös et al. 2016). As a consequence, the enactive approach has, since its original formulation, struggled to maintain a stable identity. There is, however, a group of influential researchers who have attempted to stop this from happening by embracing and then further developing most of the central tenets of the initial enactive proposal.

Indeed, so successful have these researchers been in developing and promoting – in enacting – this new brand of enactivism that it would by no means be an exaggeration to suggest that it has steadily but surely coalesced into *the* canonical position within the wider enactivist community. Daniel Hutto and Erik Myin (2013) have, somewhat misleadingly, dubbed this variant of enactivism *Autopoietic Enactivism* (hence AE).<sup>11</sup> I say misleading because, although the original formulation of autopoiesis has served as the main inspiration for a second wave of enactivists, the theorists who have been greatly influenced by autopoietic theory have also revised and refined it in important and fundamental ways (see Barandiaran 2017; Colombetti 2014; Di Paolo 2005; Di Paolo et al. 2017; 2018; Fuchs and De Jaegher 2009; Stewart et al. 2010; Thompson 2007). As we will see in Chapter Three, it is autonomy rather than autopoiesis, which is

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<sup>11</sup> It should be noted from the outset that the great majority of theorists who align themselves with the cluster of ideas presented in this section often reject outright the "AE" label (e.g. Thompson 2018). Rather, these theorists tend to use "enaction" or "the enactive approach" rather than enactivism or AE as a means to both stay true to the inherent reflexivity of epistemic practices promoted by VTR and thus avoid reifying its own concepts (see the Introduction).

fundamental for the project. Nonetheless, and notwithstanding the potential to mislead, I will continue to use the label as it is now standardly used within the broader literature.<sup>12</sup>

One way to understand AE is simply as a natural continuation and further development of the ideas and themes developed by VTR. Nevertheless, it also diverges from it in some interesting respects: it goes back to and draws from one of its other original roots in the form of autopoiesis and autonomy; it rethinks the role of phenomenology; casts aside the Buddhist epistemologies; it introduces and places special importance on teleology, meaning and value; and finally, it draws from the work of Hans Jonas to argue for a distinctively *phenomenologically grounded* continuity between life and mind. For these reasons I believe it is warranted to understand AE as a distinct and distinctive enactment of enactivism. Let us briefly explore some of the diverse strands which have contributed to this specific enactment.

Inspired by Weber and Varela's (2002) influential paper which aims to reconcile the notion of autopoiesis with intrinsic teleology, value and meaning, a number of researchers have brought the original account of enactive cognition into close dialogue with the concepts of autopoiesis and autonomy. These theorists have, in the process, developed an ambitious, all encompassing, non-reductive but naturalist framework, which aims to account for cognition across the biological spectrum and at varying levels of organisational complexity. Like the original enactivist proposal, AE theorists tend to oscillate between on the one hand, presenting its approach as a unified scientific research programme for cognitive science (e.g. Stewart et al. 2010), while on the other hand, also presenting the approach as a much broader philosophy of nature which transcends the narrow confines of a strict scientific research programme (e.g. Froese and Di Paolo 2011).

As we will explore in greater detail in the following chapters, this dual tendency is perfectly exemplified in a central tenet of the AE approach, namely its "life-mind continuity thesis". AE theorists propose a *life-mind continuity thesis* (LMCT) and argue

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<sup>12</sup> Note that here I will only briefly and somewhat superficially introduce the key concepts of AE. This is because these concepts are explored in-depth in the chapters to come. For our purpose here it will suffice to briefly introduce some of its central concepts and note how it is also a distinct and distinctive enactment of enactivism.

that, it is *autonomous systems*<sup>13</sup>, which “bring forth” *intrinsically meaningful worlds* through processes of *sense-making* (e.g. Di Paolo 2005, 2009; Di Paolo et al. 2018; Froese and Di Paolo 2011; Thompson 2007; Stewart et al. 2010).<sup>14</sup> While AE takes up the notion that organisms bring forth their own worlds directly from VTR, it places greater emphasis on both life-mind continuity and intrinsic meaning, value and teleology, and aims to provide a fully naturalistic and operationalised account of these notions. In so doing, it routinely straddles the line between scientific research programme and philosophy of nature. We will set this particular point aside for now and instead focus more specifically on the other core tenets of AE.

As already noted in the Introduction, Evan Thompson (2007) has argued that AE, or what he calls the “enactive approach”, is underpinned by two core pillars: (i) the rejection of computational representationalism and the emphasis on embodiment and the dynamics of agent-environment sensorimotor couplings and (ii) the centrality of biological autonomy in the constitution of agency and cognition. For Thompson, a co-author of the *Embodied Mind*, both “pillars” are direct historical and theoretical decedents of the original enactive proposal. However, these are also modified, refined and developed further in certain key aspects by AE theorists. This ongoing refinement and development of the enactive approach has given birth to five essential, mutually interdependent concepts which cluster around Thompson’s two central pillars: (i) autonomy; (ii) sense-making; (iii) emergence; (iv) embodiment; and (v) experience. Let us briefly take a look at these individually.

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<sup>13</sup> Perhaps due to its historical connection with systems theory and cybernetics, most enactive theorists tend to use the term “system” as a direct substitute for “organism” or “living entity”. The terms are more often than not used interchangeably. I will follow suit in using these terms interchangeably as the context dictates. Nonetheless, it is worth recognising that doing so adds an extra layer of abstraction which is problematic to say the least. However, this is an issue which I cannot address here, but I will point the reader towards Donna Haraway’s (2008, pp. 19-35) insightful discussion of certain philosophical treatments of “animals” which is directly relevant to this very specific point.

<sup>14</sup> I would like to briefly note here, although not in any detail, the similarity between this enactive proposal and the account of cognition developed some decades earlier by the social psychologist and organisational theorist Karl Weick. In *The Social Psychology of Organizing* (1969/1978), Weick proposes an account of cognition which has some interesting similarities, both in terms of content and vocabulary, with the account proposed by VTR. In it, Weick develops an embodied account of cognition as emergent, and which brings together not only process philosophy and phenomenology, but also cybernetics, systems theory and theoretical biology. Perhaps more interesting is the fact that Weick also introduces the terms “enactment” and “sense-making”, which themselves overlap considerably with enactivism. Weick’s conception of enactment in particular is remarkably similar to the enactive one.

- (i) *Autonomy*: According to AE, living organisms should, first and foremost, be understood in terms of intrinsic (biodynamic) organisational processes. According to AE, organisational closure and structural openness realise autonomous systems which generate and sustain their own activity by exploring their environments. This, however, does not mean that autonomous systems are materially closed, i.e., closed off from outside influences. Rather, autonomous systems need to be thermodynamically open and structurally coupled to the environment and capable of dynamically interacting with it.
- (ii) *Sense-making*: Autonomous systems generate and maintain their own identities and, as a consequence, enact their own *cognitive domains*. This coupling between an autonomous system and its environment results in what AE calls “sense-making”. Sense-making is thus the *relational dimension* of biological autonomy. However, sense-making is not mere structural coupling with the environment but rather an *active regulation of this coupling* such that the system transforms the environment into a place of salience, meaning and value. Through sense-making, a system is said to transform its local environment into a meaningful *Umwelt*.
- (iii) *Emergence*: The notion of emergence is already implicit in both (i) and (ii). Thus autonomy arises from organisational closure and is therefore not a property found in any of the constituent components; while meaning and value are not properties found either in the organism or in the environment but are properties which arise only in the relational – sense-making – sphere between the two. Di Paolo et al. (2010) point out that, “in order to distinguish an emergent process from simply an aggregate of dynamical elements, two things must hold: 1) the emergent process must have its own identity and 2) the sustaining of this identity and the interaction between the emergent process and its context must lead to constraints and modulation to the operation of the underlying levels”. There is thus a mutual interdependence between emerging and enabling processes, such that the former enable but are not fully determined by the latter, and the former have their own unique identity which cannot be reduced to the latter. Di Paolo et al. (ibid.) use life itself as evidence for emergence, pointing to living cells as entities which are constrained by and contain properties that cannot be found at a lower molecular level.

- (iv) *Embodiment*: Cognition fundamentally emerges from dynamic patterns of embodied action. AE take embodiment to be a non-negotiable, ontological constituent component of cognition and not a mere afterthought as is the case with cognitivism. Mind and cognition are thus argued to be inherent in the active *living* body, which is comprised of autonomous layers of self-coordination, self-organisation and self-production. This body is argued to be “open to” the world and that which grounds sense-making activities. The body is therefore not a passive puppet controlled by the brain but a whole animate, living, breathing system.
- (v) *Experience*: Subjective, first-hand conscious experiences, must be brought into scientific investigation and not simply dismissed or ignored. To do so, AE, following Varela’s recommendation, suggests that researchers draw from phenomenological analysis to complement and inform scientific research. This fifth concept has two aspects to it – one thematic the other methodological. Thematically, AE takes experience to be an intrinsic aspect of all cognitive activities, one which needs to be acknowledged and account for, and not, brushed aside. Methodologically, AE recommends phenomenological resources to help in the systemic investigation of these experiences.

Taken together, these are argued to form the core of AE, which constitutes both of its central pillars and provides the critical resources for an alternative cognitive science – an *Enactive Cognitive Science*. It is, however, important to emphasise here again, not in the least because it remains implicit and unspecified within these five key concepts, that central to the AE framework is a commitment to the continuity between life and mind. Thus, whereas cognitivists and some embodied cognition (Shapiro 2011) theorists tend to remain distinctly anthropocentric, exclusively concentrating on human forms of cognition, AE takes cognition to also be a key feature of *all* autonomous living systems.

It is this central insight which underpins AE’s commitment to LMCT and informs its view that mind needs to be understood within the broader context of the conditions for *life* (Froese and Ziemke 2009; Thompson 2007, 2011a, 2011b). Moreover, it is within the context of this LMCT that the notion of autopoiesis acquires its central importance. As we will see in the following chapters, a fundamental feature of AE, one which

distinctly sets it apart from other types of enactivism and other embodied cognition approaches, is the central role that the notion of autopoiesis *and* autonomy occupy within its framework (see Degenaar and O'Regan 2017).

Finally, it is worth noting that one central omission of AE, in relation to the original enactive proposal, is Buddhism. As we saw previously, VTR proposed a fundamental circularity which provides a bridge between Buddhist epistemologies/mindfulness meditation traditions and cognitive science. Moreover, Buddhist epistemologies also helped secure the groundlessness of world and self. Although AE has retained a sense for the groundlessness of the world by retaining the notion that organisms “bring forth” worlds, it no longer relies on Buddhism, or indeed groundlessness, to justify this claim. Generally speaking, AE theorists have not, by and large, taken up VTR’s Buddhist commitments. A notable exception, however, is some of the work by Evan Thompson (e.g. Thompson 2014).

To sum up our brief discussion: we have seen that AE attempts to provide a coherent, unified framework which can account for the totality of cognition. This includes not only human cognition, but biological cognition at all levels of the evolutionary spectrum. AE presents a unique account of cognition and agency where cognitive agents do not merely react passively in and towards the world but creatively enact a unique and meaningful cognitive domain. Cognitive agents therefore actively bring forth the world rather than represent it internally. This makes cognition intrinsically relational vis-à-vis processes of active sense-making which are neither reducible to the agent nor to the environment. At the heart of the sense-making process is the living body which grounds meaning and subjective experience. Subjective experience is essentially enacted and therefore intrinsically embodied.

### **3 Interlude: Entangled divergences**

We started this chapter by introducing the work of VTR and argued that this constituted the first enactment of the enactive approach. We then introduced subsequent work of AE theorists which was not only historically connected to this work but also attempted to further refine and promote most of its core tenets. However, despite its influence and popularity, the AE approach is not the only enactment of enactivism. Indeed, over the



last two decades the enactive approach has fragmented rather than unified, as AE theorists had hoped. It is, of course, within this fragmentation that the label “enactivism” emerged and with it the questionable appropriation, distortion and liberal applications of core enactive ideas into other areas of research.

So, in parallel with the ongoing refinement of AE itself, several other enactments of enactivism also inspired by the original proposal, have emerged and gained great popularity and influence. In relation to AE, these alternative enactments are marked out primarily by the fact that they tend not to endorse or sometimes simply downplay the role of autopoiesis and autonomy (e.g. Degenaar and O’Regan 2017; Hutto and Myin 2013). Nonetheless, these accounts follow the original enactive proposal in advocating situated embodied couplings with the environment and rejecting, in varying degrees, notions of internal mental representations and computation. These also tend to narrow their focus to very particular aspects of cognition, whereas AE aims for a *systematic unified theoretical framework* – a novel paradigm – for understanding cognition in its complex *entirety* (Di Paolo et al. 2018; Steward et al. 2010). That is, AE is interested in accounting for cognition as a *whole* and not just some *particular* aspects thereof.

The most popular and influential of these enactments are *sensorimotor enactivism* (SE) and *radically enactive cognition* (REC) respectively. Often, these alternative enactments of the enactive project, are also grouped together under the broader “4E cognition” (embodied, embedded, extended and enactive) banner in philosophy of mind and cognitive science (Menary 2010). Some theorists (e.g. Hutto and Myin 2013), propose a radical/conservative distinction of this theoretical space along the lines of one’s commitment, be it tacitly or explicitly, to internal mental representations. Where some “conservative” researchers within the 4E camp explicitly take some insights and concepts from enactivism as a means to “extend” cognitivism (e.g. Clark 2008; Wheeler 2005), most enactivists champion a more distinctive “revolutionary” line and insist that enactivism can provide the necessary theoretical and methodological tools for a clean break with the cognitivist hegemony (e.g. Di Paolo 2009; Di Paolo et al. 2017; Di Paolo et al. 2018; Froese 2007; Fuchs 2018; Gallagher 2017; Hutto and Myin 2017; Thompson 2007).

In the following two sections, I will elaborate a bit further on these two distinct enactments of the enactive project. It goes without saying that my treatment of these accounts are not meant to be exhaustive, but rather a means to introduce other enactments of enactivism, while also noting both how these overlap and diverge with the enactments introduced above.

#### **4 Enacting sensorimotor enactivism**

Sensorimotor enactivism has its origins in the joint early work of Kevin O'Regan and Alva Noë (O'Regan and Noë 2001), who set themselves the dual challenge of explaining what visual experiences *are* and *where* they occur. It has subsequently been developed by a number of researchers and taken up in a variety of disciplines from philosophy of mind to artificial intelligence (see Bishop and Martin 2014). Unlike the enactivism(s) explored above, the central and exclusive explanatory aim of SE, is perception – especially visual perception (though the account has been used to address other modalities). SE follows the enactive approach in rejecting traditional cognitivist accounts which essentially reduced perception to the construction of internal representations or models of the world inside the brain. Furthermore, SE also follows enactivism in claiming that perception is constituted by embodied agents engaging with the world through skilful action and sensorimotor “know-how”, not just computational processes encased in the head. It is then *practical knowledge*, expressed through sensorimotor know-how, which constitutes perception.

This idea of sensorimotor know-how is cashed-out in terms of a cognitive system's grasp of "sensorimotor contingencies", which are understood to be systematic, lawful dependencies, corresponding to features of an agent's sensory apparatus and features of the agent's environment. They are interrelations between actual and possible perceptions, sensations, actions and movements. This sensorimotor knowledge is argued to be grounded on an “implicit” understanding of how our experiences and perceptions are effected by our bodily movement. This is, in effect, a variant on the enactive idea which intimately connects perceiver and the perceived through embodied sensorimotor action.

According to proponents of SE, my perception of, for example, a whole tomato, is constituted by an implicit understanding of the ways in which my potential movements in relation to the tomato, or its movement in relation to me, will bring further aspects of its shape into view. Accordingly, “vision is a mode of exploration of the world that is mediated by knowledge of what we call sensorimotor contingencies” (O'Regan and Noë, *ibid.*, p. 940). Or, in other words, perceiving is not an internal, passive process, but *a way of acting*. As Noë (2004) argues, “[p]erceptual experience acquires content thanks to our possession of bodily skills. What we perceive is determined by what we do (or what ever we know how to do); it is determined by what we are ready to do [...] we enact our perceptual experience; we act it out” (p. 1). Thus, for Noë, perception should be thought of as action, as a type of “skilful bodily activity”.

Furthermore, O'Regan and Noë's SE account of perception argues for a *constitutive* role for embodied know-how and practical understanding. The central point here is that the ability to perceive is something both dependent on, and constitutive (in part) of sensorimotor knowledge, which is built up of sensorimotor contingencies. Thus, according to SE, sensorimotor contingencies are more than merely causally important to perception – they actively constitute it. Despite this insistence regarding the constitutive nature of embodied action for perception, Ezequiel Di Paolo (2014) has suggested that O'Regan and Noë's (2001) claim that perception requires an agent's mastery of the laws of sensorimotor contingencies, can be broadly interpreted in two very distinct ways. Di Paolo (*ibid.*) points out that the “mastery” involved here can be broadly understood as either “in-the-head” or “not-just-in-the-head”. When mastery of sensorimotor contingencies are conceived of as in-the-head they can be understood as states which can be sufficiently accounted for simply by the functional architecture of the agent. Though the label suggests that these states are realised solely in the head of the agent, this need not be the case. Nonetheless, the result of this conception is internalist representationalism. By contrast, interpreted as not-just-in-the-head, sensorimotor contingencies are conceived as nonrepresentational forms of embodied know-how which *cannot* be reduced to an agent's functional architecture.

There has been some debate within the broader enactive literature as to how compatible SE is with the original enactivist proposal (e.g. Degenaar and O'Regan 2017;

Thompson 2007). The consensus among AE theorists, for example, is that SE is at best only a partial proposal because it does not have an account of agency which could ground sensorimotor contingencies (cf. Di Paolo et al. 2017). In light of our above discussion, I suggest it would be equally fruitful to take SE as yet *another enactment* of the enactive project, no different in this respect from the ones introduced above. One which diverges from, but also certainly overlaps with, other enactments. With this, we can now turn our attention to a more recent enactment of the enactive approach, dubbed by its authors as “radical enactivism”.

## 5 Enacting Radical Enactivism

Daniel Hutto and Erik Myin (H&M) are the main architects of an increasingly popular and influential enactment of the enactive approach which, by the authors’ own admission, has its closest affinities with VTR. They label this position *Radically Enactive Cognition*, or REC. However, while acknowledging a debt to enaction, H&M are also quick to distance themselves, in certain key respects, from other enactments of the approach.<sup>15</sup> For example, H&M take issue with SE’s claim that a cognitive system needs “knowledge” to actively engage with the world. The authors are also suspicious of AE’s claim that an organism's worldly interactions “create” and “carry meaning” (Hutto and Myin 2013, p. 34). Indeed, for H&M (ibid.), the central issue is that enactivism simply is not *radical* enough. But how so?

H&M locate the source of this “conservatism” in a residual commitment to representationalism. To illustrate the issue H&M identify two variants of representationalism which can be found in both cognitivist and non-cognitivist cognitive science. Proponents of what the authors call “CIC” (“Cognition Necessarily Involves Content”) advocate a form of hyper-intellectualism which maintains that representational content inside the brain is a non-negotiable necessity for genuine cognition; while proponents of “CEC” (“Conservative Embodied/Enactive Cognition”)

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<sup>15</sup> It should be noted, however, that Hutto and Myin argue that REC’s relationship to both AE and SE is not primarily antagonistic nor critical. Rather, they suggest that REC is best understood as a project which seeks to “unify enactivism” by specifically improving its anti-representationalist dimension (see, Hutto and Myin 2017, Chapter 4). This, of course, goes against those AE (e.g. Thompson 2018) and SE (e.g. Degenaar and O’Regan 2017) theorists who argue that their specific enactments of the enactive approach is *the* one which can and should unify enactivism. We will (briefly) re-turn to issues regarding unification of the enactive project in the Appendix.

endorse embodiment but nonetheless remain “conservative” because they essentially retain CIC’s commitment to the idea that basic cognition is representational and, as such, involves (informational) content.

REC rejects both CIC and CEC, and argues that only creatures with fully developed conceptual abilities, scaffolded by public language, can or need be, described in content-involving terms. Moreover, while significantly important, this is but the tip of the iceberg as far as the broad spectrum of cognitive abilities is concerned. The significant majority of “basic” cognitive activities are non-contentful and non-representational in character. Basic cognition here refers to a class of cognitive activities which are non/pre-linguistic and involve “sensitively and selectively responding to information, but [...] does not involve picking up and processing information or the formation of representational contents” (Hutto and Myin 2017, p. 92).

According to REC, most types of action and behaviour can be explained purely in terms of dynamically unfolding, situated, embodied patterns of interactions. For REC, basic cognition is constituted by the concrete patterns of environmentally situated, organismic activity, that unfolds over real time. These interactions are essentially nonlinear and “loopy”, making it impossible to clearly demarcate an “inner” domain of mentality from an “outer” domain of environmental causal factors. Basic cognition thus involves brain, body and environment, tightly interconnected in a mutual and simultaneous dance of reciprocal influence. This commits REC to what H&M have called a “Developmental-Explanatory Thesis”, which maintains that, “mentality-constituting interactions are grounded in, shaped by and explained by nothing more than the history of an organism’s previous interactions” (Hutto and Myin 2013, p. 8). The same logic is also applied to the phenomenological properties of subjective experiences, which are similarly understood in terms of specific types of activities, “even if only neural activity” (ibid., p. 8).

The crucial point here is that REC staunchly rejects explanations of cognition that posit contents that are acquired and transformed by a cognitive system in order to create internal mental representations which then enable, facilitate and guide organismic action and experience. Moreover, not only do we not need to invoke internal representations as

explanatory posits, REC maintains that, ontologically speaking, there actually are no such naturally occurring, internal, content-bearing representational states.

For REC, anyone insisting on internal, content-bearing representational states, must provide a naturalistic account for the origin of this content. As H&M point out, for a state to be contentful it must have “specified conditions of satisfaction”, or “truth-bearing properties” which truthfully specify that the world is a particular way. A paradigmatic example here is that of a linguistic proposition: in cognitive science and philosophy the tendency is to assume that all mental states, just as linguistic propositions, necessarily carry content. H&M problematise this notion of content by highlighting how all attempts to naturalise it have, thus far, failed. The most promising accounts rely on co-variance relations between internal states and external states of affairs, but as H&M note, co-variance does not constitute content. H&M (*ibid.*, pp. 41-53) call this the “hard problem of content”.

It might come as something of a surprise that, H&M target not only proponents of traditional cognitivist accounts of mind, but also more non-traditional accounts closer to their own, including enactivism. As we noted at the outset, H&M argue that although proponents of what they deem to be “less radical” embodied views, including both SE and AE, share central themes and concerns which are broadly consonant with REC, such as the emphasis on the active and world-engaging nature of cognition and perception, it is nonetheless the case that these non-REC accounts remain tacitly committed to representationalist thinking. For this reason, H&M maintain that, only a thoroughly radical anti-representationalism, can save enactivism. Indeed, if enactivism is pushed to its logical conclusion, then REC is the outcome – therefore “the only good enactivism is a properly radical enactivism” (*ibid.*, p. 5).

This, then, concludes our brief discussion of the different branches of the enactive project. This should hopefully provide us with some of the necessary background for situating the specific discussions of the enactive project in the following chapters. In doing so, we have also suggested throughout that rather than seeing these distinct approaches as ‘branches’ of enactivism, one could do just as well seeing them as different ‘enactments’. This was done primarily as a means to gently prime the reader

for what is to come. That is, to ease the reader into thinking about the enactive project in terms of *enacted multiplicities* comprised of somewhat overlapping and somewhat divergent theories, ideas, concepts and arguments. In the next section we begin (provisionally) clarifying and (tentatively) motivating this particular shift in terminology and focus.

## **6 Enaction enacted: Provisional groundwork**

Given the admittedly rather vague, and thus far, generally under-thematised suggestion that the enactive project is made-up of different enactments, one might now be wondering if this is *really* any different from simply calling these ‘branches’ of enactivism. As noted in the Introduction, one way to render visible some of what this shift in terminology and focus entails, is to highlight the sorts of questions it allows us to ask. More specifically, it shifts the focus more easily towards questions and concerns about *how* and *where* these different versions of the enactive project are enacted and done. Although this general idea should become more apparent and clearer as subsequent chapters unfold, I want to conclude this chapter with a few preliminary stage-setting remarks about it.

If one thinks about AE, SE and REC as all being branches of enactivism, then questions concerning how these relate, overlap, support and/or mutually exclude each other, how they can be coherently assimilated and/or critiqued for their flaws, blindspots and oversights and/or conceptually improved to become more coherent, relevant and feasible and so on, naturally come to the forefront. However, as we will see in the following chapters, thinking in terms of enactments of the enactive project relegates these to the background and foregrounds a different set of concerns. First and foremost among these is a sensitivity towards the *diverse worlds* that these enactments help create; the theoretical spaces they open up for further investigation and debate, and those which in the very same process they foreclose, relegate to the side and cast as insignificant. It also foregrounds a sensitivity towards both the intended, and, perhaps even more importantly, the *unintended consequences* and *less apparent implications* of the specific worlds and theoretical spaces which are created and opened up with and through these enactments. Put differently, it shifts the focus towards how and where certain theories, concepts, ideas and arguments, help *enact different versions* of the

enactive project and the intended/unintended implications and consequences these (might/do) have.

So, with these brief clarifications on the table, we can now say that the central concern of this work is with heterogeneous enactive multiplicities, but it shifts the focus towards how one particular enactment of the enactive project is itself constituted by heterogeneous multiple enactments. More specifically, it will explore how some of the central tenets of AE in particular, expressed with and through specific ideas, distinct concepts, theories and original arguments, are themselves multiply enacted by different enactive theorists.

We will, of course, have significantly more to say on what exactly it means to enact arguments, ideas and concepts throughout the following chapters.<sup>16</sup> For now, a brief example will suffice to help illustrate some important aspects of the general idea. In De Jesus (2016a) I attempted to show that while AE's life-mind continuity thesis presented a strong case *against* anthropomorphism, it nonetheless *also* ended-up reintroducing and *reproducing* it. We will revisit some of the details of this argument further in Chapters Three and Four; the important point for now, however, is how a central tenet within the AE framework seemingly pulls in two polar opposite directions. I want to say that this "pulling in opposite directions" is a direct consequence of *two different enactments* of the notion of anthropomorphism. The first enactment threads together a number of heterogeneous resources, concepts and ideas in order to *reject* anthropomorphism, while the second is a consequence of an entanglement with and (re)assembling of some less apparent aspects of these heterogenous resources, concepts and ideas, which *unintentionally reproduces* anthropomorphism. As we will see, through these often less apparent entanglements and reassembling(s), anthropomorphism is reintroduced and reproduced as it is also rejected.

An initial intuitive response to this claim would be to suggest that, strictly speaking, enactive theorists only enact *one* version of anthropomorphism. Enactive theorists only

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<sup>16</sup> As mentioned above, the notion of enactment is discussed in more detail in the Appendix; there we also clarify the specific understanding intended throughout this work. My hope is that, upon reading the Appendix, the reader will be motivated and sufficiently compelled to re-turn to some of these prior discussions around the notion of enactment.



enact its rejection. In one sense this is of course true. However, assuming that the notion of anthropomorphism can indeed also be found within certain enactive discussions, and as a direct result of the very same resources used for its rejection, I believe that we can justifiably claim that anthropomorphism *is* being enacted in two opposing contradictory ways *through* enactive theory itself. As I hope to demonstrate in the following chapters, this pulling in opposite directions is a rather pervasive feature of enactive theory, evident in a number of key ideas, concepts and arguments. It will be the central aim of this work to show how and where some of these dual enactments happen within the enactive, specifically AE, literature.

One very important tool, but by no means the only one, used towards this end will be the notion of the “modern constitution”, as introduced by French sociologist/anthropologist Bruno Latour (1993). Thinking with the notion of the modern constitution will serve two distinct but related purposes in this work: (i) it will allow us to narrow our scope and focus on those AE dual enactments specifically related to key modernist (dualist) tenets (i.e. subject/object, nature/culture, epistemology/ontology) and (ii), it will provide an alternative set of resources with which to explore and bring to light these dual enactments. Following the same logic of the example of anthropomorphism introduced above, the aim will be to show how some of AE’s central tenets not only help reject and subvert, but *also* reproduce and thus continue to unintentionally reinforce a number of modernist dualisms more commonly associated with scientific modes of rationality and objectivity.

Many enactive theorists will, of course, question the second part of the preceding claim. After all, AE, either in the guise of a narrower, scientific research programme, or a broader philosophy of nature, is known for its very trenchant rejection of all forms of modern dualism (Di Paolo et al. 2018; Varela et al. 1991; Vörös and Bitbol 2017). Indeed, this is something which, as generally agreed, enactive theory does rather well and generally successfully (e.g. Stewart et al. 2010). Let me, therefore, emphasise from the outset that my intention is *not* to dispute this claim, and part of this work will be dedicated precisely to further *justifying* its validity.

This work is, therefore, neither an exegesis nor a proposal for how to improve the enactive project in some way or other. Indeed, my aim is considerably more modest, but no less challenging for that. As is well known and explored in more detail in the following chapters, AE is explicitly and very deliberately positioned as a direct subversion of modernist/post-enlightenment scientific rationality and its underpinning dualisms. As we already noted above, AE theorists have, from the very outset, cast the scientist/observer as always-already part and parcel of the very nature they seek to understand. In the following chapters, we will see that there are two central recurring themes, what after Latour (2004a) I will call enactive “matters of concern”,<sup>17</sup> within the enactive literature with and through which AE theorists enact this subversion: (i) the continuity between life and mind; and (ii) the notion of brought forth worlds. In both of these, we see not only explicit rejections of the divisions between nature/culture, subject/object, for example, but also modernist forms of detached scientific rationality.

The challenge for my project, therefore, is to be able to convincingly show that the reverse is also true; to show how AE, at the same time, also *does* the exact opposite. That is, to show how it enacts the very modern constitution ideals and tenets it rejects. How and where do some of AE’s core tenets cross the line between rejection and subversion to reproduction and perpetuation of a modernist/post-enlightenment scientific rationality, which positions an *active* scientist/observer *against a passive nature* seeking to *uncover its underlying structures, universally-realised mechanisms and intrinsic laws*? Answering this question in a satisfactory manner is, therefore, the challenge which faces us in the following chapters.

Broadly speaking, this challenge could also be described as twofold: on the one hand, how can we convincingly show that a project, which by all accounts successfully rejects all aspects of modernist dualism, also seems to fall into the very dualist traps it works so

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<sup>17</sup> Latour (2004a) introduces the notion of “matters of concern” as a means to emphasise the entanglements of facts and values. For Latour, modernity splits nature from culture, and casts the sciences as the pursuit of brute, objective facts of nature – what Latour calls “matters of fact”. Latour, however, argues that matters of fact are always saturated and deeply entangled with distinct values, political interests, ethical concerns, and so on. For this reason, and as a means to take this into account, matters of fact are best reconceived as matters of concern. We will re-turn to these issues in the next chapter. For now, I simply want to point out that I use “matters of concern” throughout this work to refer to the specific enactive topics which structure this work in a dual sense: on the one hand, these are topics which effectively also collapse the fact/value dichotomy. On the other hand, these are also specific topics which are of *special interest* to enactive theorists.

hard to overcome? On the other hand, we have to deal with the seeming contradiction this brings up. How can, how is it even possible, for AE to *both* reject and perpetuate modernist dualisms at the same time? The strategy will be to tackle the former first, and then address the latter at the end of this work, once all the relevant concepts and resources we need have been introduced and discussed.

Evidently, in order to render explicit and thus bring to light the enactments of enaction as reproducing modernist/post-enlightenment ideals, a lot more work needs to be done. Indeed, as noted in the Introduction, rendering visible this alternative enactment of enaction will require that we read it diffractively *with and through* a number of sources not routinely associated with enactivism, let alone cognitive science. Fields such as anthropology, STS and feminist science studies will be extremely valuable here. We explore and further motivate this in more detail in the following chapter.

## **Conclusion**

In this chapter I have introduced and explored some of the multiple heterogeneous enactments of enactivism. The main aim here has been to introduce the core tenets of the enactive project, with an eye towards easing the reader into what is to follow. We suggested that the different approaches to enactivism could be understood as different enactments. We concluded by laying some groundwork for the following chapters and clarified that the rest of this work would explore the multiple ways in which AE in particular enacts some of its core tenets. The next chapter presents some more resources to help us realise this project.

## **Chapter Two**

### **The Birth of Modernity and the Bifurcation of Nature**

#### **Overview**

The primary aim of this chapter is to introduce some of the other core themes which make up this work. We do so by thinking through the two central tools underpinning the analysis of the following chapters: (i) Bruno Latour's notion of a "modern Constitution" and; (ii) Karen Barad's proposed "diffractive methodology". With regard to (i), we explain how it functions both as tool to think through the (dual) enactments of core AE tenets and also opens up a space for other resources to be brought into the fold. With regard to (ii), we clarify how it functions as a method which helps both to bring these dual enactments to light, and to sidestep the excesses of critique. We conclude, by way of further stage-setting, with a discussion of Shaun Gallagher's suggestion that enactivism is best viewed as a philosophy of nature.

#### **Motivations and aims of the chapter**

As observed in the Introduction and the previous chapter, this dissertation takes something of an unusual path with regard to current debates within enactivism(s), in that it actively draws from fields and ideas not usually considered within these discussions. The fields I mostly draw from are anthropology, science and technology studies (STS) and feminist science studies. One common thread uniting most of the work I draw from is a varied but sustained engagement with what Latour (1993) has called the "modern Constitution" of modernity. An arrangement which, according to Latour, resulted in the proliferation and entrenchment of a host of problematic dichotomies that have profoundly shaped modern life at large.

Latour has famously argued that, not unlike modern liberal political democracies in terms of structural arrangement, the modern Constitution is made up of two "chambers": one chamber representing, both spatially and temporally, things, objects and events, and the other representing human beings. In this schema, scientists are given the task of representing the former, while those within the humanities are tasked with representing the latter. Out of this general "arrangement", Latour argues, a systematic

and all encompassing “bifurcation of nature” (Whitehead 2015) is introduced into the very fabric of modern life. It is with this bifurcation that a “great divide” is introduced between nature/culture, subject/object, human/animal, epistemology/ontology, theory/practice, and a host of other modernist dualisms. Much of what follows in the coming chapters stems directly from a multiplicity of entanglements between myself, the work of numerous researchers aiming to reconfigure this modern Constitution and the work of various influential enactive theorists.

At first glance, it might not be entirely obvious what relevance the work of Latour and like-minded theorists in disciplines somewhat far removed from cognitive science could possibly have for the enactive framework. However, a mere cursory look at the previous paragraph ought to be enough to convince the reader that there is some relevance here. Indeed, this becomes fairly obvious the moment we consider that the enactive framework is generally presented as either a scientific research programme or a philosophy of nature which vehemently rejects all forms of modernist dichotomies. It is precisely this enactivist rejection of dualism(s) which both connects it with the modern Constitution and forms the point of departure for this work.

Thus, the aim of the following chapters is to explore how and where some enactive theorists enact some of their core tenets *vis-à-vis* the modern Constitution. The modern Constitution will therefore serve as an important tool throughout this work, and will help us think-with and through enactive dual enactments. Given this aim, we will therefore need to first introduce, and explain in considerably more detail, what exactly the modern Constitution is. This will be the central task of the first half of this chapter. The main task of the second half will be to further explain the role of “diffractive reading” (Barad 2007) within this work and its entanglements with both Latour’s analysis and the notion of critique.

The structure of this chapter is as follows: the first part introduces and discusses the structural arrangement, implementation and some of the consequences of the modern Constitution. The second part then clarifies the broader role of Latour’s analysis in this work and further explores the feminist materialist notion of diffraction. We conclude, by

way of stage-setting, with a discussion of Gallagher's proposal that the enactive project is best understood as a philosophy of nature.

## **1 Modernity and the staging of a modern Constitution**

In *We Have Never Been Modern* (1993), Bruno Latour's central concern is with what makes a particular society, and us humans within it, *modern*. Amongst the most prominent (and positive) answers to this question that sociologists, historians and philosophers could provide might be that: (i) modern societies have representative democracy; (ii) that we use principles of rationality and science rather than rely on pure faith and superstition; which (iii) gives rise to scientific progress and increases our understanding of the objective world. Those of a less positive persuasion could point to some of the more negative consequences of modernity; the "disenchantment" of nature, the colonisation and exploitation of so-called 'underdeveloped countries', the displacement of countless indigenous peoples and the destruction and global pollution of nature, to name but a possible few.

Nonetheless, whether one is positive about modernity or thinks it is quite possibly the worst time period in human history thus far, it is generally accepted that, for better or worse, 'we' *are* undeniably modern. Latour, however, rejects this general consensus. As the title of Latour's book makes clear, we simply have *never* been modern. But what exactly does Latour mean by "modernity" in the first place? To answer this question, we need to understand what Latour calls the "modern *Constitution*". But what exactly is this Constitution, where does it come from, and how did it develop?

According to Latour (*ibid.*), the key characteristic of modernity is a relentless, but ultimately unsuccessful, attempt to bifurcate nature,<sup>18</sup> the origins of which, argues Latour, can be traced back to the development of modern science and a famous dispute

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<sup>18</sup> Following work by decolonial scholars (e.g. Mignolo and Walsh 2018), anthropologist Mario Blaser (2010) argues that there are *three* deeply entangled "basic threads" which together constitute the modernist project: "the great divide between nature and culture (or society), the colonial difference between the moderns and nonmoderns and a unidirectional linear temporality that flows from past to future" (p. 4). Although in full agreement with Blaser, it is beyond the scope of this work to explore the other two "threads" which compose modernity. I note this here because these other two threads will, from time to time, appear as tacit undercurrents in certain discussions, but will not be explicitly addressed.

between Robert Boyle and Thomas Hobbes in the 1660s.<sup>19</sup> According to Latour (ibid.), it is at this historical juncture that we see the development and establishment of a new set of organisational practices, ideas, concepts and arguments, which were introduced as a means to help separate, and keep apart science from politics and society, and to ensure these remain *ontologically separate domains*.

It is here that we see both the birth of modern science and modern politics, and where the metaphysical seeds which form the cornerstone of modernity and our modernist self-understanding are sown. For it is Boyle, now regarded as the founder of modern experimental science, who introduces a set of novel experimental practices and develops a methodology which will enable scientists to observe and establish scientific facts in a laboratory and thus speak on behalf of nature. With this, Boyle introduces a conception of nature as something which exists completely independently of the human, while it is Hobbes who introduces a novel terminology which describes how, courtesy of a legitimate social construct, human citizens can have their interests represented through an authorised political body. With this, Hobbes introduces a conception of the sociopolitical which is untainted by nonhuman materialities.

It is this particular historical incident which forms the core of Latour's subsequent analysis of modernity. According to Latour (ibid.), it is the dispute between Boyle and Hobbes which essentially brings about the *ontological distinction between nature<sup>20</sup> and culture* (and a host of other problematic dichotomies), which remain with us till this day. It is the different opposing arguments, arrangements and practices initiated by Boyle and Hobbes, which lay down the foundations for what Latour calls the "modern

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<sup>19</sup> For a detailed discussion of this particular debate, on which Latour's analysis is largely based, see, Shapin and Schaffer (1985).

<sup>20</sup> The concept of 'nature' is notoriously difficult to pin down. The term itself has a complex and varied history and is used in a number of different ways in different fields. To help us get to grips with these various meanings, Kate Soper (1995) distinguishes between three common, but differing uses, of the concept: a *metaphysical* concept used to refer to humanity's "difference and specificity," which either highlights human continuity or irreducible difference with the nonhuman; a *realist* concept which identifies the physical structures and processes studied by the natural sciences; and a *lay* use of the concept used to refer to the non-urban environment or "wilderness" of biological and ecological life. Common to all these conceptions of nature is the fact that it is understood, often implicitly, as a separate domain from culture. As Soper points out, this is true even in a metaphysical conception which sees the human and the nonhuman as continuous. This is because it "depends on a prior distinction between the human and the natural" (ibid., p. 319). We will re-turn to this point in the next chapter, where we will find a variation on this argument.

Constitution” with a capital C, to distinguish it from a political constitution. But how exactly does this happen?

According to Latour, we have, thanks to Boyle and members of the Royal Society, the invention of a novel manner of speaking about, understanding and explaining nature, that displaces the subject from the object and construes objects as *ontologically independent* from subjects. In order to do so, it was crucial that Boyle first erected a boundary between the physical and the metaphysical, and then made the metaphysical off-bounds to those concerned with nature. Boyle then operationalised this new “natural philosophy” by (i) creating a laboratory; (ii) making the laboratory a public place; and, (iii) introducing the practice of “public witnessing” so that those present could bear witness to and establish through consensus, what had happened in the laboratory. With this, Boyle introduces the three “technologies” (Shapin and Schaffer 1985), which effectively paved the way not only for the creation and subsequent institutionalisation of modern, experimental science, but also creates the very method(s) through which to establish legitimate and authoritative, objective, scientific facts.

Thanks to these three technologies, Boyle can now carefully separate and document the observable results of what actually happens – what Latour (2004a) calls “matters of fact” – from speculative interpretations of the phenomena under observation resting merely on “matters of opinion”. Boyle’s central aim here was to erect a second impenetrable boundary between the laboratory on the one hand and the ‘outside’ world on the other: the former was to be sanitised, pure and concerned itself solely with objective matters of fact, such that the personal motivations, political interests, religious preconceptions (“matters of concern”) remain strictly in the latter.

Thus, for Boyle, in order for any type of knowledge to be legitimate, authoritative and above all else *objectively true*, it needed to be the a result of a rigorous, experimental process. This (scientific) method therefore serves both as an objective “mirror of nature” and helps to reinforce the separation between the natural and the cultural, the human and the nonhuman, and the physical and the *metaphysical*. To put it slightly differently, it is exclusively interested in *matters of fact* rather than sociopolitical, value saturated, “matters of concern” (Latour, *ibid.*).



The other contributor to this debate is, of course, Thomas Hobbes. It is Hobbes who provides a new way to speak about, understand and explain the social and the political in terms of distinctively human interests, conflicts and agreements, completely independently of any broader material circumstances. Hobbes rejected Boyle's analysis and proposed methodology, and instead turned his attention towards theorising society and political order in terms of human conflicts and agreement. The central concern for Hobbes was with *social unity*: what was it that held society together and prevented it from collapsing into utter chaos?

Hobbes's proposed solution to this particular problem, which he regarded as a general state of nature, was to introduce a social contract and a sovereign (Hobbes's famous Leviathan), which presided over and spoke on behalf of all citizens. For Hobbes, people ought to give up their individual liberty in exchange for some common security provided by the sovereign. According to Hobbes, this sovereign would manifest itself as a powerful incarnation of the unity of society and would be constituted by the citizens themselves. For Hobbes, this proposal carried some important implications, two of which are worth noting here: (i) because all citizens must submit to the sovereign, which Hobbes regards as a "mortal god", the role of religion within society and politics needs to be greatly reduced; (ii) in order to maintain the unity of society the production of true knowledge cannot reside within special groups and selective authorities.

In direct contrast to Boyle, Hobbes maintains that true knowledge needs to be the direct result of "mathematical demonstrations" which are, by their very nature, both rational and logical.<sup>21</sup> Hobbes argues that mathematical demonstrations would be immediately

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<sup>21</sup> It is this point, regarding the acquisition and status of true knowledge, that is *the* central bone of contention between Hobbes and Boyle. Hobbes took great umbrage with Boyle precisely because he saw his recourse to the laboratory, which amongst other things requires an elaborate and expensive experimental setup, as simply another manifestation of a self-styled authority claiming to possess special access to true knowledge and reality. For Hobbes, this was no different from the appeal to other self-styled authorities such as priests and religious figures: Boyle simply replaced the authority of the church with that of the scientist. For Hobbes, Boyle's proposal was simply a recipe for unravelling the very societal *unity* required for a stable, just and prosperous society. At this point, it might be tempting to wonder who actually 'won' this debate. On the one hand, Boyle could be argued to have won because his experimental method was, and continues to be, the gold standard for true objective knowledge. On the other hand, one could argue that Hobbes certainly has a point when arguing that the sciences have, in many ways, simply replaced the authority of the church. It is, however, a mistake to be distracted by this line of thought. This is because, in this context at least, the issue is not who won the dispute but rather how *both* figures *jointly* contributed to the creation of the modern Constitution.

compelling to everyone, and are therefore forces which, like the sovereign, everyone should obey. This is generally in keeping with Hobbes's new way of theorising about the sociopolitical as a strictly human affair – in principle accessible and involving everyone, and unconstrained by material forces.

In summary, for Latour, Boyle and Hobbes can rightfully be regarded as the somewhat unintentional “fathers” of modernity and thus greatly responsible for setting in motion the subsequent creation of the modern Constitution. In the words of Latour, “they are inventing our modern world, a world in which the representation of things through the intermediary of the laboratory is forever dissociated from the representation of citizens through the intermediary of the social contract” (ibid., p. 27). Thanks to Boyle, scientists can represent nature and nothing else, since matters of fact prevent political interests from entering the laboratory. While, thanks to Hobbes, political representation and nothing else is possible because the social construct speaks only to human interests and power relations. According to Latour, it is Boyle and Hobbes who are *jointly* responsible for providing the resources which enable the separation of nature from culture and politics.

## **2 The materialisation, purification and proliferation of the Constitution**

As Latour (ibid.) notes, chambers of government are usually the result of arduous processes of negotiation and discussion. Amongst other things, they prescribe certain divisions of power, rights and general regulations for how the chambers ought to be governed. They contain internal mechanisms which prevent casual disruption of this arrangement. They each have their own elected representatives. On the basis of these and other similar characteristics, Latour (ibid.) draws a productive analogy between political constitutions, which divide various branches or “chambers” of government, and the development of modernity. For Latour, the modern Constitution is also underpinned by specific sets of practices, governing principles and a separation and distribution of powers, not that different from political constitutions.

Unlike political arrangements however, the modern Constitution does not separate branches of government, but instead creates procedures which help to systematically separate nature from culture and politics. As Latour (ibid.) points out, “[j]ust as the

constitution of jurists defines the rights and duties of citizens and the State, the working of justice and the transfer of power, so this Constitution [...] distinguish it from the political ones – defines humans and nonhumans, their properties and their relations, their abilities and their groupings” (p. 15). Latour thus finds it apt to cast modernity as an arrangement comprising of two distinct “chambers”: one chamber dedicated to representing things and objects; the other dedicated to representing people, with the latter chamber comprised by historians, social scientists and philosophers and the former chamber comprised of so-called “natural scientists”.

In this respect, despite their disagreements, Latour (ibid.) notes that Hobbes and Boyle are nonetheless “acting in concert to promote one and the same *innovation in political theory*: the representation of nonhumans belong to science, but science is not allowed to appeal to politics, the representation of citizens belongs to politics, but politics is not allowed to have any relation to the nonhumans produced and mobilised by science and technology” (p. 28, emphasis added). With this arrangement, we also see how the notion of “representation” acquires two distinct meanings which remain with us till this day, its meaning varying “according to whether elected agents or things are at stake” (ibid., p. 29). Indeed, for Latour, actively distinguishing between political and epistemological representation, is a key hallmark of the modern Constitution. However, according to Latour, Boyle and Hobbes are not merely classifying and categorising (representing) the world in certain ways but quite simply *creating* and thus ushering in a new (modernist) era.

Indeed, as Bruce Braun (2004) points out, “[t]his [modern] constitution is, quite literally, *constitutive* of our world” (p. 169, emphasis original). It actively shapes, structures and essentially constitutes “how we understand the world, underwrites our actions, and informs the responsibilities we accept or deny” (ibid.). This means that casting modernity in terms of a specific type of constitutional arrangement also helps Latour foreground both the multiple arrays of *material practices* which help structure, guide and constitute daily activities of various kinds, and the constant *work* needed to maintain and sustain these in existence. Moreover, even ideas, categories and arguments, for example, involve material practices which also require constant work.

This is a particularly important point, not only here, but in the overall context of this work, so let us slow down and go over it carefully.

What is at play here is a number of diverse practices, many of which are conceptual-cum-epistemic in nature (i.e. arguments, ideas, concepts, theories etc.), which together help bring about not only new modes of seeing, understanding and explaining the world, but also instantiate and realise new material configurations and arrangements which make these possible. Taking inspiration from Shapin and Schaffer (1985), I find it rather helpful in this context to think of *all* these practices – including the conceptual-cum-epistemic practices – in terms of different *material technologies*<sup>22</sup> which help structure and constitute the world in very specific ways. Importantly, in this regard, I take arguments, ideas and categories, to also be specific material technologies and not simply – or merely – epistemological means of and for abstract classification. The conceptual and the material are therefore deeply entangled and their heterogeneous material instantiations are always, and inevitably, sociopolitical in nature (see Barad 2007; Haraway 1997; Stengers 2010; Suchman 2007).

This is very much in line with Donna Haraway's (2008) suggestion that, "[i]deas' are themselves *technologies* for pursuing inquiries. It's not just that ideas are embedded in practices; they *are technical practices of situated kinds*" (p. 282, emphasis added). They are, in other words, *materialising practices* through which certain ideas, concepts and arguments are implemented, maintained and variously sustained, and which

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<sup>22</sup> Two further points of clarification are perhaps warranted here with regards to these "technologies": (i) Inspired by Shapin and Schaffer (1985), I emphasise the notion of *material technologies* as a means to highlight that these are *practices* which include, but also *encompass more* than, what Ludwik Fleck (2012) calls "thought styles"; the specific epistemic ways, the underpinning epistemologies if you like, which guide and structure how members of a "thought collective" (scientists within a specific research discipline), understand, explain and generally think about and "see" the world. To put it slightly differently, these are practices which are *always both* conceptual *and* empirical, theoretical *and* practical, never just one or the other (see the Appendix for further discussions on this issue). (ii) By emphasising that these are material technologies, I am also committing myself to the position that the notion of the modern Constitution is, or can be *both*, an analytical *and* an *empirical* figure. Something which is, arguably, not always readily apparent in Latour's analysis, where it often figures primarily as an analytic tool. This is especially true of Chapter 5, where Latour seems to suggest that all we need to establish a "nonmodern constitution", is a change in our "self-understanding" of modernity: less of purification more of hybridization. In the words of Fleck, what we need is simply an alternative, more appropriate, "thought style". Discussing this issue in any more detail is, however, beyond the scope of this work. It will suffice to note that, in what follows, the modern Constitution is understood not merely as a lens through which to view and analyse modernity, nor simply a new way to conceptually characterise the moderns' *self-understanding* of reality, but also that which *ontologically constitutes* many aspects of modern life and which can be empirically studied as such. I'd like to thank Fred Cummins here for pressing me for clarity on the second point.

configure and reconfigure the world in the same process. Arguments, ideas, and concepts are thus rendered as any other socio-technical arrangement which materialises particular ways of doing things and generate their own norms and standards. Moreover, as Eva Haifa Giraud (2019) notes, “[i]f these norms are taken up on a large scale, they can easily become normative, presented as an inevitable or even natural way of organizing everyday life” (p. 3). This is then, in a sense, what Latour is arguing happens with the advent of the modern Constitution: it introduces a constellation of diverse material technologies, instantiated through a host of different practices, which help implement, organise and structure the world and our place in it in very dualistic terms.

So, with these clarifications on the table, we can, therefore, say that it is thanks to the “innovation in political theory” by Boyle and Hobbes that a subsequent, deliberate and concerted effort to organise and regiment knowledge and knowledge practices into two ontologically distinct domains emerges and proliferates: “a human domain of subjects and culture, and a nonhuman domain of objects and nature, which are inscribed and understood as qualitatively distinct and incommensurable” (Nimmo 2016, p. xxiv). As we will explore in the next chapter, in its (in)famous Cartesian form, this separation is enacted as a mind/body dualism. Minds are cast as the centre of lively subjectivity and meaning and bodies as mere brute matter.

For Latour, insofar as these technologies actively work to transform and separate through material organisation and regimentation, they also function as a means to *purify* domains, such that nature is not “contaminated” by culture and culture is not “contaminated” by nature (Latour 1993, 2004b). Latour (ibid.) calls the relentless active labour of separating nature from culture and cutting-up, dividing and incessantly categorising the world into finer and finer distinctions, “purification”. Thus, according to Latour, purification functions not only as a means to ensure that the two domains of nature and culture remain ontologically separate, but at the same time also *reinforces the rules and methodologies* for how best to understand phenomena within each domain.

Thus, for example, purification ensures that culture (and society) is cast as an exclusively human domain. That it is composed of agency, freedom, subjectivity and multiple, sometimes overlapping, sometimes incommensurable perspectives (more on which below). That it be defined primarily, if not exclusively, in terms of *human only interests*, dealing with politics, religion, ethics and various other “matters of concern” (Latour 2004a). That it places the human and its distinctive interests above all else. As such, the human must be positioned in direct *opposition to* some *external* natural other. Processes of purification effectively ensure that ‘man’ is, and must continue to be, the measure of all things. As Richard Nimmo (2010) argues, modernity can be equated to a “secular humanism”, where the human – man – has displaced and replaced God as the highest authority. Finally, and very importantly, in this domain ‘things’ (be they customs or artefacts), are *created* by humans.

With regards to nature, purification ensures that it remains a domain defined exclusively in terms of the nonhuman. That it is composed of natural objects and entities existing ‘out there’, independent of human subjects. That it is a realm which pertains to *the* ‘external world’, which is composed of impersonal, objective, mechanical, natural processes and laws, which deal only with cold matters of fact. In this domain, things are also natural *as opposed to artificial*: things are not created but *discovered* by humans.<sup>23</sup> All “natural processes”, from animal bodies to planetary motion, are here cast as processes which simply behave according to predefined universal natural rules and laws. All natural processes can, therefore, be adequately explained and thus *reduced to* the brute deterministic physical laws of the universe. Natural objects and processes are deemed to be reliable followers of rules which can therefore be reduced to deterministic laws of nature (see Barad 2008).

Through the continuing work of purification, only the human is deemed to live in society and is social, has culture, possesses agency and ultimately is able to ‘discover’

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<sup>23</sup> In every day discussions, we tend to make a distinction between those entities which are natural and contrast these with those entities which are artificial and human-made; for example, stones and flowers are natural, while tables and chairs are artificial. This everyday understanding also seems to underpin the way we understand and distinguish natural phenomena from social/cultural phenomena, which, in turn, informs our understanding of and distinction between the natural and the human/social sciences. Thus, everything created by humans, from social institutions to skyscrapers, is not natural but rather social and cultural. The social/cultural domain is separate from the natural because it is *created* by human will, ingenuity and social/cultural norms and conventions.

the laws imbued in nature. Because nature unfolds in a predictable law-like fashion, once these laws are discovered, humans can then predict and possibly change what will happen next. Nature can, therefore, function both as bedrock to ground universal, timeless truths and help to adjudicate on controversies, by supplying untainted matters of fact. For, once nature becomes aligned with incontrovertible matters of fact as opposed to matters of concern, the time for disputes and debate is effectively over. That is, just as long as all those involved in the dispute are deemed ‘reasonable’ as stipulated by the modern Constitution (Hinchliffe 2007).

All of which is to say that, through processes of purification, nature and culture are persistently cleansed of “contamination” from each other. Hard brute objective facts are cleansed from suspect human values and values are anaesthetised from hard reality. Nature and culture, human and nonhuman are thus prised apart, purified, reified into distinct ontological realms of reality and ultimately pitted against each other. So successful and entrenched has purification and the separation of domains become that it is now fully taken for granted and “constitutes the most basic architecture for the organisation of modern thought and modern knowledge” (Nimmo 2016, p. xxiv). Indeed, even more than this, it has become common sense.

To sum up the discussion thus far, Latour’s analysis suggests that what distinctively characterises modernity is the tendency to purify nature from culture. For Latour, the moderns have become a type of people who believe in pure categories, not only those of nature and culture, but also as we have seen, the scientific and the political. To these we can add so many others: the economic, the biological, the global and the local, and so on and so forth. Given that purification radically reconfigures the very fabric of our world and is always entangled with the conceptual, I have also made a point of emphasising the constitutive material dimension – the material technologies – of all these processes. In the next section, I want to turn our focus to a very particular set of material technologies, those which help separate (and define) epistemology from ontology.

### **3 Epistemology/ontology; mononaturalism and representationalism**

The distinction between epistemology and ontology has been very much implicit in the background throughout our entire discussion above. It is arguably one of the most pervasive, and indeed most important, material technologies within the modern Constitution – not only for ensuring, but also continuously reproducing its very existence. In this section, I want to render this distinction more explicit, explore the work it does within the modern Constitution, and briefly highlight and discuss a number of entangled themes which cluster around it.

The first point that I think needs to be emphasised from the outset, then, is the distinction's fundamental importance for the very *existence* of the modern Constitution itself. This importance becomes acutely apparent once we recognise that, not unlike processes of purification, it at once *both* underpins and serves to maintain, sustain and reinforce it. With the advent of modernity, epistemology and ontology are transformed into two distinct enterprises, and through this very transformation nature and culture are at the same time not only prised apart, but also *ensured* to remain apart as long as the transformation is routinely enacted. As such, what *exists* – ontology – and how we *know* (understand and explain) what exists – epistemology – are enacted as two separate enterprises that should not and cannot be confused with each other.

This distinction is littered across Western philosophy and many, if not most, other academic endeavours. It is clearly present in Descartes's ontological distinction between the domains of thinking substances (*res cogitans*) and the domain of material objects (*res extensa*). It is similarly present in the work of Kant, who maintained that the world we know is a phenomenal world of experience, which is constituted by pure forms of intuition and human categories of understanding, and is distinct from the world of things-in-themselves (*noumena*).<sup>24</sup> And, as hinted at above, it is at the heart of the scientific method. Indeed, largely under the influence of Kant, many philosophers took it for granted that Newton had definitively shown that science reigned over the domain of the natural/nonhuman (ontological) world, which meant philosophers should

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<sup>24</sup> As Quentin Meillassoux (2010) argues, this split banishes things-in-themselves from human knowledge and effectively reconfigures philosophy into an epistemic discipline through and through. This gave rise to what the author (*ibid.*) calls a “philosophy of human access” (see also Harman 2002), concerned excessively with the human conditions of access to things, rather than things in their own right. Similarly, Daston and Galison (2007) argue that, it was Kant's “achievement to open a space between epistemology and metaphysics and to set limits to the aspirations of reason with respects to the latter” (p. 215).



only concern themselves with the human/cultural world from an epistemic standpoint (Daston and Galison 2007; Taylor 1995).

In other words, with the proliferation of the modern Constitution, philosophers were encouraged to shift their focus towards the realm of the human and concentrate specifically on mind, culture, language, ethics, politics and other solely human specific interests. Underpinning the motivation for this shift was/is the tacit conviction that whatever is said *about* the ontological status of the world is done first and foremost through *epistemic reflections* on knowledge and language. By contrast, scientists were encouraged to exclusively focus their attention on the *ontology* of the natural world and the nonhuman objects, and natural laws and processes which constitute it. A consensus thus gradually emerged and coalesced around the conviction that, if one wants to know the really real ontology of the natural world, one is advised to consult a scientist (as opposed to religious figures and/or philosophers, for example). However, what often goes unacknowledged or is simply denied outright here is that, due to the separation between epistemology and ontology at the core of the scientific method, science is equally reconfigured as an epistemic endeavour, *tout court*.

As the anthropologist Frédérique Apffel-Marglin (2011) notes, “[s]cience is a way of knowing—an epistemology—that will make us understand and give us the laws of the objects of nature, of thing-in-themselves, that is, of ontology” (p. 151). Consequently, although their methods and tools vary, the scientist, just like the philosopher, can only ‘access’ the ontological *through* the epistemic. Indeed, as the historians of science Lorraine Daston and Peter Galison (2007) point out, following Kant, objectivity in the sciences gradually morphed into a specifically “*epistemological* concern, that is, [a concern] about the acquisition and securing of knowledge rather than the ultimate constitution of nature (metaphysics)” (p. 215, emphasis original). In both cases (philosophy and science), the epistemic is not only rendered distinct from, but also *prioritised* over, the ontological. While the ontological is itself, albeit tacitly, recast in the figure of the epistemic (see the Appendix for a more in-depth discussion on ontology).

As Latour (1993, pp. 29-35) observes, this particular (epistemic) reconfiguration of science, gives rise to a seldom appreciated paradox at the centre of the modern Constitution: although the Constitution declares that nature is ontologically separate from culture, transcendent and not made but discovered by humans, while culture is imminent and the product of human construction, when it comes to *knowledges* the reverse comes into play. Because the Constitution separates nature from culture, the only way to nature is and can only be through the diverse knowledge (epistemic-cum-cultural) practices of human scientists. Knowledge practices which are at once mediated by categories of human understanding and sometimes connected to experimental practices. But, even though nature is in effect “constructed” by humans and nonhumans in these practices, the Constitution nonetheless decrees that we must proceed *as if* nature was discovered, not made.

As such, both philosophers and scientists of the modern Constitution, are pressed into endlessly ‘manufacturing’ and *projecting* clear, stable, universal ontological categories *onto* a putatively passive world, whilst denying that they are doing so (see Daston and Galison 2007). Hence, a multitude of epistemic, culturally-mediated perspectives on a stable, natural ontology, becomes a key trope of the modern Constitution. This, of course, forces us into a very particular understanding of both epistemology and ontology. As Apffel-Marglin (2011) notes, “to know is to know *about* things, people, and events, with events taken as given independently of our knowing them” (ibid., p. 156, emphasis original). Observers are thus rendered as knowers who effectively stand ‘outside’ of, and are independent from, a passive and pregiven object. Consequently, the best an observer can do to understand and explain its object, is to create accurate *representations* of it (Barad 2003; Daston and Galison, 2007; Haraway 1988; Latour 2005; Law 2004a; McQuillan 2017; Mol 2002; Pickering 1994; 1995).

In other words, the modern Constitution reconfigures both epistemology *and* ontology into quintessentially *representationalist* enterprises: all observers, be they scientists or philosophers, are tasked with accurately representing what nature is truly like (cf.

Taylor 1995).<sup>25</sup> In Andrew Pickering's (1994) very apt characterisation, science (and the social sciences/humanities more broadly) within the modern Constitution is understood in a "*representationalist idiom*". With this, we arrive at a world of *pluralist "multiculturalism"* on the one hand, and what Latour, after Viveiros de Castro, calls "*mononaturalism*" on the other (Latour 2004b). A world comprised of a singular and *passive* nature on one side and multiple human perspectives on the other. Mononaturalism is, therefore, a cornerstone of modernity and its modernist Constitution; the direct result of not only separating nature from culture, but also epistemology from ontology. It also plays an important analytical role within this entire work. I therefore want to conclude this section by exploring the notion in a bit more detail.

The first point to note is that mononaturalism is grounded on a very particular metaphysical conception of reality, which is so pervasive in the West, that it passes as simple common sense. Thus, similarly to VTR, the sociologist John Law (2004a) argues that mononaturalism presupposes a notion of reality as "independent, anterior, definite and singular" (pp. 31-32). Mononaturalism positions reality as something which is out there, essentially external to, and 'independent of', the observations of a remote perceiving subject. Reality exists and unfolds regardless of the interests subjects may or may not invest in it, and thus has its own history and temporality which is completely independent from how one investigates it.

Reality is also singular in the sense that it is the "same everywhere". Under mononaturalism, reality, or more accurately, the objects and events which constitute reality, has an essential and universal structure which makes it more or less common for all who experience it. This, in turn suggests, that it has a singular ontology which in principle can be accurately represented. This is particularly true within the natural

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<sup>25</sup> It is worth noting here that Charles Taylor (1995) argues that philosophy, if it is going to be of any true value, needs to "overcome epistemology". For Taylor (*ibid.*), just like for many STS scholars and anthropologists considered in this work, epistemology introduces a distinction between subject and object which can only be bridged via mediation. However, unlike STS, Taylor does not so much want to "overcome" epistemology (the title of his paper notwithstanding) as to offer an *alternative* epistemology which can get us *closer* to the "real world". Indeed, for Taylor (*ibid.*), the real world remains 'out there', independent of our engagement with it – universal, singular and, in principle, fully discoverable/describable by the natural sciences (see also Dreyfus and Taylor 2015). As we will see in the chapters to come, scholars from a number of different fields argue that more attention needs to be paid to the *prioritisation* of epistemology *over* ontology.

sciences, as noted above, where its empirical objects of study are generally enacted as fixed, stable and singular phenomena waiting to be discovered and represented (see Barad 2008). Although it is, of course, true that it is generally accepted that reality is always changing, this change is also assumed to be underpinned by definite physical laws and mechanisms which are themselves both *stable* over time and *universal*.

Monounaturalism also facilitates an understanding of reality, or nature more generally, as *essentially passive*. Of course, we can engage with and thus change objects and entities in the world, but we do not and cannot alter their *fundamental* (ontologically intrinsic) properties or the forces/processes which govern them. Objects and entities are constrained and bound by physical laws and forces which are independent from our engagement with them, and which can be accurately captured and detailed by the sciences (see Godfrey-Smith 1996). As Mol argues (2004), the assumption here is that “the building block of reality [are] permanent: they [can] be uncovered by means of sound scientific investigation” (p. 75). The basic ontological “building blocks of reality” are thus assumed to be passive, stable and universally pre-given entities.

This passivisation of nature also often goes hand in hand with a strong *anthropocentrism*, which endows humans with agency and places them in a privileged position over and above what is generally regarded as inferior, passive and dead nonhuman matter. As the Brazilian anthropologist Eduardo Viveiros de Castro notes, “[a]fter objects or things were pacified, retreating to an exterior, silent and uniform world of ‘Nature’, subjects began to proliferate and to chatter endlessly: transcendental Egos, legislative Understandings, philosophies of language, theories of mind, social representations, logic of the signification, discursive practices, politics of knowledge – you name it” (1998, quoted in Henare et al. 2007, p. 9). Mononaturalism therefore traps one into a representationalist and anthropocentric passivisation of nature, “disables [its] agency, and relegates the non-human world to a passive recipient of human interference” (Anderson 2009, p. 120).

Finally, a few words on terminology. Readers familiar with the philosophical tradition might have noticed the striking similarity of this notion of mononaturalism to *metaphysical realism*. This is the view that “the world is as it is independent of how

humans or other inquiring agents take it to be. The objects the world contains, together with their properties and the relations they enter into, fix the world's nature and these objects [together with the properties they have and the relations they enter into] exist independently of our ability to discover [sic] they do" (Khleentzos 2016).

Now, given this striking similarity, the reader might be wondering why I have opted to use the term *mononaturalism* rather than *metaphysical realism*. The main reasons for this are twofold: on the one hand, within philosophical circles, rejecting metaphysical realism can often be (mis)understood as a rejection of realism in general.<sup>26</sup> Whereas, in anthropology and STS, a rejection of mononaturalism does not necessarily carry these types of connotations. On the other hand, thinking-with and through mononaturalism is also to think-with a host of other anthropologists, feminists and STS scholars, and different ideas and concepts – something I feel is not readily possible with the notion of metaphysical realism.

To bring the various threads of our discussion thus far together: we can say that the modern Constitution bestows on us a number of closely related, partially overlapping, dichotomies which have proven remarkably difficult to overcome. Underpinning and perpetuating these dichotomies are an array of material technologies, realised and constituted through heterogeneous material practices, which reconfigure modes of thinking and speaking, and materially create and structure organisations and institutions far beyond the narrow confines of academia. These are technologies which ensure that once asunder, nature and culture become difficult, if not impossible, to successfully reconcile. So successful have these technologies been that the nature/culture distinction has now acquired the status of common sense. In this section we paid special attention to one such technology and its varied enactments, namely the separation between

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<sup>26</sup> Thus, consider for example, how Drew Khleentzos (2016) stages the central polemic around metaphysical realism. According to the author (*ibid.*, emphasis added), "[m]etaphysical realism is the thesis that the objects, properties and relations the world contains, collectively: the structure of the world [Sider 2011], exists independently of *our thoughts* about it or *our perceptions* of it. Anti-realists either doubt or deny the existence of the structure the metaphysical realist believes in or else doubt or deny its independence from *our conceptions* of it". Firstly, note that those who challenge metaphysical realism are cast as "anti-realists". The prefix "anti" signalling towards a rejection of all forms of realism. Secondly, worldly objects and properties are aligned or not with "our thoughts" and "our perceptions". If one rejects metaphysical realism, then one is committed to the view that our thoughts and perceptions constitute worldly objects, thus seemingly committing one to some form of idealism. Thinking in terms of mononaturalism allows one to sidestep many of these philosophical quandaries. We re-turn to this in Chapters Six and Appendix.

epistemology and ontology, showing how it ensures and perpetuates the truth of mononaturalism, gives rise to representationalism and passivises nature.

I now want to conclude our discussion on the modern Constitution by briefly visiting Latour's somewhat paradoxical insistence that we have *never* been modern after all. This will be the purpose of the next section.

#### **4 The (in)visible hybridization of nature**

According to Latour (1993), the modern Constitution's purification of culture from nature and the subsequent partitioning of the world into finer and finer categories and orders, is grounded on a profoundly flawed metaphysical view of the world. For Latour, despite our modernist *epistemological* conviction that the world is comprised of distinct domains, nature and culture have always been *ontologically* deeply entangled. As we will see in the Appendix, this observation has inspired a number of scholars to move away from the strictly epistemic register of the modern Constitution towards ontology. These authors suggest that, effectively undoing the most pervasive of modernist dichotomies, requires a move which goes beyond questioning the "epistemic frame" (Di Paolo et al. 2018, p. 17) underpinning them.

Indeed, for Latour, "purification" is only one half of the broader modernist story. According to Latour (*ibid.*), even though we moderns like to purify the world into the domains of nature and culture, nothing happens exclusively in either. For Latour, anything of historical significance is what he calls a "hybrid" – they are processes constitutively entangled by *both* nature and society. Latour illustrates this by pointing to the emergence and proliferation of technoscience,<sup>27</sup> evident in cutting-edge technologies: "frozen embryos, expert systems, digital machines, sensor-equipped robots, hybrid corn, data banks, psychotropic drugs, whales fitted with radar sounding devices, gene synthesizers, audience analyzers" (*ibid.*, p. 49). Latour maintains that, in all these cases, there is a weaving together of heterogeneous "actors" and domains which simply cannot be ontologically separated.

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<sup>27</sup> Latour (1987) uses the term "technoscience" to highlight that there is no significant difference between the fields of technology and science and that these can therefore be better understood as one single enterprise. As Latour points out, as part of solving both theoretical and practical problems, scientists also inevitably try to replicate experiments while engineers work to create working machines.

However, in contrast to processes of purification which are overt, recognised and acknowledged, processes of “hybridization” are generally denied even though they proliferates in most modern practices. As Latour points out, “the modern Constitution allows the expanded proliferation of the hybrids whose existence, whose very possibility, it denies” (ibid., p. 34). But in light of the proliferation of these hybrids, it becomes increasingly more difficult to maintain a separation between the human and the nonhuman, the natural and social, the scientific and the political.<sup>28</sup>

It is for this reason that Latour argues we have never been modern. Moreover, Latour insists that our incessant attempt to be modern vis-à-vis the purification of nature and society was/is doomed to failure from the very beginning. At the same time, argues Latour, this constant ambition to purify domains has resulted in a distorted view of what is at stake and significantly impedes our ability to develop a different (nonmodern) account of our situation. This futile attempt to attain something which is ultimately unattainable has thus obfuscated our ability to find a better way of accounting for the inherent complexity of our world(s).

Latour’s crucial insight then, is that there isn’t and there *never has* been, ontologically speaking, two distinctly separate ontological realms which somehow need to be *bridged* (but see Malm 2018).<sup>29</sup> Rather, according to Latour, when we take a closer look at the day-to-day unfolding of the world, we soon see that nature and culture cannot

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<sup>28</sup> This for Latour engenders another striking ‘paradox’ at the very heart of the modern Constitution: on the one hand, the advent of technoscience continuously leads to the proliferation of the hybridisation of nature while on the other hand, modernity has developed a completely different way to understand these processes which effectively renders them invisible. It is, in large part, as a means to deal with this paradox that the field of STS emerged. At the core of STS is the attempt to render visible and trace the “networks” and multitude of material practices underwriting scientific research. In so doing, these scholars attempt to highlight that these practices inherently weave together a multitude of actors and networks which criss-cross a variety of purportedly separate domains. For Latour, and scholars inspired by him within the STS tradition, this is one way of both undoing and reconfiguring the modern Constitution. We will re-turn to some of these issues in the Appendix.

<sup>29</sup> Andreas Malm (2018) offers a forceful critique of Latourian style hybrid thinking and a defence of why we *need* – given our current ecological crisis – to hold on to a nature/culture distinction. Indeed, Malm (ibid., Chapter 2) goes much further by arguing that Latour’s position is essentially Cartesian in nature. Or, more specifically, it is “post-Cartesian”. In a rather memorable turn of phrase, Malm (ibid.) suggests that, “[h]ybridism is to Cartesianism what e-cigarettes are to cigarettes”. Not altogether unlike what I am doing here, albeit admittedly for rather distinctively different (critical) purposes, Malm hones on in certain aspects of Latour’s position and shows how it is entangled with the very modernist tenets (e.g. Cartesianism) he rejects. For me this simply points to the observation – defended throughout this work – that theories, frameworks or intellectual positions/stances are always multiply enacted such that they contain no intrinsic static core. This issue will be variously explored throughout the coming chapters.

easily, if at all, be teased apart. It is important we pause here so as to ensure we do not misunderstand this point. Nature and culture are not easily teased apart not because they are simply tightly intertwined or intimately connected, but rather, because there simply is *no* intrinsic ontological distinction between these two realms to start with. To maintain that nature and culture are “intertwined” is merely to synthesise the two. Latour therefore does not attempt to “bring nature and culture closer together” but rather gets rid of the very dichotomy altogether.

To sum up, modernity is characterised by a modern Constitution which divides and organises the world along two ontologically separate axes – nature/culture – and operates on a dual process which emphasises purification and neglects hybridization. Purification involves the separation, organisation and systematic construction of a nature (and science) distinct from culture and society, while hybridization highlights the entanglement of nature and culture. Ultimately, we saw that the modern Constitution introduces an array of technologies which offers both a new conceptual understanding of nature (and culture) and how it should be studied and with it the practices which underpin, reinforce and reify this understanding.

### **5 Reckoning with dual enactments: Other motivations and further clarifications**

With this extensive discussion of the modern Constitution on the table, I now want to turn the focus towards the analysis underpinning the subsequent chapters. We begin by further clarifying why and how I use the trope of the modern Constitution throughout this work. We then re-turn, and once again turn over, the notion of diffraction and explain how and why it gradually morphed into a key component of this research project. Finally, we bring all these different threads together, by thinking through Gallagher’s suggestion that the enactive approach is best understood as a philosophy of nature. The discussions in these latter sections will serve as a means to more explicitly set the stage for what is to come.

### **6 Thinking-with the modern Constitution to think through enaction**

Now, with regards to the enactive project, *why* the modern Constitution? We have already begun sketching out part of an answer to this question in the previous chapter, and in this, and the following section, I will attempt to fill this sketch in a bit further.



First and foremost, I believe that this notion of the modern Constitution is a very good tool to “*think-with*” (Haraway 2016). And, as I hope to demonstrate in the following chapters, it is also a very good tool to *think-with and through*<sup>30</sup> enaction in particular (cf. Barad 2007). As a tool to think-with, Latour’s analysis will (i) help provide a different context within which to situate the enactive project, and through which to render visible the pulling in opposite directions – the dual enactments – of certain key enactive ideas, concepts and arguments and (ii), introduce into the discussion a different (in contrast to cognitive science and philosophy of mind) set of resources, ideas and concepts which will not only aid with (i) but also help open up alternative routes of enquiry not often thought of in the context of the enactive project. Let us briefly take these in turn.

On the one hand, thinking-with the modern Constitution to think through enaction will enable us to render more fully explicit the heterogeneous multiplicity – the various dual enactments – of core enactive tenets. That is, the following chapters will explore in some detail, in the hope of bringing to light, *how* and *where*<sup>31</sup> some enactive theorists in certain specific places, *both reject and reproduce* key tenets of the modern Constitution. The notion of the modern Constitution will thus serve as a particularly useful means to help render visible, as starkly as possible, the aforementioned dual enactments. In many cases, as explained further below, it (and variants on/of it) also serve as what Karen Barad (2007) calls a “diffractive apparatus”, with and *through which* to read enactive texts.

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<sup>30</sup> The notions of “thinking-with” and “through” are, at least in the manner presented here, admittedly somewhat ambiguous and vague but deliberately so. The reason for doing this is that I don’t want to constrain myself in advance by proposing a definition *before* I put these notions to work. I see these as *performative concepts* which not only change that which they engage with but are also themselves changed in this process. Therefore, to attempt a definitive definition of what exactly is meant or intended by these terms is somewhat futile for our purpose. Suffice to say that I fully embrace these potential ambiguities and hope that in the course of this work that these might lead both myself and the reader to novel ways of understanding the enactive framework. With this in mind, I will note that these notions are inspired by and directly aligned with the notion of diffractive reading. We will re-turn to this alignment below and in the Appendix.

<sup>31</sup> A point of clarification regarding the “where”/ Throughout this work, the *where* is always in reference to specific enactive *texts* within the literature: books; peer-reviewed papers; book chapters and so on. However, as we will briefly touch upon in the Appendix, it must be noted that this is but a *subset* of places where these dual enactments are enacted. They are also constantly enacted in conferences, seminars, research groups, formal and informal conversations, webinars, chains of email exchanges and much more besides. It is an open empirical question as to *how* this is done in these diverse locations. Nonetheless, I will continue to refer to “where” throughout this work as a means to emphasise the *specific textual source*.

On the other hand, thinking-with the modern Constitution is also a thinking-with and through a heterogeneous assemblage of people, places, objects, ideas, concepts and theories. It is a means of bringing into the discussion figures, ideas, concepts and areas of research which are not regularly in conversation with the enactive project. Thus, despite focusing almost exclusively on Latour's analysis above, this work does *not* exclusively rely on it when thinking through enactive texts. Rather, it also uses this analysis as a means to *connect with* and thus *bring together* a number of other resources which are then mobilised for the specific aims of illustrating various enactive dual enactments. The important point is that, as used here, Latour's analysis of modernity first and foremost always signals to other thinkers, other ideas, other concepts and other practices *beyond* Latour himself. To put it slightly differently, thinking-with Latour's analysis of the modern Constitution *qua* extensive gathering, offers up a direct link to anthropology, STS and feminist science studies in a manner that thinking-with cognitive science resources alone simply does not.

What follows is then perhaps best regarded as a somewhat experimental (metaphysical) exploration into how certain enactive ideas, concepts and arguments are *enacted in relation to* certain core tenets of the modern Constitution. In order to do so in a more systematic and focused fashion, we will structure the discussions that follow roughly around two core enactive "matters of concern": (i) the phenomenologisation of nature; and, (ii) the rejection of a pre-given world (mononaturalism) and the insistence that organisms "bring forth" worlds. What makes these enactive matters of concern particularly apt for our purpose here is that they often go hand in hand with a profound rejection of modernist conceptions of nature and its subsequent modes of scientific rationality and objectivity. Both, moreover, also contain enactments of the very opposite. That is, within these topics, we encounter clear examples whereby theorists at once explicitly reject and also tacitly reproduce core tenets of the modern Constitution.

However, despite this aptness, I do recognise that carving up the enactive approach along these two axes is not without its problems. As it will soon become apparent, these two matters of concern are, after all, theoretically continuous and mutually interdependent, forming part of a broader and integrated unified account of life, mind,

culture and sociality. My framing of the discussion around these two topics, which are of central concern for enactive theorists, is therefore merely heuristic and analytical, and not a direct mirror of the enactive project more broadly.

In the Introduction and the previous chapter, we briefly suggested that this project is in no way to be regarded as a critique of the enactive project. I now want to take up this point once again and explore it a bit further. More specifically, in the next section I want to illustrate how my desire to avoid critique is also deeply entangled with what Barad has called a diffractive reading/methodology, which is the other core tool of this work.

### **7 Diffraction, care and (not) critique**

In his article “Why has critique run out of steam? From matters of fact to matters of concern”, Latour (2004a) reflects on the very militant nature of much academic debate: “Wars. So many wars. Wars outside and wars inside. Cultural wars, science wars, and wars against terrorism” (ibid., p. 225). Latour takes issue with this type of scholarship and critique more broadly and suggests instead that researchers take up new approaches to criticism which aim to *develop*, rather than *debunk*, theories and ideas. For Latour, doing so would provide a more fruitful way to engage with the messiness of reality. This work is both motivated by Latour’s cautions over critique and inspired by his suggestions that we can do research by different means.<sup>32</sup>

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<sup>32</sup> In line with his views on reductionism discussed below, underpinning Latour’s contentions about critique, is his insistence that we need to cultivate an attentiveness to the different entities which come together to make up reality. For Latour, this multiplicity is manifest in a host of different ways and takes many forms. These multiple realities are each constituted by the gathering, or what Latour calls a “*composition*”, of a heterogeneous group of entities. Latour’s central insight here is to first note that critique is simply the active mobilisation of *one particular composition of reality qua true reality*, which is itself susceptible to critique. Insofar as this is the case, a more fruitful way to sidestep this apparent impasse would be to maintain that there are in fact *multiple realities* each composed by their very own set of heterogeneous entities. Thus, instead of wanting to debunk reality, we should be attentive to the incessant composition of multiple realities. (Latour, ibid.). It is worth noting here, however, that, although Latour’s “compositionist manifesto” starts with plurality and multiplicity, it mobilises these as means to “compose” a “common world”. As John Law (2009b) points out, “if we become constitutionalists we’re losing location and specificity. We’re losing contingency” (p. 5). Nonetheless, as it will become apparent in subsequent chapters, Latour’s discussion here simply offers a good *departure point* to begin thinking in terms of multiplicity in its own right and as a means to sidestep critique. Not unlike the notion of the modern Constitution, what is perhaps more important here is the *connection* to other scholars and other works which his discussions afford.

Given that I have been suggesting that some enactive theorists enact some of the core dualisms of the modern Constitution, there will most likely be a strong temptation to read this as a *critique of* the enactive project – a way of debunking and unmasking its intrinsic flaws and shortcomings. Indeed, what could be more damning than the suggestion that the enactive project is complicit in the very dualisms it works so hard to overcome? However, I want to (re)emphasise that this work is not intended as a critique of the enactive project. Nor is it my aim to provide solutions or specific answers to purported enactive problems in order to improve it. Inspired in large part by Latour’s concerns over critique, this dissertation will try to avoid, as much as possible, this often confrontational, divisive and exclusionist logic.

In this respect, as already noted above, I am also directly and profoundly inspired by the work of Donna Haraway (1991, 2003, 2008, 2016), who urges us to *think-with* rather than merely think *about* our various research materials. The latter, unlike the former, is more prone to lead one to critique and/or the desire to ‘improve’ these materials. Similarly, I try to pay heed to Maria Puig de la Bellacasa’s (2017) insistence that “relations of thinking and knowing require care and affect how we care” (p. 69). Drawing from and expanding on Latour’s matters of concern, Puig de la Bellacasa urges scholars to pay more attention to “matters of care”. These are understood as “a force distributed across a multiplicity of agencies and materials and supports our worlds as a thick mesh of relational obligation” (ibid., p. 20). Pursuing matters of care involves an “affective state”, a “material vital doing”, where one not only affects but is affected by whatever is at stake (see also Haraway 1991). This means that care is effectively a *doing* with important material consequences which “contributes to *matter*ing the world” (Puig de la Bellacasa, ibid., p. 41, emphasis added). Thus, in what follows, I aim to mostly think-with and not always about enaction with all the care it deserves.

This attentiveness to matters of care goes hand in hand with the eschewing of the modernist tendency, so deeply entrenched in all academia, to critique, debunk and generally find fault and instead aim to foster relations of care and concern *for* and *with* that which we aim to study and understand. My suggestion that enactive theorists often reproduce some core tenets of the modern Constitution and hence the dualism(s) it

brings with it is therefore done from a position of such care. Thinking-with and through enaction is thus also a caring for the enactive project, which allows me at the same time to shift the focus towards the heterogeneous *multiple* realities, vis-à-vis its dual enactments, that these theorists routinely enact. This does not mean that a ‘critical’ eye is completely absent from this work, only that it might not always take the form it traditionally does (cf. Taylor 2016).

These notions of thinking-with/through and *care*(full) not critical research, are also inspired by and deeply entangled with Barad’s (2007) “diffractive methodology”. As noted in the Introduction, Barad following Haraway, proposes the notion of diffraction<sup>33</sup> as an alternative to reflection and/or reflexivity. Haraway (2004) was especially drawn to the notion of diffraction because it “does not produce ‘the same’ displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the *effects* of difference appear” (p. 70, emphasis original). For both Barad and Haraway, reflection – using a mirror for example – repeats (reflects) the same whereas diffraction *creates something new*. Thus, as a methodology, diffraction is more concerned with the *creation of differences*, rather than *observing* what these differences are.<sup>34</sup> To put the point slightly differently, whereas reflexivity and reflection are premised on sameness and require that one accurately represents what is already there, diffraction is instead concerned with *differences which make a difference*.

A number of posthumanist (new materialist) feminist theorists have taken up and developed this methodology along a number of different paths. This thesis is largely inspired by, and in large parts, is a direct outcome of what Barad (2007), again following Haraway (2004), has called a “diffractive reading”. As noted in the Introduction, in its most straightforward sense, a diffractive reading involves reading

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<sup>33</sup> Diffraction is an established concept within the physical sciences and refers to the disruption of wave-based systems as they encounter obstacles and create an observable pattern of interference (see Barad 2007).

<sup>34</sup> We will re-turn to the notions of reflexivity and diffraction in later chapters. On reflexivity, see Chapters Five and Six. On diffraction, see especially the Appendix. Note that the notion of diffraction in particular can only be partly explored here as it requires concepts and ideas which will only be discussed in later chapters. Here I offer merely a brief discussion of the aspects relevant to the points at hand. More specifically, I draw attention to the notion of diffractive *readings*, although this is only *one* aspect of a diffractive methodology. Finally, note that although central to this work, a diffractive methodology has been but one tool, albeit a very helpful one, that I have used to think-with and through enactivism.

different texts *through* one another with the aim of engendering creative entanglements between these, such that they might help the researcher address their particular research question(s). It involves the possible creation of new patterns and/or ideas through the entanglement of the texts, allowing the texts “to engage aspects of each in dynamic relationality to the other” (Barad 2007, p. 95). It is, in other words, “the practice of reading insights *through one another* while paying attention to patterns of difference” (Barad 2011a, p. 445, emphasis added). Very importantly, here texts are read *with care through* rather than *against* one another. For Barad (ibid.), reading diffractively is an *affirmative generative engagement* and not a means of critique which finds flaws and puts other positions/theories/ideas down.

In many respects we could think of this work as the direct result of reading a number of STS and feminists science studies texts, many of which deal in some way or other with aspects of the modern Constitution,<sup>35</sup> *diffractively through enactive texts*. To further illustrate this, and indeed to turn the notion of diffraction over once again, it might be helpful at this point to briefly document how my relationship with diffraction emerged and developed over the course of working on this dissertation. This should hopefully shed some light not only on the method of reading diffractively, but also help bring the various disparate threads of the discussion thus far closer together.

As noted in the Introduction, the first iterations of this work began with the *conviction* that the enactive approach was in certain key respects inadequate and the subsequent *ambition* to *rectify* it. In its earlier stages, I drew on a number of different texts which I mobilised both as a means to *legitimise* the purported inadequacies and to help develop a *better alternative* (see De Jesus 2016a, 2016b, 2018; Heras-Escribano and De Jesus 2018). The aforementioned texts were primarily drawn from the field of biosemiotics and the theoretical biology of Jakob von Uexküll. Around halfway through this research I developed an interest in STS, new materialism, feminist science studies and anthropology, and I subsequently began reading a number of influential and classic texts from these fields with and through the enactive approach. This was in keeping, I later

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<sup>35</sup> Note here how the two main motivations for using Latour’s analysis in this work coalesce and become mutually entangled at this point.

discovered, with Barad's (2007) recommendation for "transdisciplinarity", which aims to use texts from different sources and disciplines in productive ways.<sup>36</sup>

Given my ever-so-brief description of the notion of a diffractive reading, it might be thought that what I had been doing leading up to the writing of this dissertation was indeed reading texts diffractively. This would be a mistake, and explaining why should also help further illustrate the notion of diffraction under consideration. In many respects, I take my earlier reading of texts through one another to not only exemplify how the process can fruitfully lead to unexpected 'insights' but also how deeply held preconceived convictions can fundamentally affect the unfolding of the research, and hence the insights attained. However, it also clearly exemplifies that, just reading texts through one another, is not enough for an 'adequate' diffractive reading.

An important aspect of the process, which I now recognise I had not fully appreciated, was the fact that a diffractive reading/methodology is not about uncovering the hidden truths buried within texts. As Lenz Taguchi (2012) points out, a diffractive analysis "is not about uncovering the essence or truth of the data. This is an uncovering of a reality that already exists among the multiple realities being enacted in an event, but which has not been previously 'disclosed'" (p. 275). Rather, it is about the always-already entanglement between researcher and text, and the possibility of the creation of new ideas and insights. It is about making a difference and not overlooking the differences that are thusly made. It therefore involves cultivating an attentiveness towards both connections and contrasts instead of focusing on accurate classification and representation. Here, too, critique recedes into the background but does not altogether disappear.<sup>37</sup>

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<sup>36</sup> As it will become clearer in the following chapters, it *makes a difference* which text(s) one chooses and reads through another. This point is perhaps as trivial as it is important. The enactive approach is by its very nature interdisciplinary and theorists routinely use different texts and resources to both theoretically strengthen their respective approach and to highlight the deficiencies in others. The point here, however, is not so much that enactive theorists are *primarily* preoccupied with undermining other positions (although some, like radical enactivists for example, certainly are) while aiming to strengthen their own, but rather that the texts used can often have this and other (unintended) consequences. We will see variations on this particular theme as this work develops.

<sup>37</sup> As Haraway (1997) argues, "diffraction can be a metaphor for another kind of critical consciousness". But, she continues, it is "one committed to making a difference and not to repeating the Sacred Image of the Same (...) diffraction is a narrative, graphic, psychological, spiritual, and political technology for making consequential meanings" (p. 16). This is in line with Latour's (2004a) suggestion that critique should be "associated with more, not less, with multiplication not subtraction".

Although the texts I was reading the enactive approach through had changed – from biosemiotics to STS, feminist science studies and new materialism – my starting conviction, assumptions and ambitions had not (e.g. De Jesus 2018). As a consequence, many, if not all, of the texts used were chosen almost exclusively towards these ends. Doing so however, meant that I was not only producing research as if I occupied a *privileged position outside* the work I was dealing with, but also uncovering what was already there but not readily seen. This meant that critique inevitably played a crucial part in the work which directly followed. Despite my constant attempts to do otherwise, the pre-established diagnoses of an inherent inadequacy within the enactive approach was always rendered in a deeply critical, often antagonistic, fashion.<sup>38</sup>

It was only once I began putting aside my pre-established conceptions and ambitions that I believe I was able to sidestep some of these issues. Thinking with diffraction was certainly an important part of this process. So too was Latour’s insight that critique had ran “out of steam”. Both of which, and much besides, not only helped me recognise my deep entanglement with my research materials and the differences I made but also how this eventually helped to dislodge my deep-seated, pre-established convictions and ambitions. And *entanglement*, *multiplicity* and *differences* are crucial to both. Diffraction in particular makes it clear that we are not only inextricably implicated in that which we study but these entanglements create differences which we need to be attentive to. It is therefore not only that different text(s) lead to different insights and ideas (although this is, of course, also important) but also that these texts, together with pre-established convictions and assumptions, lead to the *making of specific differences* (see Appendix for more on these points).

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<sup>38</sup> In this regard, the multiple interventions by Fred Cummins, one of my supervisors in this work, becomes crucially important. Fred was/is rightfully sensitive towards this critical dimension of my work and would routinely try his utmost best to make me realise and understand this. Unfortunately, throughout most of the development and writing of this work, I did not fully appreciate Fred’s insightful points. Or perhaps more accurately, while I did recognise his concerns I wasn’t able to fully or indeed adequately realised them at the time. It was only once I put aside my pre-established convictions and ambitions and began cultivating an attentiveness to differences – both to the making and recognising of them – that I came to terms with Fred’s concerns. As noted here, the notion of diffraction certainly played a key role in this process.



We could say that in this work diffractive reading(s) (but not only) are therefore largely responsible for my reconfiguration of the enactive project as a project whose concepts, ideas and theories subvert/reject and reinforce/perpetuate core tenets of the modern Constitution, all at the same time. Many texts, not in the least Latour's, served at various points in time as important "diffractive apparatuses" (i.e. the texts *through which* enaction was read). The outcome, most of which is documented in the following pages, can therefore be understood as the "diffractive patterns" of my diffractive reading(s). Finally, it is worth noting how diffraction itself reconfigures critique. As Andreas Folkers (2016) points out, critique "is not just a reflection that leaves what it reflects upon unaltered, but a diffraction that changes what is put under critical scrutiny" (Folkers as cited in Taylor 2016).

So, with these motivations and clarifications on the table, I now want to conclude this chapter by turning our focus back to the enactive project more specifically. In what follows I will continue laying the groundwork for the following chapters by briefly exploring a recent proposal by Shaun Gallagher which suggests that enactivism is best understood as a "philosophy of nature" rather than a scientific research programme.<sup>39</sup> Gallagher's suggestion is particularly helpful here because it both touches upon and directly links up with most of the themes and topics addressed in the following chapters. It touches on both of our central topics and presents some examples where concepts, ideas and arguments are enacted in directly opposing ways vis-à-vis the modern Constitution.

## **8 Enacting the enactive project as a philosophy of nature**

Based solely on the discussions of the previous chapter, it would appear that the enactive project not only directly rejects and challenges the modern Constitution and its dualistic conception of nature, but also provides a rather attractive alternative to it. Indeed, this has recently motivated Shaun Gallagher (2017, pp. 21-23) to suggest that

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<sup>39</sup> It is worth noting from the outset that enactive theorists, or rather AE theorists more specifically, tend to oscillate between casting the enactive project as either a somewhat narrower scientific research programme or as a much broader all encompassing philosophy of nature. Often these two are run together such that enactivism is cast as a project which aims to reconfigure the very nature of science itself so that it can become more aligned with its broader philosophy (e.g. Stewart et al. 2010). Our discussion of both VTR and AE in the previous chapter already contained strong hints of all these variations. As far as I am aware, Gallagher is the first theorist to explicitly thematise this distinction and explore what he takes to be some of its implications.

the enactive project is perhaps best understood as a “philosophy of nature”. Motivating Gallagher’s suggestion is precisely the ambition to overcome the most prominent excesses of modernity: scientific reductionism, the separations of nature from culture, subject from object, self from other, and mind from body. For Gallagher (2018), the best way to go about dealing with the problematic of the modern Constitution – particularly the notion of scientific reductionism – is to “rethink the concept of nature itself”.

Underpinning Gallagher’s proposal to rethink the concept of nature are two distinct but mutually complementary commitments: (i) a rejection of scientific reductionism and (ii) a complementary ambition to *phenomenologize nature* (see also Di Paolo et al. 2018; Gallagher 2018; Thompson 2007). For Gallagher, and most enactive theorists would certainly agree, the problem with scientific mechanistic reductionism is that it makes it virtually impossible to adequately account for subjectivity. The sciences of the mind, just as other natural sciences, are underpinned by many of the material technologies which comprise the modern Constitution. As a consequence, all human intentional behaviour, subjectivity, meaning and ultimately even free will, is reduced to patterns of neuronal activity and rendered as *fictitious* by-products of deterministic and mechanistic laws and processes (see Fuchs 2018).

With regards to commitment (ii), enactive theorists insist that we need to, in effect, re-conceive nature through a phenomenological lens, as a means to enrich our understanding of embodied living beings and subjective consciousness as a natural but non-reducible biological process. It is these two commitments, here somewhat very broadly conceived, which jointly constitute the enactive project’s alternative philosophy of nature. The second commitment is, in my opinion, part of a much more ambitious project which we will explore in the next two chapters.<sup>40</sup> Here, I will only therefore briefly focus on (i) and a small cluster of themes related to it in order to set the stage for the following chapters.

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<sup>40</sup> Note also that commitment (ii) is specific only to AE theorists, while commitment (i) is a core tenet of enactivism in general. Indeed, for AE theorists, both commitments are intimately entangled and jointly necessary for an adequate understanding of mind and cognition.

As an entry point into the discussion it might be useful to consider why Gallagher suggests that the enactive project is best understood as a philosophy of nature as opposed to a scientific research programme. According to Gallagher, enaction “present[s] a challenge to science” (ibid., p. 21). The reason for this is that enactive theorists advocate a much more “holistic” approach to cognition, which not only focuses on the brain or behaviour but rather on the “rich dynamics of brain-body-environment”. Science finds it hard to deal with holism, or, in the words of Gallagher (ibid.), “it is difficult to operationalize holism”. This, however, does not imply a rejection of science but rather calls for a rethinking of certain scientific assumptions about cognition and how philosophy itself relates to science (see Froese 2022). It is in so doing that enactivists, according to Gallagher, develop a novel philosophy of nature distinct from, but not necessarily opposed to, natural science. In this respect, contrary to what we saw in the previous chapter, the enactive project should *not* (perhaps cannot?)<sup>41</sup> be aiming to establish a “Enactive Cognitive *Science*”.

The notion of a ‘philosophy of nature’ at play here is taken from Godfrey-Smith (2001) who contrasts it with a “scientific research program”. According to Godfrey-Smith, the principal task of a philosophy of nature is to comment “on the overall picture of the natural world that science, and perhaps other types of inquiry, seem to be giving us” (ibid., p. 284). Such a commentary on scientific knowledge, Godfrey-Smith argues, “can, if necessary, fashion its own way of *describing the structure that has been uncovered by science*” (ibid., emphasis added). A philosophy of nature thus “comes *after* empirical science and tries to *redescribe structures in the world* that have already been *described* by the sciences” (ibid., p. 284, emphasis added).

It is important that a philosophy of nature, thus understood, should not be confused with a purely ‘naturalistic philosophy’ which sees all philosophical work not only as continuous with, but also completely *subsumed* by, natural science and thus devoid of any real autonomy. Rather, it is a philosophy which can and should also serve to positively contribute to scientific research and theory. Such a philosophical endeavour

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<sup>41</sup> This is an interesting open question which I cannot really address here. Nonetheless, by way of an indirect answer, I will simply point out the following: these are not merely two different *understandings* of the enactive project but rather two different *enactments* of it. As such, it can and often *is* both.

is then granted its autonomy so long as it “takes seriously the results of science, and its claims remain consistent with them” (Gallagher 2017, p. 22). Thus, although autonomous from the natural sciences, a philosophy of nature nonetheless remains constrained in certain key ways by it.

For Gallagher then, the enactive project is best understood as a philosophy of nature because (i) it *re-describes*, in more appropriate self-constructed dynamic/holistic and enactive terms, the structures uncovered by natural science, whilst also (ii) aiming to substantially contribute to scientific research itself. Moreover, a philosophy of nature in this sense is also not restricted to the results of one particular scientific subfield but can and should “reframe those results to integrate them with results from many sciences” (Gallagher, *ibid.*, p. 22). Focusing exclusively on cognitive neuroscience, for example, as the science of cognition would, in this view, be misguided. A more holistic approach would strive to integrate and synthesise results from a broader pool of scientific results and research.

According to Gallagher, it is clear that the enactive project is a philosophy of nature because it not only provides a novel rethinking of the notions of mind and cognition but also of the “concept of nature itself”. For most enactive theorists, enaction is a form of non-reductive naturalism, scientifically engaged philosophy, which rejects reductionist/mechanistic conceptions of nature found in the natural sciences (see Barandiaran 2017; Di Paolo et al. 2017; Di Paolo 2005; Gallagher 2018; Thompson 2007). Moreover, in line with VTR’s proposed circularity explored in the previous chapter, Gallagher also argues that for enactivists “nature cannot be understood apart from the cognitive capacity that we have to investigate it” (Gallagher, *ibid.*, p. 23). Thus, for Gallagher, holism serves both as powerful *critique* of reductive, mechanistic conceptions of nature and as alternative, naturalist-friendly epistemology which helps re-conceive the concept of nature.

Gallagher’s intervention therefore explicitly enacts the enactive project as a philosophy of nature which actively subverts and thoroughly rejects modernist (reductionist and dualist) modes of scientific rationality and objectivity. Indeed, it goes even further than rejection and subversion by hinting towards an alternative constructive

reconceptualisation of nature which would reconfigure the very reductionist/dualist core of the modern Constitution. With one fell swoop it makes the enactive project's subversive force against and alternative proposal to the modern Constitution crystal clear.

And yet, even as Gallagher subverts key tenets of the modern Constitution, he also at the very same time re-enacts and thus reproduces them. As a means to continuing laying the groundwork for the following chapters, I want to conclude this chapter by briefly exploring some of these enactments. In particular, I want to do so specifically in relation to Gallagher's rejection of scientific reductionism.

### **9 (In)visible spectres of reductionism**

We noted above that commitment (i) is primarily characterised by a rejection of scientific reductionism. We also saw that Gallagher suggested that, to truly overcome scientific reductionism, one ought to embrace holism as enactivists do. I want to conclude this chapter by briefly think-with and through this appeal to holism. And, more specifically, the *opposition* between reductionism and holism. Although the focus is deliberately narrowed at this point, the cluster of themes and issues it touches upon are nonetheless highly relevant and thus set the stage for what is to follow.

So, according to Gallagher, a core aspect of the proposed philosophy of nature is its embracing of holism as a means to adequately account for the dynamic complexities of nature. More often than not, as we saw in the previous chapter, enactive theorists tend to draw from dynamic systems theory and related areas to "naturalistically" account for this holism. Complexity theory, dynamic systems theory and theories of self-organisation thus provide enactivism with some key resources to help account for nature's inherent holism in scientific respectable terms. Indeed, these alternative scientific resources are in great part mobilised in the aid of scientific legitimacy/congruency. But it also serves to enact an alternative non-modernist theoretical framework which not only subverts traditional modes of scientific rationality and objectivity but also helps reconfigure the very concept of nature itself. And this non-modernist, scientifically congruent framework is, in turn, best understood as a *bona fide* philosophy of nature.

However, this is not all that it is doing. What happens when we read this broad commitment to holism diffractively with and through Latour's analysis of the modern Constitution? Doing so could help render visible how this particular enactment of holism not only subverts but also *reproduces* some of the core tenets of the modern Constitution. This is because, in enacting holism in the manner it does, it also inadvertently reintroduces a nature/culture dichotomy. How so? In a nutshell, this dichotomy is enacted by tacitly casting 'the world' on one side – a world filled with objects which behave in complex dynamic ways – and placing scientists who observe these objects and can more or less accurately represent (redescribe) these mathematically, courtesy of the tools provided by the enactive project, and complexity/dynamic systems theory, on the other side.

Two further points are worth noting here. Firstly, the distinction enacts and legitimises an overarching conventional representationalist "epistemological hierarchy" (Jensen 2017), which places science *above* philosophy and takes scientific research programmes to provide the foundations for an adequate philosophy of nature. This is despite the fact that it explicitly argues that a philosophy of nature can and should aspire to influence the sciences and is autonomous from it. But, as we also saw, it is ultimately the sciences which lay down the constraints for philosophy, such that a transgression of these constraints are strictly unacceptable.<sup>42</sup>

Secondly, and as a direct consequence of the first point, the distinction also both reinforces and perpetuates mononaturalism. As we saw above, Godfrey-Smith argued that a philosophy of nature comes *after* the scientific work of discovering and describing "structures in the world" is done and tries to "redescribe" them. This, as we saw, was actively and explicitly also defended by Gallagher who suggested that it is something enactive theorists should strive to do. But doing so would be simply to accept the truth of mononaturalism. Gallagher, after Godfrey-Smith, maintains that the

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<sup>42</sup> One important implication of such enactments is an inability to adequately account for cosmologies which are radically different from our naturalist Western one (see Descola 2013). Even worse, perhaps, is that such things as spirits, gods and divinities are here, with one full stroke, deemed ontologically nonexistent (see de la Cadena 2016). The ontology of the world is here determined by the best science. In turn, one's philosophy is legitimate only insofar as it does not transgress this ontology (see Watts 2013). This is of course, as we saw above, core to the modern Constitution.

“structures of the world” are naturally pregiven and also independent of observational practices. It is up to the enactive philosopher to represent these as accurately as possible.

Even if we take into account our discussion on diffraction and critique above, it will be difficult to overlook the rather counterintuitive (provocative?) force of the previous three paragraphs. Is it not the case that systems theory, for example, not to even mention enactivism, rejects outright these sorts of dualistic thinking? Indeed, systems theory and subsequent developments of it through cybernetics and mathematics, routinely argue that it collapses the nature/culture divide precisely because it offers a (scientifically feasible) way of accounting for the *intimate coupling* between organism and environment. As we saw in the previous chapter, these dynamic couplings are argued to make it impossible to draw a distinction between subject and object, or nature and culture if we prefer. I think this is indeed correct and do not dispute this claim. But, I want to maintain, it *also does* the exact opposite.

Although this is an issue we will re-turn to and further turn over and clarify in subsequent chapters, it will be instructive to already begin considering it. And to do so, I will tentatively, and somewhat cautiously, introduce two<sup>43</sup> rather distinct ways that complexity and holism itself can be and has been enacted. This should, in turn, help shed a somewhat different light on both the notion of holism and reductionism.

Complexity (or holism more broadly) can be enacted in the ‘traditional’ sense, the sense in which enactive theorists more commonly do, as a set of scientifically respectable mathematical-cum-modelling tools and formalisms that enable one to *represent* (complex) nature. Complexity, however, can also be enacted not as a means of representation but rather as *performative* and *multiple*. The contrast here is essentially between, in the words of Ian Hacking (1983), “representing and intervening”. The former, as Pickering (1995) argues, casts science in a “representational idiom”, while

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<sup>43</sup> I say tentatively and cautiously because the resources to adequately understand these claims will only be introduced in later chapters. The reader could therefore re-turn to this section once the relevant concepts have been introduced. Moreover, I should also note that there are, of course, many more ways in which holism is enacted (see Mol and Law 2002). I point to these two versions here only as a means to illustrate my broader points.

the latter casts it in a “performative idiom”. Whereas the former takes complexity *theory* to be another way to simply represent nature, the latter sees it as another way of *performing nature(s)* (cf. Law and Mol 2002).

Dynamic systems theory and similar mathematical tools, while certainly important and useful, tend to enact complexity in strictly representationalist terms. This however could be understood to have the unfortunate consequence of inadvertently *taming* complexity and somewhat ironically threatens to collapse into yet another version of *reductionism*.<sup>44</sup> Indeed, as Donna Haraway (1988) long argued, we need to be wary about totalising explanatory theories. Note, then, that understanding complexity in a performative key alerts us both to the inherent messiness – the complexities – of worlds and the impossibility of “operationalising” them but *not* exactly for the same reasons Gallagher seems to suggest. Or, to put it more accurately, insofar as the world *can* be operationalised, it is merely *one enactment of the world among many* (see Appendix).

As we will begin exploring in Chapter Five, if we do take the idea of ‘multiple worlds’ (the enactive rejection of a pre-given world and the insistence of brought forth worlds) seriously, the notion of complexity automatically gets reconfigured: from a single overarching way the world and the objects therein can be ordered and represented to a multiplicity of coexisting, often overlapping, partially excluding, orders. It is worth noting at this point that inherent in this ‘reconfiguration’ is a crucial theme which runs throughout this entire dissertation, namely *multiplicity*. Or more precisely, *ontological multiplicity*, the difference between which will only become fully apparent in Chapters Six and the Appendix. Nonetheless, we can cautiously note here already that enacting complexity in purely representationalist epistemic terms is also to enact it as an all-encompassing tool of redescription which flattens difference, heterogeneity and ontological multiplicities.<sup>45</sup>

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<sup>44</sup> Indeed, as Zygmunt Bauman (1989) has argued, “rational schemes” in general are inherently reductive because they cut-up, divide, simplify and in the process inevitably exclude. No doubt that the totalling notion of ‘complexity theory’ can often be just such a “rational scheme”.

<sup>45</sup> A prime example of this is the enactive notion of autonomy. As we will see in the following chapters, the notion of autonomy is routinely cast as a multiply applicable formal (operationalised) tool capable of accounting for phenomena across multiple scales of organisation (cf. Di Paolo et al. 2018). But, of course, in so doing it pays the price of flattening ontological differences. We will re-turn to these points in later chapters.



What becomes of reduction in light of performative enactments of complexity and ontological multiplicity? To start off, theorists who enact complexity in a performative manner whilst also aiming to foster an attentiveness to ontological multiplicity (e.g. Blaser 2013a; Barad 2007, Haraway 2016, Law 2004a, Mol and Law 2002), do not seek to overcome reductionism and replace it with an alternative holistic anti-reductionism. These theorists, in their own respective idiosyncratic ways, suggest that not only should we eschew this problematic dualism but maintain that perpetuating it is to become complicit in the very material technologies which reproduce and sustain it. The holism vs scientific reductionism debate could thus be regarded as something of a red herring perpetuating yet more dualistic thinking/practice. Thus, as Latour (2004c) argues, scientific reductionism should not be seen as an issue.

To see why, consider Latour's (ibid.) insistence that "no scientist can be reductionist, disciplines can only *add* to the world and almost never subtract phenomena" (p. 226, emphasis original). Latour is here echoing a long tradition of STS scholarship which has insisted that, once we pay attention to the *multiplicity* of scientific *practices*, the impossibility of reductionism becomes self-evident. This should, in turn, displace the pervasive urge to 'overcome' or 'reject' reductionism in the first place. Indeed, a more STS friendly sensibility here would be to suggest that it is perhaps more productive to explore *how* reductionism itself is done – how it is enacted – rather than seeking alternatives to replace it with.

As we will explore in more detail in the Appendix, once the objects of contemporary science are reconfigured as "instances of relatedness in the making" (Puig de la Bellacasa 2017), the supposed spectres of reductionism simply loosen much of their tight grip. As Latour points out, "[i]n the laboratory of the most outrageously [reductionist] white coats, phenomena proliferate: concepts, instruments, novelties, theories, grants, prizes, rats and other white coats" (ibid., p. 226). This not only makes light of reductionism, but also reinforces the view that, it is "not a sin for which scientists should make amends" (ibid.). Thus, for Latour, it is not only complexity and holism which need to be taken seriously, but so too is reductionism. Latour thus enacts reductionism *qua* scientific practise as a fully legitimate practice in its own right just as

any other scientific practice. One which, however, could never fulfil its core theoretical ambitions

### **Conclusion**

We began this chapter by first exploring Latour's modern Constitution. We saw that it presided over the bifurcation of the world into the two ontologically separate domains of nature and culture. We then turned our attention towards explaining the notion of a diffractive methodology, highlighted its role in this work and drew attention to its entanglement with critique. We conclude by introducing Gallagher's suggestion that enactivism was best understood as a philosophy of nature and briefly considered this suggestion in relation to the modern Constitution. In the next chapter, we explore how the enactive phenomenologisation of nature subverts the modern Constitution.

## Chapter Three

### Phenomenologizing Nature as Rejection(s) of the Constitution

#### Overview

The main aim of this chapter is twofold: (i) to explore how AE theorists phenomenologize the concept of nature and (ii); show how the multiple processes which constitute this phenomenologisation at the same time enact a rejection and deep subversion of several key tenets of the modern Constitution. We explore how this is achieved through a creative combination of ideas, concepts, arguments and thinkers drawn from dynamic systems theory, theoretical biology and existential phenomenology. This creative assemblage not only enables AE theorists to enact a distinctive philosophy of nature/scientific research programme which pivots around the idea of a strong continuity between life and mind but also to disrupt a number of crucial modernist ideals which effectively renders such a continuity impossible to begin with.

#### Motivations and aims of chapter

The core thesis of this work is that enactive theorists often enact their core tenets in a manner that both rejects/subverts and reproduces various tenets of the modern Constitution. As noted, my aim is therefore to show *how* and *where* this happens. In this chapter we begin this project in earnest by exploring the specific enactive matters of concern which gather around the topic of the phenomenologisation of nature with and through which AE theorists effectively enact a rejection and subversion of the modern Constitution.

At the end of the previous chapter, we briefly introduced and explored Shaun Gallagher's suggestion that the enactive project is best understood as a philosophy of nature. We noted that, as a philosophy of nature, it had the distinctively ambitious goal of "rethinking the concept of nature itself". This chapter takes Gallagher's suggestion as its departure point and explores how this ambition is realised by AE theorists precisely through an enactive phenomenologisation of nature.

Recall how, according to Gallagher, this alternative enactive philosophy of nature can be broadly understood to consist of two distinct but mutually supporting commitments: (i) a rejection of reductionism and (ii); the *phenomenologizing of nature* itself. We noted how commitment (i) is a non-negotiable tenet of *all* enactive theorists. By contrast, (ii) is by and large mostly enacted only by AE theorists. The central focus of this chapter is this particular enactment. We will see that at its core is the suggestion that life and mind are not distinct phenomena, as most traditional cognitive scientists tend to assume, but a unitary process which is deeply entangled and continuous at multiple organisational and evolutionary scales.

AE theorists articulate this idea by proposing a strong life-mind continuity thesis. This thesis not only suggests that life and mind are continuous but, more importantly, also functions as a connecting thread between an objective third-person biology of cognition and an experiential first-person embodied phenomenology. Most of the discussions which follow in this chapter will thus revolve around the various ways the thesis entangles these two perspectives. We will explore how a creative gathering of different, but mutually complementary, theorists, texts, ideas, concepts and arguments are threaded with and through this thesis such that in the process it also enacts a substantive rejection/subversion of fundamental modernist ideals.

The structure of the chapter is as follows: We begin by first briefly exploring traditional cognitive science's relation to the modern Constitution. The notion of life-mind continuity is then introduced and two distinct versions of it are discussed. Next we situate the enactive project of phenomenologizing nature in the broader context of debates around the naturalisation of phenomenology. The second half of the chapter then explores the role of existential phenomenology within life-mind continuity. Throughout the discussion special attention is paid to how the phenomenologisation of nature subverts the modern Constitution.

## **1 Cognitive science and the modern Constitution**

At the core of the enactive project, specifically as it is developed by AE theorists, is the conviction that nature needs to be phenomenologized. Underpinning this conviction is a broader discontentment with the 'disenchantment of nature' brought about by

modernity. A disenchantment which has only grown stronger with the proliferation and entrenchment of the modern Constitution. This disenchantment is perhaps most acutely felt within the sciences of the mind where the human has not only been displaced from the nonhuman but also reconfigured and recast in the strict image of the (modernist) nonhuman; non-agentic, passive and completely at the mercy of natural forces and laws outside its control (see Rosenberg 2013). Following Varela (1995), many enactive theorists argue that what we need is a “*re-enchantment* of the concrete” which could remedy our modernist predicament.

Our discussion of the modern Constitution in the previous chapter painted a very broad, very general and somewhat abstract, picture of this predicament. A picture which focused primarily on the sociological/anthropological features of modernity. However, given that this work deals extensively with the enactive project, I am sure it did not go unnoticed that very little was said about the nature of cognition and mind in light of the modern Constitution. What becomes of cognition, mind, meaning and subjectivity – the human itself – with the advent of modernity and the proliferation of the modern Constitution?<sup>46</sup> This is a particularly interesting question in light of our discussions on the modern Constitution precisely because it appears to problematise one of its key tenets. It will therefore be helpful to briefly consider how (traditional) cognitive science relates to the modern Constitution before exploring how enaction rejects both.

In the previous chapter we saw that the human was attributed a special set of properties, principally intended to secure its uniqueness, which were quite distinct from those attributed to the nonhuman. However, with developments in biology and the advent of the science of the mind, this general picture gradually began to shift somewhat. Not only was this uniqueness put into question, but the very division between nature and culture seemed to come under threat. One of the reasons for this change was the increased popularity of *naturalism* (see Bashour and Muller 2014).

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<sup>46</sup> There is a much bigger historical story, involving the sociology and anthropology of the modern Constitution as specifically pertaining to the sciences of cognition, to tell here. This is however beyond the limited scope of this work. Insofar as we touch upon some of these aspects throughout this work, it will be merely as a consequence of addressing other related, though often distinct, issues.

In many important respects the history and development of the study of cognition and mind since the emergence of the modern Constitution is guided by a deep-seated desire for *naturalisation* (Boden 2006). Broadly speaking, the notion of naturalisation here refers to a conviction that an understanding of cognition must be connected to or in certain aspects congruent with empirical ‘natural’ – hence naturalism – science.<sup>47</sup> This of course brings with it a rather different understanding of how the human, and indeed organic living nature more generally, fits within the natural world.

Cognitive science is a paradigmatic example of a fully fledged (re)incarnation of this broader naturalisation project. Indeed, current understandings of cognition as essentially mechanistic processes involving computations over internal representations, cannot be easily disentangled from this historical lineage. A history where, as is routinely pointed out, the French philosopher René Descartes played a pivotal role. Within this history Descartes is primarily remembered for his ontological distinction between two types of substances, *res cogitans* (mind) and *res extensa* (body).

Descartes’s mind/body dualism is not altogether equivalent to the nature/culture split but nonetheless maps onto and operates within the same conceptual/practical space it arguably also opens up (see Blaser 2010). This dualism can thus be regarded as much a product as it is a cause of the modern Constitution itself. As Blaser (2010) points out, “Cartesian dualism operates in the modern myth [modern Constitution] as a generative principle of ever expanding sets of opposing pairs such as mind-world, culture-nature, representation-reality and the like. This dualism is a product of successive conceptual layers laid prior to (and after) Descartes *cogito*” (p. 4, emphasis original).

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<sup>47</sup> There are many ways that this connection/congruence can and has been cashed-out (see papers collected in Bashour and Muller 2014). However, as David Papineau (2015) points out, naturalism comprises two broad “components”, one “ontological”, the other “methodological”, which most theorists tend to agree on. Ontologically, reality is conceived in monistic terms without any room for “supernatural” or “spooky kinds of entities”. While, methodologically, it argues for the “general authority [of] the scientific method” (p. 1). A third component, already noted in the previous chapter, is also worth highlighting here. Whether strongly or weakly construed, naturalism is usually grounded on a metaphysical realism which insists that scientific understanding and practices (Papineau’s scientific method), “involves [the] *correct representations* of its object and their modal properties” (Rouse 2004, p. 145, emphasis added). Objects and modal properties which are deemed totally observer independent. See Chapters Five, Six and Appendix for more on this topic.

The ontological dualism proposed by Descartes can thus in effect be understood as the result of applying the nature/culture distinction to the human itself. The human can now be placed within two separate domains: language, thought, subjectivity and meaning on one side, bodies *qua* natural entities on the other. Language and thought are distinctly human properties and need to be studied as such. While the body is a natural material entity which, like the rest of nature, operates through mechanical/deterministic laws and principles and must be studied as such (see Plumwood 1993).

This both contributes to and perpetuates the modernist project by ensuring that subject and object – human and nonhuman – remain distinct and distinctive. However the desire for naturalism eventually collapses Descartes’s original ontological dualism and extinguishes the distinction by placing the mind and cognition (human subjectivity in general) squarely within the realm of nature as conceived and realised by the modern Constitution. Thus, taken to its extreme, the desire for naturalisation culminates in the recasting of the human as *equivalent in kind* to the nonhuman. Ontological dualism then gradually morphs into *Cartesian materialism* (Rockwell (2005)<sup>48</sup> such that everything about the human can and should be understood and explained in purely physicalist/materialist terms *qua* brain processes. After all humans are also natural *objects* and therefore cannot escape the universal natural laws of physics.

As Alex Rosenberg (2013) points out, “[i]f the physical facts fix all facts, however, then in doing so, it rules out purposes altogether, in biology, in human affairs, and in human thought processes too” (p. 19). Within a modernist cognitive/neuro-science register more specifically, this leads to a position where self, consciousness, subjectivity and ultimately free will are rendered illusions fabricated by (human) brains. It is precisely here that the modern Constitution itself appears to get reconfigured by this understanding of mind and cognition. That is to say, this naturalised conception of the human appears to effectively *collapse* the core tenet of the Constitution, its separation of nature from culture. While this observation is not wrong, it is also not quite right either.

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<sup>48</sup> As Rockwell (2005) argues, contemporary cognitive science is a species of Cartesian materialism in that it takes cognition to supervene entirely and *exclusively* on internal brain processes alone. The brain alone is the supervenience base of mental phenomena. For this and closely related reasons, Vincent Descombes (2010, chapter. 4) argues that this sort of position in fact simply reproduces, rather than effectively undermines, another type of Cartesian dualism.

In my opinion, a closer look at some of the details, reveals that the reproduction of the nature/culture split is also being enacted here. This becomes fairly evident once we recognise that Cartesian materialism *qua* naturalising project, despite insistence to the contrary, not only leaves the Cartesian dualist division(s) between inner/outer, mental/physical, fully intact, but also operates *within* and thus perpetuates the very conceptual/practical space introduced by the modern Constitution (cf. Descombes 2010). Let me explain.

The modern Constitution, with and through its multiple arrays of material technologies, both separates and allocates the relevant properties to each domain: the human retains its distinctively human characteristics while the nonhuman is rendered as passive matter for human consumption. The sciences of the mind, however, disrupt and reconfigure this separation by placing the human *within* the realm of the nonhuman and redistributing their properties. At first glance this reconfiguration clearly appears to collapse the nature/culture split by virtue of reducing everything, including the human, to the domain of nature. Everything is natural and must therefore be naturalised, the human is no exception; *everything* is or will eventually be subsumed under the natural sciences (see Rosenberg 2013). But, as we already saw Latour pointing out, even in this staunch mechanist reductionism it is still the human scientist who disrupts domains and allocates properties.

Let us put this slightly differently: an array of different material technologies motivated by Cartesian materialism emerge and proliferate which ensures that cognition is first reduced to pure material mechanism obeying the universal laws of physics and then empirically locate these mechanisms solely inside brains. Mind, cognition and subjectivity are therefore all natural processes which can be adequately studied and explained solely by the natural sciences. But, of course, there is a tacit sleight of hand involved in this process. The (active/subjective) human is the one which *discovers* and then *represents* the (objective/mechanical) laws and mechanisms underpinning cognition but this (creative) work is, more often than not, simply *rendered invisible* (see Daston and Galison 2007).



A similar point, as we saw in Chapter One, was made by VTR and cashed-out there in terms of reflexivity. Studying cognition is after all itself a cognitive process and the human observer cannot therefore be so easily erased out of this loop. However, the point I wish to highlight here is somewhat different from VTR's. In line with some of the discussions from the previous chapter, it is not so much that all scientific practices involve humans and are therefore inherently reflexive and recursively self-referential, but rather that the modern Constitution, through which these practices are maintained and sustained, enact these practices as *essentially epistemic in nature*. And in so doing they continue to operate within the same conceptual/practical space which separates nature from culture.

Thus, as it pertains to the sciences of the mind more generally, scientists and philosophers studying mind and cognition continue to be guided by a tacit conviction that there is an intrinsic separation between what we know (ontology) from how it is known (epistemology). Scientific accounts of cognition, or philosophical (naturalistic) accounts of cognition which are deeply informed by the relevant sciences, are *epistemologies* of what there is and how what there is functions. As we saw in the previous chapter, by its own (modern Constitution) terms, scientists only have *access* to the (ontological) nonhuman *through* the epistemic (see Latour 2007a). As Pickering (1994) points out, this understanding of science “takes it for granted that the defining characteristic of science is its production of representations of nature, facts and theories” (p. 413). Scientists, be they concerned with nonliving matter or with human cognition, therefore merely *represent* the phenomena which they study.<sup>49</sup>

And here we see that, even as it collapses the human/nonhuman divide (by casting everything as natural), it also reinscribes it (by operating within the epistemology/ontology distinction): while everything is now rendered natural, this is done on an epistemic-cum-representationalist register, and as such effectively reproduces the very divide it sets out to overcome. Nature remains passive on one side while creative subjects who have now finally accurately represented its true universal essence remain on the other. This being the case, even the most reductionist of research projects will enact a nature/culture divide, if they are grounded on an epistemic representationalist

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<sup>49</sup> We will re-turn to all these issues in Chapters Five, Six and Appendix.

register. With these clarifications on the table, we can now (re-)turn our attention to the enactive project.

Enactive theorists object to both this unbridled reductionism and to the separation between human and nonhuman engendered by the modern Constitution and perpetuated within the sciences of the mind. More importantly, as we will see below, it also rejects the epistemology/ontology distinction on which traditional naturalising projects are grounded. In light of this, I believe that it is within this broader context that Shaun Gallagher's suggestion that the enactive approach is best understood as a philosophy of nature, really stands out. Because for Gallagher, as with VTR and numerous other enactive theorists, to fully understand cognition one needs to reject the very idea that the human can be reduced to or separated from the nonhuman. As VTR argued in somewhat different terms, modernist modes of rationality and scientific objectivity, make it impossible to adequately account for features of mind and cognition which enactive theorists deem fundamental. All of which is to say that the very concept of nature needs to be reconfigured anew.

Although enactive theorists see the human as an evolution and thus extension of nature, it enacts this position in a radically different non-modernist manner directly at odds with the modern Constitution's entrenched Cartesian materialism. Indeed, it does so precisely because it works with a rather different (non-modern) conception of nature. In the following sections we will explore some of the hugely creative and insightful ways that enactive theorists have done this.

## **2 Life, mind and their entangled connections**

It is then in the context of the proliferation and entrenchment of key modernist tenets within the (cognitive) sciences of the mind that we find Varela's plea for a re-enchantment of the concrete. A plea which also alerts us to the excesses of theoretical (epistemic) abstraction and the overgeneralisation to the universal, be they general principles or ahistorical physical laws. For Varela, and many AE theorists after him, an adequate understanding of the phenomena of *life itself* can pave the way for a *re-enchantment* of the concrete. This is because, as Tom Froese (2011b) observes, for Varela, "a proper understanding of the phenomenon of life must take into account the

*concrete living body*, including its material and thermodynamic properties, and the *concrete lived body*, including its first-person phenomenological or experiential properties” (p. 633, emphasis original). Situating cognition within the broader context of life itself is therefore crucial for an alternative enactive philosophy of nature.

Indeed, once we take Varela’s suggestion into account, cognition can no longer simply be reduced to inner brain mechanisms because the body and the multiple environmental resources which surround it, need to also be taken into account. At the same time embodiment and arrays of environmental resources also constitute subjectivities across phylogenetic scales far beyond the human. But this also alerts us to the point that non-reductionism is simply not enough to undo modernist conceptions of nature and the accounts of cognition these entail. What is needed is precisely a more robust conception of life which can also acknowledge and adequately account for the *concreteness of all lived bodies*. Thus, as a means to account for and ontologically dignify lived *and* living bodies, enactive theorists propose a *life-mind continuity thesis* (LMCT). This thesis, I will argue, forms the theoretical core of an enactive philosophy of nature and enables enactive theorists to provide a nonreductive (phenomenologized) conception of nature which strikes at the very heart of the modern Constitution.

As Di Paolo et al. (2018) argue, the commitment to a life-mind continuity “is a guiding statement for a nonreductive naturalism that takes our experiences as concrete human beings seriously, without dualism” (p. 6). As such, for AE theorists, “life-mind continuity is at its core a methodological, epistemological and ontological attitude” (Di Paolo 2018, p. 75). But what exactly is this thesis and why is it so important for AE? The thesis precedes the current enactive understanding and has been formulated in a number of different ways (e.g. Godfrey-Smith 1994; Maturana and Varela 1980; Stewart 1995; Wheeler 1997). All of these formulations are, however, theoretically committed to the idea that life and mind are continuous such that mentality cannot be something identified exclusively with human beings. As Di Paolo (2018) notes, depending on one’s theoretical commitments, the thesis could come across as either trivial or nonsensical.

On the one hand, all instances of cognition that we know of involves a living entity, so of course, life and mind are quite naturally continuous. On the other hand, it is often

taken for granted that cognition can be studied simply by paying attention to the abstract/mechanistic/computational properties of cognitive systems, which requires no special attention to life as such. Both concerns are taken as valid by AE theorists and serve as motivation for theoretically shoring up its account. Exploring how these theorists do this is one of the main aims of this chapter. Let us begin this task by considering another common feature shared by all proponents of life-mind continuity.

All advocates of LMC maintain that there is a shared basic set of *organisational properties* between life and mind such that those organisational properties distinctive of mind are “an enriched version of those fundamental to life. Mind is *life-like* and life is *mind-like*” (Thompson 2007, p. 128, emphasis added). As such, “[t]he explanatory principles that help us study the organisation of life are continuous with those that help us understand the mind, without reducing the latter to the former” (Di Paolo et al. 2018, p. 6). At its core the thesis maintains that the “principles and conceptual categories” used to study the phenomena of life should be the same as those used to study that of mental phenomena and vice versa (see, for example, Di Paolo 2018). It is important, however, to re-emphasise that the thesis is essentially nonreductive in nature. Higher-level mental properties are not reduced or reducible to lower-level biological properties, but rather *emerge* from these. Thus a primary explanatory target of the thesis is the *nonreductive biodynamics* of cognition across the phylogenetic scale.

It is perhaps this common aspect shared by all proponents of the thesis which has caught the most attention within the cognitive science community. Discussing the LMCT, the philosopher of cognitive science Andy Clark (2001) remarks that, “the thesis of strong continuity would be true if, for example, the basic *concepts* needed to understand the organization of life turned out to be self-organization, collective dynamics, circular causal processes, autopoiesis, etc., and if those very same *concepts and constructs* turned out to be central to a proper scientific understanding of mind” (p. 118, emphasis added). Clark here latches onto precisely the organisational *nonreductive*, phylogenetic extensive, biodynamics of living systems and how these would reconfigure cognitive science *if* they were taken up by researchers.

Clark's reading of the thesis also directly taps into two further core aspects: Firstly, as just noted, life *qua* biological phenomena should be understood in the terms provided by a non-reductionist theoretical biology (more on this below) and not those of the modern Constitution. Secondly, a prerequisite for mind and cognition is life itself. Taken together, these entail that mind, just like life itself, emerges only out of certain very specific organisational structures. It is because both life and mind ultimately share these specific organisational structures that they are therefore argued to be continuous. Mind is prefigured in life. From the perspective of life-mind continuity, the difference between mind and life is essentially one of degree and not kind.

With Clark, many of these theorists have argued that the LMCT has some significant ontological and methodological consequences which should not be overlooked. From an ontological perspective, a possibly attractive consequence would be the potential for a *unified non-reductionist theory* of life *and* mind. As noted above, Clark (*ibid.*) argued that, *if* the LMCT proves to be correct then it implies that its applicability will be wide ranging and provide the theoretical foundation not only for understanding 'lower-level' adaptive behaviour but also for the most sophisticated of human cognition. While from a methodological perspective this would imply that mind and cognition should be studied in the broader context of living systems rather than as mechanical computational processes exclusive to humans. As Thomas Fuchs (2018) points out, "neuroscience has largely neglected that the brain is primarily an organ of a *living being*, not of a mind" (p. v, emphasis added). The theoretical/methodological resources and tools used would primarily derive from the biological sciences of living creatures. Ultimately, the study of life would be continuous with the study of mind.

Already from these brief remarks it should be clear that the conception of cognition which emerges from this LMCT does not sit altogether comfortably within traditional cognitivism nor with Cartesian materialism more broadly. The thesis at once enacts not only a direct subversion and rejection of (lifeless) cognitivism but also fundamentally *decentres* the human as a privileged and exclusive locus of mind and cognition. Living organisms, and not the human alone, are now cast as equally minded, cognising entities. AE theorists, however, push this even further by arguing that a LMCT also engenders a very welcomed and important acute sensitivity and attentiveness towards the value-

saturated (organic) “more-than-human”<sup>50</sup> worlds which populate our planet. That is, in its AE enactments, it recognises, acknowledges and attempts to account for the very presence of *other meaningful living/lived worlds* beyond the human.

Note that this is something which is clearly not within purview of Clark’s reading. Or indeed more ‘traditional’ accounts of LMC on which Clark is commenting. The allusions to “meaningful living/lived worlds” should be rather conspicuous when considered in the context of Clark’s quote above. Clark refers explicitly, and exclusively, only to *organisational/functional properties* which, although nonreductive in character, are, according to AE theorists, not always sufficient<sup>51</sup> for an adequate understanding of nature. Thus, for most AE theorists, Clark’s reading of the thesis is indicative of a general oversight found in other accounts of life-mind continuity (Colombetti 2014; Froese 2011a; Froese and Di Paolo 2009; Froese and Ziemke 2009; Di Paolo 2009, 2018; Di Paolo et al. 2010; Stewart 2010; Thompson 2007, 2011a, 2011b; Weber and Varela 2002).

To sum up this section. Proponents of LMCT argue that the human and the (organismic) nonhuman are continuous with respect to mind and cognition. Mind is prefigured in life such that the basic principles required to understand and describe the organisation and behaviour of living nonhuman organisms are also those required for understanding and describing mental phenomena itself. Enactive theorists, however, insist that this view does not go far enough. Following Varela, it does not fully re-enchant the concrete because it does not do justice to both the lived and living nature of organic bodies. And for this we need phenomenology.<sup>52</sup> However, before exploring the role of phenomenology, we first need to further clarify the specific biological foundations which underpin this broader project.

### **3 Autopoiesis: Enacting biological foundations and constructing bridges**

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<sup>50</sup> On the notion of “more-than-human” worlds see Chapter Four.

<sup>51</sup> But see Section 4 below for further clarifications on this.

<sup>52</sup> The term ‘phenomenology’ has different meanings across different fields. Here it is used in the sense originally proposed by Husserl and further refined and developed by the phenomenological tradition in philosophy (for an excellent introduction to the field, see Gallagher 2012c). Moreover, unless otherwise specified, it will be primarily the phenomenology of Hans Jonas which will be of concern throughout this chapter. We re-turn to phenomenology in the second half of this chapter.

A number of theorists have pointed out that the LMCT most famously developed and defended by Maturana and Varela (1980, 1987) is really more of an *identity thesis* than a continuity thesis (see Barandiaran 2017; Di Paolo 2009). As Barandiaran (2017) notes, this account equates mind/cognition with life such that *mind = life* and *all* living systems *qua autopoietic systems*, with or without a nervous system, are therefore cognitive and minded (see Boden 1999; Maturana 1975; Stewart 1995; Wheeler 2008).

AE theorists find this problematic because: (i) it uncritically extends the notions of mind and cognition to processes and entities which, intuitively at least, do not seem to possess them. It seems to imply that processes as diverse as digestion and involuntary seizures are all equally cognitive (see Di Paolo 2005) and (ii); it appears incapable of adequately accounting for subjectivity, meaning and value. All of these properties need to be adequately accounted for if we are going to have a satisfactory theory of mind and cognition. AE theorists therefore argue that rather than think in terms of strict identity between life and mind, we need to instead see mind and cognition as only pertaining to a *subset* of living systems. Thus, in order to do so, one needs to rethink some of Maturana and Varela's original propositions on the matter.

As Ezequiel Di Paolo (2018) points out, “[t]he enactive view of life and mind derives from the theory of autopoiesis” (p. 78). Thus, despite AE's substantial move away from Maturana and Varela's original work, it nonetheless remains crucial for AE theorists for at least three reasons: (i) it provides theorists with, or has directly inspired, a suite of scientific/empirically informed concepts which (ii) help to biologically ground its distinctive LMCT and (iii) provides a direct bridge to the phenomenological domain of subjectivity, meaning and value (more on which below). This being the case, we therefore need to slow down and re-turn to a core concept of this work, namely autopoiesis, and turn it over a few more times to reveal some of the work it is doing within the enactive phenomenologisation of nature.

As noted in Chapter One, Maturana and Varela (1980) coined the term ‘autopoiesis’ to conceptualise living systems as self-organising autonomous networks, which produce and recursively sustain themselves as distinct entities from their surrounding medium. In more formal terms, an autopoietic system is a system organised as a network of

processes comprised by the synthesis and destruction of its components such that these components: (i) continuously regenerate the network which is producing them and (ii) constitutes the system as a distinct entity in the domain in which it exists. What therefore essentially characterises such systems is their ability for *self-distinction and self-production* (see Di Paolo 2005, 2009).

Di Paolo (2005) has, however, persuasively argued that this original formulation of autopoiesis is not sufficient for an adequate account of cognition in the first place. This is because, according to Di Paolo (ibid.), an autopoietic system is an all-or-nothing class category which only has one crude concern, namely to keep itself in existence. As Di Paolo (ibid.) notes, this implies that falling off a cliff, for example, would be a cognitive process, right up until the point the system hits the ground and loses its cohesion (see Barandiaran 2017). What this suggests is that autopoiesis on its own is incapable of accounting for the various *grades of value* and meaning which constitute all cognitive processes.

Following Di Paolo's assessment, AE theorists have subsequently argued that the original conception of autopoiesis needs to be further refined so as to be able to adequately accommodate the emergence of teleology and the gradation of norms and values found throughout living nature. As a first step towards this end, theorists need to recognise and acknowledge that autopoietic systems maintain systemic identity under what Di Paolo (ibid.) calls "precarious conditions". This means that we cannot overlook the fact that, as Maturana (2011) notes, "living beings are beings that die" (p. 145, quoted in Froese and Stewart 2012). The second step is to recognise that *adaptivity* is an essential property of life.

Drawing on Varela's (1979) work on autonomy, AE theorists argue that living systems are not just autopoietic, but also *autonomous systems*. Thus, "an autonomous system is defined as a system composed of several processes that actively generate and sustain an identity *under precarious circumstances*" (Di Paolo 2009, p. 17, emphasis added). Identity generation is here directly and very specifically aligned with the notion of "operational closure" (Varela 1997). The notion of operational closure refers to an organisational property which specifies the systems as an (organised) "closed



circuit” (Villalobos and Ward 2015). Following Varela, Thompson (2007) defines an operationally closed system *qua* autonomous system as follows: “In an autonomous system, the constituent processes (i) recursively depend on each other for their generation and their realisation as a network, (ii) constitute the system as a unity in whatever domain they exit, and (iii) determine a domain of possible interactions with the environment” (p. 44).<sup>53</sup>

AE theorists point out that all living systems are not only autonomous systems in this sense but also inherently vulnerable and thus intrinsically fragile. Their ‘internal’ constitutive processes degrade and decay from stress and are intrinsically prone to become increasingly less robust over time. They are also equally at risk from ‘external’ pressures. Environments are filled with ongoing, contingently emerging, obstacles and challenges which the system needs to successfully navigate and overcome if it is going to maintain itself in existence. Living systems are thus perpetually at risk of disintegrating back into the environment due to both internal and external pressures on their organisation. Less formally and more concretely put, living organism, are finite beings which die. Because of this inherent fragility, the system develops a distinct *concern* for its own existence such that it is able to differentiate between those things which are good, those which are *better* and those which are detrimental for its existence.

As Di Paolo (2005, 2009) argues, in order to counter the multitude of internal and external pressures and maintain in existence, living systems *need to adaptively* regulate their interactions with the environment in such a manner that enables them to maintain their identity. Adaptivity is therefore proposed by Di Paolo (2005) as an *essential requirement* for the emergence of mind from life because it endows systems with the ability to (a) recognise when it is approaching the *boundaries of its viability* and (b); *act accordingly* so as to counter and properly change its circumstances relative to its current (internal and external) state(s). Thus, for Di Paolo (ibid.), it is autonomous adaptivity

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<sup>53</sup> Autopoiesis is thus a *type* of autonomy realised purely at a biochemical level. Indeed, Varela’s (1979) development of the notion of autonomy is partially motivated by concerns regarding the indiscriminate application of autopoiesis to domains which are not strictly speaking biological or autopoietic, i.e., social institutions. It is for this reason that the emphasis is here placed on autopoiesis rather than autonomy as such. The reader should therefore bear in mind that the class category of autonomy is broader than that of autopoiesis. For a more detailed discussion of autonomy, particularly as it relates to the question of agency and the constitution of agents, see Chapter Five.

and not “bare autopoiesis” which ensures the eventual emergence of the gradation of norms across living nature.

With these re-configurations of autopoiesis we then get: (i) the emergence of a distinct entity (an agent)<sup>54</sup> which, because of ongoing internal and external pressures, develops a (ii) concerned *normative perspective* on the environment that it is distinct from but also part of. This normative perspective is in turn grounded on (iii) the system’s own intrinsic self-generated goal-directed behaviour and not simply the product of mere feedback loops or projection. At its most basic level we have biological autonomy. As systems evolve and get increasingly more complex, different levels of autonomy emerge, such as “sensorimotor autonomy” at the level of perception and action (Di Paolo et al. 2017) and “intersubjective autonomy” (Di Paolo et al. 2018) at the level of intersubjectivity.<sup>55</sup>

Thompson (2004)<sup>56</sup> gives us a rather helpful and succinct schematisation of how these developments inform the successive steps from life to mind which constitute the enactive LMCT: (i) Life = autopoiesis + adaptive autonomy. (ii) Adaptive autonomy entails the emergence of a unique identity. (iii) A unique identity entails the emergence of a normative and meaningful relational domain unique to the unity. (iv) The emergence of a unique relational domain = sense-making. (v) Sense-making = cognition. In this section we have been particularly concerned with steps (i) and (ii). The second half of the chapter will have substantially more to say on steps (iii) to (v). For now, simply bear in mind that it is a re-tweaked and re-configured account of autopoiesis which provides the *biological foundations* for an enactive LMCT.

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<sup>54</sup> The move from autopoiesis to full blown cognitive agency which this implies is discussed in Chapters Five and Six in more detail. Note that I therefore omit a considerable amount of detail here surrounding these notions. Nonetheless, I do not believe this negatively impacts the central discussion of the chapter. But, if the reader requires further detail on these notions, I would advise a cursory reading of Chapter Five first.

<sup>55</sup> The notion of autonomy is generally taken to be applicable to – and is *implicated* in – every new major transition in the evolution of life (Di Paolo 2009). Note, however, that these new levels of autonomy are not independent from each other but mutually overlap, constitute and constrain each other in complex ways. Again, this is not something I can do justice to here. I will simply refer the reader to Di Paolo et al.’s (2018) extensive and detailed treatment of the issue.

<sup>56</sup> I adopt, adapt and essentially paraphrase, Thompson’s five steps here in light of our above discussions.

However, it is worth noting that Froese and Stewart's (2010, 2012) extensive and detailed analysis of the concept of autopoiesis, highlights that the notions of precariousness and adaptivity are necessary only if we interpret the notion in overly abstract and formal terms. As several theorists have pointed out, (Barandiaran and Moreno 2008; Christensen and Bickhard 2002; Collier 2002), in its original formulation autopoiesis exclusively refers to the organisational/functional properties of living systems. As such, the account was more concerned with (abstract) *form* rather than with the (concrete) structure or *matter* which constitutes the system *qua* material entity. This, however, "explicitly abstracts autopoiesis from its material and energetic realisation" (Froese and Stewart 2012). But, as the authors go on to argue, *if* we "recognise that the concrete thermodynamic embodiment of the living is an essential aspect of autopoiesis, the concept's current shortcomings for grounding our concrete phenomenological embodiment can be resolved" (ibid., p. 62). Put differently, adaptivity and precariousness stop being something which needs to be *added* to autopoiesis once its *concreteness* is taken into account.<sup>57</sup>

Nonetheless, and regardless of one's reading of autopoiesis, the point is that mind and cognition are underpinned by, but not reducible to, a very specific biological autonomous organisation which enables the organism to adaptively interact with its environment. Moreover, this biological organisation not only forms the biological core of AE's LMCT, it also functions as a bridge towards accounting for subjectivity, meaning and value across living nature. The organism not only interacts with its environment but always-already encounters it as a place of meaning and significance. Having explored this biological core in this section, we will now begin turning our attention more specifically towards the phenomenological-cum-experiential dimension of life-mind continuity. But first, a brief interlude.

#### **4 Interlude: Is biodynamic continuity enough?**

Our discussion thus far has situated the LMCT within broader discussions over the nature of cognition. We have suggested that the enactive appeal to the thesis stemmed in

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<sup>57</sup> This is something that Di Paolo (2005, 2009) also recognises and acknowledges but nonetheless feels that it needs to be more explicitly stated. For Di Paolo, it is because the primary literature has not been explicit on these points, that much confusion and disagreement has emerged around the topic.

great part from a desire to overcome modernist conceptions of nature which had taken hold within cognitive science. For this reason a rethinking of the very concept of nature was/is in order. Such a rethinking, I have suggested, can be understood to comprise a broader philosophy of nature which rejects reductionism and aims to phenomenologize nature. We saw that, while other approaches to life-mind continuity rejected reductionism, AE theorists continued to insist these remained inadequate.

We have just seen how, for AE, ‘identity theses’ miss-out on crucial aspects of life and mind when it focus exclusively on the biodynamics and organisational, functional/behavioural (third-person) properties of living systems. As we will explore further below, these have also overlooked the “phenomenological dimension” (first-person) crucial to an adequate understanding of life-mind continuity.<sup>58</sup> In a sense we could say that there are in fact two types of continuity involved here: one involving organisational *biodynamical* continuity and the other involving *phenomenological continuity*. The enactive LMCT requires that *both* types of continuity are acknowledged and adequately accounted for. Thus, for AE theorists, understanding life, mind and how they relate, requires bringing together biology, cognitive science and phenomenology.

There is, however, a sense in which the discussions of the previous section clearly suggest that once the biodynamic ‘objective’ (third-person) properties are fixed, the normative subjective (first-person) phenomenological properties will simply follow. In other words, biological adaptive autonomy seems to provide the necessary *and* sufficient condition for the emergence of intrinsic normativity, teleology, value and meaning. In which case, all we need is biodynamic continuity, as identity theorists maintain. However, this remains very much an open question, with some theorists such as Froese and Stewart (2010, 2012) insisting that this is indeed the case (see also Mossio and Bich 2017) and others strongly rejecting it (e.g. Villalobos and Ward 2015). Despite the tone of our above discussion, AE theorists tend to oscillate between enacting biodynamic organisational properties as necessary and sufficient for intrinsic

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<sup>58</sup> It is worth noting here that, as originally conceived, autopoiesis was regarded as a fundamental requirement for living, and hence the life = cognition. However, with Varela’s turn to phenomenology and its gradual incorporation within enactivism, a shift of focus from cognition as a feature of the living in general to cognition as a feature of *experiencing subjects* takes place (cf. Froese 2011b). This partially explains why experience plays such a fundamental role for many AE theorists.

normativity and meaning while also seemingly maintaining that they are only necessary but not sufficient.

A prime example of this oscillation is found in Evan Thompson's influential work. On the one hand, Thompson (2004) argues that, "[i]t's one thing to have a scientific representation of the mind as 'enactive' – as embodied, emergent, 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" (p. 382). What Thompson is signalling to here is precisely the need for phenomenology and the fact that phenomenological properties do not seem to necessarily follow automatically from scientific, operationalised conceptions of the organism as adaptively autonomous. On the other hand, Thompson (2007, 2011a) also insists that adaptive autonomy *is* that on the basis of which normative properties intrinsically emerge for living organisms, and therefore not something projected by an external observer.

This point is perhaps easily overlooked precisely because the notion of autonomy has two distinct senses which are often run closely together within the enactive literature (see Cummins 2014). Within this literature, autonomy usually refers both to a more common-sense understanding of the term as *self-determination* and the more technical sense of *operational closure*. While the former implies teleological properties such as goal-directness, intentionality, value and meaning, the latter does not. Autonomy *qua* operational closure refers solely to organisational dynamics. Thus, because of how the two senses of the concept have been closely aligned and entangled within the enactive approach, it is rather natural to come away thinking that autonomy *qua* operational closure *entails* autonomy *qua* self-determination. Nonetheless, as just noted, the two senses also come apart and the opposite is also enacted.

To illustrate the general point further, consider how enactive theorists, in their ambition to naturalise their framework, aim to 'operationalise' agency, meaning and sense-making (e.g. Di Paolo et al. 2017). On the one hand, these theorists take issue with traditional scientific functionalist/mechanistic approaches to cognition for not being able to account for intrinsic meaning and significance. On the other hand, these theorists also

want to operationalise – precisely in order to naturalise – key enactive concepts such as meaning and significance (see Cuffari et al. 2021). Fred Cummins (2014) has argued that in so doing, enactive theorists essentially succumb to the very same issues they object to in the first place. Cummins (ibid.) maintains that operationalising enactive concepts in the manner enactive theorists are wont, does not necessarily guarantee the properties they suggest. For Cummins these theorists simply conflate levels of description, questionably attempting to locate properties where they simply do not belong (see also Cummins 2020).

The point I wish to make here is, however, somewhat different from Cummins's. This might, or might not, very well lead to something of a dilemma for the enactive project as Cummins argues. My intention is not to enter into this particular debate here. Rather, the point I wish to highlight is that, *biodynamic continuity is often enacted in two different ways within the enactive literature*. This is particularly evident in the context of LMCT where the two positions are most prominent and explicitly in play. One enactment focuses predominantly on biodynamic continuity (e.g. Di Paolo et al. 2017) and suggests that it is necessary *and* sufficient for teleology. The other which, although not exclusively so, suggests that it is necessary but *not* sufficient and thus enacts a much greater importance for phenomenological continuity (e.g. Thompson 2007, 2011a). But as is already evident here, both enactments are not self-contained, but rather crisscross, overlap and are essentially entangled in many complex ways.<sup>59</sup>

In De Jesus (2016a) I argued that, for AE, phenomenological continuity subsumed and *univocally* had priority over biodynamical continuity. The core of the argument there was that phenomenological continuity was what uniquely characterised an enactive LMCT and hence the reason it acquired priority. This priority was then cast as

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<sup>59</sup> The enactment of these two positions and the subsequent “crisscrossing” entanglement between them is perfectly epitomised in Di Paolo et al.'s. (2018, pp. 34-35) discussion of Villalobos and Ward's (2015, 2016) critique of intrinsic teleology. The authors began by taking issue with Villalobos and Ward's conception of an “inert version of materialism”. They point to work in contemporary physics which suggests that living entities *qua* complex systems are “full of indeterminacies and [are] entangled with their surroundings, [these] are the kind of systems organisms on earth *actually are*” (p. 35, emphasis added). Directly following from this clarification, the authors go on to claim that concrete systemic properties like intentionality and teleology in these systems “cohere not with the presence or absence of conscious experience (...) but, more precisely, with the *structure of experience after we put it to phenomenological scrutiny*, something which would *remain mysterious* otherwise” (ibid., emphasis added). In this particular example, the organisational is enacted as necessary and sufficient for teleology while at the same time also being subsumed within the phenomenal.

something which generated a problematic tension vis-à-vis biological continuity. In light of the above remarks we can now see that this conclusion was rather too hasty. Of course, it is not so much that AE theorists do not emphasise the phenomenological over the biological. They certainly do, but they also do the very opposite. What the argument overlooks then, is the intricate, complex, multiply entangled ways that the LMCT is enacted and how different theoretical aspects are/not prioritised within these enactments. These are *not, pace* my earlier arguments, *univocally enacted across the board by all involved*.

In a similar vein, Villalobos and Ward (2016) have argued that the enactive recourse to phenomenological continuity implies that “[o]ur grounds for crediting non-human organisms with teleological properties are to be found in our own experiences, and our knowledge that we too are biological organisms, *not* in an independently motivated theory of how teleology can emerge from the purposeless materials of the non-living world” (p. 207, emphasis original). Although coming from an opposite direction, this argument similarly overlooks the nuanced ways that LMC is enacted by AE theorists. This is all the more surprising since the authors recognise that AE uses autopoietic theory to do precisely what they deny. We will be re-turning to these points below.

These clarifications are thus worth keeping in mind while reading the following sections because I will be primarily emphasising only one of these enactments. Namely, those concrete instances where biodynamic organisational properties are *not* sufficient for phenomenological continuity. But, I do so by fully acknowledging that this is *not* the only way these ideas and arguments are enacted. I hope that as the following sections unfold, the reason for this decision will become clearer and justified. To anticipate somewhat, it is my opinion that phenomenological continuity – within the context of the enactive project – offers the most concerted and robust subversion and rejection of some core tenets of the modern Constitution. However, as it will also become fully apparent (if it isn’t already), in this context it is almost impossible to not also continuously run-up against both these enactments, making it equally impossible to consistently and exclusively focus, on just one.

To sum up. Although biodynamic and phenomenological continuity is crucial for the enactive LMCT, their relationship is complex and far from univocal. This brief interlude has attempted to bring some of this complexity into sharper focus. We noted that in certain enactments AE theorists aim to go beyond mere objectivist behavioural/functional properties towards a much ‘richer’ *phenomenologically informed* continuity. In these instances it is suggested that it is only in so doing that we can truly overcome the strictures of the modern Constitution and re-enchant nature. Nature needs to be not only alive but *lively*, full of agency, ceaseless creative and intrinsically meaningful. It is a conception of nature which, unlike its modernist counterpart, *includes* the subjectivities of living bodies. Here the phenomenology of inner subjective experience becomes a crucial plank in AE’s distinctive enactment of LMC. However, before exploring this phenomenological continuity in more detail, I want to first consider how this ambitious project fits within and relates to the project of naturalising phenomenology.

## **5 Naturalising phenomenology/phenomenologizing nature**

Before moving on to explore how this phenomenologizing of nature is further enacted, I want to pause here to note that this specific project forms part of, or more accurately is related to, a broader debate at the intersection between cognitive science and phenomenology centred around the possibility/ambition of naturalising phenomenology itself (cf. Varela and Shear 1999). This is a debate spanning a few decades and which has motivated a number of interesting research projects. Here I simply want to briefly draw attention to and situate the enactive project within these broader discussions and highlight how certain aspects of it are enacted in the literature. This should also shed some light on both the discussions above and those which will directly proceed.

Let us once again re-turn to Chapter One and VTR’s proposal that: (i) subjective experience needs to be part and parcel of cognitive science and (ii); there needs to be a “fundamental circularity” between objective third-person naturalistic methodologies and experiential first-person phenomenological/meditative approaches which can account for these experiences. This proposal also gives rise to and connects up with a much older debate concerning the exact relationship between phenomenology itself and the natural sciences. The debate here revolves around whether or not phenomenology



should or could be naturalised. Some theorists argue that phenomenology can and should be naturalised so as to be made fully compatible with the natural sciences while others strongly reject this suggestion and argue that traditional phenomenology is in principle incompatible with the natural sciences (see Petitot et al. 1999).

By and large the work done within that context has primarily focused on *naturalising phenomenology* (Fazelpour and Thompson 2015; Gallagher and Varela 2003; Gallagher 2012a; Lutz and Thompson 2003; Petitot et al. 1999; Roberts 2018). That is, on showing how phenomenology could coherently be made to integrate with the naturalist (scientific) paradigm. Much less attention has, however, been paid to the possibility of doing the reverse, namely, *phenomenologizing nature*. AE theorists are an exception here. Indeed, VTR's proposed fundamental circularity can be enacted as a direct call for theorists to take up the project of phenomenologizing nature itself.<sup>60</sup> VTR are explicitly clear that not only is there a need for mutual dialogue between phenomenology and science but also that phenomenological insights and resources should also influence and help (re)shape (cognitive) science itself (cf. Vörös 2014).

The enactive project of phenomenologizing nature as presented here is not only clearly situated within this broader debate but is also in many respects a fundamental part of it. However, it is important we do not forget that, as mentioned in the previous chapter, AE's broader aim is not solely confined to influencing and changing scientific method and how cognitive scientists conduct research into subjective first-person experience. Its distinctively much more ambitious pursuit is to provide an alternative conception of nature itself (see Gallagher 2018) which would in turn fundamentally reconfigure the very core foundation of (cognitive) science itself.

Thus a thorough phenomenologisation of nature will “recast the very idea of nature and modify accordingly our modern conceptions of objectivity, subjectivity and knowledge” (Petitot et al. 1999, p. 54). It is a process which, at its core, aims to provide a radically

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<sup>60</sup> VTR's proposal of fundamental circularity can thus be understood to contain within it a dual requirement: the naturalisation of phenomenology on the one hand and the phenomenologisation of nature on the other. It is not only that phenomenology needs to be made to fit within the natural sciences but that natural science needs to be reconfigured in light of phenomenological tenets. To my mind, AE provides the most coherent and convincing account that aims to meet this dual requirement (cf. Vörös 2014).

new (non-modern) concept of nature that is underpinned by the core tenets of phenomenology itself and the theoretical biology discussed above. This would of course have tremendous implications not only for the natural sciences but modern life more generally. With respect to cognitive science more specifically, it would substantively reconfigure not only how the field understands but also studies cognition.

As highlighted both above and in the previous chapter, one half of this pursuit is grounded in the ambition to reconfigure and reconceptualise the very nature of cognition itself. This is done, in part, by eschewing reductive mechanistic-cum-deterministic materialism and developing a more dynamicist-cum-holistic framework. But only in part. As Zahavi (2009) points out, “[i]t is not as if matters would improve if naturalism opted for some version of emergentism or property dualism” (p. 7).<sup>61</sup> Hence, the “other half” of this complementary pair is precisely the phenomenologizing of nature, which aims to show not only that mind and cognition emerges from and are thus pervasive across the natural living world but also that subjectivity itself cannot be subtracted from this nature. For this project to be truly viable, an *alternative conception of nature itself* is deemed to be a necessary requirement.

One final point of clarification is in order here before we move on. Traditional Husserlian phenomenology was *transcendental* in nature (see Zahavi 2003). Very coarsely put, transcendental phenomenology examines the fundamental, invariant structures of consciousness. It is therefore particularly interested in the *essential condition of possibility* of conscious experiences; on those conditions which enable both subjectivity and objectivity. As the field developed it gradually transformed into *existential* phenomenology. Under the influence of thinkers such as Heidegger, Merleau-Ponty and Sartre, the field became primarily interested in investigating the world of pre-reflective everyday experience (see Gallagher and Zahavi 2008). By and large, the enactive project of phenomenologizing nature operates within, though as we will see not entirely exclusively, the space opened up by existential phenomenology.

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<sup>61</sup> For Zahavi (ibid.), the “real problem has to do with naturalism’s commitment to scientism and metaphysical realism”. Most AE theorists would concur with Zahavi on this point. However, despite addressing the phenomenologizing of nature in this chapter, I do not address these specific issues here. Rather, they are addressed in Chapters Five and Six. The reasons for this are primarily methodological. See the final section of this chapter for further clarification on this point.

As Vörös (2014) points out, existential phenomenology shifts the focus away from the “fundamental structures of *consciousness* to the fundamental structures of *human being*” (p. 102, emphasis original). As we will see below, this shift is particularly important both for the enactive project and in the broader context of this work, because it further helps enactive theorists collapse the epistemology/ontology distinction so crucial for the modern Constitution. For enactive theorists the focus is no longer simply on knowing but on *intersubjective experiencing*. These theorists are not just interested in abstract isolationist theorising, but more concerned with embodied being, experiential intersubjectivity and interaction. As Thompson noted above, there is a fundamental difference between having an alternative representation of the organism as autopoietic and agentic and *experiencing agency*. Indeed, it is at this very point where a “naturalistic attitude” is completely subsumed by a “existential attitude” (Villalobos and Ward 2015).

Let us pause here to recap our discussion thus far. We have seen that AE has called for a continuity between life and mind, but a continuity which is rather distinct from earlier incarnations. We saw that AE argued that this continuity would have to be grounded both on biological autonomy and a phenomenological analysis of *life itself*. In this section we have just seen that this commitment to phenomenologize nature is effectively the flip-side of VTR’s call for a “fundamental circularity” between the natural sciences and phenomenology. Thus, rather than merely aiming to naturalise phenomenology, phenomenology should *also* be able to reconfigure the natural sciences.

We have now reached a point where we can proceed to explore in more detail some of the entangled relationship(s) between phenomenology, and indeed what type of phenomenology, and the LMCT. In what follows I want to further explore some of the other figures, resources, concepts, ideas and arguments which help AE theorists further enact their distinctive phenomenologisation of nature. Once again I will remind the reader that we do so with the further aim of showing how this phenomenologisation of nature enacts a direct rejection/subversion of a number of key modernist tenets.

## **6 Kant and the question of intrinsic teleology**

With the above background on the table, we are now ready to begin shifting focus towards phenomenological continuity more specifically. The aim of the following sections is, first and foremost, to bring together some of the other key figures, ideas and concepts which also help theorists *compose and thus enact* a thoroughly robust phenomenologisation of nature. The first figure I would like to introduce here is the German philosopher Immanuel Kant. In particular, I would like to begin by briefly considering Kant's influential conception of living organisms and use this discussion as a bridge to considerations regarding existential phenomenology and its role within AE more specifically.

Kant is a particularly important figure in the current context because he offers a distinctively modernist challenge to AE's distinctively non-modernist project. A challenge which, perhaps most importantly for our current purpose, is very often a strong motivating force behind many AE theorists' recourse to existential phenomenology. This is perhaps unsurprising once we take into account Kant's important role in the development of the modern Constitution. Many aspects of his work gave rise or directly contributed to the development of core modernist tenets which remain with us to this day (see Latour 1999). But what exactly is Kant's modernist challenge? To answer this question we first need to say a few brief words on Kant's influential philosophy of the organism.

A central aspect of Kant's (2000) account of the organism is the view that one can attribute the directly observable uniqueness of living entities to a special kind of self-organising reciprocal causality. Peculiar to living entities, Kant noted, is a distinctive type of organisation in which all relations of cause and effect within the system are also relations of *means* and *purpose*. That is, there is a reciprocal influence such that the parts of a system are dependent for their existence on their relation to the whole and the whole is possible only through its parts. Every part of the system exists for every other part in the system and is also reciprocally produced by them. By virtue of this circular self-organisation, Kant argued that cause-and-effect relations are also means-ends relations.

Thus, unlike inanimate systems which are argued to be fully explainable purely in terms of intrinsic physical processes operating on mechanistic laws, living systems are altogether *different in kind*. Living systems, Kant maintained, are “organised beings” whose very organisation *cannot* be accounted for simply in terms of mechanistic laws. So far, so very non-modern. But this is not the end of the story. According to Kant, in order to *understand living nature*, we must deploy what he calls “*teleological judgement*” rather than mechanical explanations. Herein lies the rub: although for the purpose of enquiry we have to *treat* living organisms *as if* they are intrinsically teleological beings, this is *not an ontological characteristic of the organism itself*. It is only because we are *incapable* of deriving the workings of living systems mechanistically, from the basic properties of unorganised (dead) matter, that according to Kant we are *forced to* explicate living systems teleologically in terms of intrinsic *aims* and *purposes*.<sup>62</sup>

Although brief, these remarks make it fairly clear that there is some interesting similarities and differences between Kant’s philosophy of the organism and the enactive LMCT. The first point to note is how, similarly to autopoietic theory, Kant conceives of living systems as self-organising systems which are intrinsically self-maintaining and so are both cause and effect of themselves. This has a *prima facie* non-modernist flavour about it as it conceives of organisms in distinctively non-mechanical/non-deterministic terms and as integrated entities in their own right.

However, whereas AE maintains that this serves (together with adaptivity) as the grounds for intrinsic teleology, meaning and sense-making, Kant argues that this is merely the *projection* of an observer. It is precisely here that we come face-to-face with Kant’s very modernist challenge. For Kant, intrinsic teleology is “regulative and not constitutive”, meaning that it is only a “guideline” that is “without harm to the mechanism of nature” (CPJ §67, 5:379). What all this boils down to is that in the final analysis, according to Kant, there is no purpose or acting according to ends or goals in the domain of nonhuman living animate nature and intrinsic teleology is not an

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<sup>62</sup> My aim here is not to provide an exhaustive account of Kant’s philosophy of the organism. Rather, I use Kant merely as a means to connect a number of threads together and highlight and situate the enactive account within these. For an in-depth discussion of Kant’s rich philosophy of the organism and its overlap and divergence from AE, see Thompson (2007, Chapter 6) and Weber and Varela (2002).

*ontological principle* but rather an *ascriptional epistemic* one. It is therefore only the human which is endowed with these properties, not the nonhuman. Kant thus retains a strict dualism between a deterministic and mechanical nonhuman nature – albeit one cast as self-organising – and a purposeful teleological domain pertaining only to the human.

As Hinchliffe (2007) points out, for Kant “only men are ‘free with regard to all laws of nature, obeying only those laws which they make themselves’ (...). He called this unique ability ‘autonomy’ – literally self-law. Everyone and everything that didn’t have the freedom to rule themselves, the will to make their own world, was heteronomous – literally ‘other-law’ – governed, if you like, from without” (p. 41). Kant thus enacts a distinctively modernist conception of living nature in full congruence with the tenets of the modern Constitution which he himself contributed to.

By contrast, although grounded in similar (but not equivalent) considerations, AE theorists enact a rather different conception of the organism which *rejects and subverts* these modernist impulses. The human and the nonhuman are not distinct but continuous, and cognition, mind and subjectivity are not characteristics pertaining solely to the human. More importantly, however, is that we *can* be sure about this not because of abstract theoretical principles but due to our *embodied being*.

The question regarding intrinsic teleology has been a rather contentious one ever since the time of Kant if not earlier. Indeed, the modernist underpinnings of contemporary biology, simply render teleology purely fictitious in nature (cf. Weber and Varela 2002). But, because it is somewhat difficult not to think of living nature as purposeful, biologists coined the term *teleonomy* (Pittendrigh 1958) to replace the ‘misleading’ notion of teleology. Living organisms might certainly *appear* to us as purposeful, goal-directed entities, but this appearance is in no way an indication of an ontologically intrinsic teleology (see Rosenberg 2013). Teleonomy thus ensures that purposefulness and goal-directness remain purely ascriptional properties. It provides an important material technology which delineates and distributes properties into very distinct realms of existence: teleology remains solely within the domain of the human, the rest of living

nature is merely teleonomic. Kant, as we have just seen, played a substantive role in the development of this particular technology and the challenge(s) it gives rise to.

At this point one might be wondering what really ‘picks out’ the *true nature* of living entities. Are they *really* intrinsically teleological as AE theorists maintain or are they merely teleonomic as much of modern biology following Kant seems to argue? Moreover, what is it that tips the scales one way or the other? As Thompson (2007) asks: “[h]ow do we *know* our *linguistic descriptions* are not simply observer-relative, but rather correspond to symbolic structures that belong to the system itself and play a role in its operation?” (p. 54, emphasis added). Thus, an important aspect of Kant’s challenge *qua* material technology, is that it forces us to answer these questions. It enacts (invents?) a specific problem which necessitates a solution or at the very least an adjudication.

It is therefore precisely in order to address Kant’s challenge, and/or variations of it (cf. Hutto and Myin 2013; Villalobos and Ward 2015, 2016), that many AE theorists have drawn from existential phenomenology. Thus, in what follows, I will explore how existential phenomenology is mobilised by AE theorists as yet another means to phenomenologize nature, but one which helps guarantee intrinsic (ontological) teleology. I should note from the outset that it is not my aim to adjudicate or provide support or critique one position over the other. Rather, the question motivating me is the following: what other figures and resources do AE theorists gather together so as to continue composing this position? How else – other than through biodynamic continuity – do enactive theorists address Kant’s challenge?<sup>63</sup> The most important figure in this regard is, in my opinion, Hans Jonas<sup>64</sup> and the resources are primarily drawn from

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<sup>63</sup> Indeed, Kant’s challenge is particularly pertinent in this regard because it reaches a diametrically opposing position even though it is grounded on similar initial premises. A recent incarnation of this challenge is found in the work of Villalobos and Ward (2015, 2016). Not unlike Kant the authors maintain that autopoiesis at best entails teleonomy but not teleology. Again, it is not my aim to adjudicate between these two positions. Rather, what is of interest here is how these positions are enacted. What are the resources that need to be brought together to compose teleology or indeed teleonomy? Existential phenomenology is often, although as noted above not always, an important component in the AE composition of teleology.

<sup>64</sup> An equally important figure in this context is Merleau-Ponty (see Thompson 2007). Merleau-Ponty, however, provides a less expansive conception of both cognition and phenomenal interiority and seems to align the latter (inwardness) exclusively with organisms with a central nervous system (see Kee 2020). In this respect his work is more easily aligned with biodynamic continuity (cf. Villalobos and Ward 2015). It is precisely for these reasons that, in my opinion, AE theorists more often than not look to Jonas for inspiration. In light of this I have opted to concentrate exclusively on Jonas’s role within AE’s LMCT.

existential phenomenology. It is to his work and the role it plays within this composition that we now turn.

### **7 Hans Jonas: Enacting biological facts existentially**

So far we have seen that at the very core of an enactive philosophy of nature is the conviction that teleology is an *ontologically real principle* and not, as Kant would have it, a merely observer-relative description. AE theorists have enacted the validity of this position primarily along two complementary and entangled theoretical paths. The one path, as discussed above, corresponding to biodynamic continuity, the other corresponding to phenomenological continuity. We have already seen that theorists tend to alternate between arguing that biodynamic continuity is necessary *and* sufficient, and necessary but *not* sufficient. It is the latter enactments which are deeply entangled with phenomenology and that which we will be further exploring in this section.

Phenomenological continuity is grounded on a key number of phenomenological insights derived primarily from Hans Jonas's (1966) "'existentialist" interpretation of biological facts" (p. ix). It is these phenomenological insights which provide AE theorists with another line of argument for the *ontology* of intrinsic meaning, value and teleology across the natural phylogenetic scale. Essentially, it is Jonas who provides a number of further crucial resources which enables AE theorists to compose a different and very distinctive non-modernist LMC. Jonas is thus another key figure in AE's phenomenologisation of nature. With the help of Jonas, AE can rethink and re-conceive nature – enacting it – as a pervasive natural biological phenomenon such that, evolutionary speaking, even the simplest of single-cell organisms *are in significant ways teleologically – and phenomenological – similar to us*. Let us first take a closer look at how Jonas himself reached these conclusions and then how AE (re)enacts them in its own project towards its own particular ends.

Existential phenomenology is perhaps not the first thing that would come to mind when thinking about the continuity between life-mind. After all, existential phenomenology is a distinctively human-centred enterprise, so what could it possibly have to say about nonhuman living entities? Indeed, as Jonas himself notes, "[c]ontemporary existentialism, obsessed with man alone, is in the habit of claiming as his unique



privilege and predicament much of what is rooted in organic existence as such” (ibid., p. ix). However, Jonas’s work is interesting in this respect because, although situated within the phenomenological tradition, it nonetheless has much to say about other living entities. While existential phenomenologists were “obsessing” over human experiences Jonas was trying to locate and account for its origins and first manifestations across animate nature.

Jonas (ibid.) draws on two somewhat disparate sources, namely Darwinian evolution and the phenomenological tradition respectively, to support the view that all lifeforms, not humans alone, are endowed with a *subjective phenomenal interiority*. For Jonas, the dimension of “inwardness” (the phenomenological inner dimension) begins with the emergence of life itself, and *metabolism* is its essential source. Thus the notion of metabolism itself needs to be read existentially and not as a mere physical process. Once we do so, maintains Jonas, we will recognise that it is not only teleology which emerges with life itself but also *experiential subjectivity*.

Metabolism is crucial for Jonas because it provides the constant turnover of matter into energy which is at the very same time responsible for its own constitution. Anticipating the subsequent development of autopoietic theory, Jonas identifies metabolism as the means through which organisms are able to both maintain and sustain themselves and individuate themselves from their surrounding medium. Jonas characterises the relation of metabolism to matter as one of “*needful freedom*” (Jonas 1966, p. 80). For Jonas (ibid.), there is a primordial tension at the very core of life itself: organisms need energy and matter to maintain themselves as distinct entities and to stay alive but the very act of searching out matter and energy in order to do so immediately places the organism in a vulnerable and precarious situation. Needful freedom thus requires that the organism continuously interact with its environment to maintain and sustain its identity and continued survival despite the constant threats posed by the same environment.

Metabolism thus leads to three crucial existentially structured developments: firstly, it leads to the emergence of a “self” distinct from the medium which surrounds it. The being of which is its own ongoing achievement and gives rise to an organisational distinction between an inside and an outside relative to its own being. Secondly, as just

mentioned, it gives rise to a process of needful freedom. Thirdly, from this needful freedom, emerges norms which are relative to the entity itself. The world stops being a neutral place devoid of any significance and particular events become inherently significant and meaningful; things to be pursued or avoided. Life, according to Jonas, is therefore intrinsically teleological and is from its very beginning endowed with inwardness.

Jonas then draws on the work of Darwin as a means to complement and further expand this position. Drawing on Darwinian evolutionary theory, Jonas (*ibid.*) goes on to argue that it not only provides grounds for displacing the prevalence of anthropocentrism, it also grounds the *phenomenological inwardness of other living organisms*. As a consequence, Jonas argues, human beings do not lose their inwardness as a reductionist/mechanistic materialism would have us believe, since this inner dimension would be hard to negate, but rather, it is other living creatures which acquire theirs. In bringing evolutionary theory and phenomenological insights closer together, Jonas in effect composes a bridge between human forms of experience and cognition, and the evolutionary emergence of these experiences in other lifeforms which begins with life itself. As Jonas argues, “the organic even in its lowest forms prefigures mind, and (...) mind even on its highest reaches remains part of the organic” (*ibid.*, p. 1).

This allows Jonas to not only dismantle the human/animal, subject/object dichotomies but also the pervasive anthropocentrism underpinning them. Organic matter is no longer rendered mechanical and passive as the modern Constitution would have it, but is instead cast as lively, creative and possessing an intrinsic inwardness which cannot easily be denied. As Theresa Morris (2013) points out, Jonas insist that “[t]o heal the split between matter and mind, subject and object, and human and nature is not to diffuse the differences and reduce what is other to sameness. Instead, it is to imagine the dialectic between these seeming opposites and to examine the evidence that points to the essential harmony that is their synthesis” (p. 48). We will turn to this “evidence” below. For now simply note how modernist dualism(s) between the material and the mental, in whatever guise it has taken over the centuries, is thoroughly rejected and subverted by Jonas. As already noted above, modern biology makes it impossible to account for

teleology, let alone the inwardness of nonhuman living beings. Jonas's approach presents a concerted attempt to rectify all this.

Thus, in direct opposition to the biology developed with and through the modern Constitution, Jonas insists that wherever there is self-maintaining and self-individuating processes of metabolism, there is also the essential existential conditions for mind and interiority more broadly. For this reason the categories which existential phenomenologists deploy exclusively to the human, and biologists/Cartesian materialists outright deny, can legitimately be applied to the most 'simple' manifestations of organic life. Subjectivity, freedom, desire, autonomy, meaning and value, can all be said to apply as much – although minimally conceived<sup>65</sup> – to a single cell bacterium as they do to human beings. As Jonas (*ibid.*) argues, “the great contradictions which man discovers in himself (...) have their rudimentary traces in even the most primitive forms of life, each precariously balanced between being and not-being, and each already endowed with an internal horizon of “transcendence”” (p. ix). Thus all living creatures experience a phenomenological inwardness which, to varying degrees, share fundamental properties and structures with that of human beings.

This should now help explain why Thompson, and many AE theorists after him, takes the basic “experiential categories” needed to understand human experience to be applicable to life itself. It also explains how existential phenomenology can very fruitfully contribute towards a richer understanding of the continuity between life and mind. Moreover, it provides a clear illustration of how phenomenology, and phenomenological continuity more specifically, helps AE theorists thoroughly reject and subvert many important modernist ideals.

Finally, it is also worth noting that while it is certainly true that Jonas's account is comprised of *both* objective third-person (metabolism) and subjective first-person (phenomenology) dimensions, he tends to nonetheless prioritise the latter over the

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<sup>65</sup> It is important that we do not misunderstand Jonas's broader point here, something which I (e.g. De Jesus 2016a) am certainly guilty of. It is not that these categories are mapped one-to-one across nature. Rather, Jonas's point is that we can find its 'earliest' manifestations, hence “rudimentary traces”, in “primitive” lifeforms. Unicellular organisms, for example, are not subjective in the exact same way that a human being experiences and embodies subjectivity but merely express its most minimal form.

former. This is made perfectly clear by his own suggestion that he is reading the biological register existentially. As Jonas points out, “the exclusion of teleology is not an inductive result but an a priori prohibition of modern science” (ibid, p. 34). However, rectifying this by reading the biological register existentially therefore also seems to involve a call for the reshaping of science and scientific thinking/practice itself (see Torrance 2016). This is perhaps more explicitly present in AE’s philosophy of nature but, although to a lesser extent, it is also present in Jonas’s work.<sup>66</sup>

In the next section we continue exploring how Jonas further enacts the ontological status of teleology and “inwardness” and how this goes on to inform the broader AE phenomenologizing of nature.

### **8 Life as we know it, life as we (all) experience it**

In light of the above considerations, Jonas comes to the conclusion that modern biology is faced with a dilemma: it either “take[s] the presence of purposive inwardness in one part of the physical order, viz., in man, as a valid testimony to the nature of that wider reality (...) or [it] extend[s] the prerogatives of mechanical matter to the very heart of the seemingly heterogenous class of phenomena and oust teleology even from the ‘nature of man’” (ibid., p. 37). Though put in rather different terms, Jonas is here expressing a variant of the very same predicament brought about by Cartesian materialism introduced at the beginning of this chapter. Thus, in order to overcome this predicament, Jonas feels obliged to *ontologically ground* teleology and inwardness.

For Jonas, teleology and inwardness cannot be mere descriptive posits but need to be an intrinsic ontological component of life itself. According to Jonas, “the teleological structure and behavior of an organism is not just an alternative choice of description: it is, on the evidence of each one’s own organic awareness, the external manifestation of the inwardness of substance. To add the implications: there is no organism without

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<sup>66</sup> It is undeniable that in *The phenomenon of life*, Jonas pits biological science *against* teleology and forcefully opts for the latter over the former. Nonetheless, it is also equally true that much of this work is not only scientifically informed but also draws direct inspiration from scientific biology (see Hverven and Netland (2021) for detailed discussion on these and related points). Not in the least Darwin who is a core figure in Jonas’s broader philosophy of nature (see Villalobos and Ward 2016, for a reading of Jonas which casts him as fully rejecting science). The big difference with AE, at least as AE theorists see it, stems from the fact that Jonas just missed out on some of the fundamental scientific developments which allows for a much more holistic conception of science. (see, for example, Di Paolo 2005).

teleology; there is no teleology without inwardness; and, life can only be known by life” (1966, p. 91). Note then that Jonas’s central point is as much *ontological* as it is phenomenological. And the somewhat curious phrase that “life can only be known by life” provides the key for understanding how these phenomenological properties and structures are ontologically grounded across nature. It provides the “evidence” that Morris refers to above.

Behind the phrase is the conviction – the “evidence” – that human beings have an “intrinsic acquaintance” with “*what it is like*” to be an embodied living agent such that, to paraphrase Jonas, we have *insider knowledge*. Our phenomenological experiential embodiment becomes a testament to the phenomenological experiential embodiment of the rest of nature. This becomes a crucial insight for the AE project. Following Jonas, AE theorists (e.g. Colombetti 2017; Di Paolo 2003, 2005, 2009; Di Paolo et al. 2018; Froese and Di Paolo 2009; Froese and Ziemke 2009; Froese 2011a; Thompson 2007, 2011a, 2011b; Varela and Weber 2002) argue that nonhuman lifeforms possess an inwardness which is coextensive with intrinsic teleology, meaning, sense-making and the like, because *we are ourselves undeniable embodied beings who experience a teleological drive which is intrinsically meaningful and full of value*.

What Kant and like-minded theorists fail to appreciate is that our very own embodied experience of being purposeful agents provides us with *undeniable evidence* for the intrinsic teleology of other lifeforms. Subject and object, human and nature are not separate entities or domains because our own embodied first-hand experiences provides us with, as Morris (*ibid.*) noted above, all “the evidence that points to the essential harmony that is their synthesis”.

As Renaud Barbaras (2010) notes, Jonas’s “description of life is situated at the point of convergence between a physcobiological approach to living organisms, which identifies them as forms of metabolism, and an anthropocentric approach, which we might also describe as a phenomenological approach, which makes it possible to specify the metabolism of living organisms by adding a dimension to which we have access only through our own embodied first-person experience” (p. 91). This point of “convergence” highlights how, just like AE, Jonas’s approach involves biodynamic *and*

existential phenomenological continuity. Jonas therefore, like other AE theorists, does not *univocally* prioritise the phenomenological (cf. Hverven and Netland 2021).

On the one hand, Jonas often enacts metabolism as being the “essential source” of intrinsic teleology, meaning and value, across nature. In these instances metabolism comes across as being both necessary *and* sufficient for intrinsic teleology and experiential phenomenology. On the other hand, he of course also enacts intrinsic teleology as a species of interiority, which is *only known and knowable to us* precisely because we *are* living beings with an interiority. Here it is only “through our own embodied first-person experience” that we have access to the inwardness of other organisms. Villalobos and Ward (2016) have suggested that the latter involves a “Jonasian inference” which starts with brute physical metabolic processes (biodynamic continuity) and leads to phenomenological interiority (phenomenological continuity). The authors suggest that it is this Jonasian inference which helps cement phenomenological continuity. However, Jonas’s occasional insistence to the contrary notwithstanding, the notion of “inference” is perhaps already too theoretical and abstract to capture the primordial nature of this (phenomenological) observation.

There is something phenomenologically more basic and primordial underlying this ability which precedes inference of any kind. As Thompson (2004) argues, “[t]o make the link from matter to life and mind, from physics to biology, one needs concepts like organism and autopoiesis, but such concepts are available only to an embodied mind with firsthand experience of its own living body” (p. 90). Our embodied, non-theoretical first-hand experiences, *precede* these concepts. Before we theorise, or indeed make any inferences, we already encounter living organisms *as* purposeful beings. This suggests that, without our own unquestionable first-hand embodied experience of life *qua* phenomenological endowed endeavour, other lifeforms would appear to us as just any other lifeless, purely objective, physical system in the universe (Di Paolo et al. 2018; Thompson 2007; Weber and Varela 2002; Wheeler and Di Paolo 2011). And so, in order to *directly know* life’s essential interiority, one has to actually *live* it.

Andreas Weber and Francisco Varela (2002) succinctly encapsulate this insight as follows: “It is actually by experience of our teleology – our wish to exist further on as a

subject, not our imputation of purposes on objects – that teleology becomes a real rather than an intellectual principle (...) In observing other creatures struggling to continue their existence – starting from simple bacteria that actively swim away from a chemical repellent – we can, by our own evidence, understand teleology as the governing force of the realm of the living” (ibid., p. 110). In other words, because we experience ourselves as striving beings, we are at the same time also capable of *directly recognising* this striving as an intrinsic feature across the rest of (living) nature.

This can be illustrated further by use of an example. Consider the phenomenon of oscillating particles in a continuum as discussed by Di Paolo (2003). One could, as a matter of epistemic convenience, simply describe this phenomena as a “wave”. In Jonas’s view, once we know the relevant properties of each particle, we would also know all there is to know about this particular phenomenon. For this reason, the phenomenon can now be understood and so described as an independent entity, as a wave. But this, according to Jonas, would simply be a fictitious, though useful, way of seeing the phenomenon of oscillating particles; a human *projection* of an observed phenomenon which is not intrinsically – ontologically – a wave.

Similarly, one *could* also from the third-person observational perspective, epistemically describe an organism as the locus of material and energetic flux in terms of its form. For Jonas, however, this would be how a disembodied mathematician (intellect) would see and understand life: simply as a ‘lifeless’ system constituted by fleeting objective physicochemical events. From the perspective of such an intellect there would be no inherent difference between a wave and a living organism because these are merely two different ways of describing material phenomena. But, argues Jonas, disembodied mathematicians lack the first-hand subjectivity of embodied experience and it is for this reason that they are incapable of truly understanding life as such. They lack the “crucial bit” of *knowledge* necessary to know the important difference between the living and the nonliving (Thompson 2007). They lack the first-hand phenomenological experience of being an embodied living being.

Indeed, it is precisely for this reason that we *can* do much better than disembodied intellects because we *do* have the crucial bit of knowledge required. We have an

“*epistemic privilege* that we must not dismiss” (Villalobos and Ward 2015, p. 226, emphasis added). In the words of Di Paolo (2003), “[w]e can ascertain beyond any shadow of a doubt that organisms have an identity beyond the epistemological convenience of detached description. The way we *know* this for certain is simply that *we are organisms*. We know by the *direct availability* of our bodies and by our struggles that we are indeed one of these entities (...) We have, as Jonas puts it, *inside knowledge* – a knowledge that is not available to a disembodied and mathematical mind” (p. 25, emphasis added).

Di Paolo et al. (2010) similarly enact the primacy of phenomenological continuity on the basis of our primordial experiences by insisting that “the inward aspect of life cannot be demonstrated using our current scientific tools. This does not make it any less factual for Jonas. He knows that all life is connected along an evolutionary continuum, and he knows that we ourselves are embodied living creatures with an inner life. This is how we can then know that living beings are forms of existence and that they also have an inner life” (pp. 44-45). In these instances it is *only* by taking on board these primordial phenomenological considerations that we can justify that teleology and sense-making are ontologically intrinsic to all living organisms. Biodynamic continuity gets relegated deep into the background here and phenomenological continuity takes centre stage.

Note that, with this move, AE theorists in effect collapse the epistemology/ontology distinction so crucial for the modern Constitution. It is not because of abstract principles and detached theorising that we can account for intrinsic teleology but rather because we directly experience it as such. Of course, as its requirement for biodynamic continuity makes clear, this does not mean that theory and abstract models are not important. It simply means that, in the context of phenomenological continuity, pre-reflective experience is *prior to* reflective abstract theorising. As Tom Froese (2011b) argues, “*we already participate in the world before we can decide to reflect upon it*. There is more to our concrete existence than any theory about intellectual activity can capture” (p. 636, emphasis original).



It is then with the help of Jonas that AE theorists argue that the inwards pertaining to life beyond the human can only be revealed to me in the *phenomenological experiential domain* by virtue of the experience that I have of my own lived existence. It is on “the strength of the immediate testimony of our bodies that we are able to say what no disembodied onlooker would have a cause for saying” (Jonas 1966, p. 79). We are thus capable of recognising intrinsic teleology because it resembles what Thompson (2007, p. 163) calls: “the form of our own bodily selfhood, which we know first-hand”. Which, according to Thompson (ibid., p. 164), amounts to a “transcendental”, in the phenomenological sense of the word, argument. It provides the *conditions of possibility* for knowing life because we have this biological knowledge first hand.

Thompson’s transcendental argument very nicely encapsulates the central features of phenomenological continuity discussed in this and the previous sections. The argument is as follows: firstly, certain observable phenomena can only be adequately accounted for, and so require the concepts of, the organism as a self-organising unity and autopoiesis. Secondly, the source of meaning of both these concepts *stem from our lived body*, that is our phenomenological first-person experience of our *living* body. Thirdly, these concepts, and the respective biological framework in which they are embedded, are not derivable from an observe-independent, non indexical, objective, physico-functional description. This argument also captures the essentially non-modernist force underlying the enactive phenomenologisation of nature.

Let us pause here to take stock of the core themes of this chapter, particularly as these relate to modernist modes of rationality and scientific objectivity. By phenomenologizing nature, enactive theorists have ensured that living entities are neither passivised nor reduced to mere deterministic mechanisms following predetermined fixed universal laws. Drawing from resources within existential phenomenology, and threading them through consideration regarding biodynamic continuity, enactive theorists have enacted a conception of the organism as *ontologically endowed* with intrinsic goal-directed teleology and inner experiential phenomenology. Organisms are not only autonomous beings but entities which live in a world that is inherently full of value and meaning for the organism itself. Thanks to the creative threading together of these various resources, this last claim is no longer a mere

epistemic posit made from or for purely observational convenience, but rather an ontological fact of living matter. This in turn ensures that the human itself is neither relegated to pure mechanism nor separated from or placed above the rest of living nature. In one fell swoop AE dismantles anthropocentrism *and* Cartesian materialism. Finally, advocating for the primacy of phenomenology over epistemology also disrupts the epistemology/ontology distinction and with it the nature/culture and subject/object divide.

Having discussed how enactive theorists phenomenologize nature and, in the process, offer a thorough rejection and deep subversion of some of the most stubborn of modernist tenets, I now want to conclude this chapter by saying a few preliminary words on how this process relates to the notion of mononaturalism.

### **9 Phenomenologizing nature as an undoing of mononaturalism; a preamble**

In the preceding sections we explored some of the figures, ideas, concepts and argumentative moves which enabled AE theorists to compose and enact its distinctive philosophy of nature. We saw how this was partially constituted by a resolute phenomenologisation of nature itself. In this regard we have simply been following Gallagher's suggestion that enactivism is best understood as a philosophy of nature but explored where and how this was *done* by other theorists within the enactive literature.

Recall, however, that when discussing Gallagher's suggestion, we noted that such a philosophy of nature was constituted by two distinct yet interconnected and mutually supporting commitments: (i) a rejection of scientific reductionism and (ii) the phenomenologizing of nature. In the previous chapter we addressed some aspects related to (i) and, of course, in this chapter we dealt extensively with (ii). In this final section I would like to provisionally, and as a means for further clarification, *re-entangle* these two commitments.

The first point which needs to be emphasised in this regard is that it is only *together* that they constitute a robust and *integrative* enactive philosophy of nature. For enactive theorists we need an account of mind and cognition which is not held hostage either to computational representationalism or to neurobiological reductionism. More

importantly to note here, however, is that both of these are argued to be premised on the ‘classic’ – *mononaturalistic* – conception of nature *as observer-independent*. In Chapter Five we will explore in more detail how exactly enactive theorists go about undoing this ‘classic’ conception of nature. However, anticipating that discussion somewhat, we need to say a few provisional words on it here already because a rejection of mononaturalism seems to be implied by the phenomenologisation of nature.<sup>67</sup>

Although the phenomenologisation of nature has been defended above as a project which is primarily concerned with endowing all living organisms with a sense of experiential subjectivity, it also contains within it the resources which help enact a rejection of mononaturalism. Recall that, as AE theorists argue, it is because we experience ourselves as embodied existential living beings that we, at the same time, can be sure that other living organisms are also ontologically endowed with similar experiential properties. One important implication of this view is that, humans and nonhumans alike, are said to have *meaningful perspectives on the world and do not therefore encounter neutral objective spaces*. Because this perspectiveness is an intrinsic biological property found across nature, the very idea of mononaturalism is rendered unintelligible.<sup>68</sup>

Pierre Steiner (2021) has argued that an “epistemological constructivism” is therefore *built into* the very fabric of the enactive framework since organisms are said to enact or “bring forth” unique worlds.<sup>69</sup> From this perspective, in the context of a phenomenologisation of nature, a strong epistemological constructivism comes to the

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<sup>67</sup> Here we come face to face with some of the limitations of my idiosyncratic curving-up of the enactive project along two axes. I will therefore simply urge the reader to keep in mind that the phenomenologizing of nature and the rejection of a pregiven world form part of the broader enactive philosophy of nature/scientific research programme: both of which overlap, crisscross and mutually support each other.

<sup>68</sup> In Chapter Five we will identify and discuss other ways with and through which AE theorists reject mononaturalism. This argument from “epistemological constructivism” identified here will be further discussed in that chapter and more specifically aligned with the enactive conception of agency.

<sup>69</sup> The constructivists roots of the enactive framework are not always, or explicitly, recognised. However, as Stewart et al. (2010) note, “the paradigm of enaction is ontologically nonobjectivist—or to put it more positively, radically constructivist”. While Cappuccio and Froese (2014), similarly recognise that “the enactivist concept of sense-making builds on a general *constructivist epistemology* of the living organism situated in their specific niche” (p. 10, emphasis added). Thus for some, although certainly not all enactive theorists, the rejection of mononaturalism seems to entail, or is dependent upon, some form of constructivism (cf. Cummins 2014). For Steiner (2021) the LMCT developed by enactivists implies an epistemic constructivism at the very *biological core* of life itself.

fore which rules out precisely those traditional modernist modes of rationality and scientific objectivity that give rise to mononaturalism. The world cannot be observer-independent because all organisms, not humans alone, have unique perspectives on it. It is important therefore to keep this rejection in the back of our minds when we consider what actually happens to the *concept of nature* once it has been phenomenologized and thus fully re-conceptualised.

Recognising that phenomenologizing nature could also enact a substantive rejection of mononaturalism is important because it helps prevent the seeming reduction in scope of the notion of nature itself within this project. On the face of it, our discussion above seems to suggest that AE is *only* concerned with “rethinking” a *subset of a subset* of nature (i.e. adaptively autonomous living systems). This would in turn suggest that, with regards to a philosophy of *nature* as proposed by Gallagher, the operative term “nature” therein refers equally only to a subset of *living* nature. However, this is only the case due to my deliberate omission in this chapter of AE’s treatment of mononaturalism. As just noted, at the very core of the phenomenologizing of nature project – at the very fabric of life itself – is an epistemic constructivism which rejects mononaturalism and also points to AE’s interests in nature way *beyond* a subset of the living. Finally, note how this also offers another explanation for how matters of fact cannot but always be anything other than matters of concern: it is built into the very biological nature of life itself.

We will be re-turning to these topics in Chapters Five and Six, where they will be discussed extensively. However, I felt it was important to offer a few provisional clarifying remarks here not only to acknowledge an important omission on my part, but also to already highlight the entanglement between these notions, which were here purposefully disentangled.

## **Conclusion**

In this chapter we have attempted to show how the marriage of biological autonomy and phenomenology has been enacted. We explored how it provided theorists with two pillars around which a number of diverse but complementary resources were gathered and compose, enabling theorists to enact a direct subversion and influential rejection of

traditional dualist, passive and anthropocentric conceptions of cognition and nature bestowed on us by the modern Constitution. In the following chapter we will explore how some of these very resources also help compose a diametrically opposing position.

## **Chapter Four**

### **Phenomenologizing Nature and the Reproduction(s) of the Constitution**

#### **Overview**

In this chapter we explore some of the multiple entanglements between the enactive phenomenologisation of nature and the modern Constitution. These entanglements will be brought to light by exploring how enactive theorists enact two very specific modernist tenets: (i) nature/culture dichotomy and (ii) anthropocentrism. The first half of the chapter explores how (i) is enacted through the separation(s) between epistemology and ontology. The second half explores how (ii) emerges as a direct consequence of a general neglect of material agency. We then explore the complex relationship between anthropomorphism and the modern Constitution, by thinking-through some of my earlier discussions on the topic. The chapter concludes with an addendum which resulted from diffracting enactive life-mind continuity through multispecies ethnography.

#### **Motivations and aims of this chapter**

In the previous chapter we explored how enactive theorists composed a bold philosophy of nature which placed the phenomenologisation of nature at its core. We explored some of the key figures, ideas, concepts and argumentative strategies which enabled these theorists to bring biodynamic and phenomenological continuity together under a novel LMCT. This bold proposal drew equally from theoretical biology and existential phenomenology to sketch out a position which brought the ‘objective’ of biology and the ‘subjective’ of phenomenology closer together without reducing the one to the other. So it was that, by phenomenologizing nature, AE theorists at the same time rethought and re-conceived – enacted anew – the very *concept* of nature itself.

The alternative concept of nature which AE composed, thanks to this active phenomenologizing of nature, was one equipped to both subvert and challenge the core pillars of the modern Constitution: anthropocentrism, determinism, mechanistic reductionism and other modernist modes of scientific rationality and objectivism which

split mind from body, self from other and nature from culture, are all thoroughly problematised. This in effect initiates a shift from pure matters of fact to matters of concern. Herein lies much of its true novelty, insight and ultimate promise: all organisms are now argued to form a continuum not only in terms of mind and cognition but, more importantly, also in terms of subjective phenomenology. All living organisms are deemed to be autonomously adaptive and at the same time agents in their own right. All of which becomes even more admirable, in the context of cognitive science at least, when we consider that enactivists do so in what many regard to be a legitimate *naturalistic but nonreductive* manner.

The last sentence contains a proviso which might strike many as redundant but is however crucial when undertaking a diffractive reading. The enactive rejection and subversion of some crucial tenets of the modern Constitution attains much of its provocative and iconoclastic force *precisely within the context* of traditional cognitive science. Or, to put it in the words of Chapter Two, when the enactive project of phenomenologizing nature is read with and through traditional (modernist) cognitive science, the diffractive pattern(s) which tends to stand out most strongly is exactly the unabashed disruption of core modernist ideals. But, what would happen if the diffractive apparatus changed?<sup>70</sup> What happens to this project when it is read with and through sources from STS, feminist science studies, anthropology and multispecies ethnography? Does it retain its provocative and iconoclastic anti-modernist force? In the discussions that follow we will see ways in which it does not.

The discussions which follow in this chapter will bring to light how, once the more traditional and commonly used diffractive apparatuses are changed, the diffractive patterns which emerge are rather (surprisingly) different. What we will see is that a number of distinctive but overlapping patterns emerge which are also entangled with a number of distinctly modernist tenets. We will show that these entangled patterns, vis-à-

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<sup>70</sup> Of course, with some caution, I will claim that *many* things *can* happen. And what *does* happen here, what is documented in these pages, is simply *one diffractive possibility* among potentially many. Given our discussion on diffractive reading(s) in Chapter Two, were the reader to read the same texts together, in exactly the same manner that I did, the outcome – the diffractive pattern – is bound to be different. But then, this is precisely the point of diffractive readings. As Barad (2007) notes, “scientific practices do not reveal what is already there; rather what is “disclosed” is the effect of the intra-acting engagements of our participation with/in and as part of the world’s differential becoming” (p. 361). The same applies to reading practices (see the Appendix for more on these points).

vis the phenomenologisation of nature, effectively also reproduce and perpetuate some of the very modernist tenets AE theorists reject.

It is the central motivation and aim of this chapter to bring to light how and where this happens. We will therefore focus our attention around how phenomenologizing nature also enacts (i) a nature/culture dichotomy and (ii), an anthropocentric conception of nature. The first half of the chapter explores how (i) is done by enacting an epistemology/ontology distinction. The second half explores how (ii) is done thanks to a general neglect of material agency. We then explore the rather complex relationship between anthropomorphism and the modern Constitution. The chapter concludes with an addendum which tells different stories about/with the continuity between life and mind.

### **1 Changing apparatuses**

In the first half of this chapter I would like to lay some of the further crucial groundwork not only for the rest of the chapter but indeed for much of what is to come by exploring how AE theorists enact a nature/culture dichotomy by variously separating epistemology from ontology and privileging/prioritising the former over the latter. Instances of this appears not only in the project of phenomenologizing nature as explored in the previous chapter but also in several key places throughout the enactive literature. We will start with this particular issue not only due to its manifold enactments within the literature but also because it is intimately entangled with enactments of anthropocentric conceptions of nature as explored below.

My strategy in what follows is to first clarify that/how the enactive approach is routinely and self-consciously enacted as an essentially epistemic project. This will be the main aim of the following section. Before doing so, however, I want to first clarify how much of the discussion that follows is a direct consequence of the particular diffractive apparatuses I have staged. As noted previously, it is a central contention of this work that it matters greatly what texts we read the enactive project with and through. Different readings with different texts will help stage and render more visible different worlds; inevitably foreclosing some while bringing others right to the forefront.



Recall that, as discussed in the Introduction and Chapter Two, a diffractive reading involves reading texts with and through each other. As noted, I was/am particularly drawn to this practice(s) because, among other reasons, it is *not* primarily concerned with interpretation or representation but rather with *differences*. It is *not*, therefore, a representational practice concerned with accurately mirroring what is always-already there passively awaiting accurate representation. As Barad (2007) points out, a diffractive reading involves reading insights “through one another in ways that *help illuminate differences as they emerge*. How differences get *made*, what gets *excluded*, and how those exclusions *matter*” (p. 30, emphasis added). Diffraction thus shifts the focus away from interpretation towards the *effect(s)* of differences (Barad 2014).

As Lenz Taguchi (2012) notes, a diffractive reading allows the researcher to pose a different set of questions: rather than ask the “interpretive question ‘what does it mean?’ when reading theory or analysing data, [one can] instead ask: ‘how does it work?’ and *what does this text or data produce?*” (p. 268, emphasis added). Inspired precisely by these sorts of questions, I have in this chapter read texts dealing with the enactive phenomenologisation of nature through a number of texts drawn from three distinct but closely related areas of research. These were: (i) STS, (ii) feminist science studies and (iii) multispecies ethnography. All of which were in turn closely read with Latour’s analysis of modernity and, in the second half of the chapter, also with his discussions on anthropomorphism. Special attention was paid to how initial points of similarity and overlap between AE and these different research programmes, gathered around similar matters of concern, gradually morphed into vectors of contrast and differences as these texts interfered with and through each other. The first half of the chapter stages Latour’s analysis and related texts within STS and feminist science studies as the diffractive apparatus. The second half stages Latour’s discussion on anthropomorphism and texts from multispecies ethnography as the central diffractive apparatuses.

Finally, I should note here that various aspects of the work dealt with in this chapter are also diffracted through my own experiences as a researcher and my previous writings on some of the topics at hand. This is perhaps most acutely visible in the second half of the chapter where my previous writings on anthropomorphism are essentially reconfigured

as a consequence of my particular engagements with certain texts. More specifically, I in effect diffract my previous assumptions on anthropomorphism both through the work of Latour and AE texts, as a means to “expand” and disrupt my stance on the issue. This in turn opened up new possibilities to think-with and through not only enactive anthropomorphism but my own previous position on it. We will re-turn to and further explore the role of the researcher more specifically in the Appendix.

## **2 Enacting enactivism(s) as an epistemology**

As noted above, it was by reading the different texts diffractively through each other that the multiple entanglements between the enactive approach and the modern Constitution began to ‘manifest’ themselves. In light of this, Latour’s analysis and related STS/feminist science studies texts, will provide us with the initial and provisional apparatus needed to explore how/where a nature/culture dichotomy is enacted by some AE theorists. However, before doing so, we first need to briefly explore and clarify how enactivism more broadly, and enaction in particular, is often enacted as an epistemic project.

In a recent paper aiming to bring together the two “camps” of ecological psychology and “enactivism” under the umbrella of a unified “radical embodied cognitive science”, Edward Baggs and Anthony Chemero (2018) suggest that this could be done simply by recognising that researchers are “pursuing different but complementary types of explanation” (p. 1). The authors argue that while the former camp “pursue an ontological strategy”, the latter “pursue an *epistemic* strategy” (ibid., emphasis added). By which they mean that enactive theorists “start by characterizing the exploratory, self-regulating behavior of the individual organism (...)”. Baggs and Chemero express an important aspect of the enactive approach here which, although generally accepted and often remarked upon, is not always explicitly thematised. That is the *epistemic nature* of the enactive approach; the observation that enactivism is generally understood/presented as an epistemic project.

Miriam Kyselo and Wolfgang Tschacher (2014), for example, make clear that the enactive approach is an “integrative *epistemological framework* for cognitive science that adopts a process-based and biologically grounded *perspective* on cognition” (p. 2,

emphasis added). Many enactive theorists thus maintain, as Di Paolo et al. (2018) argue, that in order to fully understand cognition “[w]e need a *theory of bodies*” (p. 6, emphasis added). That is, a theory which is both scientifically grounded and sensitive to embodied experience and can therefore “provide the operational *conceptual categories* with which to *describe* their objects of study and distinguish them from those outside their remit” (Di Paolo 2018, p. 75, emphasis added). Ultimately, as Fred Cummins (2020) argues, “it is in the care of drawing distinctions that are adequate to the task of explanation to a specific community that enaction can provide a *foundation for epistemology* in which the tools, methods and insights of science can flourish” (p. 6, emphasis added).

Similarly to these theorists, one finds that the great majority of researchers which in some way or other align themselves with, or are sympathetic to, the broader enactive community, tend to enact enactivism(s) in an equally epistemic register (e.g. Baggs and Chemero 2018; Colombetti 2014; Cuffari et al. 2021; De Jaegher 2020, 2021; Di Paolo et al. 2017; Hutto and Myin 2013; Nöe 2004; Stewart 2010; Thompson 2007). This is all to say that, the status of enactivism(s) as an epistemic endeavour is generally fully accepted, taken for granted and endorsed, and there are practically *no* instances (that I am aware of) where this is put into question.

However, at this point we need to note that, as the above quotes clearly indicate, enactive theorists aim to provide *better epistemic alternatives* to those provided by the modern Constitution. Indeed, insofar as it is an epistemology, it is a very *different* epistemology to that found within more traditional cognitive science and analytical philosophy circles. Nevertheless, and this aim notwithstanding (and we will be returning to it in due course), the point to be noted here is that, by and large, enactive theorists enact enactivism(s) in epistemic terms. So, we can say that the enactive account: (i) is an epistemology which (ii) does not follow the epistemology of the modern Constitution but is instead interested in developing legitimate (non-modernist) alternatives.

This epistemic nature of the enactive approach is not something which stood out for me for many years. Indeed, for well over a decade now, this ‘theme’ made no impression on

me whatsoever other than simply being tacitly taken for granted and endorsed. This only began standing out for me after having spent some time reading Latour and similarly minded STS, feminist science studies scholars and anthropologists. As the previous chapter exemplifies, when the diffractive apparatus is principally constituted by resources from a cognitive science underpinned by Cartesian materialism, then the challenge and proposed alternative to modernist epistemology is not only unproblematic but also very welcomed. This is perhaps one of the central reasons why this epistemic nature did not stand out for me in any significant manner other than as a productive and insightful means to disrupt traditional conceptions of cognition.

However, once I did change the apparatuses, this epistemic nature not only began standing out for me but also some of its entanglements with the modern Constitution started to become apparent. Latour's analysis played a crucial role here as it helped to situate the role of epistemology itself within the modernist project. As many, not in the least Latour, STS and feminist science studies scholars, have observed (e.g. Barad 2007; Bennett 2010; Blaser 2013a; Hekman 2010; Henare et al. 2007; Haraway 2016; Holbraad 2011; Kim 2019; Jensen 2017; Law 2004a; Mol 2002; Pickering 2017; Viveiros de Castro 2004a, 2004b), the modernist project is one marked by its fixation with the epistemic, and many of its subsequent problematic dualisms stem precisely from this fixation.

Thus recall how, as noted in Chapter Two, the active and continued separation between epistemology and ontology was a *quintessential* modernist material technology mobilised and deployed in multiple ways by the modern Constitution. It was noted that distinguishing between *what we know* and *that which is known* is a key characteristic of modern thought and practice. More importantly, we saw how the distinction could also be seen as a direct proxy for, or variation on, the much broader nature/culture dichotomy. This is because, as Latour (1993) argues, the epistemic tends to be exclusively aligned with the domain of the human, which of course comprises the subjective, the cultural and the social. While the ontological is aligned with the domain of the nonhuman and comprises all that is objective, nonhuman and thus natural. Epistemology is thus, as Susan Hekman (2010) points out, "of necessity about representation, and *representation is necessarily about dichotomies*. Representation

gives us two choices: knowledge is either objective or subjective. As long as we remain within the purview of epistemology, this dichotomy is inescapable” (p. 69).

The following section will attempt to document how, when Latour’s analysis is used as a diffractive apparatus, the diffractive pattern(s) which emerged was one where the AE approach is variously entangled with the nature/culture dichotomy *by virtue of enacting an epistemology/ontology distinction*. A distinction which cannot easily be disentangled from its explicit epistemic underpinnings and concerns. Thinking-with and through several concrete examples drawn from the enactive literature, I will show how AE theorists: (i) *separate* the epistemic from the ontological and then (ii) routinely *privilege and prioritise* the former over the latter. It is suggested that all the examples are both underpinned by and perpetuate a nature/culture dichotomy. These examples thus highlight instances where certain AE ideas, concepts and arguments become part and parcel of the very modernist material technologies which also reproduce the very modernist tenets AE theorists strongly reject.<sup>71</sup>

### **3 Enacting a separation between epistemology and ontology**

Having shown that enactivism is (i), generally enacted in an epistemic register and (ii) suggested that we need to change the diffractive apparatus to be able to see some other consequences of (i), we now need to show how and where some theorists also enact a further separation between the epistemic and the ontological. In what follows I will therefore explore a few concrete examples in which these particular (re)enactments are composed, maintained and sustained.

The following examples appear here because they significantly stood out in my specific diffractive reading(s) of the enactive phenomenologisation of nature. These concrete examples are here organised around five distinct, though intimately related, themes. These are: (i) the casting of autonomy in epistemic terms, (ii); the fundamental circularity between biodynamic and phenomenological continuity, (iii); the Kantian

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<sup>71</sup> One could argue that, simply by virtue of developing the enactive approach in essentially epistemic terms, enactive theorists at the same time *always and automatically* enact some of the core tenets of the modern Constitution. This, however, is *not* the position adopted in this work as it is too univocal and thus too wide in scope. The strategy deployed throughout this work is instead to deploy specific concrete examples rather than overarching blanket statements/arguments.

challenge, (iv); the ambition/aim to reconceptualise the concept of nature and (v); the epistemologization of phenomenology. Let us explore these in turn.

### **3.1 Autonomy *qua* epistemic concept**

As we have seen in previous chapters, the notion of autonomy is perhaps one of the most, if not *the* most, important concepts within the AE approach. It is particularly important in the phenomenologisation of nature because it plays a fundamental role in enabling theorists to bridge the realm of biology with that of intrinsic teleology, meaning and values. In the previous chapter we saw that theorists tend to oscillate between arguing that autonomy is necessary and sufficient, and necessary *but not* sufficient for the aforementioned properties. The work of Evan Thompson was used as one example of this oscillation and here I want to re-turn to this work once again. More specifically, to a very brief but illuminating discussion of the notion of autonomy, found in Thompson's (2007) seminal book *Mind in Life. Biology, Phenomenology, and the Sciences of Mind*.

While Thompson tends to oscillate between the two aforementioned positions, within his broader work there is a general consensus that autonomy *is* an *intrinsic ontological property* of living systems. One route to this conclusion stems from the enactive argument that autonomous systems, in contrast to heteronomous systems, are *self-individuating*. Unlike the latter, autonomous systems do not require the conventional standards of external observers to individuate them as integrated entities (see Di Paolo and Thompson 2014). The point of note here then is that Thompson's oscillation develops from this initial premise. This initial premise, however, enacts a separation between the epistemic and the ontological which then goes on to privilege and prioritise the former over the latter.

One of the clearest expositions of this comes with Thompson's (2007) claim that the notions of "autonomy", just as "system" and "heteronomy", are strictly speaking "heuristic notions" and "cognitive aids" meant as "guides" for scientific investigation. According to Thompson, "[f]or any system, it is always possible to adopt a heteronomy or external control perspective, and this can be useful for many purposes" (p. 50). The same, Thompson (*ibid.*) maintains, is equally true of autonomy. However, in the case of

living organisms, the “heteronomy perspective” simply obscures the important intrinsic characteristics of these systems and thus an “autonomy perspective” is more appropriate.

In this particular instance, Thompson enacts both autonomy and heteronomy as essentially *epistemic* and *instrumental* in nature: as different *representationalist-cum descriptive tools* relative to particular frameworks. They are distinct *perspectives*, informed by different (theoretical) biological traditions, that observers can take on a particular class of system. As such, any given system can be represented in at least two different ways, depending on the framework used, the context of the study and the needs of the researchers involved. As Thompson (*ibid.*) notes, these notions “(implicitly) refer back to and implicate the *interpretive* and *explanatory stance* of an observer (or observer community)” (*ibid.*, emphasis added). Thus, even after giving the best possible description/representation of a system from within a certain framework, other alternative possible descriptions will remain open and viable.<sup>72</sup>

By enacting autonomy and heteronomy as essentially epistemic and instrumental in nature, Thompson also separates the epistemic from the ontological. Moreover, this separation is enacted in such a manner that it perpetuates the distinctly modernist tendency to privilege and prioritise the epistemic over the ontological. In our example, Thompson places living systems (and nonliving system) on the one side and scientists/observers on the other. Autonomy and heteronomy are then cast as different *perspectives* which observers can take *on* any given system. The set of properties which an observer can attribute to a system always loops-back to that observer and is therefore relative to its adoptive perspective. This both reproduces and perpetuates modernist logics of dividing nature from culture, placing living (and nonliving) systems within nature and scientist within culture such that the latter have access to the former simply by means of taking different epistemic perspectives on them.

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<sup>72</sup> Note, of course, that this is directly at odds with the central premise that autonomy *is* an *intrinsic ontological* property of biological systems. This is, following the central premise of this work, not really surprising since enactive theorists routinely enact their ideas and concepts in directly opposing ways.

In this respect, living systems remain “stable and static” in that they have a certain set of intrinsic universal properties while representations of them are variable, multiple and change according to epistemic needs and context. In other words, perspectives *qua* representations, can and do change but what they represent do not. Given that perspectives are what are emphasised, the focus remains explicitly on the epistemic while the ontological recedes to the background. But, when the ontological comes back into focus as it often does in these discussions, it is inevitably *accessed through, reduced to and recast in, the image of the epistemic*. We re-turn to this point below.

### **3.2 Fundamental circularity**

For my second example I want to explore how biodynamic *and* phenomenological continuity are argued to be jointly necessary for a proper phenomenologisation of nature. In the previous chapter we saw that, for AE theorists, in order to properly phenomenologize nature, researchers had to bring together both biodynamic and phenomenological continuity. The former signals to a biologically grounded continuity in terms of autonomous adaptivity, while the latter signals to a phenomenological/experiential continuity which exists across living organisms. Put differently, we *need* a scientifically grounded third-person perspective accounting for continuity from the bottom-up *and* a phenomenologically informed first-person perspective accounting for continuity from the top-down (see Welton 2011).

As we also noted, the relationship between these two “continuities” is not as clear-cut as some enactive theorists have suggested. In keeping with the discussion from the previous chapter, I will once again only concentrate on the position that biodynamic continuity is necessary but not sufficient for a proper phenomenologisation of nature.<sup>73</sup> As hinted at in the previous chapter, this is simply a variation, or more accurately, a *specific concrete enactment* of the “fundamental circularity” proposed by VTR. It will therefore be helpful to re-turn to this particular proposal and then frame the discussions that follow around it. We will then draw the similarities between the two more explicitly at the end of the section.

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<sup>73</sup> Although I should note that the analysis here applies equally to those instances where biodynamic continuity alone is deemed necessary and sufficient for a proper phenomenologisation of nature.



Recall how VTR suggested that, in order to adequately study cognition, there needs to be a “fundamental circularity” between “lived experience” and “scientific understanding”. As we saw in Chapters One and Two, the motivating force behind this notion is the call for a “mutual back-and-forth” between objective (third-person scientific) and subjective (first-person phenomenological) methodologies. A call to “pragmatically build the bridges between first- and third-person” (Varela 1999) approaches to the study of mind and cognition. This proposal is therefore the direct inspiration for the desired approximation between third-person biodynamic and phenomenological continuity argued for by AE theorists. I want to suggest here that this requirement for a “back-and-forth” between first- and third-person methodologies, in the various expressions it takes, also enacts a separation between the epistemic and the ontological which then privileges and prioritises the former over the latter.

When we first read this proposal for a fundamental circularity in the previous chapter, with and through modernist Cartesian materialism, the suggestion not only stood out as an important remedy to modernist excess but also something with the potential to radically transform modernist modes of rationality and scientific objectivity. However, when the apparatus is changed, a rather different diffractive pattern also emerges. Let me explain.

What first stands out from this diffractive pattern is how the very notion of fundamental circularity effectively leaves what Annemarie Mol and John Law (2004, p. 44) call “the *modes of knowing*”, which comprise this circularity, completely untouched. Modes of knowing which are grounded on the conviction that, “[o]n the one hand there is an objective, public and scientific way of knowing the body from the outside. On the other hand there is a subjective, private and personal way of knowing the body from the inside” (ibid., pp. 44-45). That is, fundamental circularity often appears to directly operate within the tacit assumption that there *is* a ‘readymade’ and thus ‘pregiven’ separation between first and third-person ‘perspectives’ or “modes of knowing”.

This is unsurprising since it is, first and foremost, a methodological proposal to bring these two domains *closer together*. This is perfectly captured in Varela’s “bridge” metaphor. In these instances the proposal *begins* with a dualism which it argues needs to

be overcome, and is overcome, with this mutual dialogue. While VTR insist that the methodologies underpinning each perspective should be able to mutually *influence/constrain (and possibly change) each other*; the dualist separation between these two distinct modes of knowing remain fully intact.

The suggestion then is that this separation is not only premised on the epistemology/ontology distinction but also *reproduces* it. One explicit manifestation of this separation, which I want to highlight and emphasise here, appears in the way that fundamental circularity is routinely enacted on a strict epistemic/conceptual register; such that only knowledge of/from each “mode” circulate between them.<sup>74</sup> It is the *knowledge* collected and attained from *knowledge practices* within each domain that needs to circulate back-and-forth and mutually constrain, hopefully enrich, each other (see Sheets-Johnstone 2004, Varela 1999). Here both science *and* phenomenology are cast as essentially *knowledge generating/gathering* practices which will contribute to a more accurate and robust *understanding* and *explanation* of human cognition.

In contrast to cognitivism, VTR therefore insist that cognitive scientists need to make space for the embodied lived experiences of living, breathing humans. Varela and Shear (1999), for example, distinguish between “first-person events” on the one hand, which are the “lived experience associated with cognitive and mental events”, and “third-person descriptions” on the other, which “concern the descriptive experiences associated with the study of other natural phenomena” (p. 1). The authors insist that both “descriptions” are needed to adequately account for mind and cognition. But again, this insistence seems to be premised on the view that there is an *objective* and scientific way of *knowing* cognition (or the world in general) from the “outside” and a *subjective* way of *knowing* cognition from the “inside” (cf. Mol and Law 2004). This is in effect an attempt at conjoining which effectively also separates.

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<sup>74</sup> It is perhaps for this reason that Vörös et al. (2016) argue that one should not conflate “methodology with metaphysics” in this context: fundamental circularity is not an account of what the world is really like but a method to help study aspects of it. Fair enough. But what if method is not neutral in the manner the authors seem to suggest? What if methods also help enact objects as STS scholars argue? In this particular case, I suggest that the very act of trying to bring these domains together, also ensures that they remain separate by enacting them as different to begin with (see the Appendix for further discussions on these points).

It must be noted, however, that the understanding of “subjective” and “objective” in play here have changed and are significantly different from how they are understood with/in the modern Constitution. As Varela and Shear (ibid.) insist, “knowledge is inescapably in part subjective, since it depends on individual observation and experience, and partly objective, since it is constrained and regulated by the empirical, natural phenomena”. What the authors are pointing towards here is that any type of observation, including scientific observations, is constituted by processes of *reflexivity* and/or *recursive self-referentiality*. Thus, similarly to the argument made by Thompson above, subjective experiences are argued to always-already be implicated in purportedly “purely objective” scientific investigations. Every description always refers back to and therefore implicates the observer.

Nonetheless, this too continues to operate within and re-enacts a distinction between the epistemic and the ontological which prioritises the former over the latter. According to the authors, objectivity (and indeed traditional understanding of subjectivity) is disrupted because subjective experiences are always part and parcel of any objective observation. But, and we will re-turn to this point in Chapter Six, this very suggestion also reproduces the epistemology/ontology distinction: the world and its distinctive ontology is here always filtered through human experience and epistemology. But, insofar as this is the case, epistemology has already been separated from ontology and it is therefore all that essentially matters.

And at this point we can bring biodynamic/phenomenological continuity back into the discussion. In light of the above, we can say that this proposal operates within the same dualistic space opened up by fundamental circularity whereby first and third person perspectives are essentially separated from each other from the very beginning. Each perspective in turn providing us with new/different/better *knowledge about* one and the same phenomenon. This then becomes an attempt at *bridging* a duality while leaving its distinct terms intact. Thus, rather than undoing the distinction, it reinscribes it by keeping the two domains intact whilst attempting to *synthesise* them.

It is biodynamic continuity which deals with the scientific/objective whilst phenomenological continuity deals with the personal/subjective. Both need each other.

But, if these two domains are not pre-given in the order of things, then they also do not need to be brought closer together and synthesised. By keeping these domains apart, the world that is observed from either perspective remains one, and only models/experiences *of* this world, only perspectives on it, remains many: epistemology and ontology not only remain separate but only the former is really taken into consideration.

### 3.3 Kant's challenge

For my third example I want to re-turn to Kant's modernist challenge to intrinsic teleology as presented in the previous chapter. In the context of the debate over the ontological status of these properties, the AE endeavour appears not only to be *prima facie* completely warranted but also necessary. Kant staged a modernist problem for which AE provided a non-modernist answer. However, the very framing of the issue – the staging of the problem – *presupposes* and subsequently enacts a separation between epistemology and ontology to begin with.

I think that it is fairly evident that Kant's objection to intrinsic teleology both presupposes and then actively enacts this separation. This is made clear by the very dilemma it presupposes: organisms might appear to us as intrinsically teleological but this is merely an *epistemic illusion*. In *reality* this is not the case. Thus, for Kant, how we know and what we know clearly comes apart here and are enacted as essentially different within his broader philosophy.

The first point I want to draw attention to then is the *epistemic grounding* of Kant's challenge. Kant's philosophy of the organism, just as the enactivist's, is first and foremost an epistemological project. It is a project which follows a strict modernist logic in assuming that the ontology of the organism is and can only be attained through the epistemic. In a nutshell, for Kant, we *cannot know* that nature possesses intrinsic teleology and as such we can also further *legitimately* conclude that this is *ontologically* the case. As we saw in the previous chapter, AE theorists accept Kant's challenge and subsequently continue the debate very much on those terms.

In contrast to Kant, AE theorists maintain that we *can know* that nature possesses intrinsic teleology, and as such we can also further *legitimately* conclude that this is

*ontologically* the case. In these instances, these theorists argue against Kant (and indeed reductive mechanistic Cartesian materialism) *from within* the same dualist (epistemology/ontology) modernist grounds. But note how epistemology is *privileged* and *prioritised* over ontology such that in both cases we are presented with two ontologically distinct conceptions of the organism derived *exclusively* from distinct and distinctive (although similar) *epistemologies and epistemic considerations*.

What I am suggesting here then is that Kant's challenge and the subsequent debate(s) it gives rise to enacts and further perpetuates a fundamental separation between epistemology/ontology which privileges the former over the latter. The challenge itself thus forms part of broader modernist material technologies which help re-enact and thus perpetuate the separation. We can say that Kant lays and then enacts the foundations for the epistemology/ontology distinction which AE theorists subsequently (re)enact by partaking in the debate and accepting the modernist terms it is grounded on. This provides another concrete example whereby AE theorists become yet again entangled with modernist modes of thought and practice and actively partake in their enactment(s).

### **3.4 Reconceptualising nature**

In this example we re-turn to the enactive ambition to rethink the *concept* of nature. We saw that, according to Gallagher, it was the concept of nature itself which was argued to be in need of a critical rethinking. Echoing Gallagher's suggestion, Sebastjan Vörös (2014) argues that, "phenomenologisation as pertaining to nature entails the *reconceptualisation of the concept of nature*" (p. 114, emphasis original). In this regard then, to "change nature", or to change our "understanding of nature", requires an *alternative conception* of what nature traditionally *means*. It is to present an alternative coherent theory/conceptual framework which successfully undermines and rejects the modernist dualisms still prevalent in most scientific, not in the least cognitive scientific, conceptions of nature.

This explicit focus on reconceptualisation, theory and conceptual framework, presents another distinct concrete example where the enactive phenomenologisation of nature is enacted as a distinctively epistemic project which overlooks or simply downplays the

the ontological. Thus, whilst on the one hand collapsing the epistemology/ontology distinction by shifting the focus to phenomenology, AE theorists on the other hand also (re)enact the distinction by presenting and developing critical aspects of it in a specifically epistemic key. In this particular example it is enacted *through* the call for a *reconceptualisation of the concept* of nature itself.

Thus the phenomenologisation of nature *qua* epistemic process of reconceptualisation not only continues to maintain a strict epistemology/ontology distinction but also *privileges* and prioritises the former over the latter. It is different concepts, theories and ultimately representations, which hold the key here. Epistemology becomes the dominant force here such that ontology, the realm of the ontological, recedes deep into the background. As far as ontology itself is concerned, being *qua* being, is enacted as being *qua discourses/theories/concepts of being* (see Appendix). This is made clear by Gallagher (2018), who questions “whether this kind of rethinking [the concept of nature] would leave the *practice* of science, as we know it, in place, as is, or not” (pp. 134-135, emphasis original) However, it seems to me that it is only if epistemology and ontology (or the conceptual/theoretical and empirical/practical in this case) are treated as separate to begin with, that we can legitimately ask the question of whether the former will or can impact the latter.<sup>75</sup>

One could at this point reasonably object that I am uncharitably reading the notions of “concept” and “reconceptualisation”. The call for reconceptualisation here signals towards an ambition not only to radically rethink our current theories but also our *practices* in regards to nature. Putting aside the dualist manner in which this concern is framed, it is a fair point. Nonetheless, we also need to recognise that AE theorists (e.g. Thompson 2007) *also* explicitly aligned concepts with theory, and theory is generally also enacted as an essentially *epistemic endeavour*. Enacted in this manner, the central concern becomes one over *representation: what is the most accurate way to represent X*

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<sup>75</sup> This is also present in Gallagher’s (2018) recent reading of Neils Bohr’s work on quantum theory. Gallagher in essence reads Bohr as providing an *alternative epistemology* for understanding nature. That is, Bohr himself, thanks to his quantum theory, in effect re-conceptualised nature. This reading is backed-up by Bohr’s claim that “[i]t is a mistake to think that it is the task of physics to find out how nature is. Physics concerns what we can say about nature” (Bohr as quoted in Gallagher (ibid.)). This is a perfect example of science understood in a “representational idiom” (Pickering 1994). For an alternative “ontological” reading of Bohr which understands science in a “performative idiom” (ibid.), see the Appendix, section on Karen Barad.

or *Y*.<sup>76</sup> As with the other examples used above, one's reading will vary depending on what apparatus is used.

The examples explored thus far have all been mobilised to show how and where enactive theorists enact an epistemology/ontology distinction which privileges and prioritises the former over the latter. This is bound to strike many enactive theorists as not only wrongheaded but a complete misreading of the enactive project. At stake here is the move from epistemology to phenomenology which I have seemingly, and perhaps conveniently for my particular ambitions, overlooked. Thus, the relationship between epistemology and phenomenology, is another theme which explicitly stood out for me in my diffractive reading(s). However, given its somewhat delicate nature, I want to dedicate a bit more space to it in order to ensure I can give it the attention and care it requires and deserves.

#### **4 Being and knowing and being *as* knowing**

AE theorists will undoubtedly want to object to most, if not all, of the above. The last example in particular clearly overlooks the fact, as we made clear in the previous chapter, that representation (the conceptual-theoretical) is simply not enough. All this talk of different enactments is all well and good, but, at the end of the day, AE's phenomenologizing of nature simply does not and *cannot* enact an epistemology/ontology distinction precisely because of its phenomenological underpinnings which eschew traditional epistemology altogether (see Kee 2018). Enactivism, particularly in the lineage stemming from Varela and developed further by AE, explicitly shifts the focus away from knowing towards *being*.

An explicit argument of this nature is found in a recent paper by Hayden Kee (2018) which questions my own (De Jesus 2016a) misguided criticism of AE. In it Kee takes issue with my suggestion that part of the AE argument for a LMCT illegitimately conflates epistemology with ontology.<sup>77</sup> I would like to briefly address Kee's particular concerns here as they are broadly representative of the overall AE position on this issue

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<sup>76</sup> We re-turn to the topic of representation in Chapters Five and Six. For a materialist informed understanding of theory, see Appendix.

<sup>77</sup> I consider this to be misguided because it is premised on an epistemology/ontology distinction to begin with. Indeed, my argument was precisely that AE does *not* respect this very distinction.

and also speak to the particular points I wish to discuss further. The discussion should moreover provide us with a good entry point into issues around the relationship between epistemology and phenomenology within AE. Of particular interest here is also how the the notion of ‘being’ is often *contrasted* with that of knowing within the AE literature.

According to Kee (ibid.), “[t]his distinction [between epistemology and ontology] in Kant emerges from an architectonic view of human cognition and a corresponding conception of nature and experience that phenomenologists reject”. Following the phenomenological tradition Kee (ibid., emphasis added) goes on to argue that, “there is much more to *our experience* of the lifeworld than can be accounted for given Kant’s basic categories and forms of experience. It follows from Kant’s transcendental deduction of the categories of the understanding that experience or knowledge of teleology can only be merely regulative. But phenomenologists need not accept these aprioristic conclusions concerning the nature and limits of understanding”. As such, given its phenomenological underpinnings, AE sidesteps the very distinction between epistemology and ontology enacted by Kant.

Given what was said in the previous chapter I cannot but be in complete agreement with Kee here: when these resources are threaded and brought together and read with and through modernist Cartesian materialism, then a rejection and subversion of the epistemology/ontology is indeed enacted. This is, of course, what we aimed to show in the previous chapter. But, and this is where I part company with Kee, I think the reverse is *also* true. Kee is of course correct to note that AE theorists reject Kant’s categories of understanding which are derived from “logic and forms of intuition corresponding to the spatiotemporal world of Euclidean geometry and classical mechanics” (ibid.) and how these are used to ground objective knowledge. Indeed, as we saw in the previous chapter, it is by drawing from a rather different set of resources (phenomenological/biological) that AE subverts these modernist categories.

However, I think it is also possible to show that the enactment of the distinction is also present *even when* enactive arguments are explicitly made on a phenomenological key; reading enactive texts through Latour’s analysis helps in this regard. Once we do so, what stands out most forcefully is the phenomenologically inspired insistence on the



*primacy of experience*. I want to suggest then that it is through this insistence that enactive theorists also enact a separation between the epistemological and the ontological which privileges the former over the latter. Phenomenology is for all intents and purposes thus regarded as a *type* of epistemology. This is in keeping with Maxine Sheets-Johnstone's (2004) instance that "phenomenology does not claim to offer anything beyond insights into the *how* of human knowing and into the foundations of human knowledge" (p. 249, emphasis original). To use a somewhat awkward expression inspired by Gad et al. (2015), we can say that, in these instances, AE theorists *epistemologize* phenomenology. Due to the arguably contentious nature of this claim, we will need to proceed slowly and *carefully* here.

Let us begin with Kee himself, whose quote above clearly emphasises the primacy of experience. As we saw in the previous chapter, this is of course the move routinely made by AE theorists when arguing that LMC requires something *more* than biodynamic continuity. The 'something more' is, of course, the phenomenology of first-person embodied experience. In those instances, equipped now with their phenomenological insights, AE theorists explicitly argue that they *know* – thanks to their embodied experience – that other living organisms are also teleological beings. It is this particular move which I am suggesting also enacts a separation between epistemology and ontology where the former is *privileged* over and to the 'detriment' of the latter.<sup>78</sup> But this raises a number of pressing questions. Most important of which, from an AE perspective, is whether it is legitimate to equate phenomenology with epistemology in this manner? Are these, after all, not two very distinct enterprises which need to be kept separate?

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<sup>78</sup> Indeed, while both the phenomenological tradition and enactivism place an *experiencing* subject as the foundation of action, a residual Kantianism (cf. Sparrow 2014) remains at play in both: both ultimately distinguish between the world itself and the subject's phenomenal experience – its unique perspective – of that world. Both moreover privilege experience, albeit in different ways, over the 'world'. Indeed, as is well known, Kant is especially suspicious of ontology (or "general metaphysics") since, he maintains, we cannot say anything about the true nature of things-in-themselves. In this respect we can say that some enactive theorists adopt "the very same Kantian metaphysical framework that view[s] epistemology as a distinct problem - namely, that any and all production of knowledge stems from individual or collective subjects that infuse what they see with their own conditioned presuppositions" (Kim 2019, p. 447). We re-turn to some of these issues in Chapters Six and the Appendix.

Here again we have a situation where theorists at once *both* keep these separate (as noted in the previous chapter) *and also* entangle them, such that their equation is in the process effectively legitimised. This entanglement is most explicitly visible when theorists cast experience – the primacy of experience – as a *privileged source of knowledge*. Recall Thompson’s (2004) instance that, “[i]t’s one thing to have a scientific *representation* of the mind as ‘enactive’ – as embodied, emergent, 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” (p. 382). Phenomenology is here cast as an endeavour capable of giving us certain types of *knowledge* that other epistemic practices are not capable of (see Baggs and Chemero 2018). Here phenomenology *is* essentially epistemologized.

Another exemplary enactment of this view is found in recent work by Vörös and Bitbol (2017). Discussing the insidious nature and far-reaching implications of Cartesian dualism, the authors argue that “an *epistemic wound* inadvertently opened, one that has not yet fully healed and has separated the (cognitively underprivileged) ‘lived experience,’ in which I, as an *embodied agent*, seem to be intimately and meaningfully intertwined with the world, from the (cognitively privileged) ‘theoretical attitude,’ where I, as a *disembodied observer*, seem to be separated from my embodied self, the world, and the others” (p. 32, emphasis original). Although the authors treat knowing (epistemology) and being (phenomenology) as distinct, they are nonetheless also entangled by virtue of enacting both as different means of acquiring (cognitive) knowledge. Framing the issue in terms of an “epistemic wound” seemingly only reverses the order of privilege and continues to enact phenomenology as a type of epistemology. Consequently, shifting the focus from knowing to *being* – being *qua* phenomenological embodied lived experience – does not, in this case, collapse the epistemology/ontology distinction but simply re-enacts a variation of it.

At this point I would like to draw our attention to how the notion of ‘being’ is used here, which is perfectly in keeping with how it is generally used throughout much of the AE literature. The notion of being, as used within the AE literature, is distinctly phenomenological (as opposed to ontological and metaphysical) in character. AE theorists tend to follow Varela’s phenomenologically inspired understanding of being as

“experience, sense-of-self or directed knowledge”. Varela contrasts this with epistemology, or “knowledge” more specifically, which he understands as “description nomological net, logical discourse” (Varela 1978, p. 66, as quoted in Vörös and Bitbol (ibid.)). For Varela there is an inherent tension between the two notions which can only be resolved by recognising how both “mutually specify each other” such that “every knowledge requires a certain level of experience and vice versa” (ibid.).

This is, in many respects, simply another variation on the proposed “fundamental circularity” discussed above and in previous chapters. But here the epistemic underpinnings of this circularity are considerably more explicitly enacted: the tension between knowing and being can only be resolved once we recognise that the *knowledge* attained from either side is inherently implicated in both. But, just as with the notion of fundamental circularity, the realm of the epistemic *qua* phenomenological is divorced from the ontological and the former is privileged and prioritised over the latter. We are once again caught in an unescapable circle (a ‘*hermeneutic*’ circle) of recursive self-referentiality. Ultimately, insists Varela (1996), what the study of mind and cognition needs is a “corpus of well-integrated *knowledge*” (p. 343, emphasis added). Here, again, the phenomenological is cast in epistemological terms.

As a final example, consider Jonas’s remark that, “life can only be *known* by life”. This is a point routinely found within the AE literature which also enacts phenomenology as a type of epistemology. As Steve Torrance (2016) points out, Jonas is making “a deep *epistemological point*, one that he develops over much of the book, and in many different ways - a point summed up in his often-quoted phrase that “life can only be known by life”” (p. 223, emphasis added). It is only the distinctive experience of being an embodied living being which provides us with an important type of *knowledge* not otherwise obtained or obtainable. Indeed, it is perhaps only by understanding the phrase in this manner, that it does not collapse into an empty tautology. Be that as it may, the point is, with this quote theorists are directly aligning phenomenology with epistemology and consequently epistemologizing it.

The case being made here, that phenomenology is in certain places and by some theorists enacted as a type of epistemology, strongly echoes Eduardo Viveiros de

Castro's assessment of phenomenology within the modernist project. According to Viveiros de Castro (2004a) "phenomenology, new or old — and especially the phenomenology invoked these days by anthropologists — may be a surrender to epistemology. Is not 'lived world' a euphemism for 'known world,' 'represented world,' 'world real for a subject'?" (p. 494). For Viveiros de Castro, not unlike Sheets-Johnstone, phenomenology is simply a species of epistemology and should therefore be treated likewise. Insofar as phenomenological insights are routinely and explicitly presented by AE theorists in epistemic terms, experiences become simply another type of knowledge.

To conclude this section, we have shown that in *certain concrete instances* AE theorists directly align and thus enact phenomenology as a type of epistemology. In these concrete instances, in the varied ways it is done, phenomenology *qua* epistemology is in turn divorced from ontology and prioritised and privileged over it. In the next section we explore another possible concern that this analysis could potentially bring up.

## **5 The case of/for (non-modern) enactive epistemologies**

Now, even if our analysis thus far is on the right track, it could be argued that one cannot equate the epistemology and indeed the ontology of the enactive project with that of the modern Constitution. This is a legitimate concern which also needs to be *carefully* addressed.

The analysis from the above sections might lead to the following concern: they clearly presuppose that once prised apart, epistemology and ontology *retain* some, if not all, of the distinctive features of the modern Constitution. AE theorists could perhaps (begrudgingly) accept that at certain crucial points they do indeed enact a distinction between epistemology and ontology. Or even concede that, in a certain sense, phenomenological embodied experience is tantamount to another type of knowledge. But, even if this were indeed the case, I have not shown that the epistemology or the ontology which underpins this distinction is in any significant way congruent with the modern Constitution. After all the epistemology envisioned by the modern Constitution is underpinned by the idea of a Cartesian subject, a detached and singular individual

standing over and above the world observing it and rationally contemplating it in their mind.

Thus, the legitimate observation that enactivism is by and large enacted as an epistemic project, should not (illegitimately) be misconstrued as an active propagation of one of the modern Constitution's core tenets. Surely one cannot (legitimately) equate a thoroughly non-modernist enactive epistemology with the epistemologies of the modern Constitution (cf. Cuffari et al. 2021). As noted above, for many enactivists, an *alternative epistemology* is precisely what the cognitive sciences *need* (see Cummins 2020; De Jaegher 2020, 2021). Moreover, we simply cannot ignore the very relevant fact that enactivists of all stripes see their work as an ongoing *reconfiguration* of the very nature of (traditional) modernist epistemology itself.

None more so than the very AE theorists considered in this and the previous chapter. These theorists continue to push for a “new epistemology”. Just to take one of the most recent examples, Hanne De Jaegher has recently argued that we need an “engaged—or even engaging— epistemology of human knowing” (De Jaegher 2021). An engaging epistemology which, for De Jaegher, can be understood through the lens of our “loving relationships”. Even without going into specific details, it is already evident that such an epistemology is as far removed from that envisioned by the modern Constitution as one could imagine.

Nonetheless, despite the insights and promise of non-modernist epistemologies, a number of feminist and social science scholars have also pointed out that these are not sufficiently disentangled from modernist modes of thought and practice. The issue here is precisely the insistence, be it implicit or explicit, on the *priority* of epistemology. A number of diverse scholars (e.g. Barad 2007; Blaser 2018; Haraway 2016; Hekman 2010; Holbraad and Pedersen 2017; Kim 2019; Kohn 2013; Mol 2002; Latour 1999; Law 2004a; Savransky 2021; Viveiros de Castro 2004a), have not only questioned this ‘excessive’ concern over epistemology but also insisted that it effectively *reinscribes*

some of the very dualism(s) it is trying to overcome.<sup>79</sup> This is an issue which will occupy much of the Appendix and I therefore do not want to spend too much time on it here. Nonetheless, a few provisional words are required.<sup>80</sup>

The central issue for many of these scholars, a point which we have already noted in Chapter Two with regards to the role of epistemology within the modern Constitution, is that the privileging of the epistemological often runs hand in hand with the *neglect* of the ontological. The significance of this, according to these theorists, is that the heterogeneous material assemblages, which constitute *multiple* worlds (the ontological), remain forever out of reach. Or, to put this in slightly different terms, purely epistemic accounts of the world *cannot adequately account for ontological differences*. These scholars thus maintain that difference is an *ontological* matter rather than an epistemic one. Therefore, insightful and promising as alternative non-modernist epistemologies are, they nonetheless continue to miss the ontological multiplicity of the world (see Law 2004a; Pickering 2017).

To help illustrate this point, consider again Di Paolo's (2018) claim that, "[t]heories of cognition should be able to provide the operational conceptual categories with which to describe their objects" (p. 75). Such a position, according to these scholars, would *flatten* ontological differences precisely by providing and thus *pre-establishing* fixed epistemic categories to which certain phenomena must then fit. Many STS scholars have found this type of epistemic boundary-making practice – a quintessentially modernist concern – unsatisfactory. This is because, in the words of Chapter Two, differences are here enacted in a *representational* rather than a performative key.

From such a representationalist stance, what is most important for AE theorists, is the development of an alternative epistemology – different ways of knowing a specific phenomena – which rejects Cartesian materialism and other modernist forms of scientific objectivity. As we have seen, these theorists argue that what we need here is a

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<sup>79</sup> It should be noted here that these scholars, by and large, do not take issue with epistemology *per se*, but rather with the tendency to separate the epistemological from the ontological and then render the latter as merely a species of the former. See the Appendix for further discussion on this point.

<sup>80</sup> Here again I would suggest that the reader re-turn to this section after having read the Appendix. However, what is written here should be sufficient to provide a somewhat rough-and-ready sense of the particular issues at play here.

*different non-modern understanding of knowledge itself.* What needs to be changed or replaced is not so much the notion of epistemology itself but rather the *type* of epistemology. As Di Paolo et al. (2018, p. 17) argue, what is required is a change of “epistemic frame” which underpins much of modern (cognitive) science. Essentially, the authors maintain, what is needed is an epistemology which is more in tune with the direct evidence of our embodied being-in-the-world.

By contrast, the scholars that have challenged the over privileging of the epistemic, argue that this ultimately leaves the heterogeneity of the world completely intact and as a consequence perpetuates the distinction between nature and culture. In the words of anthropologist/STS scholar Anna Tsing (2019), “as long as human knowledge apparatuses continue to make up the frame through which we know multiplicity, nonhuman makings never enter” (p. 222). According to these scholars there are different *worlds* being enacted here and not just different knowledges *of* the world. Whereas the latter (tacitly) presupposes the existence of a singular reality the former challenges this. Enactive epistemologies challenge modernist/Cartesian epistemic orthodoxies, but leaves intact the equal modernist/Cartesian conviction that what we need is a better epistemology; better ways of knowing and accounting for the world.

Reading the enactive call for alternative epistemologies with and through selected texts by the aforementioned scholars brings to the fore how this call becomes entangled with the modern Constitution. It suggests that these epistemic alternatives, although far removed from traditional epistemologies, nonetheless follow this tradition with its concerns for multiplying representations of the phenomenon at hand while paying significantly less attention to the phenomenon itself and that which ontologically constitutes it. Indeed, it is this concern for and privileging of epistemology, which enacts this dualism in the first place. Just like traditional epistemologies, it becomes entangled with and reproduces the more commonplace view which cuts-up the world into the two separate domains of nature and culture and places the human squarely within the latter while leaving the former completely ‘intact’ (see Barad 2007; Jensen 2017; Latour 1999). But what about the notion of ontology itself?

While AE theorists attempt to change the concept of epistemology, the same cannot be said for that of ontology. The previous sections have been centred around drawing attention to the observation that different theorists at different times and in different places have enacted an epistemology/ontology distinction which retains some key modernist characteristics of both. Most of our discussion thus far has focused on epistemology. But what about ontology?<sup>81</sup> What is it exactly that is being ‘neglected’ in these examples? More importantly, perhaps, is how and in what way, ontology retains key modernist characteristics?

The first point to note in this regard is that, as far as the ontological is concerned, it is by and large attained *through the epistemic*; because epistemology and ontology are taken to be two separate domains and epistemology is in turn tacitly taken to ground ontological claims, the ontological in these instances simply *surrenders* to the epistemic. It is, to put it more diplomatically, rendered invisible. To borrow a very apt phrase from Gad et al. (2015), these enactive theorists in effect “*epistemologize ontology*”. Following Gad et al. (ibid.), to epistemologize ontology in this sense is to effectively draw *ontological conclusions from strictly epistemic considerations*. It is to reduce the realm of the ontological to that of the epistemological.<sup>82</sup> In these cases, the ontology of the world, is always-already derived from or reduced to an epistemology. Thus what is *known*, either through subjective experience, theoretical considerations and/or scientific modelling, serves as the basis for ontological conclusions about what there *is*. In Chapter Six we will explore more specific examples of this phenomenon.

The second point to note here with regards to ontology is that it also does not significantly depart from the more traditional modernist conceptions of it. In the instances we have observed above, ontology is always conceived as theoretical-cum-

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<sup>81</sup> The term ‘ontology’, as used in philosophy, predominately refers to the nature and essence of true *Being*. As a first approximation it can be understood as the study of what there *is*. Hence the use of capital B, which signals to ‘essential stuff’, all that very essential stuff which furnishes our world and thus makes it really real. We will re-turn to issues to do with ontology in Chapters Six and the Appendix.

<sup>82</sup> A particularly good example of this is found in a recent paper by De Jaegher (2020) who casts indigenous knowledges as “worldviews”. Several indigenous scholars (e.g. Blaser 2010, de la Cadena 2015; TallBear 2017; Watts 2013) have, however, pointed out that doing so reinscribes Western modernist dualist logics into indigenous practices (see also Kim 2019; Savransky 2017 for a sociological/ decolonial take on the topic). The very dualist logics which De Jaegher is attempting to disrupt. These authors suggest that, rather than thinking in terms of different forms of *knowledges*, it would be more productive to think of these as different *material* (ontological) practices.



conceptual, enacted in the *singular* and always in reference to the *essential*, the *intrinsic* and the *universal* (see, for example, Cuffari et al., 2021). This is perhaps most clearly evident in cases where theorists enact their concepts and ideas as *universal metaphysical propositions* about the (true and universal) nature of mind and life. The true and *really real* nature of mind and life is not only disclosed by enactive theorists but also rendered as stable, ahistorical and universal.

Thus invocations of ontology, when they do occur, never quite bypass the implicit intuition that reality simply *is what it is* and as such does not and cannot exist in different forms. It is true that very often, for AE theorists, these claims are underpinned by a process-based rather than substance metaphysics. However, the singularity of ontology tends to remain intact even in these cases, as more often than not one *fundamental ontology* is simply made to replace another (see the Appendix).

To bring the various threads of our discussion thus far together, we can make four distinct though intimately related points: (i) enactivism is generally enacted as an epistemic project; (ii) several of its core ideas enact a clear distinction between epistemology and ontology which (iii) prioritises the epistemic over the ontological (iv) in and through these processes, these theorists at the same time contrive to enact one of the most central tenets (nature/culture dichotomy) of the modern Constitution.

Having spent the first half of this chapter exploring some of the ways in which AE becomes deeply entangled with the nature/culture dichotomy vis-à-vis the epistemology ontology distinction, I now want to turn the focus towards a different modernist tenet. More specifically, I want to explore some of the entanglements between the enactive approach and anthropocentrism.

## **6 Enacting anthropocentrism by neglecting more-than-human worlds**

As a point of entry for our discussions of anthropocentrism I want to re-turn to Jonas's bio-phenomenology. Recall how Jonas, who is generally regarded as a phenomenologist, explicitly distanced himself from the phenomenological tradition. What particularly troubled Jonas was that traditional phenomenology centred its focus exclusively on human forms of mentality and payed little to no attention to nonhuman

lifeforms. In Jonas's view, one cannot sever human mentality from the rest of the animal kingdom. Jonas thus recognises a certain latent, though deliberate, *anthropocentrism*,<sup>83</sup> within traditional (existential) phenomenology which prevents it from fully appreciating the deep continuity between life and mind (Jonas 1966, p. ix). And, of course, this is a feature of Jonas's thought which AE theorists have found particularly inspirational.

Whether Jonas is correct on this assessment of phenomenology is not the concern here. Rather, my interest here is to show how, despite rejecting anthropocentrism, Jonas also seemingly embraces and therefore reproduces it. Consequently, we will see how enactive theorists, inspired by Jonas, re-enact facets of this anthropocentrism. Although the notion of anthropocentrism is often explicit within Jonas's work, its force became especially apparent to me when this work was read with and through a number of feminist science studies texts (e.g. Barad 2007; Bennett 2010; Haraway 2008, 2016; Puig de la Bellacasa 2017) and research from multispecies ethnography (Kirksey 2014, 2015; Kirksey and Helmreich 2010; Kohn 2013; Ogden et al. 2013; Tsing 2015; Van Dooren 2014; Van Dooren et al. 2016).<sup>84</sup>

One of the first things which becomes directly apparent upon changing the diffractive apparatus in the particular context of the Jonas-AE nexus, is that the notion of anthropocentrism is considered only in relation to *living nature*. This follows the more traditional understanding of the notion where the human is positioned over and above all other living organisms and human sense-making is taken as the only "constitutive force of our world" (Allen 2015). In the previous chapter we saw how AE's distinctive LMCT was enacted precisely as one means to decentre the human and as a consequence directly subverted this aspect of anthropocentrism.

In what follows I would like to explore how Jonas, and AE theorists after him, re-enact and thus reinforce and perpetuate this very aspect of anthropocentrism. However, before doing this, I want to first draw attention to and explore the enactment of another facet of

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<sup>83</sup> Anthropocentrism is a general tendency to take human beings as the central or most significant entities in the world (see Boddice (2011) and essays therein).

<sup>84</sup> Latour's analysis, STS and STS-inspired anthropology were equally important in this respect and were therefore also intimately present throughout these readings. The multiple and multiply diverse entanglements between these different texts should become apparent as these sections unfold.

anthropocentrism as it relates to *nonliving nature* which is not usually, if ever, taken to be a matter of concern within the AE literature. This facet of anthropocentrism comes most prominently to the fore once Jonas/AE's LMCT is read with and through the aforementioned works from feminist science studies and multispecies ethnography. But what exactly is anthropocentrism with regards to the nonliving?<sup>85</sup>

To illustrate this type of anthropocentrism I will explore some examples of how *nonliving materiality* (i.e. tools, objects, technologies and nonliving nature more generally and broadly) figures within certain enactive discussions. In line with the modernist conviction that there is an inherent (intrinsic) distinction between living and nonliving nature, nonliving materiality is often enacted as a passive and inert *resource* which exists purely for human use/control and consumption. Thus the anthropocentrism enacted in this manner is one which directly positions human (or living organisms) *agency* against *passive* material nonhuman (nonliving) matter (cf. Malafouris 2013). Matter here becomes a “passive landscape upon which humans act” (Allen 2015, pp. 4-5). Thus the human is placed above nonhuman (nonliving) nature which it deems to lack any material agency (cf. Bennett 2010).

Enactive theorists, like proponents of 4E cognition in general, are of course very much concerned with how organisms use ‘external’ tools and ‘resources’ as either constitutive or complementary of cognitive processes. However, the ‘issue’ of interest here is not that organisms use different tools in order to perform cognitive tasks. Rather, I want to show how these material resources are, in certain cases, understood, conceptualised and treated – in other words, enacted – as mere *passive resources* devoid of any material agency to be used and rationally controlled by humans (Bennett 2010; Pickering 1995; Latour 2005).<sup>86</sup> This is especially important here because, unlike within STS, anthropology and feminist science studies, this particular enactment of

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<sup>85</sup> Note that these two different ‘facets’ of anthropocentrism explored here should be understood simply in methodological terms rather than as descriptions of two ontologically distinct categories. Thus, for the purpose of this discussion, I will provisionally put aside any questions regarding the legitimacy of the distinction between the living and the nonliving which this distinction seemingly presupposes (but see the Appendix).

<sup>86</sup> One very notable exception here is the work of Malafouris (2013) who has dedicated a considerable amount of attention to material agency. This conception of material agency is in turn greatly influenced by work in actor-network theory (ANT). Whether Malafouris's work is enactivist, or what type of enactivism he enacts, is an altogether different question which cannot be addressed here.

anthropocentrism is never acknowledged or indeed even recognised within the broader enactive literature. And, as such, its potential implications will simply continue to go unnoticed. But first, we need some ‘new’ terminology to help us think-with and through these issues.

When discussing these types of issues, scholars from STS, anthropology and feminist science studies (e.g. Blaser 2014; de la Cadena 2015; Haraway 2016; Tsing 2013) tend to use the phrase “more-than-human”. This is generally done specifically to draw attention to the entangled heterogeneous material agency found within and between living and nonliving worlds. I find the phrase useful, insightful and good to think-with. I was/am especially drawn to Maria Puig de la Bellacasa’s (2017) rendering of the notion and find it particularly helpful as a tool to think-with and through notions of anthropocentrism (and anthropomorphism, see below). For Puig de la Bellacasa (ibid.), more-than-human worlds always refer “in one breath [to the] nonhumans and other than humans such as things, objects, other animals, living beings, organisms, physical forces, spiritual entities, and humans” (p. 1), which are routinely involved in heterogeneous multiple world-making.

I find this rendering of the “more-than-human” helpful for two distinct but interrelated reasons: (i) it opens up a legitimate space for recognising and acknowledging the agentic involvement of not only humans and animals but all living organisms, material forces, objects *and spiritual entities* (see Savransky 2021; Watts 2013). All of which can *actively* contribute to the making of *heterogeneous multiple material worlds*.<sup>87</sup> As a consequence, (ii) it substantially broadens the “ontological scope” (Puig de la Bellacasa, ibid.), such that we can recognise and acknowledge the deep material entanglements and effective agency of *all* these diverse entities on our planet. This allows for the *multiple ontologies* which Mol (2002) calls for and not to be saddled with, for example, an

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<sup>87</sup> I want to especially emphasise that by the ‘more-than-human’ I am not only referring to those technoscientific objects – Latour’s “hybrids” – which directly undermine and actively undo the modernist (dualist) project. Rather, the notion is used throughout this work as a means to both acknowledge and recognise those spiritual entities such as angels and ghosts, Gods and Goddesses, djinns and spirits which can often be overlooked not only within the cognitive sciences and enactivism itself but also in the objects of technoscience and hybrids (see Blaser 2010, 2014). That is, as a means to recognise and acknowledge the *ontological existence of these entities within certain worlds*. We will return to some of these issues in Chapter Six and the Appendix.

ontology as determined solely by natural science.<sup>88</sup> Thus, to think in terms of more-than-human world-making is to, at the same time, also enact a thorough reconfiguration of anthropocentrism *both* in relation to the living *and* the nonliving, since agency itself is distributed across multiple (living/nonliving/spiritual) entities within these (more-than-human) worlds.

With this in hand, we are now better placed to explore AE's entanglement with this facet of anthropocentrism. More specifically, I want to show how, despite AE's emphasis on external material tools and structures in the constitution of cognition, these nonhuman material resources are often enacted as passive, mute and essentially devoid of any significant material agency. In the context of the phenomenologizing of nature for example, external tools, resources and nonliving nature more broadly, if considered at all, come across as passive static entities which simply succumb and surrender to human will and desire. The (inorganic) nonhuman thus tends to be enacted as a mere passive resource or constrain for human endeavours.

As a direct point of contrast, consider for example the works of Bruno Latour, John Law and other like-minded STS scholars, who tend to enact nonhumans as much more than mere passive and inert resources. A running thread amongst these authors, albeit one which is variously enacted among them, is that the nonhuman is itself an *active* force composed of what the political ecologist Jane Bennett (2010) calls "vibrant matter". These scholars insist that, as Allen (2015) points out, "things" also have the ability to "act, engender effects and modify circumstances" (p. 5).<sup>89</sup> Agency is thus cast as a process which emerges within hybrid heterogeneous material assemblages involving relations between a diverse array of human and nonhuman entities of various sorts.

This claim is perhaps inherently ambiguous and therefore bound to elicit multiple reading/interpretations/enactments (see Sayes, 2014). It might then be helpful to slow down here again and think *carefully* through and with this particular claim. To help us

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<sup>88</sup> On the notion of multiple ontologies see the following three chapters. For a more in-depth discussion of ontology, particularly as implicitly understood here and in previous chapters, see the Appendix.

<sup>89</sup> Much of this work aims to subvert and trouble what they take to be an essentialist and universalist distinction between the living and the nonliving; between genuine agents and passive, inert, and essentially dead objects (see, for, example Barad 2007; Bennett 2010; Haraway 2008; Latour 2004b; Law 2004a; Mol 2002; TallBear 2017). This will be further explored in Chapter six and the Appendix.

do so, let us briefly consider one of the very few, if not the only, encounters, between AE and STS. This will also provide us with one example of an anthropocentric conception of nature within AE.

In a paper aiming to clarify and remedy the uncritical and questionable excessive use of the notion of agency within a number of closely related theoretical perspectives, Tom Froese (2014) takes issue with Latour's "asymmetrical sociology", for granting the nonhuman agency. In Froese's reading of Latour, humans and tools are *equivalently* endowed with agency. Based primarily on this assumption of equivalency, Froese then goes on to dismiss this position on the grounds that Latour, in giving *human* agency to tools, "trivialises" the notion of agency.

Although the notion of agency within STS and related areas of research is a much disputed topic, it is nonetheless true that Froese also misses the point of Latour's asymmetrical sociology: it is *not* that nonhumans have *human-like* agency but rather that nonhumans are re-configured as *active participants in heterogenous more-than-human worlds* of becoming and not merely passive and inert resources for human use. Moreover, in this context, agency is not something which individuals, be they human or nonhuman, either 'possess' or lack, but rather something which is *enacted within broader material networks*. In more actor-network theory (ANT) congruent terms, there is no insulated actors, only actor-networks (see Latour 2005). In the words of Donna Haraway (2008), "[t]o be one is always to become with many" (p. 4). Thus agency and agents are enacted here as fluid heterogeneous processes which cannot be identified and fixed beforehand and prior to investigation.<sup>90</sup>

For Froese (*ibid.*), a "tool owes its very existence as a tool to the concerned activity of a potential user who will employ it for some purpose, such as cooling a room, and the

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<sup>90</sup> Thus, whereas AE theorists *begin* by first identifying and demarcating – once and for all – what constitutes both agents and their subsequent agency, STS and feminist science studies scholars insist that these need to be investigated on a case-by-case basis and can therefore not be taken as settled categories. This signals directly to the fact that Froese's discussion is conceived epistemically and thus casts Latour's position as an equally epistemic proposal. An epistemic proposal which seemingly separates the epistemic from the ontological. This is most evident when Froese (*ibid.*, p. 545) equates Latour's proposal with Clark and Chalmers's (1998) so-called "parity principle" for cognitive extension. But Latour neither separates nor privileges the epistemic over the ontological. We will re-turn to some of these issues in the Appendix.

user's autonomous agency depends on her embodiment as an organism" (p. 547). Even if this is an accurate description of the situation, it nonetheless remains the case that it neglects precisely what Latour and other STS researchers are trying to bring to light: that a tool in turn equally transforms humans and is thus not merely passively responding to human needs. Naturally not in the same way that the human does but a transformation nonetheless occurs. Froese *does* recognise this but nonetheless also undermines the point. Thus, Froese (ibid.) concludes that, "the tool–user relationship is still characterized by an *essential asymmetry*" (p. 547, emphasis added). Through this conclusion, Froese enacts a species of anthropocentrism which aligns agency only with the human (and the living more broadly) which at best simply subjugates and at worst relegates the nonhuman (nonliving) to the status of passive and agency-less stuff.

Let us consider another concrete example where a similar type of anthropocentrism is enacted within the AE literature. Not unlike the recent turn to (new) materialism(s) within some feminist circles (see Dolphijn and Van der Tuin 2012), Di Paolo et al. (2018) have recently also explicitly challenged traditional passive conceptions of materiality and have instead argued for what they term an "active materiality" (p. 20). The authors highlight and then align themselves with work in physics and the complexity sciences more broadly which re-conceives matter as fundamentally dynamic and active rather than mechanical, deterministic and inert. This is in some respects not unlike the positions developed by ANT-inspired STS. However, there are also some significant differences which are particularly relevant for our current discussion.

Di Paolo et al. (ibid.) certainly signal towards, and briefly enact, a position which casts *all matter* as inherently *active and lively*. However, the reverse is *also* more consistently enacted by the authors. Throughout most of the text, *nonliving matter*, insofar as it appears, is also enacted as *inactive* and thus *passive*. This happens when the authors endorse a *principled distinction* between the organic and the inorganic, and align (genuine) agency solely with the former. Thus, for Di Paolo et al., "living bodies are *more concrete* than machines" and "more concrete than any "inert" matter in that it is rooted in ongoing dynamic relations" (ibid., p. 60, emphasis added).

Here we see that/how nonliving matter is never truly considered active in its own right but functions only as a kind of intermediary level – an interface perhaps – between the prespecified levels of the organic and the inorganic. For Di Paolo et al. (ibid.), it is this intermediary level, which allows for and makes possible full-blown agency *without* itself being agentic. However, as Haraway (1991) noted some decades earlier, such a position not only continues to perpetuate a dualism between the organic (human/animal) and the nonorganic (machine), it also fails to appreciate how “machines are disturbingly lively, and we ourselves frighteningly inert” (p. 152). So it is that, by not taking nonliving materiality as a serious matter of concern, AE theorists become entangled with and enact a specific facet of anthropocentrism.

We will re-turn to the topics of agency and materiality in the following chapters. For now, the point to bear in mind is that Di Paolo et al. (ibid.) enact nonliving matter as both active and inactive at the same time. When enacted as inactive, the authors at the same time enact a specific variation of anthropocentrism. In the next section I want to explore the more common facet of anthropocentrism as it more concretely pertains to the living.

## **7 Anthropocentrism and its entanglements with anthropomorphism**

But what about the more familiar understanding of anthropocentrism which is unquestionably a matter of concern for both AE and Jonas? The anthropocentrism regarding *living* nature specifically, which Jonas recognises within classical phenomenology, and actively seeks to reject. We have already seen in the previous chapter how Jonas rejected and thus overcame this type of anthropocentrism; in this section I want to explore how both Jonas and AE theorists also at the same time reproduce and perpetuates it.

However, it is worth noting from the outset that anthropocentrism and anthropomorphism are often entangled and intertwined both within the work of Jonas and AE when it comes to this specific matter of concern. For this reason I want to first approach the notion of anthropocentrism as it pertains specifically to living nature by exploring aspects of anthropomorphism within this work. But first, what exactly is anthropomorphism, and why is it regarded by some as something to be avoided?



Anthropomorphism, from the greek *anthropos* and *morphe* meaning ‘human’ and ‘form’ respectively, is the tendency to project distinctively human characteristics to nonhuman animals or inanimate objects (see Kennedy 1992). So how/where does Jonas, and the AE theorists who follow him in this regard, enact this type of anthropomorphism?

Recall that, for Jonas (1966), the continuity between humans and other lifeforms serves as a basic methodological principle which informs his broader philosophy of nature. The enactment of anthropomorphism enters the picture by virtue of the fact that this methodological principal is underpinned by a *phenomenological commitment to human experience* (the existential interpretation of biological facts). In so doing, Jonas also enacts a type of life-mind continuity which is distinctly anthropomorphic (and indeed anthropocentric) in nature.<sup>91</sup> This is succinctly encapsulated in Jonas’s (ibid.) somewhat surprising claim that, “man is after all the measure of all things – not indeed through the legislation of his reason but through the exemplar of his psychophysical totality which represents the maximum of concrete ontological completeness known to us” (p. 23). This quote is particularly instructive as it clearly highlights the complex entanglements between anthropomorphism and anthropocentrism within Jonas’s work.

Thus, for Jonas, we can “take the presence of purposive inwardness in one part of the physical order, viz., in man, as a valid testimony to the nature of that wider reality that lets it emerge” (ibid., p. 37). And so it is that “*man*”, from his own inner experience, bears testament to the inner experiences of the rest of organic nature. Jonas *starts* from the experiences of “*man*” (anthropocentrism) then *proceeds down the phylogenetic scale* endowing nonhuman living organisms with a phenomenological interiority derived from *his own* inner experience (anthropomorphism).

It is worth noting here that Jonas himself was keenly aware of both his own anthropocentrism and anthropomorphism (cf. Villalobos and Ward 2016). For Jonas,

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<sup>91</sup> Jonas (ibid., pp. 57-58) recognises and traces this sort of anthropomorphism to Descartes dualistic partitioning of the world into *res extensa* and *res cogitans*. With this distinction, Jonas argues, all value, purpose and subjectivity are striped from nature and become sole properties of human minds leaving the rest of nature effectively dead. Jonas goes on to point out that this notion of anthropomorphism unquestionably stipulates that animals have no mentality whatsoever and so makes it difficult to understand how humans themselves acquired these properties. Jonas thus embraces anthropomorphism as a means to overcome anthropocentrism. However, as we will soon see, this leads to some mixed results.

anthropomorphism was necessary because without it we would be unable to adequately account for the intrinsic interiority of human beings let alone that of nonhuman organisms. While anthropocentrism, which Jonas did not see in these terms, was tacitly justified essentially on ethical grounds. For Jonas, the placing of the human at the centre of the living/nonliving world, whom he endowed with a certain “nobility”, merely implied that we have an inherent ethical responsibility towards the rest of nature. This is particularly evident in the Epilogue to Jonas (1966) and also Jonas (1996). Although Jonas’s intentions might very well be admirable they are not entirely without their problems.<sup>92</sup>

We should therefore ‘care’ about preserving the integrity of nonhuman life-worlds, but we should do so primarily because we are the highest expression of life's purposiveness. And as its “highest expression” we – we *qua* “human(s)” – are the protectors and guardians of life. Jonas’s position here can be understood to be underpinned by a politics of responsibility which inevitably continues to place the human at the centre of the universe. This in turn presupposes a very strong conception of human agency itself. Although part of nature, the human is nonetheless able to transcend it and its more synchronic current circumstances, and collectively as a species cannot only save the rest of nature but also guide its destiny in the manner it so desires.

However, when we broaden the ontological scope and embrace the inherent interdependency of lifeforms within broader more-than-human materially agentic worlds, a somewhat different ethics which sidesteps a politics of responsibility, might very well be required (Shotwell 2016). If agency is a distributed process which emerges only through the relationships between human and nonhuman within and across heterogeneous more-than-human worlds then humans cannot legitimately be cast as the custodians of nature. This posthumanist conception of agency thus thoroughly disrupts the politics of responsibility which sustains a Jonasian ethics. It calls for an ethics which curtails the superiority of human ethical subjectivity of the sort envisioned by Jonas and suggests instead that humans are not protectors or custodians of nature but, for better or

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<sup>92</sup> One such ‘problem’, worth noting here, is that this anthropocentrism is also deeply biocentric such that it draws a wedge between living and nonliving nature and places its focus primarily on the former. It is therefore essentially anthropocentric inasmuch as it seemingly overlooks – if not altogether neglects – nonliving nature (see TallBear 2011, 2017). We will re-turn to this point below and the Appendix.

for worse, *active participants within* these more-than-human material worlds (see Puig de la Bellacasa 2017).

Evidently, there are important strands of Jonas's philosophy of nature which are both variously anthropocentric and anthropomorphic. The latter often being a direct consequence of the former. This can be made more explicit by summing this up in terms of the following two points: Firstly, certain key aspects of Jonas's work are explicitly anthropomorphic as a means to overcome the modernist erasure of interiority both in the human and the nonhuman. It is also enacted by thinking *man* and his experiences *first* (see Tyler 2009). Secondly, whilst aiming to overcome the excesses of anthropocentrism, an anthropocentric anthropomorphism is nonetheless re-enacted precisely by placing man above all nature and casting him as representing "the maximum of concrete ontological completeness".

We thus see in the work of Jonas a dual enactment of a philosophy of nature which directly pulls in two opposite directions: on the one hand, mentality is not simply an exclusively human property but rather something found across all of (living) nature, while on the other hand, this mentality is anthropocentrically/anthropomorphically conceived through the lens of *human* phenomenology and projected downwards to other living organisms. A similar sort of dual enactment is also found within the AE account and can be directly traced to Jonas.

Consider the following claim: strongly echoing the work of Jonas, Di Paolo (2005) argues that, "our own embodied experience does not withdraw, but trickles onto the natural world across the bridges provided by Darwin" (p. 431). Two points need to be highlighted about this poetic quote. First, it is *our* embodied experiences which trickle down. Second, the natural living world now possesses experience which are in some generally unspecified manner *just like ours*. Di Paolo at once enacts lifeforms as experiencing agents in general *and* as agents whose experiences are, in some unspecified manner, just like ours. While the former enactment rejects anthropocentrism and possibly anthropomorphism, the latter reproduces and perpetuates both. It enacts the lived experiences of other living entities as structurally similar to those experienced by human beings and vice versa.

This position is also perfectly encapsulated in Thompson's Jonas-inspired claim that "certain basic concepts needed to understand human experience turn out to be applicable to life itself" (2007, p. 129).<sup>93</sup> With this single claim, Thompson enacts both the rejection and the reproduction of both anthropocentrism and anthropomorphism. The rejection of both is perhaps too obvious to need any type of further clarification. The reproduction, however, emerges as Thompson takes human experiences to be an adequate guide to the experiences of nonhuman living others. The human is taken as the unquestionable starting point (anthropocentrism) and his experiences are then cast down towards the rest of living nature (anthropomorphism).

Broadly speaking, Di Paolo and Thompson, as well as a number of other AE theorists after them, seemingly follow Jonas in both directions. They reject anthropocentrism and possibly anthropomorphism by casting minds as processes evident in most of living nature and not exclusive to humans. At the same time, these theorists also take first-person embodied experience *as the basis for* attributing teleology, meaning and sense-making to nonhuman lifeforms. Insofar as this is the case, these AE theorists, just like Jonas, are rendered as 'external observers' attributing phenomenologically grounded *human like* experiential/cognitive characteristics to nonhuman lifeforms. A position which exemplifies both anthropocentrism and anthropomorphism.

The notion of anthropocentrism, as we saw in Chapter Two, is of course unquestionably a pervasive core modernist tenet. Indeed, the nature/culture divide is *inherently* anthropocentric: it casts "men" as authorities *of* and *over* an essentially passive nature (see Barad 2008). Anthropocentrism is therefore part and parcel of the very core of the modern Constitution and reverberates way beyond the confines of academia. But what about anthropomorphism? Is this an equally *problematic modernist* notion? Partially inspired by these questions, partially motivated by my earlier treatment of the topic, I now want to slow down somewhat to *carefully* think-with and through the notion of anthropomorphism.

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<sup>93</sup> It is worth noting here, to relate this to the discussion of the first half of the chapter, how this is pitched at an epistemic level of analysis: it is *concepts* which are important.

## 8 Diffracting anthropomorphism(s)

In most of my earlier works (e.g. De Jesus 2016a, 2016b, 2016c) I dedicated a considerable amount of time and attention to the notion of anthropomorphism within AE. Much of this work was motivated by an intuition that there was ‘something’ inherently wrong with anthropomorphism. In retrospect I have come to realise that the issue of anthropomorphism is far more complex than I initially appreciated. It is a very rich, multifaceted phenomena variously entangled with many aspects of daily life, from the religious, to the scientific and commonsensical understandings of the world. It is a notion which uneasily straddles the line between modernity and *pre*-modernity (see Villalobos and Ward 2016). Indeed, there is a tendency (by ‘us’ moderns) to associate the very idea of anthropomorphism with a “pre-modern worldview” (Descola 2013; Latour 2007). In this regard, at least, the notion is distinctly *not* a modernist one.

Much of this aforementioned work was concerned with (i) identifying and rendering explicit examples of anthropomorphic thinking within the AE literature and (ii) tracing the roots of this thinking to the work of Jonas. One of the conclusions I drew from that particular line of research was that enactivism, specifically in the guise of AE, was *inherently* and thus *univocally* anthropomorphic in general. Again with the benefit of hindsight, I now recognise that this conclusion was drawn far too hastily on my part. In light of our ongoing discussion, I would now claim that AE is not intrinsically and univocally anything, and this applies to it being anthropomorphic.

Nevertheless, as just noted, inasmuch as AE does reject and subverts anthropomorphism, it also has the tendency to enact it. AE, in my current understanding of the topic, is simply not inherently (or intrinsically) anthropomorphic but yet sufficiently entangled with it so as to sporadically enact it. Now, if one accepts this observation, and it goes without saying that there might very well be reasons *not* to do so, then the question which presents itself is the following: Is anthropomorphism something *inherently problematic* such that it needs to be avoided? The very modernist impulse here, as hinted above, is to argue that anthropomorphism is not necessarily inherently problematic. It is only problematic in the context of modern science. This is essentially the argument made by Villalobos and Ward (2016). The authors insist that if

enactivism intends to be a legitimate alternative to traditional cognitive science it needs to reconsider its anthropomorphic underpinnings.

Villalobos and Ward also trace these anthropomorphic underpinnings within the AE approach to the work of Jonas. Much of their discussion is centred around the observation that Jonas himself often casts the natural sciences as essentially incompatible with anthropomorphism. According to Villalobos and Ward (ibid.), faced with this incompatibility, Jonas unequivocally opts for the “undeniable truth” of anthropomorphism *in direct opposition to* natural science. Thus, insofar as AE theorists uncritically follow Jonas in this context, they run the risk of putting themselves directly at odds with the workings of modern sciences. What I would like to do in what follows is diffract Villalobos and Ward (ibid.), my own previous position and AE’s purported anthropomorphism, through Latour’s (1996) discussion on the topic of anthropomorphism. I will start with a few brief words on Villalobos and Ward’s position then re-turn to my own.

According to Villalobos and Ward (ibid.), the core problem with AE (thanks to Jonas), is that it illegitimately endows nonhuman organisms with phenomenological/existential properties which it directly infers solely from its own (human) experiences. This type of inference is illegitimate because it is greatly at odds with the workings of modern day biological science. To overcome the “problem of anthropomorphism”, the authors draw instead from the work of Humberto Maturana and suggest that “the experiential domain of an organism is given by the structural dynamics of its sensory systems *and* the dynamics of its relational domain (...)”. Thus, the authors continue, “features such as purposiveness, intentionality, freedom, agency and normativity depend not upon biological structures but upon the essentially linguistic character of human psychological space, we cannot [therefore] assume these existential features of our experience are ones we share with nonhuman animals” (ibid., p. 212, emphasis original).

My own (previous) reservations about anthropomorphism (e.g. De Jesus 2016a, 2016b, 2016c) were, by contrast, not due to some purported incommensurability between anthropomorphism and modern day biological science, but rather to do with the issue of

difference. My central intuition across these texts was that anthropomorphism in general, and not simply as enacted within AE, not only erased but could not adequately account for difference. In a nutshell, my argument was that AE *lacked an adequate epistemic/conceptual framework* with which to articulate and account for (experiential/subjective) differences across nonhuman organisms. Its account of organismic otherness was too human-centric and clouded by human phenomenology. My remedy for this was to replace Jonasian phenomenology with biosemiotics (see De Jesus 2016b). The suggestion was that certain concepts and ideas within this area of research could supplement, improve and consequently provide the enactive approach with the relevant necessary theoretical tools to account for difference in a non human-centric manner. Like Villalobos and Ward, I also believed that my alternative proposal was *essentially non-anthropomorphic*.

Save for its rejection of anthropomorphism, mine and Villalobos and Ward's proposals, *prima facie* appear to be diametrically opposed: Villalobos and Ward's proposal is deeply entangled with a very modernist view on/of anthropomorphism. The early pre-modern usages of the term refers primarily to the tendency to see gods, deities and other spiritual entities in human form (see Daston and Mitman 2005). Its much broader current meaning as the (mis)attribution of human-specific characteristics to nonhuman entities gained prominence with and through the development of the modern Constitution. As Boria Sax (2011) points out, it is with the advent of the modern Constitution that the word acquires its disparaging connotations; a naive, misinformed and misguided attribution of human-like properties to nonhuman entities which essentially signals to an ignorance of the naturalist scientific worldview that separates human subjects from natural processes. Clearly Villalobos and Ward's position is directly entangled with this modernist understanding.

By contrast, and more in line with the overall AE approach, my proposal disrupted this modernist understanding by blurring the lines between the subjective and the natural. Rather than dismiss nonhuman experiences from the outset, what was needed was better conceptual tools to account for these experiences in a non human-centric manner. The problem with AE's anthropomorphism was not its incommensurability with the sciences but rather an intrinsic lack within its framework which needed to be remedied.

However, despite these admittedly important differences between the two proposals, they nonetheless also share some very significant similarities. To tease out these similarities, let us re-turn to Kant's challenge as outlined in the previous chapter and above.

Recall that Kant staged a challenge which AE theorists took themselves to be able to adequately address. We saw, however, that in so doing, these theorists also enacted a variant of an epistemology/ontology distinction which privileged the former and neglected the latter. What we did not point out there was that this challenge is also both anthropocentric and also crucially entangled with anthropomorphism: it is the *human observer* which *allocates* specific properties to the nonhuman. When these properties are said to be distinctively human-specific properties, then the observer is anthropomorphising.

As Latour (1996) notes, “[a]nthropomorphism purports to establish a list of the capabilities that define humans and that it can then project through metaphors onto other beings - whales, gorillas, robots, a Macintosh, an Aramis, chips or bugs” (p. 225). When researchers commit the “sin” of anthropomorphism, Latour (ibid.) goes on to argue, the underlying assumption is that “in reality” these nonhuman others are something altogether different. This is clearly motivating not only my own position and that of AE but also Villalobos and Ward's. Thus, like Kant's challenge, what is essentially at stake for all three positions is how one could/should “describe what they [organisms in our example] *truly are*, independently of any ‘projection’” (Latour, ibid., p. 226, emphasis added). How, in other words, can the researcher capture the *true essential nature* of the nonhumans they are observing?

Latour argues that the general solution to this question has been to simply *replace* one “list” with another: “For example, technomorphisms: the whale is an ‘automaton’, a simple ‘animal-machine’; the robot, too, is merely a simple machine” (ibid.). Or, as is common within cognitive science, *computomorphism*: the attribution of mechanistic,



computational qualities to living entities in general.<sup>94</sup> Although not cast in terms of lists, it is fairly clear that, in the final analysis, all three positions opt for this sort of solution. Now, unlike my previous arguments and those of Villalobos and Ward, Latour insists that morphising, or what he calls “(x)-morphism” (p. 227), is not only inevitable but also necessary. It is therefore also not something which one should object to. Latour would thus argue that, in contrast to what myself and Villalobos and Ward maintain, all three positions are equally partaking in x-morphism. Moreover, for Latour, this is *not* inherently problematic.

This, however, is *not* the end of the story. The issue for Latour is objecting to one type of morphising while (tacitly) endorsing another. Insisting that only one list is the correct and legitimate one to describe the real nature of things. Of course, all three positions insist that theirs is the truly correct “list” – or, at the very least, the most accurate list – and that the others are in some way or other misguided/inaccurate. Now, what becomes particularly important at this point is the following: what makes this insistence possible in the first place? On my diffractive reading of Latour here, what does make this possible is essentially an epistemology/ontology distinction which also prioritises the epistemic and pays little to no attention to the ontological. This is precisely *the* crucial characteristic shared, but not explicitly acknowledged, by all three positions. They are all underpinned by the same modernist logic which separated epistemology from ontology and is itself a variation on/of the nature/culture dichotomy.

All three positions place the nonhuman on the side of nature and the observer on the side of culture. The observer then casts the nonhuman as a particular type of entity and then projects onto that entity certain types of properties. These projected properties are then argued to capture the essential, “really real”, nature of the nonhuman entity under consideration. Thus, in the case of AE, for example, the (living) nonhuman is cast as a biological entity with specific intrinsic biological/phenomenological properties. This is

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<sup>94</sup> For Latour (1996), we humans are routinely “morphising” the world around us; be it anthropo, techno or computo -morphising. Latour insists worlds can only be understood through these “morphisings” and as such, it would be misguided to either object to the process of morphising in general or to specific types of morphising rather than others. For example, it is fine to computomorphise but not anthropomorphise or vice versa. We could therefore “say that (...) there is never any projection onto real behaviour, the capabilities to be distributed form an open and potentially infinite list, and that it is better to speak of *(x)-morphism* instead of becoming indignant when humans are treated as nonhumans or *vice versa*. The human form is as unknown to us as the nonhuman” (ibid., p. 227, emphasis original).

what defines and accounts for the true nature of biological entities. For these theorists, casting biological entities as, for example, deterministic mechanical devices as Villalobos and Ward do, is not only essentially wrong but fundamentally misguided and an inappropriate attribution of mechanical qualities to biological entities (see Barandiaran 2009; Froese 2014; Froese and Stewart 2012; Di Paolo 2005; Di Paolo et al. 2018; Thompson 2007).

Thus, the epistemic grounding underpinning my “biosemiotic enactivism” (De Jesus 2016b), Villalobos and Ward’s anti-anthropomorphism and AE’s attribution of phenomenological properties to nonhuman organisms, makes these all equally complicit in a re-enactment of the separation between the epistemic and the ontological where the former is privileged over the latter. Consequently, these do not allow for the possibility that x-morphising might not only be entirely appropriate under certain circumstances but also potentially insightful and informative. More importantly, they are all also directly entangled with anthropocentrism because the human always has an *epistemic privilege* over everything else. Indeed, as we will see below and in the next chapters, many AE theorists also enact this privileging through an insistence on the inescapability of recursive (human) self-referentiality and reflexivity.

Similarly to the points raised above regarding alternative epistemologies, insofar as all these positions privilege the epistemic, they will find it difficult to adequately deal with difference. For all three positions, x-morphising cannot be anything other than *human-centric metaphorical projections* which *neither ‘touch’ nor help constitute the entities* under observation. Nonetheless, all three positions share the same conviction that the “really real” nature of the entities under consideration, although hidden behind an epistemic veil, *can* be more faithfully captured with specific concepts, models and theories. Or, as Latour might say, all that we need is essentially the right “list”.

I want to suggest that, in light of these diffractions, one of the issues to worry about with regards to anthropomorphism, is that it makes it difficult to deal with *ontological* difference. This is equally the case with my suggested biosemiotic enactivism precisely because it tacitly casts difference in epistemic terms. Thus the difficulty, evident in all three positions discussed here, is rooted in their epistemic-cum-representational

grounding. As the ecological feminist Val Plumwood (2003) argues, “the charge of anthropomorphism may then legitimately draw our attention to a loss of sensitivity to and respect for animal difference in humanising representation” (p. 52).

At this point the reader might have some concerns. On the one hand, we have suggested that all three positions enact a nature/culture dichotomy vis-à-vis the separation of epistemology from ontology. On the other hand, we also approvingly suggested that x-morphising was an important (inevitable) part of our general ability to understand the world. Both these positions appear, at least *prima facie*, to face similar problems. So why is Latour’s position, which of course subsumes anthropomorphism and I seem to approve, any better than the enactivist, for example? After all, isn’t x-morphising an equally *human-centric* enterprise? A tacit (modernist) acceptance that the human is the one who designates properties to the nonhuman. Indeed, AE would readily ‘agree’ with Latour that it is simply impossible to ‘step outside’ the human perspective. As we noted on several occasions, AE theorists argue that there is an inherent recursive self-referentiality to all human practices which cannot be avoided. Let me conclude this section then with some clarifying remarks which might shed some light on this concern.

Perhaps the first point which needs to be noted from the outset is that Latour’s position is *not* premised on human recursive self-referentiality. For Latour, as well as for many STS, feminist science studies scholars and multispecies ethnographers discussed below, x-morphising always involves processes of more-than-human *world-making*, rather than simple metaphorical projection grounded on recursive self-referentiality. This general starting point decentres and dethrones the human. Indeed, the ‘x’ in x-morphism signals towards both the ontological entanglement between the human and the nonhuman and the *world-making* evolved in these entanglements.

Recall how, according to some STS theorists, material agency proliferates across more-than-human worlds and is neither intrinsic to humans nor nonhumans but emerges in heterogenous relationships between them. This, it is argued, disrupts the nature/culture dichotomy and with it the modernist ideal of (cultural) creative subjects endlessly projecting different metaphors onto (natural) passive objects. It thus equally disrupts the conviction of an inescapable self-referentiality and shifts the focus away from human

projection to entanglements of/between/with human and nonhuman relations within heterogeneous more-than-human worlds. Put differently, it shifts the focus towards a different type of life-mind continuity. The notion of x-morphising should, therefore, be understood as another means to embrace, rather than flatten – vis-à-vis metaphorical projection – *ontological difference* within and across more-than-human worlds.

In the next and final section, which figures primarily as a (sort of) addendum, I want to say a bit more on this shift of focus towards more-than-human worlds. The aim here is not so much to render visible any more enactive dual enactments, but rather to pause, slow down, and *carefully* think-with and through enactive life-mind continuity in light of multispecies ethnography.

### **9 Parenthetical addendum: Storying multispecies worlds**

In this final section I want to offer something of an addendum to some of the central themes discussed in this and the previous chapter. Much of what follows is the result of diffracting the enactive theme of life-mind continuity through multispecies ethnography.<sup>95</sup> Here, thanks to these diffractions, a somewhat different set of stories<sup>96</sup> about/with life-mind continuity emerges; stories not so much focused on not/knowing the other but on some of the inevitable implications of being/living-with them; stories which pivot around the mutual(ly)/exclusive relationship(s) between nonhuman organisms and between organisms and humans; stories which also significantly disrupt and reconfigure business-as-usual within the modern Constitution.

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<sup>95</sup> My understanding of this work follows Ogden et al. (2013) who define multispecies ethnography as “ethnographic research and writing that is attuned to life’s emergence within shifting assemblages of agentive beings. By “beings” we are suggesting *both* biophysical entities as well as for the magical ways objects animate life itself” (p, 6, emphasis original). This is very much in line with the notion of the more-than-human as discussed above and tries to steer away from the more biocentric focused research within multispecies ethnography which tends to actively separate the organic from the inanimate (see TallBear (2011) for a critical discussion).

<sup>96</sup> The notion of ‘story’ used here, and throughout this work, does not refer merely to narrative practices but rather *performative world-making* practices which collapse the epistemology/ontology distinction. This follows a number of indigenous scholars such as Venessa Watts (2013), Mario Blaser (2013a) and Kim TallBear (2017), who argue that stories and storytelling in general is not simply a means to represent the real or the imagined but rather another way of performing and thus making different worlds. As Blaser (2013a) points out, “stories are not only or not mainly denotive (referring to something “out there”), nor are they salacious renderings of real practices. Rather, they partake in the *performance* of what they narrate” (p. 552, emphasis added). Stories are thus performative rather than merely representational (see also Law 2002). Thus, stories, as Blaser (ibid.) argues, “imply more than discursive practices”. This suggests that “the difference between telling stories and acting realities isn’t so large” Law and Singleton (2000, p. 769). We re-turn to these points in the Appendix.

As an entry point into the discussion, let us briefly consider what we might cautiously call the ‘standard’ treatment of nonhuman living organisms within much of AE’s discussions on life-mind continuity. This is an apt entry point because living organisms are central to both the enactive phenomenologisation of nature and multispecies ethnography. However, reading the enactive treatment of living organisms with and through sources from multispecies ethnography, what first stands out is that, despite this importance, there is a total absence of not only nonliving nonhuman others but also more curiously, the lack of other nonhuman living organisms.

Only one living nonhuman organism – an *E. coli* bacterium – prominently figures within the AE literature (see Cummins and De Jesus 2016). Indeed, I think it is rather telling that the entire previous chapter only makes reference to just *one* specific living organism (a bacterium). An *E. coli* bacterium is certainly a very good organism to think-with as much of the enactive literature attests. It has enabled AE theorists to tell very insightful and influential stories about the nature of life and mind. But, in light of the absence of more nonhuman others, the story routinely enacted by AE theorists is that of a lone *E. coli* bacterium cast as a surrogate for *all* organisms (cf. Merritt 2021).<sup>97</sup>

This is, at its core, a quintessentially single-species (single organism) story involving a single protagonist – the aforementioned lone *E. coli* – swimming upstream towards a sucrose gradient. But this is a particular story which helps tell other stories which create worlds where agency, individuality and meaning have priority. Stories which create worlds where *autonomy*, *self-individuation*, *self-making*, *self-preservation*, individual agency and ultimately *significance/meaning for*, always have centre stage. But these

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<sup>97</sup> Merritt (2021) provides a very insightful and illuminating discussion on some of the “weakness” of autopoietic enactivism, specifically related to its autopoietic underpinnings. Drawing from work by Haraway, Merritt (ibid.) proposes that enactive theorists take-up a “sympoietic enactivism” which would be able to recognise and better account for the non-individualistic, more-than-human multi/interspecies worlds discussed in this section. Much of this section is very sympathetic with the spirit, if not the letter, of Merritt’s analysis of autopoietic enactivism and her proposed alternative. However, in my reading of this proposal, I see a danger that “sympoiesis” simply can become/does become, a replacement for (or improvement on) autopoiesis. In which case it would simply be replacing one encompassing formalism for another. Moreover, unlike Merritt, I have no ambition to improve on the enactive project.

stories and these worlds, like any other stories and any other worlds, always come with a price.<sup>98</sup> For, in as much as they include, they inevitably also *exclude*.

AE theorists seldom, if ever, enact stories about the *entangled relations among and between organisms* (cf. Cummins and De Jesus 2016; Merritt 2021). Stories which bring to the fore how all “[c]ritters interpenetrate one another, loop around and through one another, eat each other, get indigestion, and partially digest and partially assimilate one another, and thereby establish sympoietic arrangements that are otherwise known as cells, organisms and ecological assemblages” (Haraway 2016, p. 58). Which is to say that telling stories *about* only one single bacterium makes it difficult to tell other stories not only about but also *with* other living organisms: stories with and about how nonhumans (sometimes with humans, sometimes not) in more-than-human *social communities* commune amongst themselves, or between and within multi/interspecies entanglements. Stories with and how these live and die in their own unique environments and possess their own species-specific ways of enacting multiple material worlds with other organisms, objects and things. Stories which not only help us think about lively and unruly others, but also considers what it might mean to be *living with* and amongst them (Haraway 2003).

This is, of course, not to devalue, dismiss or undermine the insightful stories that AE theorists have enacted with the help of the *E. coli* bacterium and the multiple worlds these have helped create. Rather, it is an open invitation for these theorists to tell *more* stories; *other* stories that can help create *more* worlds. An invitation for storying not

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<sup>98</sup> Although, both in its original proposal by VTR and in the work of autopoietic theory there is a recognition and an account of “co-evolution” which signals directly towards the inevitable presence of other living organisms, multispecies ethnographers tend to operate within a much broader ontological scope. Whereas co-evolution tends to focus on the somewhat narrower process between two species; multispecies ethnographers tend to focus much more on the broader, messier entanglements between a multitude of organic lifeforms and nonorganic entities. Note, moreover, that the very notion of multispecies ethnography also problematises and disrupts the overemphasis on autopoiesis *and/or* adaptive autonomy. Thus, for example, Haraway (2016, p. 33) argues that “autopoietic systems are hugely interesting—witness the history of cybernetic and information science” but, she continues, “they are not good models for living and dying worlds and their critters”. Now, of course, in certain respects, AE would not disagree with this statement. Nonetheless, insofar as adaptive autonomy (i) privileges self-individuation, self maintenance and boundary construction and (ii) is enacted as a generalised universal tool, courtesy of *operational closure*, applicable across multiple levels, Haraway would probably continue to insist it still remains an impoverished model with and through which to understand and explain living and dying worlds (see also Hayles 1999). According to these scholars, it is a model which, due to its highly abstract and *self-centred* nature, will struggle to genuinely account for ontological differences (cf. Merritt 2021). We will re-turn to some of these issues in Chapter Six and the Appendix.

only single-species *but also* multispecies worlds. Because, as Donna Haraway (2016) so poetically reminds us, “[i]t matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories” (p. 12).

For their part, multispecies ethnographers have attempted to tell other stories in order to help create other worlds which speak to the multispecies entanglements which constitute more-than-human world-making. Stories which help create worlds that attempt to disrupt and trouble anthropocentric conceptions of nature and the overly ‘self-centred’ and ‘individualistic’ conceptions of organismic being which often come along with it. Stories informed by and grounded on an attentiveness towards the messy and unruly nature of multispecies and interspecies relationships and the complex and precarious place/role of the human within them (see Kirksey and Helmreich 2010; Helmreich 2014; Hustak and Meyers 2012; Van Dooren et al. 2016; Yates 2017).

For these thinkers, one needs to use different non-anthropocentric, non-self-centric stories to tell other stories about/with human/nonhuman communal living, flourishing and dying. And it is in telling these different stories that different worlds are also created, worlds where the human is simply another agent amongst a multiplicity of agential nonhuman others. As Ogden et al. (2013) observe, “the nonhuman world of multispecies encounters has its own logic and rules of engagement that exist within the larger articulations of the human, encompassing the flow of nutrients and matter, the liveliness of animals, plants and other things” (p. 6). Here the human only “comes into being relative to multispecies assemblages, rather than as a biocultural given” (ibid.).

As the anthropologist Anna Tsing (2013) argues, all more-than-human natures are always-already *interspecies relationships*. All human action, for example, is intimately entangled with a multitude of other lifeforms: from the bacteria which constitute our bodies, to the soil we tread on to the food we eat (Kirksey and Helmreich 2010; Helmreich 2014; Yates 2017). As Myra Hird (2012) argues, humans “are utterly dependent upon the teeming assemblages of dynamic microbes that make up and maintain both our corporeality and our biosphere” (p. 69). The same applies to other

nonhuman lifeforms which are equally entangled with a multitude of organic *and* inorganic “others”. In the words of Deborah Bird Rose (2012), “every creature has a multispecies history—it came into being through its forebears and through others” (p. 136).

Multispecies ethnography thus provides a good resource with which to tell stories about and with lively multispecies entanglements found across more-than-human worlds. Stories about those multiple places and geographies where multiple species encounter each other and “meet” (Haraway 2003, 2008). Stories which help tell other stories about and how these co-mingle and co-become in complex webs of material multispecies entanglements. Thoroughly non-anthropocentric stories which tell stories about how humanity, as all other species, is ontologically spatiotemporally constituted in and through webs of more-than-human interspecies/multi-species dependencies and relationships (Haraway 2008). Stories which foreground *living and dying with*, not simply thinking about, others (Van Dooren 2019).

Moreover, it not only helps us tell stories which acknowledges, attempts to dignify and account for more-than-human worlds, but it also helps us problematise and trouble any neat boundary between nature/society, human/animal, agent/non-agent and ultimately the animate/inanimate<sup>99</sup> (Benezra 2021; Kirksey 2015; Shotwell 2016; Watts 2013; Yates 2017). The problematisation of this last boundary in particular is especially important in the context of multispecies ethnography. This is because the very notion of life itself is significantly reconfigured within the great majority of this work.

To bring this (re)configuration into sharper focus, it will be worth briefly (*re*)considering again the conception of life defended by Jonas (1966) and closely followed by numerous AE theorists (e.g. Di Paolo 2018; Froese 2014; Thompson 2007). This enactive conception of life insists that, “the point of life” is “self-centered individuality, being for itself and in contraposition to all the rest of the world, with an

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<sup>99</sup> As Karen Barad (2007) argues, “the inanimate-animate distinction is perhaps one of the most persistent dualisms in Western philosophy and its critiques: even some of the most hard-hitting critiques of the nature-culture dichotomy leaves the animate-inanimate distinction in place. It takes a radical rethinking of agency to appreciate how lively even ‘dead matter’ can be” (p. 419). See the Appendix for further discussions on this point.



essential boundary dividing ‘inside’ and ‘outside’” (Jonas 1966. p. 79). Shifting the focus to the multispecies entanglements amongst more-than-human worlds thoroughly disrupts this conviction. It rejects the intuition that maintaining boundaries from the environment in order to preserve identity is the very essence of life. It does not foreground self nor does it simply opt for the reverse; rather, it foregrounds multispecies relationships of living and becoming-with. It thus chips away, undoes and reconfigures, the self-centred, hierarchical and anthropocentric underpinnings of this conception of life.

The notion of “becoming-with” is taken from the work of Haraway (see 2008, 2016) and speaks to a metaphysics *and* ethics of connection and relationship(s) in contradistinction to a metaphysics of separation which emphasises self-individuation and self-maintenance. It is a messy process of world-making with and through the multitude of diverse entities which enfolds all beings. For Haraway (2008), becoming is always a becoming-with forged with and through engagement and unruly attachments. As Haraway puts it, “becoming is always a becoming-with, in a contact zone where the outcome, where who is in the world, is at stake” (ibid., p. 244). Hence Haraway’s (ibid.) insistence, as noted above, that “to *be* one is always to *become with* many” (p. 4, emphasis added). But, and very importantly, it is also as much a process of exclusion as it is of inclusion. To become-with some is always to also exclude many others.

Thus cultivating an attentiveness towards the multispecies entanglements which constitute more-than-human worlds helps effect an important shift of focus. The issue is then no longer about *our inevitable recursive self-referential knowledge* of the nonhuman; how is it that we *know* that this or that nonhuman is lively and agentic? How do we *know* that agentic nonhuman worlds ontologically exist intrinsically and thus independently of our projection? Rather, the issue becomes one of mutual/unmutual coexistence between and across species (see Kirksey 2012; Yates 2017). How do multiple species live and die and make/unmake more-than-human worlds together? As Latour (2004d) argues, we have to “build” worlds “together, tooth and nail, in concert with other agents (p. 455). These worlds are always more-than-human worlds, and always unfolding and enfolding through and with the precarious and unruly

processes of becoming-with a multitude of known and unknown others (cf. Giraud 2019).

### **Conclusion**

This chapter has explored where and how the AE project of phenomenologizing nature reproduces and perpetuates core tenets of the modern Constitution. We explored how AE theorists routinely enacted a distinction between the epistemic and ontological and privileged the former over the latter, enacted versions of anthropocentrism and anthropomorphism which both opened and foreclosed important worlds. In the next chapter we will explore more ways AE theorists also reject the modern Constitution.

## Chapter Five

### The Dual Thesis as Rejection(s) of the Constitution

#### Overview

This chapter explores a second ‘site’ where enactive theorists, sometimes explicitly sometimes tacitly, disrupt the modern Constitution by enacting different rejections of mononaturalism. These enactments pivot around a “dual thesis” which argues that (i) organisms do not live in a “pregiven” world but instead (ii); “bring forth” unique *worlds*. Here we explore how this dual thesis is enacted with and through four distinct but interconnected themes: (i) agency, (ii); embodiment/structural coupling, (iii); anti-representationalism and (iv) reflexivity. We bring to light how each of these themes contain a number of key arguments/ideas/concepts and theoretical/methodological commitments/considerations which help give support to and enact the dual thesis. We conclude with some thoughts on how, by rejecting mononaturalism, AE theorists open the door for the development of a non-modern constitution.

#### Motivations and aims of chapter

In the previous two chapters we explored how and where the enactive reconceptualisation of nature vis-à-vis the phenomenologisation of nature both rejected and reproduced certain core tenets of the modern Constitution. In this chapter we explore a different site of enactive disruption, vis-à-vis the rather multifaceted rejection and subversion of mononaturalism. As we touched upon in Chapter Two, most modern dichotomies, and the hierarchisation(s) that stems from them, are essentially premised on the unquestioned truth of mononaturalism. Indeed, the very distinction between nature and culture at the heart of modernity, would be rendered meaningless without it.

This is something which both Latour (as we have seen) and VTR (as we will see in more detail below), in their own respective ways, have recognised and sought to disrupt. Mononaturalism is, therefore, a specific matter of concern shared by these scholars. Indeed, at the very core of the enactive approach, specifically in the lineage stemming directly from VTR, is both a rejection of mononaturalism and an alternative proposal. This rejection and its alternative centres around what I (De Jesus 2018) have called a “dual thesis” which claims that: (i) living organisms do not encounter a pregiven world

but rather (ii) enact or bring forth their own unique worlds. As we will see below, this dual thesis is something which permeates, albeit at times implicitly, through much enactive (AE) work.

The central aim of this chapter is therefore to explore how and where, with and through this dual thesis, enactive theorists disrupt the modern Constitution by enacting various rejections of mononaturalism. The dual thesis itself is, however, multifaceted and enacted in a number of complex, interrelated ways. For the purpose of this chapter, I explore these enactments specifically through four different enactive themes: (i) agency, (ii) embodiment/structural coupling, (iii) anti-representationalism and (iv) reflexivity.

Framed around these four themes we will then explore some of the ideas, concepts, arguments and other theoretical/scientific/methodological considerations and different contexts, where different enactive theorists have gone about rejecting and subverting the notion of mononaturalism. We will see how some, like VTR, have done this explicitly and through specific systemic argumentation. While others, mostly after VTR, have tended to ‘argue’ against mononaturalism somewhat indirectly (e.g. Di Paolo et al. 2018). Yet, in other cases, we will see that certain ideas and concepts either entail the rejection of mononaturalism or are implicitly taken to secure the inherent truth of anti-mononaturalism without further explicit argumentation.

Throughout these discussions we will also emphasise how these various enactments of the dual thesis strikes directly at the very core of the modern Constitution. Arguing that, by undoing mononaturalism, enactive theorists not only ‘collapse’ the nature/culture dichotomy but also trouble a number of subsequent pervasive divisions, not in the least those between human/animal and epistemology/ontology as explored in detail in Chapter Three.

The chapter is structured as follows: we will begin our discussion by first thinking-with and through the enactive dual thesis, exploring how/where it relates/converges to the anthropological/STS rejection of mononaturalism. We then re-turn to the notion of enactive agency. We present a more systemic discussion of the notion as a primer for the four themes which then comprise the remainder of the chapter. We explore how, through

each of the aforementioned four themes, the undoing of mononaturalism is variously enacted whilst keeping an eye on the interconnection between these themes. We conclude the chapter by considering the possibility of an enactivist non-modern Constitution.

### **1 Re-turning to mononaturalism**

The central aim of this chapter is to explore how enactive theorists, sometimes explicitly and sometimes implicitly, reject mononaturalism. We do so as a means to show how this rejection functions as yet another profound subversion of the modern Constitution. However, before doing so, it will be helpful to, firstly, remind ourselves what exactly is meant by *mononaturalism* and, secondly, explore how this notion converges with the enactive dual thesis and its rejection of a pregiven world. Let us begin, however, by turning mononaturalism over and placing it within the context of anthropology.

As we noted in Chapter Two, the notion was first introduced by the anthropologist Eduardo Viveiros de Castro (1998) and then taken up by Latour (e.g. 2004b). In the context of anthropology where the term was first used, it refers to a particular implicit (metaphysical) view prominent in the West, which assumes that reality is singular and only cultures are multiple. Similar to Latour (1993), a number of contemporary anthropologists also argue that this conception of nature as singular is a direct product of modernity itself (see Blaser 2010; Holbraad and Pedersen 2017).<sup>100</sup> But what exactly does it mean to say that reality is “singular” while “cultures” are “multiple”? And, perhaps more importantly, how does this converge with the enactive dual thesis? To address these questions, I think it would be helpful to go back once again to Latour and briefly re-turn to his analysis of modernity.

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<sup>100</sup> It should be noted that the ‘naturalism’ of *mononaturalism* as used within anthropology both overlaps and diverges somewhat from how it is used in philosophy (see Chapter Three, footnote 47). Thus, whereas philosophers use the term to designate a general desirable congruence with the natural sciences, anthropologists use it to designate a particular ontology most prominently found in the West. Moreover, in direct contrast to most philosophers, the anthropologists referenced above generally take issue with and argue directly *against* naturalism (but see Candea and Alcayna-Stevens 2012). Finally, understood in this manner, the prefix ‘mono’ becomes somewhat redundant. Nonetheless, it does help to put the emphasis on the singularity of nature underpinning this particular ontology.

As we indicated in Chapter Two, at the very core of the modern Constitution is a distinction between nature and culture. The latter being the domain of subjectivity, values and appearances. It is where politics and society reside. While the former is the domain of cold, objective and essentially human-independent, (matters of) facts. Here we find the natural sciences and its scientists. Thus the modern Constitution is made up of two “chambers”, one tasked with representing the human, the other tasked with representing the nonhuman. A particularly important point for our purpose here regarding this structural arrangement is that it tends to treat the matters of fact with which scientists are involved as more or less indisputable. Or, at the very least, it tends to endow those representing nature with a certain authority not readily granted to those tasked with representing the human. This is because matters of fact disclose the *true nature of reality* which exists independently of any observational practices. The term “mononaturalism” was introduced in anthropology to capture this overarching metaphysical view.<sup>101</sup>

Based on extensive and diverse ethnographical research from around the globe, a number of influential contemporary anthropologists (Apffel-Marglin 2011; Bertelsen and Bendixsen 2016; Blaser 2010, 2014; Cabot, 2018; de la Cadena 2015; Descola 2013; Kohn 2013; Henare et al. 2007; Holbraad 2010, 2012; Jensen 2012; Jensen 2017; Lien and Palsson 2019; Scott 2007; Strathern 1988, 2005; Viveiros de Castro 2013, 2014)<sup>102</sup> have taken issue with the purported *universal nature* of this distinctly modernist metaphysics. A central contention for these thinkers is the assumption that there is *one common world with pre-given and fixed properties* where universal laws of nature apply

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<sup>101</sup> As noted in Chapter Two, within philosophical circles, this is more commonly known as ‘metaphysical realism’. Like these anthropologists, some philosophers argue that this is simply an implication of modern science itself. The reader trained in philosophy might note here that both the treatment of mononaturalism here as well as Latour’s analysis of modernity more broadly, appear to equivocate metaphysical realism with *scientific* realism. The latter being the view that pre-existing, pre-given organism-independent objects, *are* as scientists represent them to be. The reader might want to insist that the two are not the same and should be kept apart: one could be a metaphysical realist while denying that scientists accurately represent objects. Scientific representations are, after all, only *representations* and as such are susceptible to be *misrepresentations*. This is a perfectly understandable objection. But it is one which is underpinned by a representationalist conception of science which most STS and ontological anthropologists would resist. We will re-turn to these points in the Appendix. For our purpose here, it will suffice to bear in mind that both metaphysical realists and scientific realists are guided by the conviction that there *is* a pre-existing and pre-given world out there existing independently of any organismic engagement with it. And it is this conviction – albeit one which is greatly informed by modern science – which both anthropologists and STS scholars call ‘mononaturalism’.

<sup>102</sup> Within anthropology, most of this work has come to be known under the umbrella term “the ontological turn”. See Holbraad and Pedersen (2017) for a detailed introduction and discussion.

univocally and independently of any human engagement. The guiding intuition here being that there is and there can only be one world – one nature – which *only scientists* and the *sciences* can reveal. All these scholars argue that a careful consideration of different ethnographical records show this is merely a somewhat parochial Western ‘worldview’<sup>103</sup> which is far from being universal and/or univocal.

Not unlike Latour, these anthropologists consider a mononaturalistic ontology to be the direct result of a questionable conception of the relation(s) between the human and the nonhuman, which severs the natural from the cultural and casts the latter as multiple and the former as singular and insular. Thus, in order to move beyond this modernist nature/culture dichotomy and not impose it where it is argued to not exist, one needs to abandon these entrenched mononaturalistic intuitions. This anthropological work can and is then mobilised as a means to draw attention to non-Western cosmologies which are not grounded on the metaphysical presumptions of mononaturalism, and as such, do not consequently separate nature from culture, object from subject or mind from world.

What is especially important for our purpose here is the distinctive metaphysical conclusion that these authors reach from this work. The conclusion drawn by many of these scholars is that “the world is always in the making, emergent, incomplete and as fragile and mutable as the practices and processes that bring it into being and hold it, precariously, together” (Holbraad and Pedersen 2017, p. 39). Thus, “contrary to the mononatural[ist] ontology of the modern constitution, a world thus composed, which is to say a world which is always recomposable, is best conceived as *multiple*” (ibid., emphasis original). The objects and diverse entities which constitute reality are not, according to these theorists, singular, pre-existing and pregiven, but rather inherently multiple. To put the central point somewhat provocatively, there is no singular world but *multiple worlds*. In the main body of this chapter, I will attempt to trace out some of the ways in which the enactive dual thesis directly aligns with, supports and reinforces this conclusion.

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<sup>103</sup> Many of the aforementioned anthropologists would argue, however, for worlds rather than ‘worldview’ (see Bertelsen and Bendixsen 2016). The latter being associated with the epistemic while the former with the ontological. We will re-turn to this point in the Appendix.

## 2 Unpacking the dual thesis

In my view, VTR and a key number of enactive (AE) theorists after them, are in certain key respects attempting to do for cognitive science (and indeed philosophy more broadly) what STS and the aforementioned anthropologists are trying to do for the social sciences in general (see also Caracciolo 2021; Di Paolo et al. 2018; Di Paolo and De Jaegher 2021; Kaup 2021; Jatón 2021).<sup>104</sup> That is, attempting to disrupt the modern Constitution by specifically subverting its core premise: the unquestionable truth of mononaturalism.<sup>105</sup> The pervasive conviction that there is a singular pre-existing and pregiven world out there ready to be discovered and represented. Cognitive science seems to be particularly well poised to be a disruptive force in this regard because of the distinctly unique position it occupies within the current academic landscape. At once firmly rooted in the natural sciences through neuroscience and biology whilst *also* being connected to and rooted in the humanities and social sciences through linguistics, philosophy and, not in the least, anthropology.

VTR were acutely aware of this positioning, noting that “cognitive science stands at the crossroads where the natural sciences and the human sciences meet. Cognitive science is therefore Janus-faced, for it looks down both roads at once. One of its faces is turned towards nature and sees cognitive processes as behaviour. The other is turned towards the human world (or what phenomenologists call the “life-world”) and sees cognition as experience” (p. 13). These two “faces” align rather closely to nature and culture respectively. Neuroscientists and biologists see matters of fact as corresponding to nature while the philosophers, linguists and anthropologists turn to culture and see only the subjective-cum-social experiences of human beings. In this way, two extremes naturally follow suit, one aligning with the objective and natural the other with the subjective/experiential and cultural.

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<sup>104</sup> Having finished the main body of this work, I came across Monika Kaup’s (2021) fascinating book which comparatively brings together various figures from the ontological turn and post-apocalyptic fiction. In it she dedicates a chapter to the work of Maturana and Varela, which in many respects, aligns very well with what I do in this chapter. Especially with regards to her reading of Maturana and Varela’s work as “new realist” and congruent with the ontological turn. Given my late encounter with this chapter I unfortunately cannot engage with it in a manner which would do it any justice here. It is also worth noting here that Di Paolo et al. (2018, p. 207) also hint at some of the theoretical overlap with the ontological turn in anthropology. The authors, however, do not explore this overlap in any significant detail. While Jatón (2021) productively compliments and enriches an STS informed study of the material constitution of algorithms with an enactive account of cognition.

<sup>105</sup> Indeed, the central importance of this disruption is perhaps best captured in the fact that VTR’s original title for *The Embodied Mind* was *Worlds Without Ground* (see Thompson 2017, p. xviii).



As we saw in previous chapters, VTR argue that in order to avoid following into this dichotomising trap, we need to recognise and embrace the fundamental circularity involved in *all* knowledge practices. If cognitive scientists neglect this circularity, as some have done for centuries, the danger is that they will eventually succumb to either extreme. Falling into either extreme would mean an untenable reduction where everything is either culture (mind/subjective experience) or nature (behaviour, cognitive mechanism etc). VTR in fact note how many debates within cognitive science tend to revolve around disagreements between these two extremes, such that in the process these debates tend to “recapitulate—though with new twists—the typical oppositions within the human sciences” (p. 13). The “typical oppositions” being, of course, grounded on the distinction between nature and culture. A distinction which is itself propped up by a commitment that there is a pre-given world. Therefore, a cognitive science wedded to the extreme oppositions engendered by the modern Constitution and propped up by this commitment, will struggle to provide an adequate account of life, mind and culture.

For VTR, then, just as for Latour and the anthropologists noted here, we need “to question one of the more entrenched assumptions of our scientific heritage—that the world is independent of the knower” (p. 150). In other words, we need to question the taken for granted truth of mononaturalism. This questioning of a pre-given, organism-independent world is perfectly embodied in what I (De Jesus 2018) have called the enactive “dual thesis”. This dual thesis can be stated as follows: organisms do not (i) encounter a pre-given and thus organism-independent world, but rather (ii) “bring forth” or “enact” their own unique “worlds”. I refer to this as a “dual” thesis because of its two distinct though interlinked and mutually supporting *metaphysical* commitments. Let us briefly unpack this dual thesis and clarify these two mutually supporting commitments.

The first point to note here is that, with regards to (i), there is a rejection of an organism-independent *and* pre-given world. This first part of the thesis thus contains two independent, though mutually reinforcing, commitments: a first commitment which (a) rejects the intuition that there is a world which exists *prior to and independently of* any organism engagement with it and (b) that this world is *pre-given and thus prestructured*

and not significantly altered by our engagements with it.<sup>106</sup> Although these are very similar, they are not equivalent. We can see this by simply noting that one could, for example, defend (a) whilst rejecting (b).<sup>107</sup> With regards to (ii), the suggestion is that there is *no singular reality* but rather *multiple realities*. We will re-turn to and further explicate this below.

My suggestion in what follows is that, although the enactive dual thesis is far removed, in disciplinary terms at least, from Latour's and likeminded anthropologists' rejection of mononaturalism, both nonetheless are motivated by very similar matters of concern and thus have the same 'target' in sight (the conviction that there is a pre-given world) and both reach the same conclusion (reality is not singular but multiple). At its core, all these theorists are putting a question mark over the idea of a fixed, universal, pre-given organism-independent nature. Organism and environment do not stand over and against each other as two pre-given fixed entities but rather "enfold into each other and unfold from one another in the fundamental circularity that is life itself" (VTR, p. 217). All these different researchers thus appear to converge upon a remarkably similar 'solution' to the dualisms which mononaturalism inevitably gives rise to: subject and object, mind and world, nature and culture *co-emerge together through processes of worldly engagement*, rendering the seemingly solid foundations of mononaturalism all but meaningless.

However, putting into question these foundations is simply not enough. According to VTR, "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" (p. 144). Part of the concern here is motivated by the potential of turning this rejection into a fixed, pre-given foundation itself. Turning 'anti-foundationalism' into yet another fixed and pre-given foundational ground. Thus,

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<sup>106</sup> As noted in Chapter Two, although the world does change, the mechanisms, laws and intrinsic structures/properties which allows these changes to happen, do not.

<sup>107</sup> Many, if not most, representationalist theorists appear to be (tacitly) committed to precisely such a position. Representationalist theories within cognitive science, for example, take representations to be *organism-dependent* while still maintaining that they *represent a pre-given world*. Whether this is strictly speaking a coherent position to hold is an altogether different question which I cannot address here. I bring it up simply to note that it is a position some theorists do maintain (see, for example, Goldman and McLaughlin (2019) and chapters therein for discussion and some representative examples).

groundlessness – *anti-foundationalism* – should not be taken as another ‘better’ foundation upon which to erect better, more solid, epistemologies.<sup>108</sup>

These different considerations give rise to a radically relational ontology where, strictly speaking, there are no fixed subjects or objects standing against/over one another, but multiple entangled *relations* which help constitute the two. Nothing is fixed and everything, therefore, emerges in these relational processes. As such, “knower and known, mind and world, stand in relation to each other *through mutual specification or dependent coorigination*” (VTR, p. 150, emphasis added). The convergence with ontological anthropology,<sup>109</sup> STS and feminist science studies is difficult to overlook here. Indeed, it has much in common with Latour’s actor-network theory (ANT), which also takes the world and the objects therein to have no intrinsic essential properties (see Latour 2005).<sup>110</sup>

Entangling together work in (ontological) anthropology, STS and the enactive dual thesis, will thus allow me, through the four themes explored below, to open up a space for the *material multiplicity of the world*. I will attempt to show how, through these four themes, various enactive theorists put into question the existence of an organism-independent pregiven world whilst advocating for *multiple brought forth worlds*. These brought forth worlds are *not* representations of the world but rather *real* unique multiple worlds brought forth in and through worldly engagement. As John Stewart (2010) points out, the commitments underpinning the dual thesis have “important ontological

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<sup>108</sup> This anti-foundationalism also has an important experiential-cum-practical dimension which should not be overlooked. As VTR 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” (p. 218). This means that we should not only philosophise and develop theoretical understandings of groundlessness (anti-foundationalism) but also learn to *experientially live and practice* it. Evan Thompson (2004), in a quote already encountered in a previous chapter, relates this aspect of their position to Varela’s specific insight 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” (p. 382).

<sup>109</sup> Indeed, Varela himself speaks of an “ontological turn” developing in several areas of academia as early as 1996: “[k]nowing, doing and living are not separate things and reality (...) and our transitory identity are partners in a constructive dance. This tendency I designate an ontological turn is not a philosophical mode but rather a reflection of the life of all things. We are entering a new period of fluid and flexibility which drags with it the need to reflect on the way in which humans make the worlds they live in and do not find them already made as a permanent reference” (Varela 2009, pp. 74-75).

<sup>110</sup> See the Appendix for more on ANT, its views on anti-foundationalism, and some of its differences to the enactive project.

consequences, as it means that *'reality' is not pre-given but co-constructed by the organism*" (p. 3, emphasis added). This being the case, reality cannot but be ontologically multiple, just as argued by some STS scholars and anthropologists. The themes explored below present some of the ways with and through which the dual thesis is enacted within the enactive project and in the process also disrupts the modern Constitution.

Ultimately, it is my aim to show that the enactive dual thesis presents yet another strong challenge against the very idea of a modern Constitution, vis-à-vis the rejection of mononaturalism as variously enacted through the dual thesis. If there is no fixed pre-given world then there also are no fixed, ontological, dichotomising categories such as nature/culture, subject/object, human/nonhuman, epistemology/ontology and so on. Or, indeed, ontological structures/foundations which correspond to them. Once one rejects mononaturalism, a host of dichotomies come tumbling down with an earth shattering thud.

To sum up. In this and the previous section, we aligned and entangled the anthropological treatment of mononaturalism with the enactive dual thesis. This was done primarily as a means to clarify the claim that the dual thesis presents a major disruption and subversion of the modern Constitution by virtue of its rejection of mononaturalism. In what follows I will continue this project by further exploring how this dual thesis is the central pivot around which the enactive treatment and subsequent rejection of mononaturalism develops, unfolds, and is variously enacted across a varied range of topics and contexts. To do so, I will frame and structure the discussion around four themes through which this rejection is enacted. Four themes which help legitimatise and give further support to the dual thesis.

But, before beginning this task in earnest, I want to first re-turn to the enactive concept of agency. The notion of agency has, of course, been an omnipresent feature across this entire work. It should not come as a surprise then to find that agency is precisely one of those themes which, by and large, indirectly supports an undoing of mononaturalism. More importantly, however, is the fact that this account of agency variously touches upon, develops or is dependent on, all the other three themes which we discuss below.

For these reasons we will begin by first presenting the enactive account of agency in a bit more detail.

### **3 Interlude: Re-turning to enactive agency**

The enactive account of agency does a lot of work within the enactive approach. But, what is of particular interest for us here is the different ways that this conception of agency often implicitly underpins or is explicitly mobilised *as an undoing of mononaturalism*. In order to show how and where this is done, it will be helpful to take a more detailed look at the enactive account of agency. One of the most systematic and thorough treatments of agency within the enactive literature is undoubtedly the landmark (2009) paper by Barandiaran, Di Paolo, and Rohde.<sup>111</sup> In it the authors identify and provide support for three central characteristics which are argued to constitute the *necessary and sufficient* conditions for agency in general. These key characteristics are; *individuality*, *interactional asymmetry*, and *normativity*. Let us take these in turn.

#### **3.1 Individuality**

The enactive framework takes as one of its starting premises the view that any naturalist theory of agency must be able to provide a naturalistic sound account of what makes a natural biological system a distinctive and separate entity from its environment. As Barandiaran et al. (2009) insist, “in order for a system to be an agent, there must be a distinction between the system and its environment” (p. 4). The notion of *biological autonomy* is particularly significant here, and it not only grounds the enactive account of agency but the enactive project more broadly. As Froese and Di Paolo (2011) point out, biological autonomy is “arguably the most foundational concept of the entire enactive approach” (p. 5).

The enactive account thus introduces the concept of (biological) autonomy both as a means to account for the aforementioned “distinction between the system and its environment” and to explain how agency emerges in the natural biological world in fully naturalistic terms. For AE theorists, it is *individuation through biological autonomy* which is at the very core of agency, and as we saw in the previous two

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<sup>111</sup> More recently Di Paolo et al. (2017) have provided an extended book-length treatment of this account of agency.

chapters, life and mind more generally. It is particularly important to take note here that biological autonomy does not just refer to individuation as such but more specifically to *self*-individuation. Hence individuation *through* biological autonomy.

As we have already noted on several occasions throughout this work, AE theorists argue that genuine agentive systems are a distinctive sub-class of self-organising, self-creating, dynamic systems, which are biologically autonomous, or “organisationally closed” and capable of creating their own boundaries (Di Paolo 2005, 2009; De Jaegher and Froese 2009; Thompson 2007). The notion of autonomy involved here is, as we have already noted, one both derived from and directly inspired by autopoietic theory. Autopoiesis continues to be influential today in various fields and is typically associated with chemical forms of self-production.

But while autopoiesis remains a paradigmatic example of autonomy at the level of chemical cellular self-production, a more generalised type of autonomy derived from the notion of chemical autopoiesis, has been used to account for higher levels of organisation. Here it will be worth recalling Varela’s (1979) more general operational definition of autonomy encountered in Chapter Three: autonomous systems are “organizationally closed. That is, their organization is characterized by processes such that 1. the processes are related as a network, so that they recursively depend on each other in the generation and realization of the processes themselves, and 2. they constitute the system as a unity recognizable in the space (domain) in which the processes exist” (p. 55). This conception allows for a much broader definition of autonomy which, as we saw in previous chapters, can then be applied to various scales of organisation.

This generalised definition of autonomy as *organisational closure* thus not only applies to chemical self-production but also “to living systems, such as single-cell and multi-cellular organisms, [and] to a whole host of other systems such as the immune system, the nervous system, and even to social systems” (Froese and Di Paolo 2011, p. 6). What is characteristic of all these systems is that, by virtue of being self-organising and self-constituting, they also have the capacity to *define themselves as distinct individuals*. This self-individuating identity is grounded on a “dynamic network of precarious

processes where each process is enabled by other processes in the network and also contributes to enable other processes in the network” (Kyselo and Di Paolo 2015). Thus, self-individuation *qua* dynamic network of precarious processes, is a property of organisational closure.

Like Kant and Jonas, AE theorists argue that autonomous systems are organised in such a manner that their activity is both the “cause and effect” of their own intrinsic organisation. The system’s activity is grounded on organisational constraints which are themselves the very products of the activity itself (Froese and Di Paolo 2011). But as we saw in Chapter Three, unlike Kant, the AE theorist, insist that this dynamic organisation is what enables the system to distinguish *itself* from its environment such that the organism/environment distinction is no longer one which is or needs to be made by an external observer (Barandiaran et al., *ibid.*). Thus a circular process of generative activity essentially; (i) individuates the system from its environment, (ii) demarcates what counts as a proper part of the system and what belongs to the environment and (iii) endows the system with a self-constituted identity.

As a means to support and illustrate the criterion of (self) individuality, AE theorists tend to explicitly contrast living organisms with mechanical devices. Within a mechanical system, Barandiaran et al. argue, “no intrinsic force or process is lumping the components together, nor has the system as a whole (independently of us) a specific way of functioning and demarcating itself from the rest” (*ibid*, p. 3). This means that both the boundaries and functionality of mechanical devices are *externally defined* by an observer. By contrast, living organisms are *self-constructed from the inside* and do not need an external observer to endow them with individuality or functionality. Living organisms are therefore self-individuating and capable of defining their systemic identities from the inside out, such that in the process they both define themselves *and* their environment.

Mog Stapleton and Tom Froese (2016) call this “ontological individuation” to highlight the fact that this type of process “refers to more than an appropriate posit relative to an explanatory project; it is a strong claim about the *fundamental status of minimal living systems*. On this view, ontological individuation is necessarily based on self-

individuation, of which autopoiesis is one fundamental example” (p. 221, emphasis added). The authors here are representative of the broader AE approach to agency which casts self-individuation as an ‘ontological’ *category* to which a distinctive sub-class of living entities belong. Agency is thus enacted here as, first and foremost, a characteristic of *agents qua self-individuating autonomous biological entities*.

### 3.2 Interactive asymmetry

Once we have a self-individuating entity, we have an agent, and once we have an agent, we have an entity which is, at the same time, the *source of and for its own actions* (see McGann 2007, 2014). The key notion of *interactional asymmetry* thus concerns the ‘*responsibility*’ an agent has for its own action. For the enactive approach, any theory of agency must explain why responsibility for an action is allocated to the agent rather than to its environment. In other words, it must explain the nature of the *asymmetric relations* which occur between an agent on the one hand and the environment on the other. As Barandiaran et al. point out, agents exchange “matter and energy” with their environment and are therefore coupled to it, but “the concept of agency is intuitively associated with that of action, not mere system-environment coupling or exchange” (ibid., p. 3). Here we see how and why agency is also enacted as an *asymmetrical characteristic* of systems *qua* agents.

It is by virtue of this observation that agents are said to be ‘responsible’ – in the sense of being the source of – for what they *do*. Genuine agents, therefore, require the ability to affect and alter the parameters of their coupling with the environment such that changes in the state of the agent enable changes to the parameters of its coupling. Agent and environment thus can be said to play essentially different roles in this coupling. However, as Barandiaran et al. (ibid.) are at pains to emphasise, this observation should not be taken to mean that agency is something which occurs *solely within the agent* but rather something which emerges *in the interaction between agent and environment*. As we will see below, the two are said to be co-dependent or co-determined. Thus the authors also enact agency here as *relational*: pertaining neither to the agent itself nor the environment which it is in.



This insistence is in part motivated by the thought that ontological (self) individuation is itself not static or passive but rather an *active process*. For AE the components which make-up the system, and indeed the system as a whole, would disintegrate back into the surrounding environment from which they came, were it not for the *active striving* of the system to *maintain itself*. Barandiaran and Moreno (2008) point out that when this is taken into account, it is possible to identify two distinct but mutually regulative processes underlying this striving: (i) internal reorganisation of constructive processes such as, for example, metabolic adjustments and (ii) the regulation of interactive cycles through sensorimotor adjustment. This in turn allows for “some degree of decoupling from the basic constitutive processes since we are now talking about two dynamic ‘levels’ in the system: the constitutive level, which ensures ongoing self-construction, and the (now decoupled) interactive subsystem, which regulates boundary conditions of the former” (Froese and Di Paolo 2011, p. 10).

It is through the emergence of mechanisms which allow the system to regulate its operations by modulating its structural coupling and the recursive interaction with the environment that we get what Froese and Di Paolo (ibid., p. 10) call “adaptive agency”. This adaptive regulation of the system-environment structural coupling is what allows for the opening up of a novel “relational domain” whereby sensorimotor cycles extend beyond the internal regulatory dynamics of self-compensation. As Di Paolo (2009) argues, “when adaptive mechanisms operate across the physical boundary of an organism so as to regulate its coupling with the environment, we move from structural coupling (essentially a symmetrical concept whereby system and environment influence each other without loss of viability) to behaviour (an *asymmetrical concept where the organism originates the regulation of structural coupling*). This regulation of interactions allows us to define certain adaptive autopoietic systems as *agents*” (p. 15, emphasis added).

This is crucial for an enactive account of agency because, as Thompson (2011b) argues, “[i]nteractional asymmetry’ is precisely [the] capacity to modulate the coupling with the environment. If we lose sight of this interactional asymmetry, then we lose the ability to account for the directedness proper to living beings in their sense-making, and hence we lose the resources we need to connect sense-making to intentionality” (p.

206). For Thompson, and indeed many AE theorists after him, interactional asymmetry offers a bridge between the domains of interiority and exteriority, of object and subject, nature and culture and enacts the organism *qua* agent as being *intentionally directed towards* the environment. But this bridging of insides and outsides is not the end of the story, for with regards to genuine agency, meaning, value and normativity also need to be accounted for.

### 3.3 Normativity

The final key characteristic of agency is *normativity*. For AE theorists *all action* is essentially *purposive* in nature. Agency is not a mere movement or modulation but rather involves and requires (self) *regulation*. From the enactive perspective, biological normativity is co-emergent with ontological (self) individuation and guides interactive asymmetry such that the system is capable of *teleologically* regulating itself and is not simply passively modulated from the outside. Although we have already addressed this in the previous two chapters, it is nonetheless worth pausing here to further clarify what exactly is meant by teleological in this context and how it connects to biological normativity. More specifically I want to highlight how there are two senses in which organismic action can be said to be teleological, both of which directly subvert modernist thinking.

According to Barandiaran et al. (ibid.) action is *necessarily* purposive. An agent acts and thus regulates itself *in order to* achieve something. There is something it is trying to do *and* in so doing the very attempt can either *succeed* or *fail*. This success or failure of action is relative to the agent itself, not an outside observer, and is therefore *intrinsically* both teleological and normative. AE regards this as an essential characteristic of all living systems which any adequate theory of agency must account for. Unlike random movements, actions are thus taken to be teleological, by virtue of always being goal-directed. This subverts modernist views of nonhuman organisms as mechanical devices with no intrinsic goals and, at the same time, chips away at human exceptionalism.

However, as we have already seen in Chapter Three, actions are also teleological in a second sense: they are related to, *meaning* and *value-guided behaviour* (Barrett 2017; De Jesus 2016a; Di Paolo 2005; Thompson and Stapleton 2009; Weber and Varela

2002).<sup>112</sup> This, as we have already noted, subverts another crucial modernist impulse, namely its insistence that only humans are creatures who find the world meaningful and full of value. Moreover, as we will soon see, it is in this very distinctive sense that agency can also be made to connect up to the rejection of mononaturalism in virtue of the enactive specific thesis that organisms bring forth *worlds*. Let us illustrate these various points with a common example.

In the previous two chapters we saw how the example of the *E. coli* bacterium helped enactive theorists tell stories which helped to enact worlds where mind, meaning and value are *intrinsic properties* of even the ‘lowliest’ of living entities and all of which that implies. As the example goes, in order to maintain itself in existence, an *E. coli* bacterium is said to swim towards higher concentrations of sucrose and away from noxious substances. This feat is achieved by virtue of the capacity the bacterium has for regulating its own constitutive network of processes with respect to its viability conditions. Conditions are registered as unviable when the system encounters noxious substances and as viable when it encounters higher concentrations of sucrose (Colombetti 2010).

The example is then mobilised as an illustration of an adaptive teleological and *intentional process* whereby the bacterium (i) acts in order to maintain itself in accordance with its own self-generated viability conditions and at the same time also (ii) evaluates its surroundings such that certain properties within this surrounding environment acquire *meaning and are valuable for* the bacterium itself. Thus noxious substances become something which need to be avoided while more sugar is something to be sought. Enactive theorists, as we have seen, call this process of environmental evaluation by an adaptively autonomous system *sense-making*. Thus, genuine agency is in these cases enacted as an intrinsic and hence *ontological* feature of all systems *capable of partaking in processes of sense-making*. In turn, these processes of sense-making also underpin the capacity for bringing forth unique worlds.

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<sup>112</sup> I will therefore not rehearse the phenomenological considerations underpinning this move and here will provisionally simply take them for granted.

It is important that we do not misunderstand this *intentional relation* between organism and environment which results in the co-emergence of a biological self on the one hand and a meaningful world on the other. Drawing from the phenomenological tradition, these theorists insist that this “intentional relation” should not be understood in terms of internal mental “*states having content but as acts having directedness*” (Thompson 2007, p. 25, emphasis original). Organisms are thus enacted as embodiments of intrinsic intentional experiences which *orient* themselves *towards* the world and the objects therein but possess no representational (mental) content (see Steiner 2021). The organism does not, therefore, need to internally represent an independently existing world but merely directs itself towards a co-emergent world. Insofar as this is the case, intentionally *qua* object directedness, also appears as a characteristic of all *goal-directed purposeful behaviour*.<sup>113</sup>

We now have the sufficient background with which to begin exploring how and where different enactive theorists have enacted, be it implicitly or explicitly, an undoing of mononaturalism. In the next section we continue on with the theme of agency, thinking-with and through it, in order to explore its entanglements with and subsequent rejections of mononaturalism.

#### **4 Enactive agency and the undoing(s) of mononaturalism**

The enactive conception of agency is one of those ‘prior’ theoretical considerations which underpins, often simply tacitly, the rejection of a pregiven world. Indeed, in my opinion it does much more than this; in many respects we could say that it also perfectly embodies the dual thesis more generally. The aim of this section is to explore some of the different facets of this embodiment. I will do so primarily by taking a closer look at some of the complex entanglements between sense-making, intentionality and the rejection of a pregiven world. I will suggest that, although the enactive account of

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<sup>113</sup> It is worth noting that this notion of intentionality as non-contentful object-directedness is something which unites all ‘strands’ of enactivism (see Steiner 2021). Where theorists diverge is precisely around the notion of sense-making (and with it *meaning, significance* and *worlds*) which, for AE theorists, follows naturally from this type of intentionality. For AE theorists, being directed towards an object also means that the object towards which the organism is directed is always achieved from a “*meaning-conferring perspective*” (Steiner, *ibid.*). We will re-turn to intentionality below and in the next chapter.

agency is not generally directly mobilised<sup>114</sup> as a means to reject mononaturalism, it is nonetheless deeply entangled with and variously enacts such a rejection. Let us begin our discussion by exploring how some of these enactments are done.

Pierre Steiner (2021) is one of the very few theorists to have explicitly made the connection between enactive agency and the rejection of a pregiven world. Recall how, at the end of Chapter Three, we concluded by suggesting that at the core of the phenomenologisation of nature was also a rejection of mononaturalism. Having explored the enactive conception of agency in some detail above, we are now better placed to think-with and through this suggestion. The first point to note in this regard is that this particular undoing of mononaturalism is the direct result of the above discussed account of agency. As noted, Steiner (ibid.) argues that the enactive project is built upon an “epistemological constructivism” which in effect secures, in a biologically grounded manner, the nonexistence of a pregiven world. Underpinning this conclusion is precisely the enactive account of agency.

From our extended discussion above, it became clear that this “biological grounding” is achieved through the way enactive theorists account for the natural emergence of agency in nature. To briefly recap the relevant points: all adaptively autonomous living organisms are said to have *meaningful perspectives on the world* such that they never encounter neutral objective objects and spaces. As such, perspectiveness, meaning and significance is what leads the organism to be *directed towards* worldly objects. From the standpoint of enactive agency, this perspectiveness *qua* sense-making process, is an *intrinsic biological property* found across organic living nature. It is, moreover, something which can be adequately accounted for in a scientifically respectable manner, thanks to the suite of enactive resources.

From this standpoint, it is only sense-making systems – those systems constituted by self-individuation/self-maintenance and adaptive autonomy – which are at the same time *intentionally directed towards the environment* and capable of enacting, and hence

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<sup>114</sup> Nor should we expect it to be, since it was developed in order to address other issues and concerns somewhat orthogonal to the concerns over mononaturalism. Nevertheless, as emphasised throughout this section, the account does seem to directly entail this particular conclusion.

bringing forth, unique worlds.<sup>115</sup> It is at the ‘transition’ point between sense-making and bringing forth worlds that mononaturalism enters the fray. To put it simply, if sense-making always entails a *unique perspective on the world*, then there is no way of ever getting at *the world*. As Steiner (ibid.) puts it “[i]f perspectiveness can already be found at the level of the living cell, then epistemological constructivism is somehow grounded in intentionality, as a basic biological and pervasive phenomena” (p. 474). Consequently, this biological grounded intentional perspectiveness, “becomes somehow the operator in virtue of which, for living organisms, there is not a pre-given world, defined in terms of ‘objective properties’” (ibid.). This means that, from an enactive perspective, the mononaturalism decreed by the architects of the modern Constitution, is simply a *biological impossibility*. An impossibility borne out by the very distinctive biological-cum-agential nature of living organisms. To paraphrase Steiner’s (ibid.) reading of the enactive account, mononaturalism is effectively a “perspective” which denies its intrinsically perspectival nature.

It is in this way that enactive *agency* can be seen to embody the dual thesis explored above. Both in its rejection of a pre-given world and in its insistence that organisms bring forth worlds. It is important that we do not lose focus of the different moving parts at play here, so let us state the argument as boldly as possible: on the one hand, the enactive account of agency implies<sup>116</sup> a rejection of mononaturalism by virtue of biological autonomy. While, on the other hand, it implies that there are multiple worlds by virtue of the sense-making capacities of living organisms. At the same time, arguing that worlds are brought forth through sense-making, *feeds-back into and reinforces the rejection of a pre-given world*. Sense-making thus functions both as a means to (i) undermine the notion of a pre-given world albeit mostly implicitly and (ii) as an explanation of not only *how* worlds are brought forth but also *what they are*. Let us continue probing these different moving parts a bit further.

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<sup>115</sup> Sense-making is, by and large, enacted within the literature as *coextensive with agency*: living systems *qua* agents necessarily act and all action *qua* actions are processes of sense-making. Therefore, to act is to partake in processes of sense-making, and sense-making is action.

<sup>116</sup> Again, I use the word “implies” here simply to note that not all theorists reach this conclusion or indeed make this sort of argument explicitly.

Sense-making and the bringing forth of worlds generally tend to go hand in hand within the enactive literature. Thus, to take only one example, Di Paolo et al. (2010) argue that it is through processes of sense-making that cognitive agents are able to “regulate the conditions of their exchange with the environment, and in doing so, enact a world or cognitive domain” (p. 38). The authors are here following a general trend within enactive theory which argues that sense-making is the process by virtue of which genuine agents bring forth worlds, For these theorists, all organisms *qua* sense-making and hence intentionally directed agents interact with their respective environments specifically in terms of the *meaning and value* they have for the organism itself. As such, all organisms have a *meaningful perspective on the world and do not and cannot encounter neutral objective spaces*. These agents are, as Mog Stapleton (2022) points out, “enacting a world of sense, that is, a world of relevance or value to itself” (p. 167). So it is that organisms bring forth worlds through processes of sense-making.

But, this view of sense-making feeds-back into and reinforces – effectively *enacts* – a rejection of mononaturalism. This is not always made explicit within the enactive literature, and often operates mostly as an unthematized undercurrent, but it can nonetheless still be found. Implicitly this occurs when theorists argue that organisms do not encounter a ‘brute physical reality’ or a ‘dead physicochemical’ environment, but rather an inherently meaningful world brought forth by the organism itself. There is therefore no pre-given fixed world out there because, through sense-making, the organism brings forth its own world. So it is that sense-making embodies a rejection of mononaturalism. At the same time, as already noted in Chapter Three, placing sense-making at the core of life itself ensures that matters of fact are *always* matters of concern.

Sense-making thus provides a connection point between biological autonomy and perspectiveness. It renders mononaturalism as a nonstarter from the outset. The ‘world’ cannot be observer-independent, pre-given and universal because *all biological autonomous organisms have unique perspectives on it* which makes notions of “one true world” essentially *meaningless*. We can also say here that multiple worlds, or multiple *ontologies*, are derived from *multiple perspectives through sense-making*. Or, to borrow a rather apt phrase from STS scholar Sergio Sismondo (2015), “the way things *are* falls

out of how they are *seen*” (emphasis added). Note that agency here not only enacts a rejection of mononaturalism but also provides an explanation of *how* worlds are brought forth. But what does this tell us about what these worlds actually are? Thinking-through this question is particularly useful in this context as it also brings further entanglements with (the rejection of) mononaturalism to the fore.

## **5 From world to worlds**

Because mononaturalism is here rejected by virtue of the claim that organisms bring forth worlds we at the same time also get a very particular enactment of the notion of ‘world’ itself. And it is through these specific enactments that we begin to get a feel for what worlds *are* in contradistinction to the singular, pregiven world, of mononaturalism. To illustrate this further, it will be useful to explore how these enactments are also often deeply entangled with the broader phenomenological tradition. In this regard, the first point of note is the congruence between this enactive notion of world as it drops out from sense-making and the notion of world as used within the phenomenological tradition.

According to Dan Zahavi, the notion of world as used by Husserl, for example, also rejects commitments to objectivism-cum-mononaturalism. As Zahavi (2003) points out, “[t]he world is not something which simply exists. The world appears, and the structure of this appearance is conditioned and made possible by subjectivity”. Therefore, the author continues, “it is absurd to speak of the existence of an absolutely mind-independent world, that is, of a world that exists apart from any possible experiential and conceptual perspective” (p. 52). As Thompson’s (2007) work clearly highlights, the enactive conception of agency is one which is not only informed by but also gives strong support to this phenomenological (transcendental) conception of world. We briefly touched upon transcendental phenomenology in Chapter Three. This transcendental dimension becomes important in this context because it “focus[es] not on



*what things are but on the ways in which things are given*” (Thompson 2007 p. 21, emphasis original).<sup>117</sup>

Thus, as Mathew Crippen (2020) observes, both for phenomenologists and enactive theorists “worlds and experiences are taken to be synonymous” (p. 6). However, as Crippen goes on to argue, this does not mean that “experience” here is a purely subjective form of conscious awareness: “We in fact speak of the ‘world’ or ‘experience of parenthood’ or ‘parenting culture,’ and likewise of ‘French culture,’ ‘the French world’ or ‘the French experience.’ Worlds, in this sense, refer to the totality of habits and comportment in surroundings that are adjusted and brought out, for example, when one switches from an academic frame to a childrearing one or as one gradually learns to enact shared French cultural practices” (ibid.).<sup>118</sup>

The notion of intentionality, as already introduced and discussed above, is of course also important in this context and plays crucial roles both within phenomenology as well as enactivism. All conscious acts are always *about something*. All experience is therefore not purely subjective but intimately linked to the world and our complex relations within it. As Popova and Raczaszek-Leonardi (2020) point out, “[p]henomenological description is therefore always an intentional description, revealing the inherent relationship of the world with subjectivity”. As the enactive account of agency makes clear, what distinguishes the enactive approach here is that it attempts to provide a scientifically feasible account of how this happens. Indeed, for many enactive theorists, adaptive autonomy provides a biological grounding of intentionality. Thompson is especially clear on this and insists that “[s]ense-making is intentionality in its minimal and original biological form” (Thompson 2007, p. 147).

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<sup>117</sup> As Zahavi (2005) points out, “[w]e are never conscious of an object *simpliciter*, but always of the object as appearing in a certain way; as judged, seen, described, feared, remembered, smelled, anticipated, tasted, and so on. We cannot be conscious of an object (a tasted lemon, a smelled rose, a seen table, a touched piece of silk) unless we are aware of the experience through which this object is made to appear (the tasting, smelling, seeing, touching)” (p. 121).

<sup>118</sup> It should be noted that Crippen is making the case that such considerations do not imply the *anti-realist* conclusions that some enactive theorists claim they do. Like Zahavi below, Crippen argues that the enactive position is fully *compatible* with realism. But note, however, that this “compatibility” tends to come at the cost of the exclusion of other compatibilities. Both Crippen and Zahavi seem to imply that the enactive approach cannot be both realist *and* anti-realist at the same time. Whereas my concerns in this work is more or less in exploring precisely this type of multiplicity which these theorists seem to want to rule out.

Tracing the phenomenological roots of the enactive approach and then entangling intentionality, experiences and *worlds* together, Popova and Raczaszek-Leonardi (ibid.) go on to argue that “[t]his is precisely how the initial formulation of enactivism as “the emergence of mind as entailing the emergence of a world” can be properly understood”. The reason for this, they go on to clarify, is “because phenomenology is primarily understood as a philosophy of experience, its influence filters directly into preoccupations in early and contemporary enactivism with issues such as individuation, autonomy, and agency” (ibid.).

As the authors note, the five core principles of the enactive project, as outlined by Thompson (2004) and explored in Chapters One and Three, all foreground “the constitutive nature of subjective experiences in relation to an external realm” (ibid.). An external realm which is brought forth by virtue of the organism’s autonomous adaptive organisation. Or, in other words, by virtue of enactive agency. Here we see another entanglement of enactive theory with phenomenology, enlisted principally in aid of metaphysics (cf. Pace Giannotta 2021). But the enactive project moves beyond phenomenology and has a much wider scope of interest.

To sum up. In this and the previous section we explored the theme of agency and how it is both entangled with the rejection of mononaturalism and the bringing forth of worlds. In the previous section we clarified how biological (adaptive) autonomy enables interactive asymmetry which then gives rise to sense-making which, in turn, results in the bringing forth of worlds and ultimately results in an undoing of mononaturalism. While in this section we briefly explored how ‘world’ becomes ‘worlds’ and drew some connections to phenomenology. In the next section we explore how the dual thesis is enacted through the theme of embodiment.

## **6 Embodiment and the undoing(s) of mononaturalism**

This section is broadly centred around the theme of embodiment as enactments of the dual thesis. I say “broadly” because we will explore how embodiment, together with closely related concepts of ‘structural coupling’ and ‘codetermination’, can and do work to disrupt deeply entrenched mononaturalistic convictions. As an entry point into the discussion I will draw on a paper by Karim Zahidi (2014) which explores some of these

concepts in relation to the notion of realism.<sup>119</sup> However, rather than argue as Zahidi does that these concepts do not have the anti-realist implications that enactive theorists purportedly claim they do, my interest here is in exploring their entanglements with the undoing of mononaturalism.

Not unlike the notion of agency explored above, the enactive notion of embodiment plays an equally important role within the broader enactive approach. The aim here is to explore how this notion, along with a cluster of related concepts, often functions as a different enactment of the dual thesis. A good entry point into the discussion is provided by the work of Zahidi (*ibid.*). The author begins his analysis by noting that, for many enactive theorists, “embodiment determines the features of the world to which an organism is sensitive” (p. 466). With regards to anti-realism, Zahidi notes that the following case could be made: because perception is argued to be organism-dependent, it is unclear whether what is perceived is really a product of the outside world or whether it is simply the product of the morphological/structural make-up of the organism and its interaction with the world.

As Zahidi observes, this line of reasoning is epistemic in nature and thus raises a challenge for epistemic realism. It challenges the idea that our knowledge of the world-in-itself is objective and organism-independent because this knowledge directly corresponds to external pregiven features of that reality. Zahidi then goes on to argue that this type of epistemic anti-realism “further feeds into ontological anti-realism: if we are not sure whether what we perceive is a feature of the world as it exists outside and independent of us, one can maintain a reasonable scepticism towards the existence of an independent world as well” (p. 466). Now, Zahidi is particularly concerned with how this specific consideration regarding the nature of embodiment is at once entangled with anti-realism but need not in fact entail these sorts of anti-realist conclusions. I however am interested in something rather different.

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<sup>119</sup> As with Crippen above, Zahidi’s particular concern is with showing that the enactive approach need not entail anti-realism. I think this is a perfectly legitimate argument to make, however, it is not my concern here. Rather, my interest is in showing that these concepts (e.g. embodiment, structural coupling) can and do other types of work (i.e. undermine mononaturalism) within the enactive approach. See also the previous footnote.

Without necessarily wanting to dispute Zahidi's argument, I am more interested in exploring what other work this sort of consideration can and has done within the enactive approach. I want to suggest that this consideration regarding embodiment also underpins another distinct rejection and direct subversion of mononaturalism. It provides, in other words, another enactment of the enactive dual thesis and its rejection of mononaturalism (cf. Rolla and Figueiredo 2021). These considerations, moreover, are also often closely entangled with that of 'structural coupling' and 'codetermination'. I will therefore consider these together and explore some of their complex entanglements within the literature.

Having briefly hinted at the particular aspect of embodiment which will concern us in this section, I want to now take a closer, although cursory, look at how and where the notion of *structural coupling* is used in these enactments. Paying particular attention to some of the ways it relates to, and is entangled with, this notion of embodiment. We have already encountered some of these entanglements above when discussing agency. Here I want to explicitly thematise them. Towards this end we might begin by recalling how the notion of structural coupling plays a crucial role in certain enactments of the definition of cognition within the broader enactive approach. To take what is perhaps the most well-known example, VTR claim that, "cognition in its most encompassing sense consists in the enactment or a bringing forth of a world by a *viable history of structural coupling*" (p. 205, emphasis added).

The notion of structural coupling referred to here, and indeed at play in the enactive approach more broadly, can be traced to the work of Maturana and Varela (1980, 1987). Throughout many of their diverse works, the authors routinely use the notion to undermine some of the excessive strictures of modernity. More specifically, the authors deploy the term as a means to emphasise the blurring of boundaries between subject and object which occurs through dynamic interaction with the environment. According to Maturana and Varela (1987), system and world are so intimately connected that they become *structurally coupled* to one another in such a way that they mutually *codetermine* each other. As organism and environment dynamically interact with one another, they co-evolve and mutually transform and change each other. According to the

authors, these ubiquitous processes of structural coupling and codetermination in effect collapses the traditional dichotomy of object/objectivity and subject/subjectivity.

As these brief remarks indicate, in the early works of Maturana and Varela as well as VTR, the notion of structural coupling is often deeply entangled with that of codetermination. Because subject and object, the knower and the known, are structurally coupled, they mutually influence and thus mutual transform and change (codetermine) each other. Both systems thus depend on each other in such a manner that neither exists, or indeed could exist, independently of one another. Embodiment ties all of this together. For Maturana and Varela (ibid.), it is the active coupling of both the *structural properties* of living organisms *and* the structural properties of their respective environments which together give rise to unique organismic-dependent, non pregiven, worlds. Or, in other words, it is the organism's *embodied structure, when coupled to the environment*, which allows for a *unique world* to be brought forth.<sup>120</sup> As Thompson (2016) puts it, “[c]ognition and world are interdependently originated via the living body” (p. xxvi). So it is that, structural coupling, codetermination and embodiment are threaded together in such a manner that they at the same time also enact a direct rejection of mononaturalism.

At this point one might be wondering how this differs, if at all, from how agency undermines mononaturalism. To push this concern home, consider Proulx's (2008) discussion on the non-pregiven nature of brought forth worlds. According to the author, “I bring forth the physical world's attributes when I give/create meaning to it – I acknowledge their physical ‘presence’ by bringing them forth. If I do not bring them forth, the physical world's attributes will still be ‘there,’ but they will remain unnoticed, not made sense of and kept ‘in the dark’. It is in this sense that the physical attributes themselves are brought forth by my interaction with them (if I perceive them). In some sense, I make the physical world emerge” (pp. 21-22). At first glance these observations appear to be motivated by considerations regarding enactive agency as discussed above.

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<sup>120</sup> Note that organisms are structurally coupled to *an environment* rather than to a world. In this sort of enactment worlds are that which results from organism-environment interaction. See the next chapter for a more detailed discussion on the distinction between environments and worlds underpinning this type of enactment.

However, underpinning Proulx's comments here are appeals to structural coupling and codetermination and *not* enactive agency.

Although connected in certain key respects to how enactive agency is itself used to undo mononaturalism, it is also importantly distinct. Indeed, it is for this reason that I am suggesting it offers a different version – a *different enactment* – of the dual thesis and its rejection of mononaturalism. The notion of codetermination is especially important for understanding how exactly these two enactments differ. Recall that the enactive account of agency takes structural coupling to be an essentially *symmetrical concept* which *lacks* the genuine interactive asymmetry of agentic sense-making (see Di Paolo 2009). There is, therefore, a distinction here between how (i) sense-making and (ii) embodiment *qua* structural coupling and codetermination reject and subvert mononaturalism.<sup>121</sup>

Embodiment is, of course, crucial in both instances, but the work it does in both is also crucially different. Recall that with regards to (i), it was meaning, value and perspectiveness which served to undo mononaturalism. While with regards to (ii), it is structural coupling and codetermination which is doing the core argumentative work. It is the organism's morphological/structural make-up – its distinctive *embodiment with its perceptual apparatus* – which determine those features of the world to which it is sensitive (or structurally coupled). Features which co-emerge and are therefore codetermined by both organism and environment. Thus, within (i), the notion of codetermination drops into the background by virtue of its essentially *symmetrical* nature.

While in the enactive literature we tend to find cases where (ii) is subsumed by (i) the reverse, to my knowledge, is much harder to find. This is primarily due to the aforementioned asymmetrical nature of sense-making. It is for this reason that even though in both cases different worlds are brought forth by virtue of an organism's

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<sup>121</sup> Note that structural coupling and codetermination are themselves also often propped up by autonomy. Thus, although each side of the distinction I am making here have their roots in the phenomenon of autonomy, different consequences and implications are often drawn from this. See Villalobos and Ward (2015) for discussion on some of these differences and where the authors argue that autonomy does *not* imply or entail the sort of agency/sense-making which many AE theorists suggest.

distinctively embodied perceptual system, only (i) mobilises brought forth worlds by virtue of meaning, value and perspectiveness. The important point here, which I will again re-emphasise, is that these offer two *different concrete enactments* of the dual thesis and function, or can function, to directly subvert and reject mononaturalism.

With these clarifications in hand, let us re-turn to VTR's suggestion that it is through distinct histories of structural couplings that different organisms at the same time bring forth their own unique worlds. This offers an example where (ii) is distinctively mobilised. The quote highlighted above is taken from VTR's treatment of colour perception. According to the authors, colour perception can be regarded as a "paradigm of a cognitive domain that is neither pre-given nor represented but rather *experiential* and enacted" (p. 171, emphasis added). VTR argue that colour is not a property 'out there' in the world but rather something which, through a history of structural coupling, differently embodied organisms *experience* in their own unique ways. Thus, "different histories of structural coupling for birds, fishes, insects, and primates have enacted or brought forth different perceived worlds of color" (p. 183).

The philosopher of cognitive science Lawrence Shapiro (2011) helps to explain VTR's core point as follows: "because many non-human organisms have visual systems with different characteristics, e.g., pigeons have perhaps as many as six types of cone cells and goldfish have four, we should expect that the world of color they 'bring forth' will differ from the world of color that human beings experience" (ibid., p. 83). Colours are therefore not pre-given worldly properties but uniquely brought forth by different organisms with different morphological structures: "cognition depends upon the kinds of *experience* that *come from having a body with various sensorimotor capacities*" (VTR, p. 172, emphasis added).

Here is another example from Anthony Chemero (1998) who, despite not deliberately aligning himself with the enactive tradition, nonetheless is very sympathetic to it. Chemero argues that "if humans and ticks and rats and so on are all able to live very successfully in the very different worlds constituted by their perceptual systems, there can be no principled reason to privilege the human world (or any other world) as the world-in-itself. [...] Thus the ontology implied by the usual human categories has no

claim on being the world-in-itself”. Like the examples used above, Chemero enacts a global rejection of mononaturalism by mobilising the notions of structural coupling and distinct embodiment and emphasising how these enable the bringing forth of unique worlds.

A more recent example comes from Amanda Corris. According to Corris (2020) “[w]hile humans and honeybees both share the same physical world, their perceived worlds drastically differ due to their variation in sensorimotor capacities. Thus, an organism enacts a perceived world depending on its sensorimotor capacities”. Like Chemero, Corris’s position is informed by VTR’s insistence that, organisms bring forth or “enact a world as a domain of distinctions that is inseparable from the *structure embodied* by the cognitive system” (p. 140, emphasis added). World(s) are thus directly connected to the morphological/sensorimotor capacities of the species.<sup>122</sup>

Although the preceding examples focus primarily on the notions of embodiment and structural coupling, the concept of codetermination is often also present. Indeed, for VTR, codetermination underpins the dynamics of all organism-world interaction. As the authors point out, “living beings and their environments stand in relation to each other through *mutual specification* or *codetermination*” (p. 198, emphasis added). A common example used to illustrate this point is that of the relationship between flowers and bees (cf. Cummins and De Jesus 2016). Flowers and bees (as well as other pollinators) need to be understood as existing only in relation to one another as they are both entangled in a circular process of mutual specificity. A relevant change in one leads to changes in the other. At a more abstract level, the point is that, organism and world, subject and object – flower and bee – codetermine each other. Both emerge as a mutual consequence of each other: “[t]he environment of a given living body of whatever degree of complexity can only be what is knowable and known to its sense organs and cognitions, and that environment is in its turn constantly changed by the organism’s action on it – (...) neither side is pre-given” (Rosch 2016, p. xxxviii).

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<sup>122</sup> It is worth noting here that this core insight, or something very akin to it, is also central to a number of influential anthropologists within the ontological turn. Thus, for example, while discussing the work of Viveiros de Castro, Marilyn Strathern (2005) argues that “[t]he body is the organ of perception; perspectives are different according to the body one has” (p. 140). It is, regrettably, beyond the scope of this work to explore these entanglements any further.



Vörös et al. (2016) succinctly capture this notion of codetermination as follows: “Instead of detection/creation or internalization/externalization of the features of a discrete world by a discrete subject, the subject and world co-emerge from, and are co-determined through, (...) recurrent sensorimotor patterns. The embodied cognizing agent can thus be said to both *shape*, and at the same time *be shaped by*, the environment” (p. 191, emphasis original). The logic(s) of codetermination and co-emergence can, at least in principle, be applied to all dynamic interactions between living entities and their worlds. But, as noted above, they do different work when it comes to the dual thesis and the rejection of mononaturalism. Admittedly, this is not always directly apparent. The ever present case of the *E coli* bacterium provides a good example here.

This organism has a distinctive embodiment and, as such, is structurally coupled to its environment in an equally unique way. It is by virtue of both its morphological/structural properties and the part of the physical world it inhabits, that certain states and properties of the world become salient for it. But note, however, that this particular example, as with many others, can itself be enacted in at least two distinct ways depending on whether it is symmetry or *asymmetry* that is emphasised. The former will be primarily underpinned by codetermination and structural coupling, while the latter will take agency and sense-making as the underlying source of its mononaturalistic rejections.

Nevertheless, whether conceived symmetrically as Maturana and Varela do, or asymmetrically as Di Paolo does, in both cases the organism (*E. coli*) is said to bring forth its own unique world. While, by and large, it is only when conceived as asymmetrical that these processes are also conceived as grounding the bacterium’s ‘perspective’, ‘point of view’ and ultimately it’s ‘meaningful world’ (see Di Paolo 2009; Thompson 2007; Weber and Varela 2002). In these cases, I would suggest, the case against mononaturalism is specifically grounded on an enactive conception of

autonomous agency and not the embodiment/structural coupling/codetermination nexus.<sup>123</sup>

Before moving on to the next section, I would like to note how much of this discussion owes a great deal to the work of the Estonian biologist Jakob von Uexküll,<sup>124</sup> especially to his notion of an Umwelt which is routinely invoked in the enactive literature. Jakob von Uexküll (2010) argued that all living organisms need to be understood as subjects who constitute their own unique worlds by virtue of the specific ways these have for perceiving the environment. Uexküll called these perceptual worlds *Umwelten*. The concept of an Umwelt originates from Uexküll's detailed empirical investigations into the nature of the relationship between organisms and their environment. According to Uexküll, all living organisms form a coupled system – the Umwelt – with an inherently meaningful environment. These meaningful environments are, in turn, a consequence of the unique morphologies that each species of organism possesses.<sup>125</sup> This work can thus be seen as both a strong precursor to and influence on those enactive considerations of agency and embodiment which undermine mononaturalism (cf. Rattasepp 2022).

To sum up. In this section we have explored the different ways in which both embodiment and the closely related concepts of structural coupling and codetermination enact rejections of mononaturalism. It is because bacteria, ticks and rats are differently

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<sup>123</sup> Evan Thompson (2011b) has, however, defended the codetermination thesis while insisting that the relation between organism and world is *both* symmetrical and asymmetrical at the same time. The relation is symmetrical in that both are structurally coupled such that which partner exerts the most influence varies over time. It is asymmetrical in that only organisms are capable of manipulating parameters of the coupling in a manner that the environment cannot (p. 121). We will re-turn to this point in the next chapter.

<sup>124</sup> I would like to thank Fred Cummins for drawing attention to my initial neglect of Uexküll in these debates and my failure to mention his importance.

<sup>125</sup> The famous example is that of a female tick. A female tick's skin is sensitive to light and this guides her up from the ground to a brighter position on a branch or blade of grass. Once up, she will hang there until butyric acid emanating from a mammal reaches her. Upon sensing the butyric acid, she will drop and plunge straight into the mammal. Here the perceptual cue of butyric acid triggers an effector cue which results in the release of the tick's legs and enables it to drop onto the mammal. When the tactile cue of hitting the mammal's coat is triggered, she begins to move around, searching for warmth, upon encountering the skin, she will trigger a burrowing behaviour, after which she starts to burrow in and suck the warm nourishing blood. When she has finished her first and last meal, she will drop down, lay her eggs on the earth and die. Uexküll (2010) argues that practically everything in the world which engulfs the tick has absolutely no salient value or meaning for it. The stars, weather, noises, smells, leaves, shadows, and much more besides, do not matter and are “ignored”. Certainly they will belong to the *Umwelten* of certain other organisms living amidst the tick, but they do not ‘carry’ any meaning for our female tick. None of these are salient or convey any meaning for the tick itself, its Umwelt consists merely of three cues which are of intrinsic significance. We re-turn to Uexküll in the next chapter.

embodied and thus have perceptual systems with different characteristics which allows for different structural couplings, that the worlds they bring forth vary dramatically from the world a human being experiences. Organism and world thus only exist *in relation* to each other and not as independently existing entities. We also noted how, despite its overt similarities, these particular enactments were nonetheless also distinct from those found in regards to how enactive agency undoes mononaturalism. In the next section we turn our attention towards anti-representationalism.

### **7 Anti-representationalism and the undoing(s) of mononaturalism**

This section explores in a bit more detail the theme of anti-representationalism and its entanglements with the dual thesis. The particular aspect of anti-representationalism of interest here is succinctly put by Thompson (2016) as follow: “a cognitive being’s world is *not* a pre-specified, external realm, *represented internally by its brain*, but is rather a relational domain enacted or brought forth by that being in and through its mode of coupling with the environment” (p. xxvii, emphasis added). As this quote indicates, anti-representationalism is also closely entangled with embodiment and structural coupling. For our purpose here, however, we will primarily focus on the theme of anti-representationalism.

We have just seen how some theorists have argued that it is by virtue of the organism’s structural coupling and embodiment that it brings forth different worlds. A legitimate case could, therefore, be made that this structural coupling/embodiment ‘thesis’ can be further *supported* and *complimented* when coupled with considerations regarding anti-representationalism. This however is not what I want to do here. Rather, I am more interested in showing how anti-representationalism *in its own right*, can be/is yet another specific enactment of the rejection of mononaturalism vis-à-vis the dual thesis. So how and where is this done?

For our first example we re-turn to the work of VTR. In Chapter One we saw that a central motivation for rejecting objectivism and its mononaturalistic implications was precisely the ambition to overcome mental representationalism. This was, of course, connected not only to VTR’s particular concerns regarding the study of cognition itself but also to deeper philosophical issues. Not in the least the rejection of objectivism. As

Vörös et al. (2016) observe, the enactive approach as originally introduced by VTR had as its main goal the ambition “to find a way to crack the old chestnut of realism and idealism” (p. 190).

In order to crack this ‘old chestnut’, VTR argued that we first need to overcome two deeply entrenched and mutually supporting ideas: (i) that we have internal mental representations mediating our access to a (ii) pregiven, perceiver-independent world. Convinced by the unquestionable truth of (ii), realists use mental representations to bridge that which is outside to what is inside, while idealists use mental representations to project what is inner to an outside. In the context of cognitive science the assumption was/is that only with accurate representations of the world can the mind solve real world problems. Without these accurate representations, organisms would simply not survive in their respective environments because they would be operating with (mis)representations of that environment. Thus, despite their deep metaphysical differences, both positions are equally premised on the unquestionable truth of mental representationalism.

In this context, VTR’s ‘solution’ to the metaphysical quandaries brought about by representationalist epistemologies, is the proposal that organisms bring forth or “enact” their worlds: “Instead of *representing* an independent world, [organisms] *enact* a world as a domain of distinctions that is inseparable from the structure embodied by the cognitive system” (VTR, p. 140, emphasis original). For VTR, autonomous systems *are* cognitive systems *which are also non-representational systems*. Autonomous, and hence cognitive systems, *bring forth* rather than represent worlds.

Here, again, we see how all the themes discussed in this chapter are intimately entangled. Bringing forth a world is either underpinned by sense-making or structural coupling and codetermination. Sometimes it is underpinned by both. Nonetheless, the first important point I want to make here is that this process of *bringing forth worlds is a non-representationalist process*. It does not involve organisms building internal pictures or models of the external world. Rather, it is a continuously ongoing, actively dynamic process, between organism and environment. It is something the organism does through its engagement with its environment.

However, as briefly hinted at above, the metaphysical implications one draws from representationalism are usually dependent on other implicit metaphysical commitments. Cognitivism, which is of course underpinned by representationalism, takes for granted the truth of mononaturalism. VTR, and many enactive theorists after them, tend to agree and assume that representationalism in fact presupposes the truth of mononaturalism. VTR articulate the cognitivist argument as follows: “We assume that the world is pregiven, that its features can be specified prior to any cognitive activity. Then to explain the relation between this cognitive activity and a pregiven world, we hypothesize the existence of mental representations inside the cognitive system (...). We then have a full-fledged theory that says (1) the world is pregiven; (2) our cognition is of this world-even if only to a partial extent, and (3) the way in which we cognize this pregiven world is to represent its features and then act on the basis of these representations” (p. 135).

Note, however, that the conviction that the world is both organism-independent and pregiven is an *a priori stipulation* grounded on very specific metaphysical assumptions which take for granted the truth of mononaturalism and not, as VTR seem to suggest, as a direct *consequence* or *entailment* of representationalism itself. Indeed, different metaphysical conclusions can be drawn from a commitment to representationalism.<sup>126</sup> Nevertheless, and regardless of the various metaphysical commitments motivating this conclusion, the point I want to make here is that anti-representationalist considerations themselves *can and often do* function as *distinct enactments* of the dual thesis and its rejection of mononaturalism.

Thus understood, representationalism and mononaturalism are regarded as intimately entangled with each other. Indeed, a convincing case could be made that within certain sectors of the Western philosophical tradition specifically, these two positions tend to mutually support and reinforce one another. Mononaturalism is said to require representationalism, since the world out there *needs* to be represented in some manner

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<sup>126</sup> Representationalism in and of itself need not entail the existence of a pregiven world. If all one has access to is one’s own mental representations then it is difficult, if not altogether impossible, to tell what exactly lies behind them. Thus one could be a representationalist and also insist that the world is *not* pregiven. We will re-turn to some of these issues in the next chapter.

in order for us to have access to it. While these representations are said to represent more or less accurately this world which exists out there, independently of the organism. Taken together, they give rise to the array of philosophical quandaries that have troubled both realists and idealists for centuries (see Dreyfus and Taylor 2015). For VTR, cognitive science, as we have seen above, owes much of its theoretical underpinnings to these two philosophical traditions. Thus, in order not to fall prey to either extreme and then recapitulate the subsequent debates they give rise to, VTR suggest we simply refuse its founding premises. That we refuse representationalism by showing how/that organism bring forth worlds. It is in so doing, I suggest, that enactive theorists also enact another facet of the dual thesis.

So it is that an ambition to overcome mental representationalism, and the realist and idealist epistemologies which VTR argue underpin them, is also entangled with the rejection of mononaturalism. The rejection of both tend to go hand in hand and sometimes, but by no means always, are *explicitly* regarded as a core component of the enactive project (e.g. Thompson 2007). More often than not, recent enactive theorists at least, simply insist without further justification that organisms do not internally represent an external world precisely *because* they bring it forth (e.g. Di Paolo et al. 2010). Nonetheless, the suggestion here is that when theorists do make these sorts of claims they are at the same time, even if only implicitly and tacitly, enacting a rejection and subversion of mononaturalism.

Here is an instance of what I take to be a representative example of the particular points I am trying to make. According to Di Paolo et al. (2010) “[o]rganisms do not passively receive information from their environments, which they then translate into internal representations. Natural cognitive systems are simply not in the business of accessing their world in order to build accurate pictures of it. They participate in the generation of meaning through their bodies and action often engaging in transformational and not merely informational interactions; *they enact a world*” (p. 39, emphasis original). This quote signals primarily to the anti-representationalist dimension of enactive theory. However, equally present here, albeit in a somewhat tacit and non-thematised manner, is the rejection of mononaturalism. Mononaturalism and representationalism are first aligned together then rejected by the appeal to the enactment of a world. A world is said

to be enacted such that (mental) representations are neither involved, required nor necessary. It is the organism's *constructive and interpretive actions* – not internal representations – which constitute its brought forth world (see VTR, p. 156). Thus we see that the explicit rejection of representationalism also implicitly enacts a rejection of mononaturalism.

We can illustrate these points further with another example: the submarine metaphor used by Maturana and Varela (1987). Maturana and Varela suggest that we can think about an organism's relation to its environment in similar terms to that of a navigator steering a submarine without using a periscope. The authors note that, although the navigator does not have any direct contact with the outer world, she is nonetheless able to successfully navigate the submarine through the sea. She does so simply by reacting skilfully to what is directly in front of her. She pushes the relevant buttons, pulls all the necessary levers, and generally engages in a more or less skilful manner with a complex system of indicator signals.

For Maturana and Varela (*ibid.*) this example illustrates the fact that, for the navigator in the submarine, there are no 'cliffs' and 'reefs' which serve as 'obstacles' in that world. Rather, the only thing she has direct access to is the complex system of indicator signals to which she more or less diligently responds. Both the design of the submarine and the skills of the navigator therein thus ensures that the submarine successfully sails its environment. As Zahidi (2014) notes, "[t]o achieve this, neither submarine nor navigator has to rely on representations of the outside world" (p. 469). An organism's relation to the world can therefore be best understood on this sort of model. Rather than having to construct internal mental representations of an outside world, the organism simply *enacts* and therefore brings the world forth through its *doings*.

Similarly to Di Paolo et al. above, Maturana and Varela use the metaphor of the submarine primarily as a means to reject traditional representationalist conceptions of cognition. However, in so doing, they also enact a direct subversion of mononaturalism: the navigator in the submarine does not need to model or internally represent the world because *the* outside world *qua* pre-existing structure does not exist *for* the navigator. And it does not exist for the navigator precisely because she brings it forth courtesy of

her structure and not due to internally mediating representations which directly mirror a pre-existing and pregiven world.

As Maturana and Varela point out, “[t]he dynamics of the submarine’s different states, with its navigator who does not know the outside world, never occurs in an operation with representations of the world that the outside observer sees: it involves neither ‘beaches’ nor ‘reefs’ nor ‘surface’ but only correlations between indicators within certain limits. Entities such as beaches, reefs, or surface are valid only for an outside observer, not for the submarine or for the navigator who functions as a component of it” (ibid., p. 137). The world which exists is therefore only the brought forth world of the navigator. It is not *the* world but *a* world because “*every act of knowing brings forth a world*” (ibid., p. 26, emphasis original). Here, anti-representationalism, embodiment and structural coupling all become deeply entangled and together function as a subversion of mononaturalism. However, in these examples, it is anti-representationalism which is brought to the foreground and explicitly thematised.

To sum up. In this section we have explored the theme of anti-representationalism and how it relates and becomes entangled with a distinct subversion of mononaturalism. We saw that underpinning this rejection was also a close connection to the notions of embodiment and structural coupling as explored in the previous sections. Indeed, all three concepts often run very closely together, but here we have simply concentrated primarily on anti-representationalism. Making the case that, flanked by embodiment and structural coupling, enactive anti-representationalism constitutes another genuine rejection of mononaturalism.<sup>127</sup> In the next section we turn our attention towards the notion of reflexivity.

## **8 Reflexivity and the undoing(s) of mononaturalism**

The aim of this section is to explore the different entanglements between the enactive approach, reflexivity and the rejections of mononaturalism. It will aim to highlight the

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<sup>127</sup> It should be noted that not all cases of enactive anti-representationalism are simultaneously enacted as rejections of mononaturalism. Thus, for example, the work of Hutto and Myin (2013, 2018) is taken as enactive anti-representationalism but does not advocate the rejection of mononaturalism. Quite the opposite: the authors explicitly align themselves with mononaturalism and regard the enactive dual thesis as too closely embodying a species of idealism (see Hutto and Myin 2013, pp. 32-36, for a discussion).



important role reflexivity plays within the enactive approach and explore some of the ways it enacts the dual thesis as a direct subversion of mononaturalism.

The notion of reflexivity plays an important role, albeit often tacitly, within the enactive approach. Indeed, VTR began their book by calling attention to the apparent ‘paradox’ of reflexivity at the very core of everyday life. This paradox is stated by the authors as follows: “in reflection we find ourselves in a circle: we are in a world that seems to be there before reflection begins, but that world is not separate from us” (p. 3). Following Merleau-Ponty, the authors suggest that recognising this ‘circle’ opens up a space between self and world which allows for the *continuation* between both. In this way reflexivity offers VTR yet another route towards the coveted ‘middle path’ which avoids the extremes of realism and idealism. As we will explore in this section, it also provides another enactment of the dual thesis.

More recently Stewart et al. (2010) have very explicitly situated reflexivity at the core of the enactive approach. The authors identify “three salient characteristics which mark the originality and specificity of enaction as a paradigm” (p. xiii). One of these “salient characteristics” is *reflexivity* (the other two being the circulation between first and third person methodologies, and connecting and accounting for the multiple levels of organisation at various scales, involved in cognition). The authors (ibid.) thus insist that, “if a paradigm in cognitive science is thoroughgoing (and enaction certainly aims at this), it cannot avoid being reflexive and applying to itself”. Despite not always being explicitly thematised, reflexivity evidently plays a fundamental role within the enactive approach (e.g. Cuffari et al. 2021; Thompson 2016; Valenzuela-Moguillansky et al. 2021; Vörös et al. 2016).

The concern over reflexivity within the enactive approach can be traced back, both historically and theoretically, to second-order cybernetics and Heinz von Foerster’s call for a “theory of the observer”. Any theory which includes the theorist as a living being needs to account for not only “himself, but also his writing this theory” (Foerster 1984, quoted in Vörös et al. 2016). As von Foerster (1979) puts it, any theory which asserts that “the properties of the observer must not enter into the description of his

observation” (p. 7) must be questioned.<sup>128</sup> Moreover, as Stewart et al. pointed out above, any theory which rejects that the world is observer-independent must apply this central principle to itself. This, in a nutshell, is reflexivity: a process between researcher and the object of research which involves the “practice of identifying and interrogating the ways in which the characteristics of the researcher’s self influences their research” (Gullion 2018, p. 85).

Thus understood, reflexivity is inherently *self-referential*, as the researcher is forced to consider “how and in what ways their standpoint in the world has an impact on the relationships and processes of research” (Gullion, *ibid.*). As Salzman (2002) succinctly puts it, “[r]eflexivity is thus the constant awareness, assessment, and reassessment by the researcher of the researcher's own contribution/influence/shaping of intersubjective research and the consequent research findings” (p. 806). This quote rather nicely encapsulates the reflexive *circularity* inherent in research practices highlighted by the enactive approach. As VTR note, “[b]y not including ourselves in the reflection, we pursue only a partial reflection” (p. 25).

Despite its genealogical connection to second-order cybernetics, I will not pursue these fairly well documented entanglements here any further (cf. Froese 2011b). Rather, in this section, I want instead to diffractively read enactive reflection on/of reflexivity through and with certain discussions of reflexivity found within the social sciences. As with second-order cybernetics, reflexivity has long played a pivotal role within both sociology (e.g. Bourdieu and Wacquant 1992) and anthropology (e.g. Clifford and Marcus 1986).<sup>129</sup> Indeed, in this respect, there is a striking convergence between the

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<sup>128</sup> At the very core of second-order cybernetics, in contradistinction to its first-order incarnation, is the attention it places on the *epistemological reflections about* observers (researcher of any kind) and their descriptive/explanatory practices (see Dupuy 2009). Thus, whereas first-order cybernetics is the study of *observed* systems, second-order cybernetics is the study of *observing* systems (see Froese 2011b).

<sup>129</sup> Some readers might want to question my literature choices here. Why not pay more attention to second-order cybernetics? Not only is it part and parcel of enactive genealogies but it is also the first scientific field to take reflexivity seriously. This is a viable, and perhaps the most obvious, path to have taken here. Nevertheless, as we have noted throughout this work, it matters what stories one uses to tell other stories with. Here I feel that I simply want to tell *other* stories, *different* stories, with the help of anthropology/sociology, which will hopefully in turn help me bring into the fray figures which are not usually part of the discussion. Reading these different treatments of reflexivity diffractively through one another has helped greatly towards these ends.

enactive approach and Pierre Bourdieu's 'reflexive sociology', which a diffractive reading has helped render more explicit.<sup>130</sup>

Bourdieu develops his reflexive sociology as a circular, self-referential, methodology for social research "which turns methods of constructing the research object back on themselves so as to produce [a] more accurate understanding of the social world" (Fries 2009, p. 326). Thus, according to Bourdieu (2003), "one knows the world better and better as one knows oneself better" and therefore "scientific knowledge and knowledge of oneself and of one's own social unconscious advance hand in hand, and that primary experience transformed in and through scientific practice transforms scientific practice and conversely" (p. 289).

Like a number of enactive theorists Bourdieu (2004) maintains that the scientific understanding of society and behaviour is not the same as the scientific understanding of other objects of study. This is because social scientists are themselves also objects under study. Sociologists and anthropologists, like cognitive and neuroscientists, are themselves social actors embedded in particular socio-historical, culturally specific contexts with unique biographies and behaviours. These biographies and behaviours are themselves moulded and influenced through the participation with and investigation of the particular object of their study.

But, as a consequence, all social scientists, Bourdieu argues, are faced with the seemingly paradoxical problem of having to study the very object (the social world) of which they are a product. Nonetheless, Bourdieu insists that, in order for social science to be a truly successful scientific enterprise, the biographies and behaviours of social scientists must be taken into account as these investigate a particular object of study. As Fries (2009) argues, "[t]he social researcher occupies a place in the social world, which is the object of study, and must therefore adopt a critical awareness of his or her own social location in relation to both the research object and process" (p. 329). This points straight to yet another important facet of reflexivity, that it necessarily involves (self)

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<sup>130</sup> Another interesting convergence worth noting here is that both are motivated by the very same matter of concern, namely, a strong desire to overcome the dualism between subjectivism and objectivism (see Bourdieu 1990). Bourdieu's hugely influential notion of an *habitus* is effectively his solution (for sociology) to this dualism. It is however beyond the scope of this work to explore this any further.

*reflection*. The researcher must take a ‘step back’ and actively delineate and scrutinise those aspects of *herself* which are considered to directly influence research and knowledge production.

The anthropologist Philip Salzman (2002, pp. 807-808) has argued that there are three primary “uses” of reflexivity within anthropology (the same could also be applied to sociology). (i) It signals a departure from a detached, objectivist positivism and a commitment towards a more subjectivist “perspectivism”. (ii) It allows the researcher to do better research. (iii) Provides information which helps the reader of the research to better understand the research findings presented by the researcher. Although all three uses of reflexivity have and continue to play important roles within social science research and methodology, it is (i) which has undoubtedly had the most profound impact in the field(s). It is this very recognition and attentiveness to reflexivity that has led a number of researchers, both within and outside of social sciences, to question the purported objectivity of traditional knowledge practices (see Clifford and Marcus 1986; Haraway 1997; Harding 1991; Salzman 2002). That is, to question traditional modernist modes of rationality and scientific objectivism.

Donna Haraway (1988), for example, has argued that the notion of objectivity in use in the sciences is essentially grounded on and promotes what she calls a “God-trick”. This God-trick rests on the assumption that researchers can be completely removed from the research object(s), such that they are able to make unbiased observations about the world, interpret these observations and then simply get to objective “truth”. As Cunliffe (2003) points out, “[o]ver the last 20 years, social science scholars have challenged conventional conceptions of social reality, knowledge, and the validity of our methods of inquiry. Many have criticized the aim of mainstream social science to provide an absolute, objective view of the world and have called for a reflexive stance in which we recognize all social activity, including research itself, as an ongoing endogenous accomplishment” (p. 983). Although coming from a rather distinct research tradition, the enactive approach nonetheless also shares most of these theoretical considerations.

Like numerous researchers within the social sciences, enactive theorists have pointed to reflexivity and our (undeniable) reflexive nature to question the ability of pure

objectivist science to ‘provide an absolute, objective view of the world’. Some enactive theorists, however, can be seen to *radicalise* this general notion of reflexivity.<sup>131</sup> Not only do these AE theorists take reflexivity to show the impossibility of a neutral and purely objective “view from nowhere” for the cognitive scientist, they also reject the very existence of a pregiven fixed world (Thompson 2016). This notion of a pregiven world is here put into question precisely by virtue of recognising and then fully embracing the recursive self-referentiality involved in reflexivity.

This is perfectly encapsulated by Valenzuela-Moguillansky et al. (2021) in the following: “The reflexive application of enactive ideas about cognition to scientific activity and scientific knowledge results in a necessarily *non-objectivist conception of science* that makes it impossible to think of science as a tool that sheds light on things-in-them-selves (...) As such, science is not only fallible and prone to mistakes but also inextricably linked with us” (p. 134, emphasis original). Although not explicitly characterised here as such, the implication is that reflexivity makes the very idea of a pregiven world, difficult to understand.

Thus, for AE, it isn’t just that the researcher’s self *influences* the object of study but also that this very object of study, by virtue of the reflexive/reflective nature of all investigation, is rendered non-pregiven. In the words of Fred Cummins (2020): “The reflexive self-awareness of the observer (community of observers) drawing a distinction is a central part of any enactive account, and this second-order cybernetic injunction *precludes any unthoughtful appeal to a simply existing world*” (p. 6, emphasis added). As with both VTR and Stewart et al. above, Cummins here enacts a clear subversion of the mononaturalistic convictions of natural sciences by pointing to the inherent reflexive self-awareness underpinning all scientific practices.

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<sup>131</sup> Although sharing much with Steven Woolgar’s (1988) notion of “radical reflexivity”, this enactive radicalisation of reflexivity is different from it by virtue of the strong ontological conclusions it draws on its basis. Radical reflexivity was based on Woolgar’s suggestion that, the methods used by STS scholars (at the time this research went under the umbrella term of the “Sociology of Social Knowledge” or SSK for short) to understand science, should be applied to itself. Thus, the radicalness involved here, refers primarily to the widening of the scope of application of reflexivity (see also Ashmore 1989). In the Appendix we briefly explain some of the crucial differences between SSK and STS.

Here is another example of this type of enactment from VTR. According to the authors “[e]ven the most hard-nosed biologist (...) would have to admit that there are many ways that the world is—indeed even many different *worlds* of experience—depending on the structure of the being involved and the kinds of distinctions it is able to make. And even if we restrict our attention to human cognition, there are many various ways the world can be taken to be” (p. 9, emphasis added). All scientists are here cast as cognising subjects embedded within specific historical, sociocultural contexts, which constitute the very “worlds” they bring forth. For VTR, reflexivity is thus not only part and parcel of all scientific processes but that *on the basis of which* worlds are also brought forth.

Entangling structural coupling, embodiment and reflexivity together, the authors go on to suggest that “the world is more like a background—a setting of and field for all of our experience, but one that cannot be found apart from our structure, behavior, and cognition. For this reason, what we say about the world tells us as much about ourselves as it does about the world” (ibid., p. 142). Cummins (2014) also echoes these views when suggesting that “[a]s we learn about phenomena in various domains, so too we are learning about that which we are” (p. 100). For all these authors, reflexivity brings to the fore both the inevitable role of subjects in the co-construction/co-creation of worlds and subsequent undoing of mononaturalism.

As a final example, consider the following from myself and Fred Cummins. In Cummins and De Jesus (2016), we argue that the “enactive framework does not map simply onto a distinction between first and third person points of view. Rather, it admonishes the scientific observer to recognise that their world too, is enacted based on their own embodiment and history, and that there is no ‘view from nowhere’ or ‘God’s eye view’ to which we can appeal. This *reflective turn* makes enactive inquiry rather different from sciences of the person that adopt a realist or positivist stance” (p. 6, emphasis added). Here all worlds are brought forth and *science itself* cannot escape this fate. By acknowledging this inherent reflexivity as a constitutive part of *all* world formation we at the same time enact an explicit rejection and subversion of mononaturalism.

To sum up. In this section we have explored how reflexivity has functioned as another enactment of the dual thesis and its outright rejection of mononaturalism. To help us illustrate this, we diffractively read some social scientists' reflection on reflexivity with and through those of the enactive account. Pointing both to some points of convergence but also of contrast. In the final section of this chapter we will briefly think-with and through the enactive rejection of mononaturalism and how it subtly but forcefully troubles the modern Constitution more broadly.

## **9 Bringing forth a non-modern constitution**

In this chapter we have explored how a number of different enactive ideas/concepts/considerations and arguments, framed around four different themes, can and do function as a disruptive force. But is this disruptive force simply a theoretical endeavour, or can these enactive ideas/concepts/considerations/arguments change not only the way we think about and see the world but also how we live and thus (re)configure our worlds? Our discussions here, at least to me, seems to clearly lean towards the latter. Seen from this light, they suggest that the different themes explored here and the various ideas and concepts which pivot around them can *also function as material technologies which disrupt* business as usual in academia and beyond.

Clearly, it seems undeniable to me that enactive theory provides researchers with a suite of resources which also help *disrupt traditional modes of knowledge production and practices*. This being the case, we can then say that these are resources which help create rather different *non-modern worlds*. We will be exploring, in more detail, something along these lines in the Appendix. Here I offer merely a few provisional remarks on these claims, and primarily as a means of connecting the dots of this chapter.

So, to disrupt traditional modes of knowledge production and practices, is therefore to also essentially disrupt, even if only in very limited and often constrained forms, the modern Constitution. As stated in Chapter Two, the modern Constitution is not just an abstract philosophical characterisation of what the world is like. Rather, the modern Constitution has informed not only the way we understand ourselves as modern but also profoundly structured and organised the world we live in. Many researchers go so far as to claim that this very structuring has had catastrophic consequences on our planet,

laying down and perpetuating the very conditions for the emergence of the anthropocene (see Blaser 2019; de la Cadena and Blaser 2018). There is, evidently, much more at stake than ‘mere’ theoretical/conceptual disputes and debate.

Again, I want to suggest that the enactive approach has a suite of resources capable of fostering a non-modern constitution not altogether unlike that envisioned by Latour.<sup>132</sup> Particularly important in this respect is the enactive project’s specific positioning within cognitive science. As we noted in the first section, cognitive science occupies a rather interesting position within academia due to its Janus-faced nature. At once dealing both with natural phenomena and with human social/cultural phenomena. The enactive approach, with its unique suite of concepts, ideas, arguments and continuously evolving methodologies, seems to be continuously bringing these two domains ever closer together. Undoing mononaturalism seems to me to play an important role within this process. It is fundamental in providing an approach which is as much natural/biological as it is sociocultural.

Whereas the standard taxonomic scheme and its distinct knowledge practices divide the natural and social sciences, the enactive approach provides a framework which aims to cut across this entrenched divide. At once problematising such common-sense schematisations and its accompanying knowledge practices. As Froese and Di Paolo (2011) point out, the enactive approach has “the potential to provide a new perspective on an extremely diverse variety of phenomena, reaching all the way from the single cell organism to human society” (p. 2). This is because, the authors continue, “rather than being constrained by the traditional boundaries of any specific academic field, the research framework of this approach is inherently trans-disciplinary” (ibid.).

Indeed, ever since the publication of VTR’s original book, the enactive approach has gone from strength to strength, cementing itself firmly within the cognitive science landscape, and in the process, presenting itself as an increasingly viable theoretical

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<sup>132</sup> For Latour a non-modern constitution would be one which explicitly recognises that nature and culture, politics and science, the human and the nonhuman form integrated networks which cannot be divided into ontologically distinct domains. This would be a constitution which establishes a symmetry between the human and the nonhuman and thus recognises the place and legitimacy of hybrids and as a consequence leads to an “enlarged democracy” where the nonhuman has more of a say (see Latour 2004b).



alternative capable of bridging many modernist divides. Thus, despite routinely positioning itself as an alternative “theoretical approach” (e.g. Froese and Di Paolo 2011), I am suggesting that it is *also more* than that. The enactive approach is not only a theoretical position, conducted solely on a conceptual register, but also an array of distinct yet overlapping and mutually reinforcing brought forth practices which itself constitutes *multiple material worlds*. Worlds within which the modern Constitution is variously undermined, routinely disrupted, configured and reconfigured.

It is within these enactive practices that the above themes have circulated and have been materialised. Practices where the problematisation of mononaturalism, vis-à-vis the deployment of the dual thesis, is always an omnipresent force. This chapter has suggested that by variously enacting subversions and rejections of mononaturalism, the enactive project not only forcefully disrupts the very foundational core of the modern Constitution but also contributes towards the bringing forth of a non-modern constitution which is no longer held hostage to many of the strictures of mononaturalism.

Clearly, if mononaturalism is rejected, then so too is the nature/culture dichotomy. Enactive theorists do not directly speak of ‘nature’ and ‘culture’ but rather of subject and object, nonetheless, as we have seen throughout this work, these have many modes of important overlap and are intimately entangled. In this chapter we have seen that there is no distinction between subject and object for at least two fundamental reasons: (i) an organism is *intentionally directed towards* and therefore dynamically *interacts with* an environment without internally representing it such that (ii) self (subject) and world (object) are co-emergent. Both are ultimately groundless in nature and thus imminently multiple. All of which is to say that, “the 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 and Bitbol 2017, p. 35).

To sum up. The enactive approach, be it as philosophy of nature, a scientific research programme or a mixture of both, can be seen to provide important tools to develop an

alternative *non-modern* constitution. A non-modern constitution which, as Latour urges, does not ontologically separate the domains of nature and culture or subject and object. Enactive Cognitive Science can itself be seen as a tentative first step towards the concrete implementation of such a non-modernist project, which, through a dissemination of alternative modes of being, knowledge practices and concrete material technologies, *also* functions as a means to chip away at and disrupt the excesses of modernity. A project that is at the same time creating small pockets of resistance and subversion, which not only seek to undermine but to positively contribute towards, better, more worthwhile, alternatives.

### **Conclusion**

In this chapter we have focused on how the enactive dual thesis is variously enacted in a manner which directly rejects and subverts mononaturalism. The primary aim was to show how these enactments also thoroughly disrupt the modern Constitution. We concluded by suggesting that the enactive project has a number of resources which can contribute to the development of an alternative non-modern constitution. In the next chapter we explore how this dual thesis is also entangled with and subsequently re-enacts mononaturalism and several other related core tenets of the modern Constitution.

## Chapter Six

### The Dual Thesis and the Reproduction(s) of the Constitution

#### Overview

In this chapter we explore how different enactments of the dual thesis, through the previously identified four themes, also become deeply entangled with and reproduce the very mononaturalism it sets out to undermine. To help us bring these entanglements to light, we diffractively read each of them with and through some selected feminist science studies, STS and anthropology texts. Doing so will allow us not only to bring to light how the dual thesis reproduces mononaturalism but also how it is further entangled with a metaphysics of individualism which forces the researcher into representationalism. Here we see that if/when mononaturalism is enacted, metaphysical individualism and representationalism soon follow suit.

#### Motivations and aims of chapter

Having now read several chapters of this work, and possibly anticipating what is to come, the reader might at this point be thinking that I am simply highlighting what could surely be better described as ‘internal tensions’ at the core of the enactive approach. Tensions which are far from fatal and will, with time, be adequately resolved. Indeed, tensions which several enactive theorists themselves have been acutely aware of since the very beginning. Thus, for example, as we will see below, Evan Thompson recognises that there is a ‘tension’ between sense-making as an asymmetrical notion on the one hand, and structural coupling as a symmetrical notion on the other.

Similarly, in Chapter Three, we saw how theorists point to a tension at the core of life itself, eloquently expressed in the notion of “needful freedom”, whereby organisms are seen as dependent on the very material resources they strive to emancipate themselves from. These theorists do not generally see these tensions as fatally problematic but see them instead as productive. They capture the very “dialectical nature” of life and mind more broadly which the enactive approach is interested in (see Di Paolo et al. 2018). Indeed, Di Paolo et al. (ibid.) have recently suggested that some of these tensions can be resolved by treating them *dialectically*.

Although my treatment of certain enactive concepts and ideas *could* certainly be regarded as an exploration and subsequent expression of these tensions, this is *not* how I see them. Indeed, were we to go down this more standard route, we would now have to say that what we have here is in fact outright contradiction rather than mere tensions. This would in turn lead us to either embrace these, possibly as a means of critique, or attempt to revolve or undo them through some sort of dexterous theoretical moves. This has not been the path chosen here. To recapitulate: what is of interest in this work is *how* exactly these dual enactments emerge and what sorts of entanglements enable, sustain and maintain this emergence. The matter of concern here is how these ‘contradictions’ are *done*, such that new worlds are not only being articulated but also *created*.

To bring these entanglements to light and thus show how some of these ‘contradictions’ are done, I will once again lean heavily on diffraction. Thus, at various points throughout this chapter, we will once again be staging different diffractive apparatuses to help us achieve our main goal. Two very specific further themes emerge with and through this change of apparatus and go on to become recurring themes, vis-à-vis mononaturalism, throughout the chapter. These two themes are (i) a metaphysics of individualism and (ii) representationalism. Much of what follows pivots around explicating how and where these two themes emerge through different enactments of the dual thesis and subsequently contribute to the reproduction of mononaturalism.

The strategy of this chapter is as follows. We begin the chapter by re-turning to the notion of diffraction in order to clarify and further motivate its uses in what follows. The next two sections then think-with the notion of intentionality to further think-through enactive agency. We make a distinction between two aspects of intentionality and explore, with the help of diffraction, how each of these in turn variously re-enact mononaturalism. The following section stages a discussion around the distinction between world and environment found across embodied cognitive science. The second half of the chapter explores the themes of embodiment, reflexivity and representationalism and their respective entanglements with, and subsequent reproduction of, mononaturalism.

## 1 Changing apparatuses

As with Chapter Four, much of what follows stems directly from diffractively reading texts (often just sections of texts) dealing with the core themes which make up the enactive dual thesis through a number of texts from STS and feminist science studies. Here again we are motivated by Barad's (2007) insistence that diffraction "brings the reality of entanglement to light" (p. 73). The entanglements of particular concern here are those which emerge between the various enactments of the dual thesis, the themes which underpin it, and key modernist tenets. Latour's analysis of modernity also remains firmly in the background of the entire discussion.

It should be noted once again that this rather evocative phrase – "bringing to light" – is not understood by Barad in representationalist terms.<sup>133</sup> As Barad (ibid.) notes, within a representationalist register, this bringing to light would involve *accurately representing that which is being represented*. By contrast, a diffractive reading, as I understand it and attempt to enact it in this work, recognises that representing also always transforms the phenomena being represented. As such, diffraction *qua* research practice, always *makes a difference* and therefore cannot but help directly *interfere* with/in the object(s) of study (Haraway 2016). Although these points are further explored and elaborated on in the Appendix, a few provisional words are in order here.

The recognition that research practice(s) inevitably transform research objects is one important motivating factor behind the intuition that the enactive approach is not univocal. Any attempt, not just my own, to represent it will inevitably transform it in some respect or other. Diffraction thus understood helps me recognise and acknowledge this point. Making it explicit that my involvement with the enactive approach is not neutral and therefore neither is my attempts to bring to light its various entanglements with modernity. This, however, does not make these entanglements any less real; simply fictional fabrications created out of thin air by myself, far from it.

Consider, for example, the process of dropping two stones into a body of water, often used by Barad (e.g. 2007) to illustrate some of the key features of a diffractive reading/

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<sup>133</sup> This is something which we will discuss further both below and in the Appendix in more detail.

methodology. As Barad notes, each stone creates its own ripple but, as the ripples come together, a more complex diffractive pattern emerges. As the ripples come into contact and become entangled with each other, they also disrupt and complicate one another. Thus, as reading/methodology, diffraction encourages the “reading [of] approaches through each other, as waves pass through the narrows of a rocky outlet, and are transformed, heading in different directions, making new patterns” (McKnight 2016, p. 197). These “new patterns” are not fictional fabrication by the observer but real world material phenomena of which the observer is a part. Thus, much of what came before and follows, is my attempt to bring to light some of these new patterns which stood out for me when reading different texts through each other while also recognising and acknowledging the significant transformational-cum-generative role I play in this process.

Many texts and scholars from STS and feminist science studies have been used to stage different diffractive apparatuses. However, the work of Karen Barad is especially important in this chapter, not only by virtue of the notion of diffraction but also for providing other resources which I use to think-with and through the enactive dual thesis. Thus, thinking the dual thesis diffractively with and through the work of Barad, will enable us to trace out some of its entanglements with what they call “metaphysical individualism” and the “representationalism” it entails. I will therefore interrelate these different insights in such a way that the conceptual apparatuses of the dual thesis is reconfigured to show its entanglements with mononaturalism by using Barad’s idiosyncratic terminology. In so doing, some enactive argumentation will be recast in both Barad’s own argumentative structure and that of STS scholar Annemarie Mol.

This, in turn, brings about a new type of entanglement which also needs to be brought to light: that between the three different approaches under consideration; enaction, STS and Baradian agential realism. Indeed, in this chapter all three approaches become as deeply entangled as waves in a diffractive phenomenon. I should, however, re-emphasise from the outset that all three positions are read with and through and *not against* each other. This should help prevent the prior privileging of one position over the other(s) and thus the lure of taking one position to be ‘better understood’ in light of the others. Again, the central aim here is not to critique or show the inadequacies, flaws

or overall shortcomings of the four themes which constitute the dual thesis, but rather to pay attention to those (modernist) “patterns of resonance and dissonance” (Barad 2007, p. 195) which were brought to light through the diffractive process.

With these clarifications on hand, let us now turn our attention to the dual thesis itself. We will begin our discussion with the theme of enactive agency.

## **2 Agency, intentionality and mononaturalism**

In the next two sections we re-turn to the theme of agency as explored in the previous chapter. There we showed some of the ways in which it helped enact a rejection of mononaturalism. Here I want to explore how it also does the very opposite. That is to say, explore some of the ways it enacts and thus helps *reproduce* mononaturalism. As noted throughout this work, not in the least in the previous chapter, the enactive account of agency is constituted by a rich multifaceted tapestry of interweaving threads (concepts, ideas, arguments). For the purposes of this and the following section, I will concentrate on only one of these interweaving threads, namely intentionality and explore how it is entangled with mononaturalism.

However, the notion of intentionality is itself equally rich, complex and indeed multifaceted. I will therefore narrow my focus even more by drawing a distinction between two different, though tightly overlapping, aspects of intentionality as they variously appear within the enactive literature. Firstly, there is intentionality as (i) an essentially *asymmetrical relation* whereby an organism is said to be *directed towards* objects in its environment. Secondly, the objects towards which the organism is directed are (ii), argued to always be meaningful for the organism such that it has a unique and meaningful *perspective* on them.

### **2.1 Thinking-with intentionality *qua* object directedness to think-through agency**

In this section, I will primarily be concerned with (i), and will therefore leave (ii) to be explored in the next section. Diffractively reading Barad (2007) with and through this aspect of intentionality will allow me to ‘bring to light’ how this understanding of

intentionality is entangled with a “metaphysical individualism” (ibid, p. 393) which reproduces mononaturalism and, as a consequence, *entails* representationalism.<sup>134</sup>

As an entry point into the discussion, I want to begin with Evan Thompson’s (2011a) recognition that there is an inherent ‘tension’ between the symmetrical notion of structural coupling and the asymmetrical notion of sense-making. Thompson (ibid.) notes that, “[o]n the one hand, the adaptive-autopoietic process is said to ‘bring forth’ or ‘enact’ what counts as the living being’s world, and not the reverse; on the other hand, the living being and its environment are said to be ‘structurally coupled,’ and interiority and exteriority are said to be ‘dynamically co-emergent’”. According to Thompson this is not a problematic tension because organisms are not insular but always open *towards* the world which surrounds them.

For Thompson and many like-minded enactive theorists, an asymmetrical relation between organism and environment is therefore *necessary* if we want to do justice to the property of *intentional directedness* found across the living realm. Recall that, as we saw in the previous chapter, Thompson (2011a) argues that “[i]f we lose sight of this interactional asymmetry, then we lose the ability to account for the directedness proper to living beings in their sense-making, and hence we lose the resources we need to connect sense-making to intentionality”. Here we temporarily bracket the other important aspect of intentionality, namely intentionality *qua* perspectiveness, implicit in Thompson’s quote and re-turn to it in the following section.

It is this intentional structure which, according to Thompson<sup>135</sup> and numerous other theorists, is an intrinsic and essential property of most (living) nature. Being directed towards the world, towards objects which will help maintain and sustain the organism, is a *fundamentally ontological property* of all living, adaptively autopoietic, entities. This point is succinctly captured by Fred Cummins’s (2018) observation that “[e]xisting

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<sup>134</sup> In this section we concentrate specifically on the enactment of metaphysical individualism vis-à-vis intentionality. The representationalism which Barad argues this entails is then addressed in its own section at the end of the chapter. See also footnote 139 for another important justification for making this distinction. I would like to, once again, thank Fred Cummins for strongly impressing on me the need for clarity and argumentative substance around the issue of individualism. Something which had been glaringly absent in earlier versions of this work.

<sup>135</sup> For a more in-depth critical discussion of the role of intentionality as used within the enactive approach see Steiner (2021).



*in relation to a world* is not a Western or Christian notion; it is a bare fact about life, or, better, of living” (p. 109, emphasis added).

Thus, and this is something we have already noted in previous chapters, intentionality as object directedness is generally cast as an essentially *asymmetrical notion*. In the enactive context, where this type of intentionality is both co-emergent with and a distinctive mark of agency, an asymmetrical relation between subject and object is therefore similarly introduced (see Varela 1991). Even though the interactions between organism and environment are regarded as *essentially reciprocal*, there is nonetheless an asymmetry built into this reciprocity. As Thompson (2011a) argues, “[a]lthough the physical and energetic coupling between a living being and the physicochemical environment is symmetrical, with each partner exerting more influence on the other at different times, the living being modulates the parameters of the coupling in a way the environment typically does not” (p. 121). It is the organism which needs to “modulate” its environment towards its own intrinsic ends and needs. But, the organism *qua* agent, can do so only insofar as it is intentionality directed *towards* the environment.

Michelle Maiese (2018) succinctly articulates this general line of reasoning as follows: “agents are spatially situated, *differentiated from the environment*, and intentionally directed towards things that lie *at a distance*” (p. 346, emphasis original). Very much in line with AE thinking on the topic, Maiese (ibid.) maintains that it is through an organic, biological living body, that the organism is directed towards its surrounding environment during action and perception. As with Thompson, intentionality is crucial here because, despite the asymmetry, it also ensures that the organism is always ‘open towards the world’. What is particularly important with regards to the discussion that follow, is Maiese’s very explicit insistence that intentional directedness also “requires that we preserve the differentiation between living body and world” (ibid.). Maiese here makes explicit something which remains largely implicit in the claim that organisms are *directed towards* objects.

My reading of these enactive texts, which explicitly treat intentionality asymmetrically in this manner with and through work by Karen Barad (2007), led to the emergence of a diffractive pattern which directly entangles it with what they call “metaphysical

individualism” (p. 393). In what follows I hope to bring to light that it is in and through this particular entanglement that the reproduction of mononaturalism is enacted by enactive theorists. Given that this particular aspect of intentionality is itself a cornerstone of enactive agency, it is further suggested that this is one way in which *enactive agency* reproduces mononaturalism.

When reading these enactive texts diffractively with and through Barad’s work, what immediately stands out is the *need* for a *separation* between an organism and its environment. As Maiese (ibid.) points out, intentionality requires that “[t]here is a separation from sources of food, noxious elements, alien creatures, or other environmental features; and movements *toward or away from* which bridge this separation” (p. 356, emphasis original).<sup>136</sup> Latour (2017), however, has recently noted that, “[t]he expression ‘relation to the world’ itself demonstrates the extent to which we are, so to speak, *alienated*” (p. 14, emphasis original). This “alienation” is thus a direct consequence of presupposing and then enforcing a prior distinction between the organism on the one hand and the environment *towards which* it is directed on the other.

Latour’s concern is that conceiving organisms as being *in relation to* the world, as is required by intentional object directedness, also enacts an *ontological separation* between subject and object which, instead of bringing these closer together, *ensures* they remain forever apart. To further illustrate this point, it will be helpful to note what happens when we diffract this conception of intentionality through Barad’s views on individualism. According to Barad (2007), any position which requires a *prior differentiation* between an organism and its environment *presupposes* a “metaphysics of individualism”. There are a number of diverse strands to Barad’s rich discussion of metaphysical individualism, but for the purpose of this section I will hone in on one strand in particular, namely, how a significant part of the Western modernist tradition

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<sup>136</sup> Annemarie Mol (2021) has, however, pointed out that while this might be true if we think of the body in “neuromuscular” terms, it appears less so if we think of the body as an “eating” body. Unlike the neuromuscular body, the eating body while eating does not move through the environment in relation to surrounding objects but rather, *the environment moves through* the body. To echo Haraway from Chapter Four, Mol’s central point is that it matters what stories one uses to tell other stories with.

has conceived *relata* (see the Appendix for a more detailed discussion of Barad's work).<sup>137</sup>

According to Barad (ibid.), a central characteristic of this tradition is its foundational grounding on a metaphysics of individualism. This is principally seen in the tradition's tendency to view objects and things as ontologically separate discrete entities with their own intrinsic properties. Barad argues that this (primarily substance based ontology) is an inevitable consequence of assuming that *relata always come before relations*. It is this fundamental assumption which, according to Barad, maintains and sustains a metaphysics of individualism. A particular brand of metaphysics which has separation, discreteness and, hence, individualism at its core. The suggestion here, then, is this: the conception of relation which underpins intentionality *qua* object directedness is deeply entangled with this metaphysical position and, as a consequence, re-enacts mononaturalism.<sup>138</sup>

As a different example, but one also premised on intentional directness and its underlying conception of the relational, consider Ezequiel Di Paolo's (2009) insistence that cognition *is essentially relational* and, as such, has *no definite location*. It is simply a categorical mistake to try and locate, as cognitivists do, cognition inside the skull. According to Di Paolo (ibid.), "[i]nspect a baby all you want and you'll never find out whether she's a twin" (p. 19). The same goes for cognition: inspect a brain all you want and you'll never find mind and cognition. Enactive theorists maintain that this is important because, if cognition and mind *are* relational processes of this kind, then the subject/object dichotomy would simply collapse. Cognition does not occur *in* any of these poles but rather *through* the *interactional relation*. At the same time Di Paolo (ibid.), just as Thompson above, also argues that when it comes to this particular (cognitive) relational domain, "we need a *prior identity* to which relations originally refer" (p. 19, emphasis added). Cognition and mind are thus relational *but*, at the same time, they are also always indexed to an adaptively autonomous agent.

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<sup>137</sup> Here I only provide the briefest of snapshots of some aspects of their work in order to make the specific point(s) that I need. The reader is advised to re-turn to this section after having read the section on Barad in the Appendix.

<sup>138</sup> I should (re)emphasise that I am *not* making a univocal claim about the enactive approach in general here. Rather, my remarks here are specific to intentionality *qua* object directness as used within the enactive approach and as an enactment of the dual thesis.

Now, in contradistinction to Di Paolo's enactive conception of the relational, let us take a very brief look at Barad's. At the core of Barad's account is a reversal of the Western tradition's insistence that *relata* are always prior to relations. Instead, argues Barad (2007), *relations are always prior to relata*. Thus, contra traditional metaphysical views which presupposes that *relata* are prior to relations, Barad (ibid.) maintains that "individuals do not preexist their interactions". Assuming otherwise is, according to Barad, what sustains, reproduces and actively reinforces a metaphysics of individualism. Intentionality *qua* object directedness can be said to be premised on a view which assumes otherwise.

Read through Barad's discussion on metaphysical individualism, Di Paolo's insistence that "we need a *prior identity* to which relations originally refer", appears to be both premised on and also subtly reproduces this metaphysics of individualism. For Barad, a central issue with a position like Di Paolo's, is that it retains a problematically strong focus on the constituent parts of the relation, vis-à-vis pre-established entities that relate, which essentially leaves individualism intact. In contrast to this, Barad suggests a shift of focus towards the *relationality of relations* (see de Freitas 2017). Only this, they maintain, truly troubles a metaphysics of individualism. Holding on to pre-established *relata* as Di Paolo does simply does not.<sup>139</sup> What we have here, then, is two fundamentally different ways of enacting the 'relational' underpinned by equally very different metaphysical presuppositions.<sup>140</sup>

To further hone in on the difference between these two notions of relation, consider a recent discussion by Marilyn Strathern (2020) of developments within biology which, like Di Paolo, Maiese and Thompson, explicitly challenge traditional notions of

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<sup>139</sup> One might be tempted to think here that only one side of these two relating sides, the organism, is pre-established. This would then leave the environment itself *qua relata* to not be pre-established. However, as we will see below, the very notion of intentionality seems to rule this out from the outset: while intentionality *qua* object directedness requires that organisms are pre-established, intentionality *qua* perspectivism ensures that objects are pre-established. If this is correct then *both relata* need to be pre-established in order for there to be a relational domain in the first place. This is in large part why I have decided to heuristically divide intentionality into two and explore them separately.

<sup>140</sup> This is, of course, *only* two ways that the relational can be enacted and does not therefore exhaust all other possible ways that it can and is enacted in other places and other spaces. Either by enactive theorists or indeed Barad. For an excellent book length, largely but not exclusively, anthropological discussion of the heterogeneous multiplicity of the notion of relation and the relational more broadly, see Strathern (2020).

‘biological individuality’ and organisms *qua* singular, self-contained, entities (e.g. Gilbert et al. 2012; Gilbert 2017). A position which can equally be regarded as essentially ‘relational’ in nature. Referring to Gilbert et al.’s (2012), anti-individualistic “symbiotic view of life”, Strathern (2020) notes how the authors introduce “non-individual-based notions” which draw both from “organic systems or ecologies to symbionts and holobionts” and “behavioral concepts such as interaction or communication, and on a broader, more abstract conceptualization of relating” (p. 170). However, Strathern (ibid.) argues, despite using such “non-individual-based notions” the exposed position does not completely undermine the individualism it seeks to reject.

The ‘problem’ stems precisely from the notion of relation underpinning Gilbert et al.’s position. According to Strathern (ibid.), “[i]n linguistic-conceptual form, if not in the authors’ intentions, how relations are described may presuppose the very kind of already-existing entities to which they object. So when they talk of “inter-active relationships among species” (...), the terms of the relation (diverse species) become, epistemically speaking, individualized, external to one another. The concept of relation may turn out to be at once key for comprehending symbiosis and an impediment to describing it” (p. 170). The same, I would suggest, could be said for intentionality *qua* object directedness insofar as it presupposes and requires that relata exist prior to their relations.<sup>141</sup>

To bring these various threads together: All the examples discussed above make clear that “the terms of the relation (...) become, epistemically speaking, individualized, external to one another” (Strathern, ibid.). This ensures not only that the individualism it seeks to undermined remains fully intact but also that *mononaturalism is re-enacted in the same process*. As we saw, all the examples enacted an asymmetrical conception of relationality which explicitly required the pre-existence of relata prior to relations. Indeed, this is at the very core of what some enactive theorists call “ontological individuation”, a process which instantiates a primordial inside/outside distinction and, as a consequence, pre-establishes (at least one) relata before any relation. Intentionality

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<sup>141</sup> However, rather than suggest that the notion of relation may turn out to be an ‘impediment to describing’ intentionality in a non-individualistic manner, I will contend instead that it helps enact both non-individualistic *and* individualistic conceptions of nature. Thus, not so much an ‘impediment’ to description, as a reproduction of the individualism it seeks to overcome.

*qua* object directedness then becomes that on the basis of which some pre-established relata relate *to* other relata (other entities). It is thus underpinned by a metaphysics of individualism and reproduces mononaturalism (we re-turn to mononaturalism below).

Furthermore, and in line with the requirements of the modern Constitution, it is important that we recognise this is a reproduction which also *privileges* the subject side of the duality. It is the organism which is (i) always cast in relation to something which is not itself and (ii) the agential locus and imminent force of this relation. This privileging is, however, most visible when the other aspect of intentionality – intentionality *qua* perspectiveness – is brought to the fore. We will therefore turn to this aspect of intentionality in the next section.

Before moving on, one final point. For Barad (2007) a metaphysics of individualism is not only characterised by a subject/object duality, which of course takes for granted and reproduces mononaturalism, but also an inevitable *representationalism*: it separates subjects from objects, privileges subjects over objects and renders the subject's access to the object representational in nature. Subjects are active entities which can, do and have to represent objects which have now been rendered into passive and static entities. Thanks to a metaphysics of individualism, “we risk falling back on the idea that there is, on one side, that which exists, and, on the other, ‘representations’ of that which exists. In this view, existence would always be a unity; representations alone would be multiple” (Latour 2013, p. 234). Insofar as intentionality *qua* object directedness reproduces and sustains a metaphysics of individualism, it will also continue to enact a representationalism of this sort. We will re-turn to representationalism below where the topic will be discussed in more detail.

To sum up this section. We have explored how the notion of intentionality *qua* object directedness, a crucial component of the enactive account of agency, is entangled with and reproduces a metaphysics of individualism which enacts a separation between subjects and objects and in the process re-enacts mononaturalism. In the next section I want to turn our focus towards another important aspect of intentionality, namely intentionality *qua* perspectiveness, and explore how this enacts yet a different version of mononaturalism.

## 2.2 Thinking-with intentionality *qua* perspectiveness to think-through agency

I noted above that there were two distinct aspects of intentionality with which I wanted to think-with and through. We began by exploring how intentionality *qua* object directedness is entangled with a metaphysics of individualism. In this section I want to turn the focus towards what we might call intentionality *qua* perspectiveness.<sup>142</sup> The aim here will be to show how this particular aspect of intentionality also provides another enactment of mononaturalism by virtue of its entanglement with a particular strand of modernist thought/practice. The work of anthropologist/STS scholar Annemarie Mol (2002) will serve as a central pivot around which to anchor and structure the discussion.

However, as with the above section, I will use only one specific aspect of Mol's work, that of "perspectivalism",<sup>143</sup> to think-with and through intentionality. This notion of perspectivalism plays a number of important roles within Mol's work. Of particular interest here is how Mol (2002, 2004) mobilises this notion to show that rejecting objectivism does *not* always automatically undermine mononaturalism but rather often *reproduces* a particular version of it. This is important for the current section because, as we have already seen, enactive theorists tend to directly align the rejection of objectivism with a simultaneous rejection of mononaturalism. Mol's ethnographic work, which directly informs her conception of perspectivalism, profoundly troubles and disrupts this easy alignment.

To begin, it will be helpful to first illustrate what exactly I mean by *intentionality qua perspectiveness*. The term is derived from the work of Steiner (2021), who argues that,

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<sup>142</sup> Perhaps a more accurate and better suited phrase here would have been intentionality *qua* sense-making. Arguably, most of what is said here with regards to perspectiveness specifically *could possibly* be said about sense-making more generally. However, given the wide scope and breadth of the concept of sense-making within enactive theory, I find the much narrower notion of perspectiveness more appropriate (less distracting perhaps) for current purposes. I use perspectiveness, therefore, as a means to not stray too far away from specificity. Using sense-making would have required considerable more argumentation and analysis, with a myriad of other connections and figures, which would be beyond the scope of this section to adequately address. For a less than successful attempt at doing this, see De Jesus (2018).

<sup>143</sup> I recognise, thanks not only to Fred Cummins's insightful interventions but also my embarrassing mixing up of the two terms in previous drafts of this chapter, that the words 'perspectiveness' (here aligned with enactive work) and 'perspectivalism' (here aligned with Mol/STS), are cumbersome, potentially confusing and generally not very elegant. However, no doubt due to my lack of imagination, I have been unable to find more elegant alternatives which would help me make the specific points I want to make.

within enactive (AE) theory, “[p]erspectiveness is our basic cognitive condition” (p. 474). As we saw in the previous chapter, this “perspectiveness” entails what Steiner calls an “epistemic constructivism”. More specifically, perspectiveness is also the direct consequence of the phenomenologically inspired enactive account of agency which places meaning, value and signification – or sense-making – at the core of the organism-environment relation.

As noted, organisms are not merely, or not only, directed towards objects. Rather, organisms *qua* agents are directed towards *meaningful objects* and not simply neutral, physical things. What organisms sense and act upon is always *meaningful for* the organism. As Maiese (2018) argues, “[i]t is from the *point of view* established by its self-affirming identity that an organism evaluates and makes sense of all that it encounters” (p 346, emphasis added). Relating to something *as* a specific object therefore means that the organism has a meaningful *perspective on* that object (Colombetti 2014; Di Paolo and Thompson 2014; Froese and Ziemke 2009; Thompson 2007; Varela 1991). This is what I have in mind when speaking about intentionality *qua* perspectiveness. And it is this very specific aspect of intentionality which I want to think-with and through in this section.

Our entry point into the discussion here will be the notion(s) of objectivity/objectivism and its relation to mononaturalism. Again we re-turn to Steiner (ibid.), who insists that for enactive theory in the AE tradition, “[o]bjectivity is derived from perspectiveness. Objectivity is a perspective pretending not being a perspective, a point of view *from nowhere* (...). Objectivity, one might say, consists in *adding* something to perspectiveness (in virtue of an intellectual construction): the (utopian) soustraction [*sic*] of perspectiveness” (ibid., p. 474, emphasis original).

As noted in previous chapters, this position appears to suggest that a rejection of objectivism also automatically *entails* a subsequent rejection of mononaturalism. Thus, if all organisms have unique perspectives on the world, then the very idea of a pre-given organism-independent objective world, accessible through detached observation, is nothing but a very modernist fiction. In other words, as Steiner (ibid.) notes, enactive theory makes it clear that one cannot escape perspectiveness: even “[o]bjectivity is



derived from perspectiveness”. But is this perspectiveness inescapable, and perhaps more importantly, does it actually significantly trouble mononaturalism in the manner Steiner suggests it does? Does the rejection of objectivism through perspectiveness *always* entail a rejection of mononaturalism?

A certain strand of influential work within STS suggests that the answer is not as straightforward as it might initially appear. At this point we need to more explicitly introduce Mol’s work into the discussion. I will do so in order to diffractively read the enactive notion of perspectiveness with and through Mol’s notion of perspectivalism.<sup>144</sup> The diffractive pattern which very specifically stood out for me when these two notions were brought together was one where (i) intentionality *qua* perspectiveness emerged as an example and *enactment* of perspectivalism which (ii) actively reproduced, rather than undermined, mononaturalism.

To make sense of this diffractive pattern and how it emerged, we first need to understand what Mol means by perspectivalism. Mol (2002, 2004) aligns perspectivalism with a very particular type of knowledge-making practice which she argues emerged as a direct reaction to the excesses of (scientific) objectivism. At the core of these practices is the intuition that different observers from different sociocultural backgrounds, with different habits and interests, will inevitably *view* the world differently. All observers, including scientists, are enculturated social subjects who “bring with them their own particular skills, habits, histories, preoccupations which means that their *eyes* are different. They look at the world from different *standpoints*. This means that they see things differently and represent what they have seen in a diversity of ways” (Mol 2004, p. 76, emphasis original). In other words, contrary to modernist intuitions, observation is never neutral or detached because all observers have *unique and meaningful points of view or perspectives on the world*.<sup>145</sup>

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<sup>144</sup> In De Jesus (2018), I refer to perspectivalism in the context of the enactive approach as “*epistemic perspectivalism*”. The reason for adding ‘epistemic’ to Mol’s notion was simply to draw explicit attention to this epistemic dimension. In retrospect, for anyone familiar with Mol’s work, adding epistemic is somewhat redundant, since her work is directly targeted at the excesses of the epistemic.

<sup>145</sup> Note that what Mol calls perspectivalism is in many respects congruent with what Latour, as we saw in Chapter Two, calls “multiculturalism”. This section however primarily uses the work of Mol, rather than Latour, as a diffractive apparatus. Note, also, the similarities with the notion of reflexivity. Mol, however, does not tend to speak of reflexivity in the context of perspectivalism and so neither will I.

The first point I want to make here, following Mol's discussion, is that intentionality *qua* perspectiveness emerges as a very specific example and enactment of perspectivalism. To illustrate this claim further, consider the following examples. According to Mog Stapleton (2022), from an enactive standpoint, "[w]hat we know is enabled and constrained by what we are. I know a very different world from that of a butterfly even though we both live in the 'same' world. The butterfly perceives what is of value to it; what it can eat, the places it can land, and the dangers it must evade. And, almost all of these are different from the aspects of the world that show up to me as meaningful. While we share a world, in some sense our environments are different" (p. 159).

Following the same line of reasoning, Hanne De Jaegher (2013) argues that processes of sense-making establish "a non-neutral *perspective on* the world. This perspective comes with its own normativity, which is the counterpart of the agent being a centre of activity in the world" (p. 6, emphasis added). Both these examples are clear enactments of the sort of perspectivalism Mol identifies in the social sciences. What is also striking in these examples is the *extended scope* and applicability of this perspectivalism. All living biological (adaptively autonomous) organisms are argued to have meaningful perspectives on the world. As De Jaegher (2021) points out, "a living being is constantly maintaining identities: for instance, organic, sensorimotor, and immunological ones. All of these identities *imply perspectives*" (p. 854, emphasis added).<sup>146</sup>

Whereas some scholars in the social sciences find this perspectivalism insightful, theoretically fruitful and an important corrective to the excesses of modernist scientific objectivism, Mol argues that it has implications which should not be ignored. One of which, directly relevant for our purpose here, is that rejecting objectivism in this manner does not necessarily undermine mononaturalism. Recall that, as Steiner (2021) notes above, insofar as all identities imply different perspectives, they also imply different *worlds*. This is not only taken to directly undermine objectivism but also, and more importantly, mononaturalism. Drawing from her extensive ethnographical work(s), Mol

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<sup>146</sup> We could say that, in these cases, enactive perspectivism is an attempt to provide a *biological naturalisation* of perspectivalism whereby scientific resources are mobilised to give further credence to intentionality *qua* perspectiveness as a natural biological process.

2002 argues that rejecting objectivism with perspectivalism does nothing to undermine mononaturalism.

Why is it that rejecting objectivism in this manner does not also undermine mononaturalism? At the core of Mol's argument is the conviction that perspectivalism remains premised on a nature/culture split which renders objects as both 'natural' and 'passive'. Working specifically with medical diseases, Mol (2002) argues that these are neither merely natural nor passive but rather active participants in different enactments. Mol (ibid.) then goes on to argue that, by virtue of maintaining this split, *perspectivalism does not and cannot multiply reality*.<sup>147</sup> And here Mol follows a number of other STS and feminist science studies scholars, about whom we will have much more to say in the Appendix, in further insisting that only through the *ontological multiplication* of reality (and not simply the epistemic multiplication of *views on* reality) is mononaturalism significantly disrupted (see also Omura et al. 2018).

Mol (2004) therefore argues that it might very well be true that “[p]erspectivalism broke away from a monopolistic version of truth. But it didn't multiply reality. It multiplied the eyes of the beholders. It turned each pair of eyes looking from its own perspective into an alternative to other eyes” (p. 76). The multiplication of perspectives as it appears with perspectivalism simply leaves 'reality' untouched, so to speak. As Mol (ibid.) notes, “in the centre the object of the many gazes and glances remains singular, intangible, untouched”. In the Appendix we will discuss how exactly Mol suggests reality itself can be and *is* routinely *ontologically* multiplied. The point for now is that, according to Mol, perspectivalism continues to (unintentionally?) be deeply entangled with mononaturalism in a very problematic way: not only does it not directly undermine mononaturalism, it also *continues to reproduce* it.

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<sup>147</sup> Rather, perspectives are simply “‘taken for granted’ as foundations on the basis of which theories [are] constructed and knowledge [is] produced” (Gad and Jensen 2010, p. 72). But, Mol (2002), argues, reality here remains passive, singular and contains universal, intrinsic organism-independent properties, which can be observed from multiple perspectives and possibly discovered but remain essentially unaffected by these observers. Speaking with regards to the body, Mol thus notes that, “[i]n talk about meaning and interpretation the physical body stays untouched. All interpretations, whatever their number, are interpretations of. Of what? Of some matter that is projected somewhere. Of some nature that allows culture to attribute all these shapes to it. This is built into the very metaphor of ‘perspective’ itself” (ibid., p. 12). We will re-turn to these points in the next chapter.

Let us bring this back to the enactive project and more specifically to its use of intentionality *qua* perspectiveness. Diffracting this notion through Mol's discussion of perspectivalism highlights that, even though a metaphysical mononaturalism is *not* actively or explicitly endorsed, it is nonetheless reproduced through the mobilisation of intentionality *qua* perspectiveness. By insisting that all organisms have unique and meaningful perspectives on the world as proponents of perspectivalism do, the objects and entities which constitute this world, remain ontologically singular, passive and ultimately 'out of reach'. As Mol notes, what is multiplied in these instances are perspectives and not reality itself. Mononaturalism thus not only remains very much intact, but is also actively reproduced through these enactments.

To take stock of the discussion thus far, we can say that read with and through the work of Mol, intentionality *qua* perspectiveness enacts all organisms as epistemic in nature<sup>148</sup> and endlessly multiplies perspectives across a range of biological domains. However, this mobilisation of perspectives not only fails to disrupt but also goes on to *reproduce* mononaturalism. This happens because, as Mol insists, multiplying perspectives does not multiply reality. Organisms simply *perceive and experience* the world differently vis-à-vis their unique perspectives on the world and this effectively "rule[s] out the possibility of multiple ontologies" (Blaser 2013a, p. 548).<sup>149</sup> Ultimately, through a diffractive reading, I have attempted to bring to light how (i) intentionality *qua* perspectiveness is in effect a species of perspectivalism which (ii) provides another enactment of mononaturalism.

### **3 Entanglements of differences within**

Before moving on to the next section, I want to pause here to briefly consider some objections to the alignment between perspectiveness and perspectivalism discussed above. In the spirit of this work, I do so not to settle the issue by arguing for the

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<sup>148</sup> See section "Embodiment" below for a more detailed discussion on how certain enactive theorists tend to cast all organisms, not only human, as essentially epistemic in nature.

<sup>149</sup> Or, in Sismondo's (2015) words, "[t]o read multiple ontologies in terms of multiple perspectives is either to deliberately ignore or to fail to appreciate the resistances, liveliness, or agency of what is being perceived. To deliberately ignore them is to be boringly representationalist, keeping analysis firmly in the realm of explicit representations, and leaving us entirely within the realm of epistemology. And to miss them is to be an idealist, to too-automatically project representations onto what they represent. Such idealism is not only philosophically problematic but also is politically objectionable, because we are likely to object to descriptions of people, particular kinds of people, or human practices as *really* one way or another simply because somebody sees them that way" (p. 444, emphasis original).

superiority of my position against the ‘flawed’ readings of others, but rather, to caution against making definitive univocal claims when it comes to enactive ideas and concepts. The notion of perspectivism, particularly in the guise of intentionality *qua* perspectivism as staged here, offers a particularly good example to help us think-with and through this caution precisely because it is often argued to be a *universal* feature of all organisms.

Miguel A. Sepúlveda-Pedro (2020) has recently taken issue with my claim (in De Jesus 2018) that the enactive approach vis-à-vis the dual thesis entails that organisms only have multiple (epistemic) perspectives on a singular world. According to Sepúlveda-Pedro (ibid.), “[f]or the enactive approach, the world described by physics and chemistry (e.g., glucose) is not a description of the world-in-itself, or an objective reality independent of any agent as it is for mainstream scientific approaches” (p. 8). Indeed! As just noted, this is precisely the central point of the sort of perspectivalism Mol discusses. As Sepúlveda-Pedro correctly notes, in an enactive register, all organisms have unique perspectives on the world which ‘prevents’ them from having direct access to “an objective reality” or the “world-in-itself” (ibid.).

At the core of the author’s objection is precisely the view that a rejection of objectivism vis-à-vis perspectivism also entails the disruption of mononaturalism. Thus, according to the author, if one takes all scientific descriptions to always be part and parcel of “the meaningful world of humans, and [hence] the result of an embodied and enculturated practice”, then it follows that “scientific descriptions are *not descriptions of an objective world*” (p. 9, emphasis added). As such, “the meaning of ‘food’ for bacteria, and what a scientist conceives of as ‘glucose’ are not two epistemic perspectives of the same object. Instead, they are two different forms of an agent-environment entanglement” (p. 9).<sup>150</sup> I do not think this is *completely* wrong (as the discussion in the previous chapter attest) but neither is it *quite* right.

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<sup>150</sup> But, of course, as Mol would certainly want to point out, the issue arises precisely when this “agent-environment entanglement” is grounded on the unique, meaning endowing, *perspective* of the agent. Be this as it may, the point is that there are multiple ways in which this very idea can be and is enacted. It is never univocally one or the other.

The question I want to ask here is as follows: is this really the way enactive theorists *always and everywhere* conceive and present their position? Indeed, do enactive theorists (specifically these theorists in the tradition of Varela) *always and univocally* argue that “scientific descriptions are *not* descriptions of an *objective world*” as Sepúlveda-Pedro maintains? To see why this is not quite right, consider, for example, Varela’s (1992) observation that an “autopoietic unity *creates a perspective* from which the exterior is one, which cannot be confused with the physical surroundings as they appear to us as observers, the land of physical and chemical laws *simpliciter*, devoid of such perspectivism. In our practice as biologists we switch between these two domains all the time. We use and manipulate physico-chemical principles and properties, while swiftly shifting to the use of interpretation and significance as seen from the point of view of the living system” (p. 7, emphasis original).

At first glance, Varela’s discussion of an autopoietic entity seems to align perfectly with what Sepúlveda-Pedro refers to as the “two different forms of an agent-environment entanglement”: on the one hand, there is the autopoietic entity which has a meaningful perspective on the world while on the other hand, there is a physical environment with “physical and chemical laws *simpliciter*, devoid of such perspectivism”. Two very distinct “agent-environment entanglement(s)” are at play here; the former involving the autonomous (autopoietic) agent, the latter involving a scientific observer. Ostensively, following Sepúlveda-Pedro’s argumentation, we do have two different forms of an agent-environment entanglement rather than two different epistemic perspectives on a singular, ready-made world. However, on closer inspection, things are not quite so straightforward.

The first point to note here is that Varela explicitly *denies* that the observer’s access to “the land of physical and chemical laws” is perspectival in the enactive sense. That is to say, Varela’s quote suggests that there *are* objective physical and chemical laws which can be discovered and accurately represented by the observer who is said to be “devoid of such perspectivism”. Note also that Varela explicitly refers to these as *laws simpliciter*. I do not think this is inconsequential, quite the contrary. It clearly suggests that for Varela, at least as far as this example is concerned, these *are* purely objective; they are for all intent and purposes pre-given, universal and unaffected by the embodied

and enculturated practices of humans. It is clear that, at least here, *pace* Sepúlveda-Pedro, Varela enacts scientific descriptions (representations) as objective descriptions of an objective world. Even while arguing that autopoietic entities have unique perspectives, there is also a class of these entities, here cast simply as “observers” by Varela, which are somehow “devoid of such perspectivism”.

Is this an anomalous exception in the enactive cannon? I do not think so.<sup>151</sup> Here is a second example. According to Di Paolo et al. (2018), “through the relations between precarious autonomy, adaptivity and sense-making, the core aspect of mind is naturalised” (p. 33). Consequently, enactive theorists can “theorize about teleology and intentionality in organisms as naturalised properties of active material systems in interaction, *not as an observer’s opinions*” (ibid., p. 35, emphasis added). The potential ambiguity regarding naturalisation notwithstanding, the authors point here is that these are *really real ontological properties* of organisms which can be fully accounted for scientifically. They are *not*, mere opinions, epistemic posits or projections onto the observed system dictated by social convention, but rather, ontologically objective, fully naturalised features, which allows enactive theorists to answer empirical questions regarding their ‘true’ nature (see also Di Paolo and Thompson 2014).

In both examples, such properties as sense-making, teleology and intentionality, are enacted as *intrinsic properties* of a sub-class of living systems. In doing so these theorists directly evoke and tacitly mobilise traditional modernist notions of evidence, objectivity and reality. Thus, in both cases, *pace* Sepúlveda-Pedro, they *do* become *objective descriptions* of certain objective parts of a world which seemingly exist “in itself”. Like Varela, the authors in this example also deny perspectiveness to the scientist observing the organism while also arguing for the intrinsicness of perspectiveness in general. The scientist is enacted as an objective observer who discovers and then documents the really real – ontological objective – nature of living organisms.

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<sup>151</sup> But neither is it univocal. Indeed, whereas I previously made the mistake of assuming *all* enactivists consistently and univocally only enact a species of perspectivalism, Sepúlveda-Pedro makes the mistake of assuming the opposite: that enactive theorists *never* enact or in anyway become entangled with perspectivalism. Thus, my intention here is not to critique or argue against Sepúlveda-Pedro reading, but rather to specifically problematise its purported univocality.

So, even though enactive theorists tend to explicitly argue for a *universal perspectiveness*, there are instances where this perspectiveness does not apply and is in fact explicitly denied but often not acknowledged. But note that in these instances, there is also a clear reproduction of mononaturalism. The ‘laws’ of biology, chemistry and physics as well as autonomy, adaptivity and sense-making, are all taken as given, universal and independent of any human intervention or convention. A nature/culture split remains intact here, as within perspectivalism, and what changes is the observers’ relation to the object, now rendered as devoid of perspectiveness.

To sum up. In this section we explored a particular objection to the claim that enactive perspectivism can be aligned with and enacts modernist perspectivalism. We did so not as a means to reinforce and strengthen my argument(s) but rather to caution against reading certain enactive ideas and concepts univocally: in line with the central motif of this work, we briefly explored two examples where perspectiveness and (scientific) objectivism were simultaneously enacted.

In the background of much of this and the previous section has been the notion of *world*. In both sections we saw, but did not thematise, how the very notion of intentionality appears to be underpinned by a very specific conception of world. A conception of world which is often explicitly distinguished from the notion of an ‘environment’. In the next section we will take a closer look at this conception of world.

#### **4 Interlude: Re-turning to enactive worlds**

In this section I want to re-turn to the enactive notion of world; turning it over several times in an attempt to bring to light new connections and other disparate polymorphic entanglements with mononaturalism. To narrow the focus and scope of the discussion, I will concentrate almost exclusively on one very specific theme, namely, the tendency by enactive theorists to frame discussions of worlds within a prior distinction which separates world(s) from environment. Because of the central role this theme plays in the enactive account I will dedicate a considerable amount of space to unpack, both its historical lineage(s) and its subsequent entanglements with and reproduction of



mononaturalism. Although this section breaks the linearity of the chapter, it nonetheless also aims to complement both the sections above and those that follow.

Like all the other enactive concepts and ideas we have been thinking-with throughout this work, the notion of ‘world’ is by no means univocal. Indeed, in my opinion, it is one of the least univocal terms within the entire enactive approach. This is in part at least a direct consequence of enactive theorists simply wanting to emphasise the dimensions of meaning, value and significance of worlds. This, however, leads to the term ‘world’ often being used *interchangeably* with a number of other closely related but arguably not equivalent terms.

Thus, for example, although the phrase “bringing forth a world” occurs with frequent regularity within the enactive literature, there is a fair amount of subtle variation in its expression(s). Particularly with regards to the ‘world’ part of the phrase. It is thus common to find not only such phrases as “cognitive world”, “perceptual world”, “experiential world”. “lived-world” and “world of significance” as synonyms or alternative replacements for *world*. To illustrate this, it will be helpful to provide some specific, concrete examples of these diverse and divergent enactments of the notion of world found across the enactive literature.

Evan Thompson and Mog Stapleton (2009), for example, alternate between claiming that organisms “bring forth their own domains of meaning and value” and that they “enact or bring forth [their] own cognitive domain[s]” (p. 23). Thompson (2007) refers to “cognitive domain” (p. 13), “sensorimotor world” (p. 59), and “environments of significance and valance” (p. 154). VTR similarly alternate between using the phrases bringing forth “a world” and bringing forth “a domain of significance” (VTR, p. 156). Di Paolo et al. (2010) argue that cognitive agents “regulate the conditions of their exchange with the environment, and in so doing, enact a world or cognitive domain” (p. 38). For Gallagher (2017), “the world (meaning, intentionality) is not pre-given or predefined, but is structured by cognition and action” (p. 6). Similarly, Stewart (2016) argues that “there are as many ‘lived-worlds’ or ‘realities’ as there are biological species”.

All these examples illustrate that these variations are not only used interchangeably but also, by and large, taken to be equivalent in meaning. As such, in these specific instances, theorists use all these notions (i) interchangeably and often (ii) without much concern for any possible differences that these phrases and terms might have. In light of the discussion in the previous chapter, one might now legitimately question whether “cognitive worlds” or “experiential domains”, for example, *are* equivalent to ontologically multiple worlds. In what follows I want to explore one specific enactment of world which rules out a positive answer.

This enactment is manifested in the tendency by enactive theorists (but not only) to explicitly distinguish between a ‘world’ on the one hand and an ‘environment’ on the other.<sup>152</sup> Indeed, the notion of *world* itself within the enactive approach, often contains within it an explicit distinction with an environment. In these cases, the former is directly aligned with meaning, value and significance, while the latter is aligned with a “purely physical” environment.<sup>153</sup> This physical environment is, in turn, variously cast in terms of ‘energy gradients’, ‘perturbations’, ‘triggers’ or simply something of an undifferentiated ‘meaningless brute physical place’ with which organisms can ‘exchange matter and energy’. As Weber and Varela (2002) argue, “[o]nly a small part of all dynamics in the environment enter as *perturbations* into the domain of relevance of the organism” (p. 118, emphasis added).

Francisco Varela, who is largely responsible for popularising the distinction within the enactive account, succinctly articulates it as follows: “I mean the important distinction between the environment of the living system as it appears to an observer and without reference to the autonomous unity – which we shall call hereafter simply the environment – and the environment for the system which is defined in the same movement that gave rise to its identity and that only exists in that mutual definition – hereinafter the system’s world” (Varela 1991, p. 85). Many enactive theorists have not

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<sup>152</sup> Note that this tendency remains more often than not only *tacit* within the dual thesis in general. However, as we will see here, it is made explicitly in many places within the enactive literature; some which directly invoke the dual thesis, others do not.

<sup>153</sup> There are, however, cases which directly reverse (linguistically speaking) this alignment: in these examples the authors align the notion of ‘world’ with a ‘brute’ physical space while environment is aligned with meaning and significance. This ‘reverse alignment’ is, however, less common within the enactive literature.

only taken this distinction for granted but have gone on to variously place it at the heart of their framework.

These theorists, on the basis of this distinction, emphasise that “[i]t is important to note that the significance which is continuously brought forth by the endogenous activity of the autonomous system is what makes the lived world, as it appears from the perspective of that system, distinct from its physical environment, as it can be distinguished by an external observer” (Froese and Di Paolo 2011, p 7). In other words, as Cappuccio and Froese (2014) argue, “[t]he world-environment is *essentially irreducible* to the natural world described by the empirical science” (p. 9, emphasis added).

Similarly, Weber and Varela (2002) argue that an “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”. As such, the authors continue, the “organism lays a new grid *over the world*:<sup>154</sup> a ubiquitous scale of value” (p. 117-118, emphasis added).

While Vörös and Riegler (2017) articulate the general idea as follows: “living beings cognize (perceive and act) in accordance with their organization, thereby bringing forth their unique surrounding worlds (their *umwelten*); these *umwelten*, in turn, function as dynamic scaffoldings of what is significant/relevant for the living beings, thereby guiding and limiting their cognitions (perceptions and actions)”. Moreover, as far as cognitive science itself is concerned, Vörös and Riegler (*ibid.*, emphasis added) maintain that “scientific models need to be conceived not as indications of what the world is truly like, but rather as parts of our *own unique umwelt*”.

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<sup>154</sup> Strictly speaking, this should be a grid over the ‘environment’ rather than ‘world’. Nonetheless, the distinction between a world and an environment remains intact despite the conceptual reversal.

However, although this distinction is especially important within the enactive framework, it is by no means specific to it. Far from it. It might therefore be insightful to highlight some of its different usages as well as trace out some of its historical/intellectual lineage before moving on any further.

The distinction is, first of all, also much used within broader 4E cognition circles and has even recently been argued to open up a space for the *unification* of an alternative anti-representationalist cognitive science (Baggs and Chemero 2018).<sup>155</sup> As Varela's quote nicely highlights, it is principally used as a means to highlight and thus render explicit a distinction between the *perspective* of a system, with its distinctive specificities, from that of an observer.<sup>156</sup> This distinction, however, first came into prominence in the post-war period in Europe with the rise of second-order cybernetics and its concern for the role of the observer in theory construction.

Thus, for autopoietic theory, which is part of this tradition, the ability to shift between inside (world *for* the organism) and outside (environment for an observer) perspectives is fundamental to biology and for our understanding of how organisms as autopoietic autonomous unities relate to their environments. The enactive use of the distinction can itself be directly traced to this work (see Froese 2011b). Before this usage, we can trace it back to the theoretical biology of Jakob von Uexküll (2010) who, as we saw in the previous chapter, distinguishes between the *Umwelt* (life world) of a living organism and the *Umgebung* (objective world) of the biologist/scientist studying the organism. Uexküll himself was deeply influenced by Kant, and the *Umwelt/Umgebung* distinction can be seen as a biological reformulation of Kant's distinction between internal *phenomena* and external *noumena*.

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<sup>155</sup> Baggs and Chemero (2018) argue that ecological psychology and “enactivism” could be united under the umbrella of “radically embodied” cognitive science if the distinction under discussion here was recognised, acknowledged and adequately dealt with and understood. It is beyond the scope of this chapter to detail what exactly this involves. This, however, is not important for current purposes. What is important is to note that the authors both advocate this distinction and explicitly align it with the distinction between epistemology and ontology respectively: enactivism being an epistemic enterprise (concerned primarily with subjects) while ecological psychology being ‘ontological’ in nature (concerned primarily with objective worldly structures).

<sup>156</sup> Within many of these debates a ‘system’ is generally understood as the object(s) under investigation while the ‘observer’ is, more often than not, the scientist observing the object. See, for example, the discussion at the end of the previous section.

In phenomenology, Edmund Husserl (1970) introduced the concept of the “lifeworld” (*Lebenswelt*) which has much in common with Uexküll’s notion of an Umwelt. The notion of the lifeworld was introduced by Husserl to highlight a distinction between the world as understood by science on the one hand and as given in experience on the other. The world understood by science is one presented in physical or mechanical terms. This, however, contrasts with the lifeworld which is the world as experienced by subjects and is intrinsically imbued with value and meaning, and is inherently vague and indeterminate. Husserl, however, also argued that it is only through the lifeworld that scientific objectivity itself is possible (see Harrington 2006).

As noted in the previous chapter the notion of world involved here is one which stems from the transcendental attitude of phenomenology and is argued to not only be distinct from but also non-reducible to the “naturalist attitude” of science (see Thompson and Stapleton 2009). As Vörös et al. (2016) argue, “from a phenomenological perspective, to equate the two uses of ‘world’ is to make a category mistake, where the same term is used in two radically different contexts and therefore carries different meanings. As Heidegger notes, a human being is ‘in’ its world in a wholly different sense from that of water being in a glass, which is how naturalism commonly construes their relationship” (p. 196).

A very similar sort of distinction can also be found within ecological psychology. According to Käufer and Chemero (2015), “Gibson offers a novel ontology of the world as we perceive it”. This ontology distinguishes between “the environment that we perceive and the world as physicists describe it” (p. 157). The environment as organisms perceive it is in turn argued to be constituted by diverse possibilities for action, what Gibson terms “affordances”. According to Gibson, “*the affordance of anything is a specific combination of the properties of its substance and its surfaces taken with reference to an animal*” (Gibson 1977, p. 67, emphasis in original). In an important sense then, as with Uexküll, Gibson also posits an essential distinction between the objective world of scientific description and the subjective world of experiencing organisms.

Although this distinction, particularly as it occurs within 4E cognition, is usually traced to the work of Uexküll, its roots can be traced considerably further back, to at least the Middle Ages (see Merchant 2015). Its direct precursor being the ancient distinction between ‘natural objects’ and ‘natural forces/processes’ expressed in the terms *natura naturans* and *natura naturata* (see Hinchliffe 2007). A prominent and well known philosophical use of the distinction is found in the work of the philosopher Baruch Spinoza. In his *Ethics*, Spinoza (2006) makes a distinction between nature in what he calls its “active” sense and nature in its “passive” sense. Spinoza calls active nature “*natura naturans*”, which literally translates as “nature naturing”, and passive nature “*natura naturata*”, which literally translates as “nature natured”.

In essence, the distinction points to two distinct ways that nature can and has been prominently understood throughout the ages: nature as a directly observable everyday event or object (a landscape, an animal etc.) and nature as predictable/unpredictable, ruly/unruly and ordered/disordered force (as either passive resource or dynamic creative process). In other words, nature *qua* *natura naturata* refers to natural objects as these appear and are disclosed to us through our senses. While nature *qua* *natura naturans* refers to the underlying ‘invisible’ forces – the natural processes – making up natural objects and which are not (always) directly observed with our senses (see Hinchliffe 2007).

Although, as Merchant (2015) demonstrates, these two conceptions of nature have changed throughout the ages, the *distinction itself* has, by and large, remained intact in many disciplines. For our purpose here, it is the *dualism* on which the distinction is premised that is principally important (rather than how these have been variously conceptualised over time). A dualism grounded on a distinction between nature as it *appears* to subjects and nature as *it is-in-itself independent of* such subjects. The suggestion here, then, is that when an enactive conception of ‘world’ is grounded on a world/environment distinction, it also *enacts a dualist conception of nature*. A dualist conception of nature which reproduces mononaturalism and subsequently falls prey to representationalism. Let me explain.

By mobilising a world/environment distinction, a duality between, on the one hand, *nature as it exists in itself*, untouched by humans, society and culture, and on the other, *nature as experienced* by organisms, is enacted. In the specifically enactive case, it reproduces a bifurcation of nature as (i) meaningful and creative and (ii) as inert, passive and largely deterministic phenomena. The former can be multiply experienced by human and nonhuman subjects while the latter is the exclusive purview of the (natural) sciences and its respective scientists. As Manuel Heras-Escribano (2021), points out, from an enactive perspective, “it is possible to describe in *purely physical terms* the movement of an agent in its environment, but at the same time this movement, the reactions, and the tendencies of the organism can be described as enacting a ‘web of significance’ that allows for a description of the same movements in meaningful terms (...). In this view, *the world of the agent is one ‘stuff’ that can be described either scientifically or phenomenologically*” (p. 348, emphasis added).

With this distinction in hand, it becomes fairly easy and rather natural to argue that what appears to us as ‘natural objects’, as *natura naturata*, are simply the outcome of culturally specific ways of seeing, ordering and ‘being-in-the-world’. Or, indeed, as noted in the previous section, unique meaningful perspectives, By contrast, the natural processes of *natura naturans*, the geological, biochemical and sub-atomic processes go on well beyond the mere surface-level phenomena of natural objects. As Steve Hinchliffe (2007) points out, the modernist assumption is to take *natura naturans*, as “elsewhere to the social, out there or deep in there, outer and inner spaces, unaffected by and indifferent to people with their axes, arguments and aesthetics” (p. 14). But note that, even if this side of the distinction was conceived in more agentic, active lively terms, mononaturalism would remain fully intact. That is, as long as the dualist conception of nature, vis-à-vis the world/environment split, remains intact. Ultimately, when theorists deploy this world/environment distinction, they are also enacting a dualistic conception of nature which does not disrupt but rather continues to reinforce mononaturalism. Let us turn this point over once again.

As already hinted above and in previous chapters, when deploying the world/environment distinction, these authors also enact the (phenomenal) world as something always *richer* than the ‘impoverished’ physical environment. In the examples above, the

physical environment tends to be cast as ‘dead’ and ‘mute’, a mere physical space devoid of meaning and agency, unless humans (or other organisms) interact with it and thereby imbue it with meaning and agency. As Thompson (2007) explicitly argues, “because of the transcendental status of consciousness (that consciousness is always already presupposed as an invariant condition of possibility for the disclosure of any object), there is no way to step outside, as it were, of experiencing subjectivity, so as to effect a one-one mapping of it onto an external reality purged of any and all subjectivity. It is in this transcendental sense that the phenomenal world is richer than any region of scientific objects—even the presumed ‘universal’ region of physics” (p. 86).

Underpinning Thompson’s quote is a phenomenologically motivated concern for how objects are “disclosed” to us which we have already briefly touched upon in previous chapters. As Thompson (ibid.) argues, “[w]hen we ask the constitutional question of how objects are disclosed to us, then any object, including any scientific object, must be regarded in its correlation to the mental activity that intends it. This transcendental orientation in no way denies the existence of a real physical world, but rather rejects an objectivist conception of our relation to it. The world is never given to us as a brute fact detachable from our conceptual frameworks. Rather, it shows up in all the describable ways it does thanks to the structure of our subjectivity and our intentional activities” (p. 82). Note that what is important here is how objects are *disclosed to* and subsequently *described by us* rather than *what objects are*. But, of course, this happens on the basis of first splitting world from environment and then prioritising the world side of the split.

Indeed, within many enactive discussions around these issues, it is always the ‘world’ which takes centre stage, the environment simply recedes into the background and becomes a homogenous meaningless space. This is nicely illustrated once again by Thompson’s (2007) insistence that “[a]n organism’s environment is not equivalent to the world seen simply through the lenses of physics and chemistry. Physical and chemical phenomena, in and of themselves, have no particular significance or meaning; they are not ‘for’ anyone”, therefore, Thompson (ibid.) continues, “from our perspective as



observers, we can constantly switch back and forth between the physics and chemistry of the world and the environments of living beings” (pp. 153-154).<sup>157</sup>

Thompson’s reference to “lenses” of physics and chemistry is particularly telling in this context, as it suggests that enactive theorists are “simply talking about the shaping of the lens onto nature, rather than the shaping of natures. In other words, there are numerous ways in which the world is read that are socially sensible, but the world itself carries on regardless” (Hinchliffe, 2007). Many scholars, not in the least those from STS and feminist science studies we have been thinking-with throughout this work, find this phenomenologically inspired dualistic mode of argumentation somewhat problematic. This is particularly the case with regards to its underlying conception of science (see Barad 2007; Blaser 2010; Haraway 1988; Harding 1991, 2008; Hinchliffe 2007; Latour 1992, 1999; Law 2004a; Mol and Law 2004; Stengers 2010; Verran 2001).

As Latour (1999) points out, this phenomenologically grounded approach “will teach us a lot about how we never distance ourselves from what we see, how we never gaze at a distant spectacle, how we are always immersed in the world’s rich and lived texture, but alas, this knowledge will be of no use in accounting for how things really are, since we will never be able to escape from the narrow focus of human intentionality” (p. 9). While Thompson and many enactive theorists after him take this as a necessarily inevitable and inescapable starting point, many STS scholars insist it operates within a nature/culture dichotomy which simply re-enacts mononaturalism and makes representationalism inevitable.

The world – or environment to be more accurate – remains one thing and the subject’s experience of it, what in this current context might be better referred to as its *cognitive world*, remains another. While, of course, the interaction between the two leads to the constitution of the subject’s own experiences, the environment itself is nonetheless enacted as an impoverished stage for action. The emphasis always falls on the subject, the subject’s experiences and those invariant structures of the subject which are the conditions of possibility for objects to disclose themselves (see Bryant 2013). Thus,

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<sup>157</sup> Note that Thompson (as Weber and Varela above) here reverses the more standard use of terms ‘world’ and ‘environment’: world is the dead space of physics and environment the meaningful space of the organism. Nonetheless, the important divide remains.

with the environment rendered passive and singular on the other side, all that the subject can do is try and represent it as best and accurately as possible (Pickering 1995). We return to this particular point below.

From this standpoint it becomes practically impossible not to prioritise and privilege the the subjective-cum-experiential agent while letting the materiality of more-than-human worlds recede deep into the background and, in the process, deeming it nothing more than mere brute, passive, meaningless matter. Not mincing his words, Latour (ibid.) argues that, “[f]or all its claims to overcoming the distinction between subject and object—as if this distinction were something that could be overcome! as if it had not been devised as *not* to be overcome!—phenomenology leaves us with the most dramatic spilt in this all sad story: a world of science left entirely to itself, entirely cold, absolutely inhuman: and a rich lived world of intentional stances entirely limited to humans, absolutely divorced from what things are in and for themselves” (p. 9).

Despite the undeniably hyperbolic nature of these claims, Latour’s central point can no longer be easily ignored: splitting nature into a domain of active, meaning endowing agents and a domain of passive, dead matter observed and experienced by said agents, continues to enact and thus reproduce mononaturalism. All of which is to say that, from an STS standpoint at least, ‘cognitive worlds’, ‘meaningful worlds’ or ‘worlds of significance’, for example, *cannot* be equivalent to ontologically multiple worlds *if* the former are the consequence of a prior distinction between world and environment.

To sum up this section. With the help of STS, we explored how the distinction between world and environment enacts a dualist conception of nature which reinforces and perpetuates mononaturalism and, in the process, makes representationalism inevitable. In these enactments we saw how it was only the subject’s experiences of nature and not nature itself which were rendered as not pre-given. Environments not only remained ‘untouched’ but essentially passive and mute. As a consequence, it was suggested that the conception of world and the many purported equivalent locutions enacted in these cases, cannot be deemed equivalent to ontologically multiple worlds as STS scholars understand them.

In the next section I want to turn the focus towards how the dual thesis, as enacted through embodiment, structural coupling and anti-representationalism, also become entangled with and reproduces mononaturalism.

### **5 Embodiment and the reproduction(s) of mononaturalism**

In this section we re-turn to the themes of embodiment, structural coupling and anti-representationalism and explore one specific way that these become entangled with and also reproduce mononaturalism. To do so I will structure much of the discussion around some critical arguments which challenge that considerations about embodiment and anti-representationalism can in fact show that there is no pregiven world. My aim here is not to assess these arguments one way or the other but rather to use them as tools to think-with. More specifically, I will diffractively read these arguments through work in STS to bring to light how the dual thesis enacts an epistemologization of ontology which reproduces the very mononaturalism it also rejects.

In the previous chapter we showed how the dual thesis, with and through considerations regarding embodiment, structural coupling and anti-representationalism, sometimes implicitly and sometimes explicitly, enacted rejections of mononaturalism. The central idea is that if we took these notions seriously then we could no longer hold on to the modernist conviction that there is a ready-made, pregiven world out there, laying passively waiting to be represented. Unsurprisingly, a number of theorists, for a number of different reasons, have directly taken issue with the dual thesis's rejection of mononaturalism. In order to focus the discussion somewhat, I am going to specifically concentrate on two theorists who have explicitly taken issue with this rejection.

We begin with an argument by Lawrence Shapiro (2011, p. 84) which directly targets VTR's "argument against colours in the world". An argument which, for all intents and purpose, presents a critical challenge against the idea that considerations about embodiment are sufficient to undo the conviction that there is a pregiven world. Shapiro begins by reconstructing VTR's argument as follow: (i) colour experiences determined by visual systems do not correspond one-to-one with properties in the world. (ii) If colour experiences do not correspond one-to-one with properties in the world, then there are no colours in the world. (iii) Therefore, there are no pregiven colours in the world

(adapted from Shapiro, *ibid.*, p. 84). According to Shapiro, this argument should be rejected.

While Shapiro agrees with premise (i) he however rejects (ii). This is because, the author insists, “there is no logical connection between a failure of correspondence and the existence of properties” (*ibid.*). Thus, for Shapiro, while it might in fact be the case that the colour visual system operates in the manner VTR specify and that there is indeed no one property to which an experience of colour corresponds, it does not follow from this that colour ‘out there’ does not exist. For this to be the case, maintains Shapiro, “VTR require an additional assumption” (*ibid.*). Shapiro suggests one possible candidate: “if there were colors in the world, color perception would be accurate” (*ibid.*, p. 84).

To see why this assumption might be necessary, Shapiro asks us to consider a colour theorist who insists that colours (though not experiences of colour) do correspond to unique collections of surface spectral reflectances. In this case the colour green ‘out there’ is a particular way an object reflects light. Shapiro notes that VTR would certainly object to this and insist that there is no objective green out there because an experience of green can correlate with a potentially infinite number of different combinations of light frequencies. However, in response, Shapiro argues that, from the colour theorist’s perspective, VTR’s claim only shows that “most experiences of green do not track actual green” (*ibid.*). Therefore, according to Shapiro, even if all experiences of green turn out to be mistaken, it does not imply that there is no green ‘out there’. Shapiro (*ibid.*) maintains that “[t]o think otherwise would be akin to denying the existence of gold because one is unable to distinguish real gold from many things that only appear to be gold”. For Shapiro, then, considerations regarding the nature of embodiment and structural coupling are *not sufficient* to guarantee that there is no pregiven world, as some enactive theorists maintain.

Karim Zahidi also comes to the same conclusion. Following a similar line of reasoning to Shapiro, Zahidi (2014) argues that, “from the fact that different organisms are sensitive to different features of the world it does not follow that there are multiple organism-dependent worlds”. Following these two theorists, we can say that the

observation that different organisms are differently embodied and thus have different histories of structural coupling does nothing to undermine the modernist conviction that there is a pregiven world. What these considerations *do* show, the author maintains, is that all organisms, by virtue of their distinctive embodied morphologies and histories of structural coupling, have different knowledge/experiences of *the* world rather than that there *are* multiple different (organismic-dependent and non-pregiven) worlds.

But what about the appeal to anti-representationalism? Does rejecting mental representations establish that there is no pregiven world and justify that there is only brought forth worlds? As with considerations of embodiment and structural coupling both of these theorists also insist that anti-representationalism is insufficient to establish that there is no pregiven world. Discussing the submarine metaphor, Zahidi (*ibid*, emphasis added) argues that all it shows is “that there are in fact *two distinct perspectives* from which this interaction can be *described*: the internal point of view — i.e. the point of view of the navigator in which only indicator readings and their internal correlations exist — and the external point of view, i.e. the point of view of an observer, that describes the correlations between what goes on inside the submarine and what goes on outside the submarine”. Thus, for Zahidi, anti-representationalist considerations are simply not enough to show that there is no pregiven world. Even if we accept that organisms do not internally represent their environment, it does not follow from this consideration alone that the environment is not pregiven.<sup>158</sup>

So what are we to make of these critical arguments? Do they convincingly show that enactive theorists are simply wrong? Are we to conclude from these arguments that these critics have now convincingly showed that the world *is*, contrary to enactive theorists, ontologically pregiven? In De Jesus (2018) I sided with these theorists<sup>159</sup> and, following a similar line of reasoning, argued that these considerations are indeed insufficient and incapable of showing that there is no pregiven world. Moreover, I also insisted that this generated an *untenable contradiction* for the enactive approach in as

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<sup>158</sup> Nor does it follow that if organisms *do* internally represent the world, the world *must necessarily* be pregiven. Recall that VTR argue that it is (mental) representationalism which ensures that the world remains pregiven. But, as noted previously, one could of course endorse representationalism, either as a realist or idealist, and also argue that the world is *not* pregiven (see Steiner 2014).

<sup>159</sup> Although, in contrast to them, I argued that the world was *not* pregiven.

much as it also “presupposed” mononaturalism. An untenable contradiction which, I argued at the time, needed to be resolved and could be resolved with other theoretical-cum-conceptual resources (see De Jesus 2018, pp. 876-878).

However, in light of the previous chapter, it should be apparent that these conclusions were not only too hasty but also rested on a questionable representationalism. It assumed, just like these critics, that what is needed with regards to mononaturalism is *more theoretically convincing arguments*. It also assumed, again partially due to this underpinning representationalism, that the dual thesis *univocally fails* to achieve what it sets out to do. But, as the previous chapter attests, this too is somewhat off the mark. Nonetheless, these critical considerations bring up some important points which are good to think-with. Thus, although I do not want to claim that the dual thesis univocally fails in what it sets out to do, I nonetheless maintain that it does also become entangled with the very mononaturalism it rejects. In order to bring to light *how* this happens, I will read these (critical) arguments diffractively with and through some work in STS.

Indeed, it was precisely by bringing these critical arguments with STS and diffracting them through each other, that a different diffractive pattern began to emerge and explicitly stand out for me. One particularly important aspect of this pattern which I want to further think-with and through here is precisely the *epistemological nature* of both embodiment and anti-representationalism. More specifically, this diffraction helps bring to light how the dual thesis’s rejection of mononaturalism – ostensibly an *ontological* issue – is often also *framed in epistemic terms*. It helps bring to light how both embodiment and anti-representationalism routinely function as means to better *understand, explain* and essentially better formulate and *conceptualise* (in relation to cognitivism) how humans *know* the world.

However, it is not only humans that know the world. As we have seen, enactive theorists routinely also cast *nonhuman living organisms* as *epistemic agents*. From an enactive perspective, other nonhuman living organisms are *also* epistemic agents like human beings, albeit with rather different epistemic capacities and abilities, and therefore also need to be understood, explained and conceptualised as such. This is something which has recently been explicitly noted by Mario Villalobos. As the author (2015) observes,

“as long as living beings are viewed as agents that try to solve problems, their interaction with the environment (and by extension their internal states), are usually interpreted in epistemic or cognitive terms”.

As such, for enactive theorists, “[l]iving beings not only exist in the world, they ‘know’, or ‘need to know’, the world in which they exist” (Villalobos, *ibid.*). Different theorists and approaches might vary with regards to how they ‘interpret’ this epistemic relation. Organisms might know the world through internal mental representations as cognitivists maintain or they might know the world through sense-making, as some enactive theorists argue. Nonetheless, despite all their differences, a common thread running across most cognitive science, cognitivist or otherwise, “is the view of living beings as epistemic or cognitive agents” (Villalobos, *ibid.*). But what is the relevance of this observation? Firstly, it brings to light how *all* living organisms, not only humans, are often cast as entities which are first and foremost in an epistemic relation to the world. Secondly, and as a direct consequence of this epistemic rendering, some enactments of the dual thesis with and through embodiment and anti-representationalism also become entangled with and thus also reproduce mononaturalism. Let us take these in turn.

The first observation is important in the current context because it clarifies that it is not only the observer observing the organism, which is cast in epistemic terms, but also the observed organism itself. To put it slightly differently, *both* humans and nonhuman living organisms are seen to be in an epistemic relation to the world. As noted above, when discussing intentionality *qua* perspectiveness, the enactive project casts both the observer’s understanding of organism *and* the organism’s “relatedness to the world” on epistemic grounds. The outcome being an endless multiplying of *perspectives* across a range of biological domains and species. This is equally present when the dual thesis is enacted with and through considerations about embodiment and anti-representationalism. Thus, just as with enactments of intentionality, the ‘world’ is ultimately also ‘determined’ from the side of the subject.

It is precisely at this point that the dual thesis becomes deeply entangled with the very mononaturalism it also rejects. There are several different ways in which this happens but here I will focus exclusively on only one. To illustrate, let us re-turn to Chapter

Four, and the discussion surrounding the epistemic nature of the enactive project more broadly. Using some of the observations and insights from that discussion, I want to suggest that enactments of the dual thesis with and through considerations of embodiment and anti-representationalism also lead to the reproduction of mononaturalism by virtue of a tacit reduction of the ontological to the epistemic. Recall that in Chapter Four, after Gad et al. (2015), we called this type of process the *epistemologization of ontology*.

To avoid unnecessary confusion, a few clarifying remarks are perhaps necessary here in regards to this purported reduction. Firstly, recall that the epistemologizing of ontology occurs when one draws *ontological conclusions strictly on the basis of epistemic considerations*. Thus the ontological is (i) *reduced* to the epistemological insofar as it is always-already derived from or underpinned by very specific epistemological concerns (cf. De Jesus 2018) and (ii) *neglected* insofar as the heterogeneous materialities which constitute worlds are not adequately or sufficiently taken into account. Thus, what is *known* either through subjective experience, theoretical considerations and/or scientific modelling/representing, serves as the basis for ontological conclusions about what there *is*. As a consequence, there is a tacit *systematic dissolving of the ontological (material specificity) into the epistemic*.

To help illustrate *how* this happens with the dual thesis, it will be helpful to take a closer look at how Gad et al. (2015) introduce and mobilise this notion of epistemologized ontology. Gad et al. (ibid.) introduce this notion in the context of debates within contemporary anthropology which centre around the ‘ontological question’, do we “inhabit multiple worlds”? According to a number of anthropologists, those we have previously identified as belonging to an ‘ontological turn’ within anthropology (see Holbraad and Pedersen 2017), argue for a positive answer. As we saw in the previous chapter these anthropologists argue against the mononaturalistic intuitions that underpin the conviction that we do inhabit a pregiven singular world. Gad et al. (ibid.), however, observe that, in many cases within anthropology, this purported ontological conclusion is reached strictly from an epistemic (linguistic-cum-conceptual) register.



According to the authors, “the anthropological interpretation of ontology becomes problematic when, in spite of its stated ambitions, it remains predominantly epistemological and culturalist, and thus disinclined to deal seriously with practice and materiality” (ibid., p. 74). This has led to a situation where many anthropologists<sup>160</sup> of the ontological turn, the authors continue, offer “a picture of ontology in which ‘thinking’ is primary, while things, when they are presented, are exhibited in the form of more or less *passive media, through which thinking unfolds*” (ibid, emphasis original). The central point for Gad et al. is that anthropologists of the ontological turn who argue for multiple worlds “access” this “ontological level” via “concepts and ideas” (p. 75). It is this which, for the authors, constitutes an epistemologizing of ontology.

Diffracting this discussion within anthropology/STS with and through enactments of the dual thesis and critical arguments against them, brings to light how similarly to anthropologists of the ontological turn who argue for multiple worlds, enactive theorists are also doing so *by effectively epistemologizing ontology*. These enactments *also* reduce the ontological to the epistemic and consequently overlook the practices and materialities which ontologically constitute worlds (cf. Jensen 2012). However, it is not that enactive theorists completely disregard environmental structures and objects (practices and materialities), but rather that these become *secondary* to the primacy of embodiment and anti-representationalism in the constitution of worlds. Nonetheless, worlds are brought forth by virtue of *foregrounding* the specific embodied morphology of the organism or its non-representational relation to the world, rather than by studying or paying close attention to the *practices and materialities* which help constitute these worlds. Worlds are in these cases reconfigured as primarily epistemic insofar as, thanks to different embodiments and/or non-representational relations, (i) different organisms come to *know* the world differently and (ii) AE researchers *represent them* as such.

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160 Gad et al. are here specifically speaking about the seminal collection *Thinking Through Things: Theorising Artefacts Ethnographically* (Henare et al 2007) which is widely regarded to have played a major role in the (anthropological) turn to ontology. Jensen (2012, 2017), however, argues that this applies to ontological anthropology more generally. Indeed, this is particularly evident in Holbraad and Pedersen’s (2017) most recent articulations of the ontological turn, which places “conceptual definition” as one of its “central concerns”.

In many respects both Shapiro and Zahidi<sup>161</sup> and Gad et al. reach exactly the same conclusion: they all suggest, albeit in different ways, that ‘worlds’ are effectively rendered as the organism’s *unique experience* and/or *knowledge of* the world. As such, one could say by way of these discussions, that perceiver-dependent *knowledge and experience* becomes the basis for the *plurality* of worlds. For Shapiro and Zahidi specifically, the central concern is to argue that the dual thesis so conceived, is *incapable* of showing that organisms *do not* encounter an objective predefined and pre-given reality. Gad et al., for their part, appear to be motivated by somewhat different reasons. These authors are more interested in showing how anthropologists inadvertently reduce ontological issues to epistemic ones. Thus, whereas Shapiro and Zahidi focus on critique and lack, Gad et al. largely focus on difference.

Similarly, rather than suggesting that the dual thesis is insufficient to guarantee that there is no pre-given world, I am instead shifting the focus and suggesting that it also *does* something different. By diffracting these various discussions with and through each other, what comes to light is that the dual thesis also reproduces and enacts mononaturalism, by virtue of epistemologizing ontology. As noted, worlds are turned into epistemic worlds such that the ontology of the world is not only filtered through the epistemic-cum-experiential but also as a consequence remains completely untouched. It is, therefore, not so much that enactive theorists lack argumentative acumen to ensure that there is no pre-given world – clearly they do as we saw in the previous chapter – but rather that the arguments they deploy *also* can/do become entangled with and enact mononaturalism. Put differently, these enactive arguments which gather around the dual thesis, *also* create different mononaturalistic worlds.

They do both: at once rejection (as we saw in the previous chapter) *and* reproduction (as shown here). This not only shifts the focus away from critique but also disrupts the representationalism underpinning it. It is no longer simply a matter of competing perspectives which could be improved/undermined with different conceptual resources but rather a matter of *different concrete enactments* which co-exist in a somewhat uneasy fashion (more on which in the Appendix).

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<sup>161</sup> I should emphasize that all I say here about Shapiro and Zahidi applies equally to arguments made in my (2018) paper.

The reader might have noticed by this point that we have spoken about embodiment and anti-representationalism but have said very little specifically about structural coupling. Its absence is perhaps even more noticeable as one might think it does not lend itself that well to the above analysis. Indeed, what is particularly distinctive about structural coupling is precisely its *symmetrical* nature, which surely enables it to cut all ties with mononaturalism. I want to suggest that, this symmetrical nature notwithstanding, enactive structural coupling does not always cut all ties with mononaturalism. Rather, it not only reproduces its own version of it but also enacts a distinctive version of subject/object duality. To clarify, we need to re-turn to Barad's discussion of relation.

Diffractively reading the notion of (enactive structural coupling), with and through Barad's conception of relation, should help us bring to light how both these two modernist tenets are reproduced and enacted. The first point to note when these notions are read diffractively is how structural *coupling* can and often *does* require pre-existing 'systems' on the one side and environments/other systems on the other which *couple together*. As is the case with intentionality, both 'system' and 'environment', *must pre-exist in some form* in order to then couple together (see McGann et al. 2013). Hence, a system is said to be structurally coupled *with the world*. Indeed, the very definition of coupling is that of a *pairing between* two or more items.<sup>162</sup> This suggests that two or more items need to pre-exist in some form to facilitate the coupling.

From a Baradian standpoint, the notion of structural coupling does not therefore fully overcome a metaphysics of individualism because it seems to necessarily presuppose a prior separation between subjects and objects. Although subjects and objects are mutually dependent and codetermined, they nonetheless exist prior, and are external to their relations. This is explicitly the case with regards to agents which need to be individuated as systems prior to any relations to something other than themselves. In

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<sup>162</sup> Another meaning is that of a device or mechanism of some kind which connects parts of machinery. Either meaning presupposes that there are entities which exist as distinct entities prior to the coupling. A diffractive reading of the notion of structural coupling brings out this particular individualistic metaphysics underpinning it. See McGann et al. (2013) for an extended discussion of the notion of coupling.

these cases at least a subset of relata, namely adaptive autonomous living organisms, *need* to exist prior to their relations.

Note, moreover, that in most discussions structural coupling functions primarily as an *epistemic concept*, functioning first and foremost as an alternative description – *a naturalistic and scientifically respectable representation* – of how certain systems interact in the world. Thus, as already noted in Chapter Two and above, the world remains one thing while representations of it are multiple. Note that this is the case for *both* a symmetric grounded autopoietic theory as well as an asymmetric grounded enactive theory. Maturana (1988), for example, makes it clear that structural coupling is essentially an observer’s abstraction: “structural coupling in its domain of existence (conservation of adaptation) is a condition of existence for any system *distinguished by an observer* (...) when an *observer distinguishes* a living system, he or she necessarily distinguishes it as a system that constitutively remains in structural coupling in its domain of existence” (p. 18, emphasis added) Therefore, enacting the dual thesis with and through considerations regarding structural coupling reproduces mononaturalism also by virtue of an epistemologization of ontology. While the very notion of coupling (when applied to humans) presupposes and enacts a subject/object dichotomy.

To sum up. In this section we explored one specific way – vis-à-vis the epistemologization of ontology – where some enactments of the dual thesis effectively also reproduced and perpetuated mononaturalism. We brought to light how this was done by enacting the dual thesis with and through the themes of embodiment, anti-representationalism and structural coupling. In the next section I want to turn the focus towards reflexivity.

## **6 Reflexivity: Individualism and mononaturalism**

In this section we will explore some of the ways in which enacting the dual thesis through reflexivity also becomes entangled with and helps enact a number of modernist tenets, not in the least mononaturalism. To help us bring these entanglements to light, we will use texts by Barad and Latour. Both of which, in their own way, argue that reflexivity is underpinned by a metaphysics of individualism which splits subjects from

objects, neglects the materiality of objects by virtue of its representationalism and ultimately continues to reproduce mononaturalism. Let us begin with Barad.

According to Barad (2007), reflexivity's deep and problematic entanglement with a metaphysics of individualism, is rendered most visible through its excessive focus on the agentic individuality of the researcher. For Barad, reflexive methodologies tend to be (albeit often tacitly) underpinned by a classic modernist understanding of the lone, objective scientist, occupying a detached "view from nowhere" trying to uncover the "true" structure of reality. This is, according to Barad, present even in many of those researchers that actively reject modernist conceptions of research and research practices, including many STS scholars.

Perhaps a good enactive example of the tendency that Barad is signalling towards here is Stewart et al's (2010) claim that "[t]he enactive topology is rather like that of a Möbius strip: by going full circle, we end up at the starting point—but with the object of scientific study having changed sides on the subject-object relation, becoming itself the *subject* of scientific enquiry" (ibid., p xvi, emphasis original). Reading this diffractively through Barad brings to light enactive entanglements with a metaphysics of individualism which, (i) retain and reproduce mononaturalism and with it a subject/object distinction, (ii) privileges the subject over the object and consequently, (iii) remain deeply representationalist.

For these different patterns to begin to emerge, we need to first explore Barad's (2007) views on reflexivity, succinctly articulated in the following passage: "Reflexivity, like reflection, still holds the world at a distance. It cannot provide a way across the social constructivist's allegedly unbridgeable epistemological gap between knower and known, for reflexivity is nothing more than iterative mimesis: even in its attempts to put the investigative subject back in the picture, reflexivity does nothing more than mirror mirroring. Representation raised to the nth power does not disrupt the geometry that holds object and subject at a distance as the very condition for knowledge's possibility. Mirrors upon mirrors, reflexivity entails the same old geometrical optics of

reflections” (pp. 87-88). Although Barad’s position is arguably overly critical,<sup>163</sup> it nonetheless manages to tap into and articulate some of the interesting but counterintuitive implications of reflexivity. Implications which also apply to the enactment of the dual thesis through reflexivity and which a diffractive reading helps bring to the fore.

It will thus be helpful to pause here in order to unpack this quote. According to Barad (ibid.) reflexivity, “like reflection, still holds the world at a distance”. But why is this the case? Barad (ibid.) first points out that the notions of reflection, or reflexivity, are based on an optical metaphor of *mirroring* which takes the phenomenon of a pattern of light to reflect a particular actual object or entity. What this suggests for Barad is that reflexivity involves a process of reflecting “on the mirror’s mirroring”. According to Barad, as a methodology, the research process itself becomes one where the primary task of the researcher is to “mirror” the “outside world” by offering an accurate description of it. Thus, despite insistence to the contrary, the task of the (reflexive) researcher is therefore to “*represent* what is already there, independent of the researcher’s gaze” (Davies 2014, p. 734, emphasis original).

Barad thus argues that it is by focusing on the researcher (vis-à-vis reflexivity) who is “holding the mirror”, that a separation between the researcher and the object of research is introduced. Hence Barad’s insistence that reflexivity is a process of reflecting “on the mirror’s mirroring”. As Gemignani (2017) succinctly puts it, “[b]y becoming aware that the search for knowledge and the modes of knowing pass through knowing one’s self, the researcher ends up being the screen or looking glass through which reality is interpreted” (p. 191). It is precisely for this reason that Barad insists that a reflexive methodology will continue to reinforce the gap between knower and known, and as such, “is nothing more than *iterative mimesis*: even in its attempts to put the investigative subject back in the picture, reflexivity does nothing more than mirror mirroring” (ibid, p. 87, emphasis added). This suggests that Stewart’s (2010) insistence

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<sup>163</sup> Although I share Barad’s concerns here, I also maintain that reflexivity can and does much more than this as the previous chapter should attest too. While Barad tends to treat reflexivity in general terms and as something of an homogenised position, I would suggest that their critical remarks are specific to those researchers which cast reflexivity in epistemic-cum-representational terms. Indeed, Barad’s alternative to reflexivity – diffraction – is still inherently reflexive in nature but is ontological and performative rather than epistemic and/or representational. We will re-turn to these points in the Appendix.

that the call for reflexivity is *not* an “individualistic credo” (p. 27) is perhaps not as clear cut as the author supposes.

This should, in turn, help us better understand why Barad argues that reflexivity also (tacitly) emphasises sameness. The issue here, much like that of separation, emerges precisely when the researcher is forced to turn the proverbial mirror on themselves. In this case the researcher takes it for granted that there is a stable reality to their distinctive subjectivity, albeit a temporary one, which is influencing and shaping how the research is conducted and understood. However, this runs the risk of “essentializing positions, assumptions, and influences, with the result of reifying its content. Seen as a representation of the ways in which the world of the researcher influences the inquiry, reflexivity becomes a sort of cartographic exercise to draw a map of the researcher-researched territory” (Gemignani 2017, p. 191). This, moreover, also points to a different sense of “sameness” involved here. As a process of mirroring, reflecting *on* suggests essentialists and fixed positions, where moments of sameness are captured by the researcher through moments of detached contemplation.

Finally, Barad (ibid.) identifies and attempts to problematise the *representationalism* underpinning reflexivity: “Representation raised to the nth power does not disrupt the geometry that holds object and subject at a distance as the very condition for knowledge’s possibility” (p. 88). Thus, when Barad speaks of reflexivity as “mirror mirroring” and entailing “the same old geometrical optics of reflections”, they are essentially signalling to an underlying representationalism involving these practices. Now, it is important to note that representationalism in this context does not refer to the *narrower* concerns with *mental* representationalism of the sort found most commonly within cognitive science debates. Rather, as briefly noted in Chapter Two, the representationalism involved here is a much *broader* one; not specific to mental representation but representation more generally, which separates the material object from its representations and assumes the latter functions primarily and exclusively to more or less accurately capture the former.

Thus understood, representationalism introduces a dualism between representation and that which it represents. As such, representations are cast as epistemic tools capable of

depicting reality but do not have “constructive, creative, or ontological power over its contents and forms” (Gemignani 2017, p. 192). We will re-turn to the notion of representationalism below. For our purpose here, it will suffice to note that Barad argues that reflexive methodologies are inherently representationalist, and as a consequence, never *adequately* deal with the *materiality* of the world. It can and often does lead to a kind of self-absorption where the researcher *rather than the research object(s)* end up taking centre stage. What follows from this is that (i) a *separation* is introduced between the researcher and the object(s) of research such that it (ii) renders research objects into mere *representations* of said objects.

Similar concerns were also raised several decades earlier by Latour. Characteristically to the point, Latour argues that methodological reflexivity often leads to an infinite regress which always “return[s] the boring thinking mind to the [centre] stage” (Latour 1988b, p. 173). Like Barad, Latour (*ibid.*) argues that reflexivity reintroduces *and* reproduces the figure of the independent researcher, a figure which then becomes the central locus for and of reflection. But, as Latour goes on to argue, the inherent risk is that the researcher will “spend an enormous amount of energy on the side of the *knowing*, and almost none on the side of the *known*” (*ibid.*, p. 173, emphasis added). Hence Latour’s concerns can be seen to be a direct consequence of how theorists, thanks to reflexivity, emphasise and privilege the *knower and the knowing*.

Let us bring this back to the enactive approach. When diffractively reading enactive conceptions of reflexivity with and through Barad and Latour’s discussion on the topic, what most forcefully stood out for me was precisely its epistemic-cum-individualistic nature. This was something which had not stood out to me prior to bringing these texts together. As I continued to turn these texts over, allowing them to continue to interfere with each other, other diffractive patterns also began to emerge. The most prominent of which being a representationalism which arises in large part due to those very individualistic impulses which prioritise subjects over the materiality of objects of study. These patterns became particularly evident when reading the specific examples (of enactive reflexivity) discussed in the previous chapter.



As the quotes in the previous chapter clearly indicate, reflexivity is by and large enacted in *epistemic* terms. The central concern and emphasis always falls on the conditions for knowledge and knowing. Of course, once we recognise the active role of the observer within the epistemic process, the question of reflexivity becomes inevitable. In this regard, the enactive approach's concern with reflexivity is very much like traditional anthropology, which Viveiros de Castro (2004a) labels as "deeply Kantian". Enactivism is deeply Kantian in the sense that it's attentiveness towards reflexivity leads it to almost exclusively concentrate on the conditions of the *observer's own production of knowledge*.

So, even though enactive theorists certainly enact non-individualistic and intersubjective forms of knowledge and knowledge practice as we have seen in previous chapters, they at the same time also enact a "concept of reflexivity [which] assume[s] the centrality of the researcher's consciousness, cognitive abilities, and personal insights to understand and develop knowledge" (Gemignani 2017, p. 191). Indeed, as a recent (indirect) intervention on the matter by Cuffari, Di Paolo and De Jaegher (2021) makes clear, "the enactive approach *is self-reflective*, meaning that *ontological claims* are themselves made by situated sense-makers, whose activities are embodied, dialogical, and historical" (p. 121, emphasis added). Which is to say, as Vörös and Riegler (2017) insist, that there is no way of escaping "the *self-referentiality* of the notion [of enaction] – the way that it reflects *back on us*" (p. 6, emphasis original).

But, when read diffractively, it appears that this enactive reflexivity *qua* dual thesis does much more than simply function as another means to destabilise core modernist ideals. In this section, and with a change of apparatus, we began seeing other entanglements, other enactments, which effectively also re-enacted some of these very modernist ideals it destabilises and disrupts. Thus the dual thesis, in its reflexivity mode, also becomes entangled with and reproduces variations of (metaphysical) individualism, which leaves mononaturalism fully intact and forces one to adopt representationalism. In the next and final section we will take a closer look at this notion of representationalism by turning it over a few more times.

## **7 Enactive representations enacting representationalism**

Representationalism<sup>164</sup> has been a prominent recurring theme throughout this chapter. But we also encountered it in other chapters, first in Chapter Two and then in Chapter Four. Recall that in Chapter Four, for example, we saw that Thompson (2007, p. 50) suggested that “autonomy” and “heteronomy” can also be understood as “cognitive aids” that can guide scientific enquiry. The underlying suggestion of that discussion was that these two notions are epistemic constructs – *representations* – which scientists can use to describe/articulate/model specific phenomena depending on the specific needs of the researcher. In this final section I want to explicitly thematise this notion of representationalism both as a means to further clarify the above discussion and to bring to light other ways it is enacted within the enactive approach.

Since the notion of representationalism is not only contentious but also used in many different ways in different fields, we need to begin by clarifying our intended use here. According to Barad (2003), “[l]iberal social theories and theories of scientific knowledge alike owe much to the idea that the world is composed of individuals—presumed to exist before the law, or the discovery of the law—awaiting/inviting representation. The idea that beings exist as individuals with inherent attributes, anterior to their representation, is a metaphysical presupposition that underlies the belief in political, linguistic, and epistemological forms of representationalism” (p. 804). This succinctly captures both the underpinning logic and extensive scope of representationalism: at once part and parcel of both the natural and social sciences and equally motivated by similar metaphysical concerns.

As Barad’s quote also makes perfectly clear, representationalism thus conceived is an essential feature – a necessary consequence – of the modern Constitution. It is, first and foremost, intimately connected to the mononaturalistic nature/culture spilt (see Bryant 2013). As Latour (2004b) notes, our very modernist tendency to distinguish a stable and

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<sup>164</sup> Issues surrounding the notion of representation are complex and varied with a multiplicity of distinct histories and uses in different fields. At the risk of being overly reductive, and to reiterate the point made above, we could however say that while the various mind sciences are concerned specifically with the *narrower species* of *mental* representations, the social sciences are concerned with the *broader genus* of representation more generally. This ranges from debates about the representation of the ‘other’ within anthropology (e.g. Clifford and Marcus 1986) to issues regarding the representational nature of science within STS as observed in previous chapters (e.g. Pickering 1995). While this is certainly an overgeneralisation it is nonetheless helpful for current purposes. Moreover, what is important to bear in mind here is that I am not concerned with mental representation but rather with the broader genus, and particularly as it relates to scientific practices within the enactive approach.

unified world of matter from our multiple representations of that world, is simply another manifestation of the nature/culture divide. Similarly, numerous STS scholars (Latour 2005; Law 2004a; Myers 2015; Mol 2002; Neimanis, 2015; Pickering 1994, 1995), have long argued that it is by upholding this divide that representationalism becomes a *necessary* but questionable requirement of modernist thought (see also contributions to Coopmans et al. 2014).

For these scholars, representationalism: (i) not only perpetuates and reinforces the nature/culture split, it also (ii) takes concepts/models/equations to directly *mirror* reality and then (iii) *prioritises* these representations over the represented phenomena. Most importantly, however, is that (iv) these representations *qua* epistemic constructs only have the capacity to *represent* and *never to directly constitute or intervene* on that reality which is being represented. Much of our discussion in previous chapters, and especially above, has already highlighted how and where a number of enactive ideas and concepts are deeply entangled with, and implicated in, all of these four issues, making them thoroughly representationalist. Nonetheless, a more concentrated discussion will help further clarify some of the central issues at hand.

To structure our discussion somewhat, I will focus on certain enactive conceptions of science. Or, more specifically, Evan Thompson's distinctive articulations of the matter.<sup>165</sup> As Thompson (2016) notes, it is sometimes overlooked that "the enactive approach also implies a certain conception of science" (xxvii). But what exactly is this conception of science? In previous chapters we touched upon some of the ways that some enactive theorists have argued for an Enactive Cognitive *Science*. Here I want to focus specifically on Thompson's account. Although I take Thompson's account to be but only one enactment of an enactive account of science, I nonetheless regarded it as fairly representative of the enactive (AE) approach more broadly.

Thompson begins by pointing out that this alternative (enactive) conception of science rests on a reflexive application of enactive ideas of cognition to science itself. As we

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<sup>165</sup> I focus on Thompson's account here for two specific reasons: (i) it offers a very succinct, well articulated, account of what an enactive science is and/or should be, and (ii), this account touches upon, and bears directly on, all the themes which constitute the dual thesis. The second reason in particular makes it rather relevant for the current chapter.

already noted in the previous chapter and above, Thompson argues that once we do this, “we can no longer hold on to the traditional realist conception of science as revealing the way things are in themselves apart from our interaction with them” (ibid.). To counterbalance this claim, Thompson also insists that neither is science the projection or creation of our own minds. For Thompson, science is simply “a highly refined distillation of our embodied sense-making” (ibid.). Thompson then goes on to draw on the work of Husserl to further explicate this view.

Following Husserl, Thompson (ibid.) argues that the departure point for the enactive approach’s understanding of science is “our concrete, sensuous experience of the life-world” which provides the “always-present background” for any scientific research. In producing “classical science”, Thompson maintains, “we set aside features of this kind of experience that vary individually and cannot be made the object of a stable consensus” (ibid.). Scientists, therefore, use logic and mathematics to create an abstract formal model or representation of “certain invariant and structural features of what we experience under rigorously controlled conditions that we impose, and this formal model becomes an object of consensus and the basis for an objective *description*” (ibid., emphasis added).

According to Thompson, then, for the enactive approach, “[s]cientific models (...) are *formalized representations of the world as disclosed* to our embodied cognition” (ibid., emphasis added). They are “distillations of our embodied experience as observers, modellers and interveners” and not objective representations of the world. Thompson is very explicit on this point and insists that “scientific knowledge is not an exhibition of the nature of reality as it is in itself”. Rather, the enactive conception of science presents a view which takes scientific knowledge to be the product of a “relation between our embodied cognition and the world that [science] purports to know” (ibid.).

Thompson’s argument for an enactive science clearly rejects and subverts traditional modernist conceptions of rationality, objectivity and indeed mononaturalism. More importantly for this section is that it also explicitly rejects the sort of representationalism highlighted by Barad. After all, Thompson is very explicit in claiming that *models do not directly represent* an “objective” reality. Furthermore,

Thompson's position also signals towards the observation that scientists not only represent but also *intervene*. Scientists are embodied beings situated within concrete material practices, not mere detached observers. Nonetheless, and despite all this, I want to show that Thompson *also* becomes deeply entangled with and enacts a representationalism which reproduces much of what he explicitly rejects. This can be made more explicit by diffractively reading Thompson's views through work within STS and by Barad. I begin with the former and re-turn to the latter shortly.

According to John Law (2009a), “[t]here are two great views of method in science and social science. On the one hand it is usual to say that methods are techniques for describing reality. Alternatively it is possible to say that they are practices that do not simply describe realities but also tend to enact these into being”. Law argues that the first approach is part and parcel of the received wisdom informing most common-sense understandings of research methods and is grounded on the assumption that “in one way or another reality has a definite form that is substantially independent of and prior to the tools used to inquire into it” (ibid.). Science is thus primarily understood in terms of *knowledge-making* practices which revolve primarily around processes of describing – *representing* – this independent reality in the most *accurate* way possible. I want to suggest that, read diffractively with this work, Thompson's conception of science and its enactive-based methodologies are effectively rendered as neutral “techniques for describing reality”. Consequently, and despite insistence to the contrary, it also continues to mobilise a *representationalist conception of description* incapable of intervening on or constituting its object.

The first point to note is that Thompson's insistence that formal models and representations *do not refer* to an *objective* reality is motivated by the conviction that science is, at its core, a *reflexive* enterprise. As such, for Thompson, acknowledging this reflexivity is tantamount to an outright rejection of objectivism and consequently mononaturalism. As we saw above, the same intuition is often involved around the discussion of perspectiveness. But, as Mol pointed out, rejecting objectivism does not automatically imply a successful rejection of mononaturalism. More importantly, since mononaturalism is not undermined, representationalism not only remains intact, it becomes a *necessity*.

To see this we simply need to recognise that, even if these models do not in fact refer to an “objective reality”, as Thompson insists, they are nonetheless made *to refer* to a reality. In the absence of this referent Thompson would be advocating for some form of idealism, something which I do not think is the case (see also Rolla and Figueiredo 2021). As our discussion of world/environment made clear, for enactive theorists there is – indeed, there must be – a material world ‘behind’ those “distillations of embodied experience”. We can thus say that there is a referent *towards which* models and representations *refer*; but its reality is always filtered through these representations precisely because mononaturalism is not adequately undermined.

To put this point somewhat differently, Thompson’s account does not significantly trouble mononaturalism because the primary concern always falls back on *our access* (the researcher/scientist) and *not* the referent (object) of the access. As a consequence, even though Thompson argues that models are “formalized representations of the world as disclosed to our embodied cognition” and *not* direct/accurate representations of an objective reality, the position remains representationalist because it continues to operate *as if* there were in fact independently existing entities which *can and ought to be represented* in some manner. But as Barad (2003) notes, this implies that, “that which is represented is held to be independent of all practices of representing. That is, there are assumed to be two distinct and independent kinds of entities—representations and entities to be represented” (p. 804).

This is something which Thompson, as well as other enactive theories who follow him in this respect, share with objectivists. It is, of course, true that objectivists insist that models and representations represent things in the world as they *really* are in-themselves while enactivists reject this and insist that these representations are the product of both embodied sensuous cognition and socially situated activities. However, despite this difference, both nonetheless also maintain a separation between representation and object which renders the latter passive and external to representational practices. Thus, in both positions, the object remains firmly on the side of nature and representations on the side of culture. All that is left for both, all that can be done, is represent the object as best and accurately as possible (see Barad 2003).

In the enactive case, this representationalism also falls out directly from what, following Barad (ibid.), we can call its theoretical “tripartite arrangement”. In Thompson’s framework there is not only knowledge (formalised representations of the world) on the one hand and the known (the object being represented) on the other but also, and most importantly, the agent-cum-knower (the scientists which craft the representations as they are disclosed to their embodied cognition). For Barad, this explicit thematisation of the knowing agent, makes “clear that representations serve a *mediating function between independently existing entities*” (ibid, emphasis added). An “ontological gap” is thus introduced which also “generates questions of the accuracy of representations” (ibid.).

This suggests that certain enactive methodologies, not altogether unlike objectivists methodologies, are first and foremost “techniques for describing reality” and hence representationalist in nature. This becomes acutely evident when it is observed that autopoiesis, adaptive autonomy, mathematical equations of brain-body-world dynamics, self-organisation patterns of behaviour, dynamic systems accounts of social interaction and so on, are all routinely rendered as more accurate models and/or representations *of* very specific targeted worldly phenomena. As Di Paolo et al. (2017) point out, enactive theorists aim to “help develop an *alternative picture* of the human mind” (p. 3, emphasis added). Despite recognising the situated nature of how these representations are crafted and insisting that they therefore do not represent a reality in-itself, these representational practices are never regarded as methodologies which also help constitute and thus enact these phenomena into being such that they collapse the gap between representation and object.

These enactive-based models and representations are placed on one side (situated embodied culture) while the referents of these models (natural biological phenomena) remain firmly on the other. This, in turn, helps enactive theorists make a case that *their* models and representations of mind, cognition and life, for example, are more accurate and true to nature than rival representations. But this simply reproduces the dualism between the material world and the inconsequential conceptual resources used to represent it. We will re-turn to and further explore some of these points in the Appendix.

Before concluding this section, it is important that we are clear that the ‘issue’ here is *not* with the fact that some enactive theorists create and use (novel) models, representations and descriptions of various kinds.<sup>166</sup> Nor am I suggesting that these models/representations/descriptions are being confused or conflated with the object of these representations.<sup>167</sup> Rather, as Barad makes clear, the point is that *representation and referent come apart such that they become two essentially separate entities in need of mediation*. We saw various manifestations of this above, in the arguments from reflexivity, in the discussion over the distinction between world/environment and in discussing both dimensions of intentionality. We also saw it in Thompson’s representationalist rendering of “description”. These representations are, therefore, (i) rendered *distinct* from what they represent and (ii) incapable of *effecting or intervening* on what they represent.

In summary, in this final section we have attempted to explicitly thematise a notion – representationalism – which has recurred in many guises and in many places throughout this work. We have tried to clarify how it should be understood in this work and explored, vis-à-vis Thompson’s specific articulations, how it figures in an enactive conception of science. With the help of Barad and STS, it was suggested that, in many

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<sup>166</sup> It is worth noting here that representationalism is a common and indeed pervasive feature of not only AE but of enactivism more generally. For example, much of Hutto and Myin’s (2017) argumentative strategy revolves around *redescribing* computationalists/representationalist explanations of basic cognition in non-computational and non-representational terms. The same sort of strategy is also found in the influential work of Tony Chemero (2009). In these cases, aspects of the world (mechanisms responsible for cognition) remain pregiven and it is the job of the scientist to model and represent it as best as possible. Sometimes these new definitions are presented explicitly as ontological facts, as we saw with the enactive project, while at other times they are presented simply as better epistemic concepts and tools. Many of the entrenched disagreements between cognitivists and non-cognitivists also revolve around the broader representational genus without ever being recognised or acknowledged as such. The issue then being about what represents and models cognition more faithfully, computation or dynamics. In this sense all cognitivists and non-cognitivists alike are equally committed to representationalism.

<sup>167</sup> Nor is it simply a rejection of the idea that the primary function of *linguistic statements* are to represent the world, as found in certain areas of analytic philosophy (e.g. Price 2011). In these particular debates the issues are centred around the metaphysics of *language* and its relation to the world. Representationalists assume that, as Heras-Escribano et al. (2015) explain, “all our explanatory practices, all our attempts at making sense of reality, have a descriptive factual character. There must be something (some fact, some property, some event) that makes true our statements, whether they are physical, biological, logical, epistemological or ethical” (p. 21). Moreover, for representationalists, what makes a factual statement true or false is just the “natural facts (...) disclosed by the natural sciences” (ibid.). Anti-representationalists, by contrast, reject these assumptions. Drawing on these debates, Heras-Escribano et al., have recently argued that the enactive project, particularly its commitment to naturalising biological normativity, is committed to this type of representationalism. Like the debates within analytic philosophy, Heras-Escribano et al.’s concerns, however, remain strictly linguistic. As such, these also enact (i), a distinction between representation and the object being represented and (ii), render representations as entities which do not ontologically effect/constitute/enact their object.



respects, enactive methodologies continue to operate under the assumption that they are ‘designed’ primarily as techniques for describing reality and, as a consequence, continue to reproduce representationalist modes of thinking and practice.

### **Conclusion**

In this chapter we have explored how the enactive rejection of mononaturalism through the dual thesis also reproduces and perpetuates it. We brought to light how enactive ideas and concepts, by enacting mononaturalism, at the same time also became entangled with a metaphysics of individualism which entailed representationalism. We concluded by thinking-through this representationalism. Next we conclude with a few remarks on the potential value of this work.

## (In-)Conclusion

Having now read through this work, the reader *qua* Ph.D thesis examiner, might now be questioning whether this work adds anything of note to its chosen area of research. Does this work contribute, in a worthwhile manner, to the broader literature? What new knowledge about ‘enactivism’ has been produced here? These are of course important questions, specifically within the context of the practices of examining a thesis. Indeed, according to Wikipedia, “those studying for a Ph.D are required to produce original research that expands the boundaries of knowledge”. I take these to essentially be questions about *value*. And so, in the spirit of these questions, I am going to leave the reader with two (and a half) final stories (not answers) about value, valuing and their (dis)entanglements.

The date is Thursday, the 7th of January 2021, and the time is roughly between 14.00-15.00. I am having a Zoom meeting with both my thesis supervisors. We are having this joint meeting not only because the COVID-19 pandemic is in full swing across the globe, but also due to the fact that the direction of my thesis has once again changed. I am trying to explain how a particular email exchange with Fred some months earlier finally made me realise how I needed to move away from critique. I now wanted to focus my attention specifically on how enaction is enacted. As I do so, I become increasingly self-conscious about the fact that I am not doing a particularly good job at expressing myself. Regret and a deep sense of dread suddenly washes over me, and once again I am questioning why I am even doing this. And then, somewhere between this sense of dread, my unconvincing staggerings, and being asked for further clarifications here and there, I am posed the question of value: “What contribution will this work make to the literature?”

This question fills me with even more dread, as I cannot answer it. I try to say something along the lines of “there is value to simply highlighting the often contradictory nature of some enactive ideas and concepts”. No one, including myself, seemed particularly convinced by this. This question regarding the value of this work, vis-à-vis its contribution to the literature, has stuck with me ever since this exchange. More than this, it has deeply troubled me throughout the assembling of this text. I did

not know how to answer this question then and I certainly do not know how to answer it now. However, it has become a bit clearer to me why I struggle to answer it in the context of this work. Let me point out two reasons for this here.

The first reason is that I think these questions sit rather uncomfortably with a work which eschews representationalism and champions multiplicity and practical ontologies. A work which experimentally intervenes with, within and through enaction; a work which is not a comment or an explanation. Although indirectly, I do think this work does also disrupt the idea that knowledge production always operates in terms of the progressive accumulations of increasingly more accurate representations of the phenomena under investigation. The very idea of wanting to do research otherwise. The ambition to be attentive and open to *difference* and *multiplicity*, does not sit at all well with the conviction that scientific progress equals to an inevitable evolution towards some sort of abstract telos.

The second and perhaps more interesting reason has to do with the very nature of value itself, its ontological character if you will. It seems to me that, if one thinks in terms of practical ontologies, then value like any other phenomenon is not only singular but also multiple. This means that value, or should we say *valuing*, is a situated practical phenomenon. Which in turn suggests that value is neither a property of an object or a subject. We do not value in the abstract, and we cannot abstract values from the network of practices within and through which valuing occurs. Since COVID raged as I wrote this thesis, consider the following. Keeping hospitals extra clean during the pandemic become imperative, an imperative which was inherently valuable locally for both patients and staff. However, these new regimes of cleanliness also brought with them an unprecedented amount of all sorts of waste which, once approached from a broader ecological level, was extremely unwelcome. At this level, cleanliness was neither desirable nor valued.

So something can be valued here but not there; it can have consequences which are immediately apparent and others which are not; and it is not a phenomenon which seems readily predictable. Perhaps the same applies to this work. It is valued over here, a bit less over there and nothing all the way over there. Much of this is going to be

completely contingent on the types of practices and networks within and through which it will (can) circulate. Perhaps it, or parts of it, might find itself in certain networks of practices where it leads to particularly undesirable implications and consequences, but there is simply no way of knowing this all the way from over here. It seems to me that whatever future value any part of this work might or might not have rests squarely in the hands of its future potential users and their valuing practices.

As I write these words I am reminded of a rather different story. A story about how, when Facebook bought the virtual reality startup company Oculus in 2014, each new employee was given a copy of *Ready Player One* (2011) by Ernest Kline.<sup>168</sup> Fast-forward (nearly) a decade and Facebook has not only spent billions of dollars towards creating a ‘metaverse’, it has also rebranded itself as “Meta” precisely in order to succinctly encapsulate this ambition. But this is another story for another time. The next one however, is not.

The date is Tuesday, 17th of May 2022, and the time is roughly between 18.00-18.35. As is the case when I am not working on lates, my family and I are sitting at the dinner table having dinner together. We eat and we talk and the topics of our conversations vary wildly and frequently. At some point I find myself explaining to everyone that I am currently working on the introduction to my thesis. As I do so, my ten year old daughter looks at me and tells me that I “should read more stories”. I mention something about story telling and how I am trying to introduce the work with different stories. She then asks me, “why are you writing your book?” (we have taken to referring to my thesis as a “book”). Without giving it much thought I reply by claiming “just because I want to”. At this point my son begins talking about something else, we all join in, and everyone forgets about my ‘book’.

A week or so later, I am thinking about “this” conclusion, and I am reminded about my daughter’s question. So, after arriving home from school, I ask her why she had asked me that specific question. She doesn’t directly recall the conversation and I have to reminder her that I had said I was writing my book simply because “I wanted to”. To

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<sup>168</sup> See <https://www.businessinsider.com/oculus-gives-all-its-employees-ready-player-one-2016-7?r=US&IR=T> (last accessed 25/05/2022).

which she replies, “you are not just writing it because you want to, you are writing it because you want to become a Doctor. If you were never going to become a Doctor, you probably would’ve never written it”.

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## Appendix

### Ontologizing the Enactive Multiple

#### Overview

The central aim of this appendix is to provide resources which could help further clarify, rectify and justify the ontological character of preceding analysis. Towards this end we will (i) introduce, discuss and draw from work within STS and feminist science studies and (ii) bring to light how an ontologically grounded analysis, such as the one offered here, further reconfigures how we understand both the enactive project and the role of the researcher. The former will provide us with resources to help clarify in what way exactly enactive theorists are enacting different ontological worlds. While the latter will serve to further justify this ontological proposal itself. Both, however, enfold and fold into each other such that they are impossible to neatly disentangle and the reader is therefore urged to bear this in mind throughout.

#### Motivation and aims of this appendix

The core of this work has been primarily dedicated to bringing to light where and how certain enactive theorists both reject/subvert *and* reproduce a number of key modernist tenets. We explored this dual enactment by focusing on a select number of enactive matters of concern: anthropocentrism, individualism, mechanistic determinism, mononaturalism, representationalism, and more broadly, several other variants of the nature/culture divide. However, the reader is bound to have noticed that considerably less attention was dedicated to explaining how exactly these rejections and reproductions enact multiple *ontological worlds* and/or *realities*. The central aim of this appendix is to rectify this important omission. It will do so by offering a number of conceptual reorientations, courtesy of work from STS and feminist science studies, which will help both clarify and justify the ontological character of the preceding analysis.

The key terms in need of further 'reorientation' here are *ontology* and *enactment*, both of which we will align with a very particular (ontological) strand of work within STS. Here we will see that it is only with a different (STS) understanding of these terms that the ontological nature of the preceding analysis truly begins to make sense. However,

with this clarification also comes two further important implications which we cannot overlook: the analysis inevitably changes how we understand both the enactive project in general and the role of the researcher in particular. These two implications will therefore serve as the basis around which the discussions of the second half of this Appendix will pivot.

In light of the analysis, the former (enactivism) gets reconfigured into an *ontological project* which helps *create* certain material-discursive worlds, or “practical ontologies” (more on which shortly), rather than a merely theoretical-cum-representational framework concerned with accurately representing *the* world. With regards to the latter (the researcher), it reconfigures research as a form of ontological intervention and the researcher an *intervener* within and through the world(s) rather than merely a representer of it. The aim in discussing these reconfigurations is twofold. The first aim is simply to highlight some of the implications of the analysis. While the second, and more important aim, is to use the discussions around these implications as a direct means to further flesh out the ontological character of the analysis itself. I should point out here already that, although these two implications are treated somewhat separately, they are anything but. As we will see below, they are mutually entangled and the one always implies the other. Thus, separating them here in this manner is simply a heuristic for structuring the discussion.

Given the expressed aims of this appendix, the reader might very well be wondering why I did not introduce the specific STS/feminist science studies resources which would facilitate this particular understanding of the analysis in a more concerted manner from the very outset. Why did I not begin with an introductory chapter on ontologically grounded STS and feminist science studies, laying out and thoroughly motivating the very specific concepts, ideas and arguments which would form the backbone of the central analytic thesis of this work? After all, this is precisely what I did with the enactive project; presenting, at the very beginning, its core tenets. As noted in the Introduction, my decision has been both deliberate and strategic, motivated by three distinct yet interrelated ambitions which are worth recalling here.

On the one hand, I wanted to leave both the notions of enactment and ontology as well as other related STS/feminist science studies ideas, concepts and arguments used in the preceding chapters somewhat ambiguous (even vague?) and thus indeterminate for as long as possible instead of definitively fixing them from the very outset. I have done so as a means to materially implement into the core of the text the STS and feminist conviction that meaning and matter are both ontologically indeterminate. On the other hand, I decided to explicitly thematise these at the end of the work, rather than the beginning, such that the reader could/would have the opportunity to *re-turn* to some of the preceding discussions if so inclined. The hope is that the reader might be compelled to re-turn to previous chapters and sections in order to re-examine and re-evaluate how certain arguments and lines of reasoning change (or not) in light of what is presented here. Here again I have done so as a means to materially implement something I have been actively doing throughout it. I also hope that this has served to inextricably weave the reader into the very fabric of the text. Finally, I have done so to add a *nonlinear dimension* to the text and to help create something with the potential to become a text multiple (Mol 2002) if you like, which is at once *both* linear *and* nonlinear at the same time. In this way I hope to have materially implemented an indeterminacy at the core of the text which will only be made determinate by the specific reading practices of the reader. This, too, should ensure that the reader is an active part of/in the *constitution* of the text.

As a final preliminary note, let me point out that my suggestion that this (ontological) analysis reconfigures the enactive as an ontological project is *not* a normative claim. It is, therefore, not a recommendation that enactive theorists now need to start treating their own project in similar ontological terms. After all, throughout this work I have been drawing attention to how the enactive approach is routinely cast as an epistemic project by enactive theorists themselves. My intention here is not to change this or suggest that this ought to change. Rather, my suggestion is simply that *if* the ontological analysis is adopted, *then* the enactive project inevitably also gets reconfigured in this manner. Or, to put it slightly differently; this analysis makes better sense within an ontological register, but within an ontological register the ‘common understanding’ of the enactive project becomes somewhat unstable. Either way, there is no normative or methodological stipulation for how enactivism ought to be done and understood.

This appendix is essentially divided into two halves: in the first half we introduce, discuss and explore ‘ontological inspired’ work done in STS and feminist science studies. In the second half we then use aspects of this work to clarify, justify and more generally flesh out precisely what is meant by an ontological analysis. The discussions, which unfold specifically in the last two sections, will pivot around taking a closer look at two interconnected implications of the analysis. The first of these looks at the enactive project in general while the second looks at the researcher more specifically. Particularly *my role qua researcher* in conducting this specific work.

### **1 A brief sketch of posthumanist STS**

Throughout this work I have been largely using STS texts to stage different diffractive apparatuses through which to read core enactive ideas, concepts and arguments. In this first section I want to shift the focus away from diffraction towards the field of STS itself (we will re-turn to diffraction in the final section). I want to do so in order to provide some background for the discussions on ontology and enactment in the next two sections. However, given the particular aims of this thesis, here I will concentrate exclusively on what some scholars refer to as the “posthumanist” strand of STS.

The field of STS<sup>169</sup> has a varied and complex history which goes back to the early 1970s, with origins in work on the sociology of scientific knowledge (e.g. Barnes 1977; Bloor 1976; Shapin 1982; Yearley 1994). As Pickering (2008) notes, for much of its first 20 years, “its practitioners presented a united front on a philosophically charged battlefield” (p. 291). This united front, however, was markedly undone by the early 1990s when parts of the field began experiencing a move away from its earlier focus on the social construction of scientific *knowledge(s)* towards scientific *practice(s)* (Pickering 1992). It is at this point that a rift opens up between what Pickering (2008) calls “humanist” and “posthumanist” wings of STS. The former remained committed to

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<sup>169</sup> STS as field of research, even within its different wings, is itself a complex and varied one which makes it difficult to concisely summarise. It is highly multidisciplinary and interdisciplinary and thus constituted by a number of closely related yet at times somewhat different approaches. See Pickering (2008) for a concise but very informative historical overview. For a more extensive overview, see the papers collected in Biagioli (1999) and Felt et al. (2016). For a very readable overview of the posthumanist wing of STS, see Latour (1999, 2005). For a broad introduction to STS as a multifaceted interdisciplinary research project, see Sismondo (2011).

the earlier (epistemological) concerns of the sociology of knowledge – the *content* of science – while the latter turned its attention to the material practices – the *object(s)* of science – involved in the constitution of scientific knowledges (see Bloor 1999; Latour 1992, 2000; Pickering 1992; Sismondo 2011).

The authors and scholars I have been drawing from throughout this work can be said to belong squarely within the posthumanist wing of STS. This wing of STS is one which is methodologically underpinned/inspired by *Actor-Network Theory* (ANT). At its core ANT<sup>170</sup> is an anti-mononaturalistic and “radically relational” *materialist* approach to the “the social”, which developed through empirical studies of science and technology (see Latour 2005; Law 2016). With and through these studies, ANT scholars came to argue that science, technology and society are neither separate domains nor interacting separate domains. Rather these ‘domains’ are always-already connected such that they are always *constituting* each other.

As Saldanha (2003) observes, ANT scholars effectively “turned an epistemological question – how can we get to truth? – to an ontological one – how does knowledge come about? This movement, from a hermeneutical preoccupation with ideas, signs and metaphor, towards an ethnographical treatment of knowledge as a physical, circulating and conflictual process, was paralleled by a philosophical movement from idealism to materialism” (p. 420). As such, unlike traditional sociological accounts, ANT does not take ‘the social’ as a stable or human-centric domain but rather argues that it is composed by diverse fluid heterogenous material entanglements – networks – of human and nonhuman actors (or *actants*). This means that for ANT, all objects, from the mundane to the technoscientific, are as much a part of the social as the human (Latour 2000).

ANT’s “relational materialism” (Law and Mol 1995), however, is not confined to the social but encompasses everything: space, organisations, groups, bodies, categories,

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<sup>170</sup> It should be noted from the outset that despite its name – actor-network *theory* – most of its practitioners reject that it is a theory at all (Gad and Jensen 2010, Latour 1999, Law 1999, Mol 2010). Rather than a theory, the approach is generally taken to be more of a methodological sensibility, or “many diffused sensibilities that have evolved in ways that eschews its original tenets” (Fenwick and Edwards 201, p. 56).

humans and nonhumans of all sorts are not taken to be pregiven in the order of things but rather continuous ongoing *performative material achievements* (Michael 2017). Everything is what it *is* by virtue of its material relations with other things and not because of any essential or stable intrinsic properties. This challenges traditional sociological explanations of the social which tend to construct and mobilise human-centric (class, gender, power) categories as representations of pregiven, fixed and stable facts of specific social settings. For ANT scholars these categories are precisely what needs to be explained rather than simply taken for granted (see Latour 2005)

So, empirically speaking, ANT scholars urge us to pay special attention to the role of the nonhuman in social life vis-à-vis heterogeneous material assemblages and networks. Moreover, as we have already noted in previous chapters, these nonhumans are said to be “actors”, or “actants”, in their own right (Callon 1986, Callon and Latour 1992; Latour 1988a). Not in the traditional humanist sense of isolated individual entities with intrinsic intentional properties but as members of larger human/nonhuman material networks. Indeed, as we have already seen, ANT has become somewhat notorious for what many regard as an all too ‘liberal’ conception of agency (e.g. Amsterdamska 1990, Bloor 1999; Froese 2014). However, as Nimmo (2016) points out, although the claim that “objects have agency” is often taken to be a substantive claim about the nature of the nonhuman, “it is more appropriately seen as just one – albeit particularly dramatic – illustration of ANT’s efforts to unthink dualist ontology” (p. xxvii).

This reconfiguration of agency as a means to unthink, or, perhaps more accurately, to *undo* a dualist ontology, is itself underpinned by what ANT scholars call a “principle of symmetry”<sup>171</sup> which assumes a “flat ontology”. This, however, does not mean that everything within a specific analysis is equal and the same. As Latour (2005) clarifies, “[t]o be symmetric, for us, simply means not to impose a priori some spurious asymmetry among human intentional action and a material world of causal relations” (p.

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<sup>171</sup> Roughly speaking, scholars within STS have advocated a “general principle of symmetry” to avoid *asymmetrical studies* that treat scientific practices differently from other types of (non-scientific) practices. The principle was first introduced within the sociology of scientific knowledge (SSK) by Bloor (1976), who argued that sociologists should use the same explanatory resources to explain both successful and unsuccessful knowledge claims. However, within posthumanist STS this symmetry principle is generalised and extended beyond knowledge claims to considerations about who/what *acts* in shaping and constituting the world. Hence ANT’s insistence that it is not only humans but also nonhumans who act in the world.

76). This means that all entities within a flat ontology, be they human, nonhuman objects or spirits, gods and goddesses, are given the same ontological status *at the start* of any investigation. For ANT inspired STS scholars (hereafter simply ‘STS scholars’) then, differences are *produced* in and through the network(s) and not premised on it, such that all entities in the network(s) must provisionally be treated in the same manner and not endowed with any *a priori* properties prior to the investigation process.

After ANT, STS scholars thus disrupt the conviction that ‘the world’ possesses intrinsic hierarchies, essential identities and dualisms, and suggests instead that it is composed of “flat” heterogenous networks of fluid, contingent material practices always constituted by human and nonhuman entities, always being made, unmade and remade. As such, since ‘things’ do not possess intrinsic properties, they cannot therefore also be made to simply fit into predetermined universal categories. For these scholars, this suggests that the binary oppositions which the modern Constitution constantly throws up do not pre-exist in ‘nature’ but are themselves the products of relational material processes within and through heterogenous networks (Jensen 2010). Indeed, as Gad and Jensen (2010) note, “[t]he categorisations we take most for granted are precisely embedded in our most stable networks” (p. 58). Dualities, binaries and divisions of all kinds exist, but they too are performed and are therefore understood as *effects and outcomes* of very specific practices (Law 1999).

As these brief remarks already clearly indicate, this brand of STS also effectively reconfigures traditional understandings of epistemology. As Casper Bruun Jensen (2010) argues, focusing on the varied entanglements between human and nonhuman actants, directly troubles and “challenges traditional epistemology because activities such as observing or representing are not seen as distinct from intervening or constructing: rather they are viewed as specific *ways of* intervening and constructing” (p. 11, emphasis original). Representations here no longer simply function as mirrors of reality but instead also help constitute it. We re-turn to representations and how they figure more concretely within these approaches below. For now simply note how this STS reconfiguration of the epistemic *also erodes* the divide between epistemology and ontology more generally.

STS scholars cast knowing the world (and thinking about knowing the world) as “particular styles and methods” for aligning and making connections with and between specific human and nonhuman actants such that more-than-human worlds are continuously being *made*. For Jensen (ibid.), casting the epistemic in terms of “particular styles and methods” in this manner, effectively signals towards an important shift of focus from “epistemology and representation to *practical ontology* and performativity” (p. 7, emphasis added).

For those unfamiliar with some recent debates within STS and anthropology, the word ‘ontology’ in “practical ontology” is bound to be somewhat conspicuous, if not altogether troubling. However, as noted in previous chapters, over the last decade or so, scholars, not only within STS but also anthropology, feminist science studies and philosophy, have taken issue with the ubiquitous primacy of epistemology. Consequently, these scholars have sought to “circumvent epistemology and its attendant language of representations in favour of an approach that addresses itself more directly to the composition of the world” (Woolgar and Lezaun 2015). This ambition to “circumvent epistemology” and pay closer attention to the “composition of the world” has thus led several commentators to suggest that this move forms part of a broader “*turn to ontology*” within these disciplines (see Holbraad and Pedersen 2017, Jensen 2017). Thus Jensen’s notion of practical ontology signals directly to this supposed turn.<sup>172</sup>

In Chapter Two we saw that a key characteristic of the modern Constitution was (is) the separation of ontology from epistemology and the privileging of the latter over the former. As Eduardo Viveiros de Castro (2004a) notes, “[m]odern thought began with that simplification; and its massive conversion of ontological into epistemological questions (questions of representation) is still with us” (p. 483). Scholars sympathetic to the ontological turn want to redress the balance. These eschew the epistemologization of ontology and in certain key ways attempt the reversal by “short-circuit[ing] the

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<sup>172</sup> I say “supposed” turn because many theorists within STS, those who align themselves with the posthumanist wing of STS at least, feel as though its concerns have *always* been ontological in nature (see Jensen 2017, Sismondo 2015, Woolgar and Lezaun 2015). Indeed, as Michael (2017) notes, “ANT has been integral to the so-called “ontological turn” in science and technology studies and beyond that, in sociology, anthropology and geography” (p. 115). This general point should become more apparent in the next section.



tendency to rephrase questions about the realities about multiple worlds as questions about the multiple ways in which a singular world is represented, and in so doing stimulates an alertness towards forms of difference that cannot be reduced to a disparity of ‘worldviews’” (Woolgar and Lezaun 2013).

Again, philosophers familiar with the notion of ontology will no doubt be perplexed by a call for “practical ontology” and “*multiple* worlds” because the word traditionally signals towards a *fundamental singular reality*. This inevitably raises the question as to what exactly is the ‘ontology’ these scholars are meant to be turning to? The next section will attempt to address this question.

## **2 From theoretical ontology to empirical practical ontologies**

Although the notion of ontology has figured prominently throughout this work it has been left rather under thematised for the reasons noted above. In this section we will attempt to remedy this by exploring how some STS scholars have reconfigured the term and appropriated it towards their own specific goals. My main aim in this section is to illustrate the term’s very specific meaning and usage within certain STS circles.<sup>173</sup> This should then provide us with the necessary resources needed for reconfiguring the notion of enactment, done so in the next section, which has similarly been at the core of our analysis.

As we noted in previous chapters, ontology has a long and distinctive history within philosophy, particularly in the area of metaphysics. As a branch of metaphysics, ontology is concerned with the fundamental and thus *essential* nature of Being, with *what there is*. Although not directly apparent, in this tradition ontology is essentially treated as a *logos*, and therefore primarily as a *discourse about* the fundamental nature of reality and Being. As a *logos*, ontology, then, simply amounts to a *theory* about “the nature of being in itself” relative to a specific system of thought/belief(s).

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<sup>173</sup> For a discussion of the various approaches to ontology within the ontological turn, both in how they relate to and are different from STS, see Jensen (2017). For an in-depth discussion of its use in anthropology, see Holbraad and Pedersen (2017).

However, as Luigi Pellizzoni (2016) notes in relation to the ontological turn, since ontology “literally [means], a discourse about the constitution of reality (...) one might object that by using this term one is reintroducing the mind/body or language/matter dualism” (pp. 74-75). Or, indeed, prioritising the accurate representation of the ultimate foundational structures of reality and Being in itself. So, given these legitimate concerns, why have so many STS scholars and anthropologists taken to using the term?<sup>174</sup> The answer to this question lies in the way these scholars have appropriated and reconfigured the very meaning of the term. A reconfiguration which, as we will soon see, emerges directly from STS work.

The STS scholar and sociologist Noortje Marres (2009, 2013) refers to the particular philosophical understanding of the ontological highlighted by Pellizzoni above as “theoretical” and distinguishes it from what she terms “empirical” approaches to ontology found within STS. Proponents of the former take ontology to be a theoretical-cum-conceptual enterprise concerned with the basic and fundamental assumptions made about the true constitutive essence of Being and reality. It aims to provide reliable categories, “schemes of clarification and representation” (Pickering 2017), capable of accurately *conceptualising* and *defining* specific phenomena. Ontology is here firmly situated at a conceptual level of analysis, concerned with theories of what there is and is thus both *essentialist* and *logocentric* in nature. Although this is unquestionably the most common understanding of the term, it is not the only one.

By contrast, proponents of the latter understanding of ontology, take as their point of departure the view that ontological issues cannot be settled simply by theoretical means alone. Objects and relations emerge, are sustained and maintained in existence and/or wither away over time and space, and for this reason need to be investigated empirically on a case by case basis. Because ontology is “dynamic and emergent rather than given” (Jensen and Morita 2015) special attention needs to be paid to how objects, entities and relations change within specific concrete material socio-historical settings.

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<sup>174</sup> Understandably, given its traditional philosophical heritage, many scholars both within and outside STS (and anthropology) have been left confused by the deployment of the term within these fields (see Lynch 2013). However, as I hope this section makes clear, the confusion which might arise here seems to stem primarily from not recognising how the term has been reconfigured by STS scholars. Indeed, this is an ambiguity which has been deliberately embraced throughout this work.

This means that, as Marres (2013) points out, “empirical ontology relocates ontological work from theory to practice” (p. 435). Ontology here is firmly situated at an empirical level of analysis; what is of special interest for STS scholars is those webs of practices which *make* entities and phenomena “visible, audible, tangible, and knowable (Mol, 2002, p. 33). It thus eschews both the essentialism and logocentrism of theoretical ontology and emphasises the importance of the *concrete, but changeable, materiality* of being.<sup>175</sup>

This understanding of ontology in empirical terms has two characteristics which are particularly important for those STS scholars, and indeed certain feminist science studies scholars, who are often aligned with the turn to ontology. The first characteristic is *materiality*, or more specifically, a renewed (within the social sciences) interest in the material constitution of heterogeneous objects, entities and phenomena of various kinds. The second characteristic is *ontological multiplicity*. This is the idea that objects, entities and phenomena of various kinds are not pre-given in the order of things but are rather always *open to the possibility* of ontologically being *many different things at the same time* (Woolgar and Neyland 2013). In what follows we will first attempt to further elucidate these two characteristics inherent in empirical understandings of ontology.<sup>176</sup> Once done, we will then highlight a few further implications of the notion which might

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<sup>175</sup> This should make it clear that a theoretical understanding of ontology underpins what in previous chapters we have called the epistemologization of ontology. In these cases, as already noted, ontology simply collapses into a specific “adherence to a set of distinctly philosophical presuppositions” (Jensen and Morita 2015, p. 83). This appears to be precisely what, for example, is motivating Cuffari et al.’s (2021) insistence that the enactive approach can and does “make ontological claims: for instance, the claim that all processes, including our bodies, are relations of occurrences, potentialities, energies, flows, as well as barriers and constraints that constitute tensions and dialectical situations that may or may not lead to individuation and new dialectical configurations” (p. 121). Not only are these ontological claims underpinned by “distinctly philosophical presuppositions”, they are also clearly underpinned by a theoretical understanding of ontology.

<sup>176</sup> One other important characteristic of this understanding of ontology, which cannot be further explored here, is its explicit “deflating [of] the original concept, both in making it mundane and by making it multiple” (Sismondo 2015, p. 442). Scholars in STS are effectively bringing ontology down to earth, so to speak, and situating it in messy quotidian practices. This is, of course, as Mol (2013) clearly observes, “to use the term ‘ontology’ in [a] wilfully counterintuitive, playful, anti-philosophical way” (p. 380). Woolgar and Lezaun (2015) echo this sentiment when arguing that ontology within STS is a “deliberately unstable term. Not only because it lacks precise meaning or definitive qualifier, but because the term itself is introduced with the intention of destabilizing seemingly robust designations of reality” (p. 463). This is also a way of being sensitive to uncertainty regarding how/what things exist and remain open to the potential instability and flexibility of any entity. Although I cannot spend any more time elaborating this characteristic any further, I hope that this work has retained some aspects of it, both here and in previous chapters.

not be directly apparent at first glance, but are important in the broader context of this work.

Perhaps the first point to note with regards to the first characteristic is that the focus on concrete materiality and the human/nonhuman assemblages which constitute objects in this understanding of ontology is something which STS directly inherits from ANT. This should be directly evident from the discussion in the previous section. However, and this directly relates to the second characteristic, one important difference with this earlier work in ANT stems precisely from a more recent concern with *multiplicity* within STS. Or, more specifically, multiplicity as an ontological phenomenon itself (Law 2015).

Whereas early ANT was concerned with how different objects are constituted within and through different networks, post-ANT (see Law 1999) STS scholars have become interested in how ‘the same’ object also often can and does become different in and through different practices. It is here that we see a marked difference with early ANT approaches. So, with a renewed attention to multiplicity, ontology stops being cast in the singular and is instead reconfigured as multiple. Rather than ontology, the focus is shifted towards *ontologies* in the plural. Thus, as Mol (2002) insists, it is “ontologies” and not an ontology, which “are brought into being, sustained, or allowed to wither away in common, day-to-day sociomaterial practices” (p. 6).

It is for these reasons that Jensen above refers to “practical ontology” with a nod towards multiplicity and difference. However, as Jensen and Morita (2015) clarify, this “concept does not entail that such ontologies relate only to “practical issues.” Instead, it means that they are “about how *worlds* are concretely made, conjoined or transformed by the co-evolving relations of multiple agents; people, technologies, materials, spirits, ideas—or what have you” (p. 82, emphasis added). Ontology *qua* practical *ontologies* thus becomes aligned with an attentiveness to the ways in and through which specific *realities* emerge in concrete locations through specific material practices constituted by assemblages of humans and nonhumans. Put differently, thinking in terms of multiple practical ontologies “requires that we treat entities as themselves a form of *ontological achievement*” (Woolgar and Neyland 2013, p. 51, emphasis added).

To quickly quell a possible concern that might appear here, and often does appear within broader social science circles (see Latour 2005) around some of these discussions, it must be noted that the aim of highlighting practical ontologies is *not* to replace “naturalist *explanations* of science with social or cultural ones” (Jensen 2010). Rather, as Latour (2004a) has argued, the aim is precisely to show how things are assembled or enacted (see below) in concrete material practices and not to reject their reality as some social constructivists – and critics of STS – might maintain. Indeed, these STS scholars are specifically concerned with how things *become real* through entanglements of multifaceted processes which are at once material-semiotic, social, ethical and political. That is, in accounting for the *material processes* constituting the diverse practices through which more-than-human ontological *multiple worlds* are continuously being brought into existence.

The notion of practical ontologies<sup>177</sup> thus nicely encapsulates the aforementioned characteristics of an empirical understanding of ontology. At its core is the conviction that ontology is not simply an ‘abstract theory’ about a fixed pre-given reality but rather something which is multiple and achieved in and through situated material practices. These heterogeneous material practices are thus said to be *constitutive* of reality and the entities which compose it (Blaser 2013a; Gad et al. 2015; Jensen 2017; Law 2002, 2004a; Mol 2002; Papadopoulos 2018; Savransky 2021; Suchman 2007). Many of these scholars have spent a considerable amount of time and effort empirically investigating the *generative role* of practices in the ontological constitutions of multiple entities; from human and nonhuman bodies and medical conditions to mundane and technoscientific objects (e.g. Abrahamsson et al. 2015; Blaser 2018; Graham and Herndl 2013; Mol 2002, 2021; Law 2015; Law and Lien 2013; Lien 2015; Papadopoulos 2018; Sørensen 2009; Thompson 2005; Woolgar and Lezaun 2015; Verran 2001). Most of these studies explore how objects, entities and phenomena of various kinds, are ontologically multiple by virtue of participating in different non-static and fluid practical

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<sup>177</sup> Note that, as used here, practical ontologies refers both to the (i) heterogeneous human/nonhuman entangled assemblages and practices which *materialise specific realities*, and (ii), as a catchall locution to capture a specific type of research practice(s)/sensitivity/orientation within STS, feminist science studies and anthropology (cf. Jensen 2021). Thus, when speaking about the enactive project in terms of practical ontologies below, I mean it strictly in the sense (i) rather than (ii).

heterogenous configurations. Key to this ontological multiplicity, according to Annemarie Mol (2002), is *practices*.

For Mol (ibid.), and indeed many STS scholars who do (empirical) ontological work, once we foreground practices, the objects within these practices change as the practices themselves changes. Hence, once “practice becomes our entrance point into the world, ontology is no longer a monistic whole. Ontology-in-practices-is multiple” (p. 157). Or, in other words, reality “multiplies” (Mol, ibid.).<sup>178</sup> In a similar vein, John Law and Marianne Lien (2018) argue that: “once we start to insist that differences are not just matters of perspective, once we start to insist that what the practices do is real in the context of those practices, once we do all these things, then we start to discover multiple times, multiple spaces, multiple relations, multiple origins and multiple modes of causality or noncausality. We find, in short, that reals start to multiply and the framing assumption that there is a single reality, a universe, starts to dissolve” (pp. 158-159).

The world, or reality more generally, as Gad and Jensen (2010) point out, following this STS line of reasoning, “does not lie around waiting to be glanced at. It does not have ‘aspects’, ‘qualities’ or ‘essences’, which are shed light upon by certain theoretical perspectives. However, when doing ontological work, different versions of objects appear. These, in turn, may relate and shape partially linked versions of reality. Concepts like ‘intervention,’ ‘performance,’ and ‘enactment’ highlight the attempt to approach reality as ‘done’ rather than ‘observed’” (p. 71). Reality, in other words, is always in the making, always open to the potential for otherwise.

So, for these STS scholars doing ontological work within an empirical register, there is no single ontology but multiple *ontologies* which are historical, situated and socioculturally *done*. Ontologies are not human-specific theoretical posits devoid of materiality but rather distinct materialities which emerge within and through very concrete practices involving arrays of heterogenous human and nonhuman actors. Thus, whereas in philosophy, ontology is generally regarded as a field of study, for STS,

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<sup>178</sup> Similarly to Jensen’s view above, Mol also argues that it dissolves the epistemology/ontology distinction by moving knowledge away from reference and representations and recasting it as practices which directly and ontologically interfere with other practices. We will clarify this further below.

entities in general have “ontologies” which can be empirically studied (see Sismondo 2015).<sup>179</sup> Moreover, and very importantly, ontologies are not specifically related to different perspectives but as noted, emerge in situated practices. However, as John Law (2016) argues, in order to fully understand ontological work in STS, one needs to look at its case studies. Indeed, the very idea of practical ontologies is not an a priori philosophical presupposition but precisely something which emerged with and through these empirical case studies.

A classic example in the literature is found in Mol’s (2002) work on atherosclerosis. In this work Mol explores a number of different spaces (outpatient clinic, consultation room, operating theatre, pathology lab) within a Dutch hospital involved in the treatment of atherosclerosis. Mol demonstrates in great detail<sup>180</sup> how this medical condition (which involves the gradual obstruction of the arteries) is, through the different practices involving varied heterogenous material arrangements within these distinct spaces, enacted as *ontologically different entities*. In the outpatient clinic it figures as the patient suffering from a painful discoloured leg. In the operating theatre it figures as ‘arteriosclerotic plaque’ which blocks blood vessels and is operated upon. In the laboratory it figures as a thickening inner membrane as viewed under a microscope.

Mol’s very extensive and detailed ethnographical work draws attention to how, within these diverse spaces, different material practices enact ontologically different *versions* of atherosclerosis into being. These different, but often co-existing, practices depend on very different arrays of objects, various technologies, different medical and non-medical equipment, different medical and non-medical professionals, skills of various kinds and ideas, thoughts and concepts. Mol shows how these different versions of atherosclerosis can at times align and include each other while at other times they do not align at all and exclude each other. They can at times complement and at other times contradict each other. In this respect they tend to be made up of partial overlapping, but also excluding,

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<sup>179</sup> Thus, in the hands of STS, ontology stops being the study of something and becomes instead that which needs to be studied. As Sismondo (2015) points out, in an empirical register, ontology is transmuted from a kind of study – as it is routinely used within philosophy – to something to be studied. Whereas within philosophy ontology is primarily a study of the ultimate nature of being and reality in the singular, within STS the concern is with empirically studying ontologies which make up worlds.

<sup>180</sup> This detail is omitted here due to lack of space. Here I provide merely the briefest of sketches simply to illustrate the most central points. I urge the reader to look up the referenced material to get a better sense of the diverse material ontologies involved in Mol’s richly detailed ethnography.

patterns. In this context Mol (ibid.) is very quick to point out and emphasise that, when these enactments do align, this too is the result of specific material performative work involving not only medical professionals, but tools and technologies of various kinds. Some of which remain common across all practices (e.g. chairs, electricity, medical professionals) and some of which do not (e.g. laboratories and their specific technologies).

Mol's work thus clearly shifts the focus of the ontological from a purely theoretical concern towards an empirical one. In this example, the different versions of atherosclerosis are not simply theoretical (epistemic) perspectives, interpretations or indeed mere representations of a single, universal stable condition, but rather the concrete *ontological materialisation* of different entities enacted through historically situated practices involving a multitude of agents, assorted materials, objects, technologies and ideas. What atherosclerosis *is*, therefore, varies in accordance with the different places and practices which materially enact it into being. Consequently, it is different things within different practices; different concrete material practices give rise to different ontologies. As Mol points out, once "practices are foregrounded there is no longer a single passive object in the middle, waiting to be seen from the point of view of seemingly endless series of perspectives. Instead, objects come into being—and disappear—with the practices in which they are manipulated. And since the object of manipulation tends to differ from one practice to another, reality multiplies" (Mol 2002, p. 4).

Having explored what I take to be the two central characteristics of an empirical understanding of ontology, I now want to change focus towards some further implications of this notion. Implications which might not be directly apparent at first glance but are important for this work. There are two particular implications which I would like to highlight and further elaborate upon. The first implication is that objects enacted in particular practices are never really fully 'finished' or 'ready made' entities which can be taken for granted as such but always open to the possibility of change, depending on the very practices they figure in. This point was already noted above but is worth dwelling on here further because it is specifically relevant for our broader analysis.



Work done in STS, such as that done by Mol and others, often draw attention “to a penumbra of not quite realized realities” (Law and Lien 2013). That is to say, ontological work done in STS can also help acknowledge, recognise and render visible “the failed, unseen or not-yet-real possibilities hinted at by ordering practices. Investigating the composition of ontological realities would thus be a way of challenging any presumption of order or completion in the world – especially those forms of order and completion that have been dear to STS scholarship” (Woolgar and Lezaun 2013). As we will clarify further below, this has been a central motivation of this work.

This is something which contrasts rather sharply with traditional thinking about ontology, where objects and entities are generally assumed to be not only pre-given and singular but also as fixed and thus fully ‘finished’ entities. This work in STS suggests otherwise; once assembled, entities and objects are never fixed or finished once and for all. They need constant work to retain that particular stability. Consequently, these objects and entities are (i) always open to the possibility of being ontologically reconfigured into something other and (ii) being multiple things all at once. We will return to this second point below, first when discussing Karen Barad’s work and then when discussing the ontological nature of our analysis.

The second implication is that STS scholars doing ontological work are not doing so as a means to replace one ontology with another. Unlike traditional philosophical metaphysicians, for example, STS scholars are not aiming to provide the social sciences with an *alternative ontology*, or more ambitiously, an alternative ontological framework. Doing so would not only reintroduce representationalism but would also completely undermine the very idea of *multiple ontologies*. As Woolgar and Lezaun (2013) make clear, “[h]aving developed its characteristic analytical sensibilities in a series of moves of deflation and deflection, it would be odd if STS were now to embark on a project to champion one or another version of ontology (...) the turn to ontology in STS can be better understood as another attempt to apply its longstanding core slogan – ‘it could be otherwise’ – this time to the realm of the ontological” (2013, p. 322).

In light of this point, it should not go unnoticed here that rejecting mononaturalism is not the primary concern of these scholars. Rather, the more interesting thing here is *how and where* mononaturalism is *done*. Since reality is done through heterogeneous practices, different natures will emerge, some of which will of course be singular. That is to say, in certain places at certain times, reality will be done as ontologically singular. Indeed, as we have been repeatedly claiming throughout this work, a core characteristic of modernity is precisely its very persistent and multifaceted enactments of mononaturalism. The modern Constitution enacts, or strives to enact, a world which is unitary and universal. This also directly relates to the first implication above, since reality – nature – is at once *both* ontologically singular *and* multiple. Nonetheless, it is precisely by virtue of the fact that nature *can* be *done* either/or that we are justified in calling it ontologically multiple.

Turning to empirical ontology is therefore not a means of providing a better, more robust and accurate, formulation of the ultimate true nature of reality. STS scholars are not proposing we replace one ontology with another. It is not, for example, a suggestion that we need to replace a dualist substance ontology with a process ontology, say.<sup>181</sup> Such a suggestion remains too closely wedded to traditional metaphysics where ontology is regarded as a “substantive metaphysical construction-project” (Holbraad and Pedersen 2017, p. 45) where its ultimate aim is to uncover what reality “really” is like. STS scholars thus want to avoid falling into the trap of wanting to determine and then proclaim with great authority for everybody else, what being *actually really is*.<sup>182</sup> Instead, they introduce tools and methods for teasing out, thinking-with and through, different practical ontologies.

To bring these various threads together and sum up this section, we can say that scholars within STS are in effect turning towards<sup>183</sup> *empirically* based understandings of

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<sup>181</sup> As we noted previously, several enactive theorists have proposed that cognitive science and philosophy of mind would be better suited with a ‘process’ rather than a ‘substance’ based ontology (cf. Di Paolo et al. 2018). While this might very well turn out to be the case, it is *not* what STS proposes.

<sup>182</sup> Consider, for example, the opening salvo to Di Paolo et al.’s (2018) masterful book *Linguistic Bodies. The Continuity Between life and language*: “You, dear reader, *are* a linguistic body” (p. 1, emphasis added). Not only would STS find the grand ontological tone of this proclamation problematic, it would also be quick to point out that this is by no means all ‘you’ are.

<sup>183</sup> But see footnote 172.

ontology. We explored how ontology within an empirical register was neither a *theory* or description of Being nor a specific understanding of Being but was instead concerned with the multiple “ways in which something can be determined *as a being*” (Maniglier 2014, p. 38, emphasis added). We saw how these scholars situated the ontological at the level of practice and materiality and argued that material *ontologies* are what emerges within and through heterogeneous processes of more-than-human world-making. Following Jensen (2010), these were called practical ontologies. We can now also clarify that it is in this specific (empirical) sense that we have been using the word ‘ontology’ throughout this work. We will re-turn to and further clarify this point below.

In the next section we will turn our focus towards Karen Barad’s “agential realism” in order to explore both how ontology figures within certain approaches to feminist science studies and (re)connect this to the previous chapters. Doing so is particularly important in the broader context of this work due to Barad’s prominence throughout it. The section thus not only functions to temporarily break the linearity of this appendix but more importantly serves as yet another means to materially implement Barad’s notion of *re-turning* into the core of this text.

### **3 Interlude: Agential realism and the ontological indeterminacy of matter(ing)**

Not unlike AE, in *Meeting the Universe Halfway*, one of Karen Barad’s central concerns is with how meaning and matter are related. How does matter, in its varied configurations such as artefacts, bodies and objects connect to agency, norms, ideas, abstract concepts and discourses such that they are able to produce and reproduce each other? And, like the posthumanist STS scholars we explored above, Barad takes agency – hence *agential* realism – to be central to answering these questions. Agency, we will note from the outset, is, however, something which Barad argues needs to be severed “from its traditional humanist orbit” (Barad 2007, p. 235). Much of Barad’s work has been dedicated precisely to this task.

Barad’s position is the direct result of their thinking-with and through an array of issues and thinkers centred around (but not exclusive to) the so-called ‘measurement problem’ (see Myrvold 2018) in quantum physics. This problem comes from the famous ‘double-slit’ experiments which are directly responsible for a number of perplexing

issues around the possible (or not) collapse of the wave function. These experiments demonstrated that, depending on the experimental arrangement, light (or atoms) can either “appear” as a wave or a particle “despite their mutually exclusive properties” (see Gamble et al. 2019).<sup>184</sup> This gives rise to numerous debates regarding not only the nature of light but of *matter itself*. Debates which continue to this day. Barad’s work has been deeply influenced by these debates and a few words on what some take to be its two central protagonists are therefore necessary before going any further.

To put it (very) roughly, there are two paradigmatic and competing explanations of this wave/particle duality: Heisenberg’s ‘uncertainty principle’ and Bohr’s ‘complementarity principle’. Heisenberg’s uncertainty principle has been the most influential both in the natural and the social sciences. Barad argues that this principle is *epistemic* in character since it focuses on what *knowledge* we can have, under specific conditions, *about* a particle’s properties. According to Barad, the uncertainty in Heisenberg’s principle thus relates strictly to limitations of the scientist’s knowledge and understanding. As Barad notes, “a determinate value of the electron’s momentum is assumed to exist independently of measurement, but we can’t know it; we remain uncertain about its value, owing to the unavoidable disturbance caused by the measurement interaction” (ibid., p. 116). In other words, the electron is assumed to have an independent existence and definitive position and we simply lack adequate knowledge of these properties.<sup>185</sup>

By contrast, Bohr takes the essential issue to be *indeterminacy* rather than uncertainty and to capture this point he proposed instead a “complementarity principle” Indeterminacy, however, is not due to epistemic limitations on the part of the observer but rather a function of the very measurement devices used in experimental setups. Bohr’s crucial insight is that entities – be it a wave or a particle – do not pre-exist apart from the measuring devices which constitute them in one specific way (say, as a

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<sup>184</sup> Very crudely put, these experiments involve the measurement of the position of an electron through the use of a photon. In these experiments a paradox seems to emerge since it becomes impossible to measure both the momentum and the position of a particle because the photon used to ‘see’ it during the measurement process disturbs the particle and thus changes its properties in the moment of measuring. See Barad (2007, Chapters 2 and 3) for a detailed discussion of these experiments.

<sup>185</sup> In premising his account on these assumptions, Heisenberg can thus be seen to (i) retain a distinction between ontology and epistemology, and (ii) question traditional epistemology but not ontology.

particle) to the exclusion of the others (say, a wave). Entities are therefore indeterminate, and what constitutes one entity as opposed to another, is precisely the material physical arrangements – the “apparatus” and “agencies of observation” – mobilised by scientists in the lab. Thus light and matter exhibit wave or particle behaviour by virtue of the apparatus used in measurement practices. For Bohr, scientists are part and parcel of the very reality they investigate such that object and the agencies of observation necessarily constituted a whole. Bohr uses the term “phenomena” to refer to “particular instances of wholeness”. As Barad (ibid.) explains, Bohr takes the basic unit of reality to be the phenomenon, and not a fixed pre-existing entity. In Barad’s reading of Bohr, experiments dealing with quantum *physics* cannot avoid *metaphysics* because they touch upon the very nature of reality and matter itself.<sup>186</sup>

Barad’s agential realism in effect takes Bohr’s central insights and both *ontologizes* and *extends* them beyond the quantum world and strict scientific practices. Indeed, for Barad, there is no strict boundary between the laboratory and the rest of the world. As Barad (ibid.) notes, “[t]o the extent that humans participate in scientific and other practices they do so as part of the larger material configuration of the world and its ongoing open-ended articulation” (p. 342). It is by thinking-with Bohr’s central insights and diffractively reading them through a number of feminist and social theorists, that Barad develops the core tenets of agential realism. Principle among these is the focus on relation rather than pre-existing *relata*. Not unlike STS, Barad proposes a radical relational materialism which takes *matter* itself to be relational, indeterminate and therefore not something which does or could pre-exist its relations: “matter is a dynamic expression/articulation of the world in its intra-active becoming” (Barad 2007, p. 392),

Barad uses the notion of “intra-action” as a means to convey and emphasise the mutual inseparability – the *entanglement* – between objects and agencies of observation which

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<sup>186</sup> It should be noted from the outset that Barad is *not* using quantum physics as a means to provide scientific evidence (and credence) for their account, in the same way that, say, an AE theorist might use dynamic systems theory as scientific support for their accounts (but see Pinch 2011). For Barad, doing so would be to fall prey not only to reductionism but also to unwittingly wed oneself to universal and generalised principles which can liberally be applied to multiple phenomena. Barad’s position does not accommodate universalism or the liberal application of generalised principles. Nor are they “applying quantum physics to the social world by drawing analogies between tiny particles and people” (Barad 2011b). Barad rejects this outright and insists it would be a simplistic misuse of theory and practice. Indeed, for Barad, it is impossible to draw analogies between the two domains precisely because they question the very distinction between the two.

give rise to specific phenomena. Intra-actions are thus what enables the “mutual constitution of entangled agencies” (ibid., p. 33). Very importantly, to be intra-actively *entangled*, “is not simply to be intertwined with another, as in the joining of separate entities, but to *lack an independent, self-contained existence*” (ibid., p. ix, emphasis added). Barad contrasts the notion of intra-action with the more familiar notion of *interaction* which, they insist, presupposes pre-existing objects. For Barad (ibid.), “[i]ndividuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating” (p. ix).

As with STS, Barad similarly maintains that objects, as well as distinctions, categories and boundaries – *all entities* – only come into being *as specific entities through* specific material configurations and arrangements, or what Barad refers to as the “apparatus”. According to Barad, an apparatus not only helps separate subject from object by performing inclusions and exclusions (as happens in scientific experiments), but is also an integral part of the phenomena itself. Apparatuses, very specific material configurations, are needed in order to instantiate specific boundaries (inclusions and exclusions) which separate subjects/agencies of observation from objects. The notion of an apparatus here is akin to what STS scholars refer to as networks or assemblages.<sup>187</sup> However, Barad is particularly interested in highlighting the *discursive* dimension of the apparatus. Thus, for Barad (ibid.), apparatuses are always both physical *and* conceptual and therefore constituted by what they refer to as “material-discursive practices” (p. 146).

According to Barad (ibid.), *all practices* are always and everywhere made-up of both matter and meaning. Hence, “[m]atter and meaning are not separate elements. They are

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<sup>187</sup> Barad’s notion of an apparatus thus diverges strongly both from the common understanding of the term and indeed from how Bohr himself used it. Although largely congruent with the notions of assemblage and network, it also differs from them in certain key aspects. Barad (2007) sums up the notion with the following six points: “(1) apparatuses are specific material-discursive practices (they are not merely laboratory setups that embody human concepts and take measurements); (2) apparatuses produce differences that matter—they are boundary-making practices that are formative of matter and meaning, productive of, and part of, the phenomena produced; (3) apparatuses are material configurations/dynamic reconfigurings of the world; (4) apparatuses are themselves phenomena (constituted and dynamically reconstituted as part of the ongoing intra-activity of the world); (5) apparatuses have no intrinsic boundaries but are open-ended practices; and (6) apparatuses are not located in the world but are material configurations and reconfigurings of the world that re(con)figure spatiality and temporality as well as (the traditional notion of) dynamics (i.e. they do not exist as static structures, nor do they merely unfold or evolve in space and time)” (p. 147).

inextricably fused together, and no event, no matter how energetic, can tear them asunder... Mattering is simultaneously a matter of substance and significance” (ibid., p. 3). This means that within agential realism “phenomena” are always and everywhere assemblages of matter and meaning; entanglements of a range of diverse entities, from theories, concepts and knowledge systems to tools, technoscientific objects and institutions, from researchers to their research objects.

Barad (ibid.) effectively reconfigures the notion of “phenomena” ontologically, and casts it as the “primary ontological unit” (p. 139) within agential realism. Thus for Barad, it is phenomena and not pre-existing things or objects, which are taken as the primary unit of analysis. For Barad there are no pre-existing entities with intrinsic properties but rather phenomena of which the apparatus is also always a part. In a Kantian register, we can say that, for Barad (2003), there are only “things-in-phenomena” rather than “things-in-themselves”. This renders phenomena “ontologically primitive relations—relations without preexisting relata” (p. 815). As they (ibid.) go on to clarify, “relations are not secondarily from independently existing ‘relata,’ but rather the mutual ontological of relata—the relation—is the ontological primitive (...) relata only exist within phenomena as a result of specific intra-actions (i.e., there are no independent relata, only relata-within-relations)” (p. 815). Subjects and objects are therefore *ontologically indeterminate outside of phenomena*, and as such, “phenomena are the ontological inseparability of agentially intra-acting components” (Barad 2003, p. 815).

This allows Barad to argue that *all* forms of matter, from subatomic particles like quarks and leptons to the mathematical theories, equations and models used to describe them, are in a flux of being ontologically ‘made and unmade’ with many other entities across scales and with other compositions (Barad 2007). It is important to note that for Barad, what is made and unmade is not only the *boundaries* which defines subjects and objects, but also that which *categorise and divide different scales of analysis*. In this regard Barad refuses the conventional understanding that there is an intrinsic ontological distinction, intrinsic to matter itself, between a quantum (micro) and a physical (macro) scale of analysis. Scale, like everything else, is an intra-active achievement which requires work (Barad 2007, p. 245). This does not mean that different scales, in some

sense or other, do not exist. Rather, Barad's point is that scales are the particular *outcomes* of intra-action within specific apparatuses and not ready made and intrinsic orders of reality which we can variably latch on to and describe with different pre-established tools.

For Barad, what constitutes a body, an agent, the living, or a distinct level of analysis or scale, is *never intrinsically given in the order of things* but always up for negotiation in and through processes of production and reproduction. Boundaries and distinctions, no matter how solid they might at first appear, are never fixed. They are always dependent on complex assemblages of sensing apparatuses, theories, concepts, mathematical description and diverse observational practices, which are themselves variously entangled with the economic, the social, the political and the ecological. Humans and nonhumans alike therefore partially constitute and are constituted, by the intra-active processes they participate in.

However, stable entities, categories, scales and dichotomies of all sorts *do* exist, but these are not inscribed into nature but are *done*. The process of deriving entities, or what are better characterised as *relata*, from the relation is also called an "agential cut" by Barad (2007, p. 348). According to Barad, separate entities do indeed exist but only as a consequence of agential cuts and not due to intrinsic properties of their own. Agential cuts are thus the means through which temporal and local differences are materialised and thus realised. Different components/properties/entities thus get cut differently within different material-discursive practices: what counts as a subject and what counts as an object, for example, will depend on how these cuts are effected within and through different apparatuses (see Marshall and Alberti 2014).

Note, therefore, that while Barad (2003) agrees with Bohr that "things do not have inherently determinate boundaries or properties, and words do not have inherently determinate meanings" (p. 813), they do not deny that these exist. I would therefore suggest that, insofar as this is the case, the notion of intra-action is *not* principally deployed as a means to dissolving boundaries but rather as a means to *account for* the boundaries that *are* produced: how, why, what's included and what's excluded, for what



reasons and for whose benefits.<sup>188</sup> Boundaries and the dichotomies they instantiate are not inherent to the world, or intrinsic to specific systems and objects, but rather, need to be continuously *performed* and *enacted* into being.

To illustrate some of these ideas, consider a person holding a stick in a room with no light. Barad notes that there are primarily two mutually exclusive ways which a person could hold the stick: the person could either hold one end of the stick rigidly so as to sense obstacles and surfaces or, in a loose(r) manner, in order to examine the stick itself (its shape, length, texture etc). Barad points out that, in the first instance, the stick is part of the “agencies of observation” and as such can also be understood as part of the “experimental set up”. In the second instance the stick becomes the object of investigation. It is, of course, also possible to hold the stick in a manner which combines both these ‘styles’. In this case it would be held semi-rigidly such that the stick is both object and part of subject/agencies of observation at the same time. Here the stick is both part of the subject and object and thus undermines the very logic of duality. In all instances subjects and objects do not interact but intra-act and are thus inextricably entangled.

Note, however, that when the person does hold the stick in one of the two seemingly mutually exclusive ways, the boundary *does* become determinate but it is *not* fixed a priori. Rather, like all boundaries, it depends on the very specific material setup in which they are determined: in one particular configuration the stick is the object of inquiry, while in the other it is part of the agencies of observation. The boundaries between subjects and objects are *ontologically indeterminate* in the absence of a complete specification of the experimental setup. The distinction between object and agencies of observation therefore *cannot* be assumed to pre-exist either the experiment or the observation. Boundaries are inherently indeterminate and as such may only be resolved locally and temporarily within very specific material arrangements and configurations. These material-discursive practices, according to Barad, are part of the necessary conditions of possibility for specific determinate outcomes and boundaries.

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<sup>188</sup> Perhaps it would be more adequate to say that it is in fact deployed to do both. Nonetheless, the point is that like STS Barad is particularly sensitive to and interested in how boundaries are made and remade within material-discursive practices of all kinds (Barad 2007, p. 32). Thus agential realism is especially apt at doing both.

As another example, one particularly pertinent for many enactive theorists, consider the purported boundary between living and nonliving nature. Whereas some enactive theorists, for example, insist that there *is* an ontologically pregiven boundary in nature which separates living from nonliving matter, animate from inanimate bodies, Barad strongly rejects this duality. Indeed, Barad (2007, 2012) goes so far as to claim that this is one of the most problematically enduring and pervasive dichotomies perpetuated by the modern Constitution.<sup>189</sup> For Barad (2008), there simply is *no* pregiven ontological distinction between animate and inanimate bodies given in the order of things which can be accurately represented by scientists. Rather, the line between the living and the nonliving is made determinate only through specific material-discursive practices (see Barad 2008). Enactivism in the autopoietic tradition is precisely one such practice. This, of course, does not mean that there is no difference between animate or inanimate matter as some enactive theorists might worry (e.g. Di Paolo 2009), but rather that difference, ontological difference, is always a performative outcome.

The notion(s) of “performance”/“performativity”, which Barad adopts and then adapts from feminist theory, is another central component of agential realism and its relational materialist ontology. However, in contrast to certain feminist uses of the notion, Barad insists that the notion of performativity can be better put to use than as a human-centric discursive inscription of the body.<sup>190</sup> Thinking-with and through the figures and resources already noted above, Barad (2003, 2007, 2012) reconfigures the notion of

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<sup>189</sup> The central issue with this dichotomy, according to Barad, is that inanimate bodies “are always being shoved to the side, as it is too far removed from the human to matter, but that which we call inanimate is still very much bodily and lively”. Thus, they continue, this animate/inanimate dualism, “stops animacy cold in its tracks, leaving rocks, molecules, particles, and other inorganic entities on the other side of death, on the side of those who are denied even the ability to die, despite the fact that particles have finite lifetimes” (Barad 2012, p. 21). However, we need to tread carefully here. Despite Barad’s unfortunate choice of potentially misleading vocabulary, it should be emphasised that they are *not* claiming that matter is *intrinsically* agentive or indeed lively as many ‘new materialists’ (e.g. Bennett 2010) argue. Agency and liveliness are *not intrinsic properties of matter but are rather the outcome of distinct and distinctive intra-active processes*. As Gamble et al. (2019, p. 123) point out, “[a] given plant, for example, performs – and thus constitutes – agency differently from a particular rock or human”. This is an important point which, on the one hand helps bring Barad’s conception of ontology much closer to those posthumanist STS scholars explored above and on the other hand, moves them away from many other feminist new materialists with whom they are routinely grouped with. See Gamble et al. (2019) for an in-depth discussion on the latter point.

<sup>190</sup> Although Barad is deeply influenced by Butler’s (1993) notion of performativity, they nonetheless, diffractively think it through and with a number of other sources which enable them to resist Butler’s overly discursive notion of performativity. This is why Barad always insists on the *material-discursive* nature of *intra-active* performative enactments.

performativity and attempts to move it beyond theorists like Butler and Foucault who align it strictly with the coming into being of human subjects and gendered bodies within particular socio-political places and spaces.

Although Barad does not, and does not want to, reject this work, they work to bring into sharper focus how performativity also relates to the *materialisation process of all bodies* (Barad 2003). Thus, the matter which intra-actively figures within these processes of bodily materialisations, is not as passive as some of these theorists seem to suggest. Performativity, in Barad's hands, is also turned into an *ontological* notion in direct contradistinction to its more epistemic mobilisation by feminist and poststructuralist theorists. In this way, performativity is perhaps best characterised in terms of ontological "performative *enactments*" (Barad 2007, p. 49). In Barad's hands performativity helps render differences as something achieved through material-discursive (not merely discursive) practices, and which does not pre-exist these practices. As a consequence, Barad disrupts the view that bodies are mere passive matter upon which culture is inscribed.

Moving performativity away from its more epistemic trappings, allows Barad to also more thoroughly sidestep and disrupt representationalism. As Barad (2007) points out, it "shifts the focus from questions of correspondence between descriptions and reality (e.g., do they mirror nature or culture?) to matters of practices/doings/actions" (p. 133). Thus, for Barad, performativity *qua* performative enactments, are not ways to accurately represent a body (or its gender) but rather a way of *actively materialising* entities and phenomena of all kinds. But performativity not only rejects, but perhaps more importantly, also helps to reconfigure the very notion of representation itself. Within agential realism, "representations are not (more or less faithful) pictures of what is, but productive evocations, provocations, and generative material articulations or reconfigurings of what is and what is possible" (Barad 2007, p. 389). Or, in other words, *representations are themselves ontological performative enactments*.

Like the STS scholars discussed above, Barad also disrupts and collapses the epistemology/ontology divide. Indeed, Barad introduces the neologism "ontoepistemological", which "marks the inseparability of ontology and epistemology. I

also use ‘ethico-onto-epistemology’ to mark the inseparability of ontology, epistemology, and ethics. The analytic philosophical tradition takes these fields to be entirely separate, but this presupposition depends on specific ways of figuring the nature of being, knowing, and valuing” (Barad 2007, p. 409). To put the point somewhat differently, Barad’s reconfiguration of these notions has, at the same time, enabled them to “*ontologise epistemology*” (Gad et al. 2015) in contradistinction to epistemologizing ontology.

The inherent indeterminacy of subjects and objects and the fact that indeterminacy collapses through specific agential cuts within material configurations makes clear that, within an agential realist register, knowledge of the world does not pre-exist material-discursive practices. As with posthumanist STS, different practices result in ongoing different material arrangements which enable, condition and constitute the knowledge(s) produced. As such, “knowing does not come from standing at a distance and representing but rather from a direct material engagement with the world” (Barad 2007, p. 49). But neither, insists Barad, are we *inside* the world intentionally *directed towards* objects.

For Barad, all organisms are *part of* the infolding and unfolding fabric of multiple more-than-human world(s)-making; all our actions – including all forms of knowledge practices – are not only engagements in/with *the* world but rather an *intrinsic part of the ontological multiplicity with and through which more-than-human worlds iteratively become*. In Barad’s words, “[w]e are part of the world in its differential becoming” (ibid., p. 185). Knowledge is therefore not an external interventions on the world and knowing, being and doing are not separate processes but are always-already entangled with each other. Onto-epistemology consequently collapses hierarchies and thus thoroughly decentres the human and its distinctive representationalist knowledge practices. For Barad, all of nature and not just living nature, continuously performs itself such that “knowing” is but a concrete manifestation of how one part of the world “makes itself known” to another part of the world through diffractive material-discursive entanglements and configurations.

Consequently, observation is no longer cast as a relation between two independent interacting entities, but rather, as another specific intra-action within material-discursive practices. A practice which “enact[s] a local resolution within the phenomenon of the inherent ontological indeterminacy” (Barad 2003, p. 815). This does not mean, as is commonly argued within embodied cognition circles, that through different tools, the observer has access to different properties intrinsic to the observed object (see, for example, Froese 2022). Rather, within an agential realist register, properties come into existence and are thus constituted as the distinctive properties they are and also become meaningful, only through the intra-active agential cuts enacted with and through apparatuses of observation. Or, to put it slightly differently, *tools within apparatuses help constitute rather than merely disclose properties*. Ultimately, “[m]aking knowledges is not simply about making facts but about *making worlds*” (Barad 2007, p. 91, emphasis added).

Finally, we should note that Barad’s central aim is *not* to propose *an alternative ontology* of the world, a *singular* “quantum ontology” (de Freitas 2017, Jensen 2017) which could replace a dualist with a non-dualist/holistic metaphysics. Similarly to the posthumanist STS work explored above, I believe this would be a somewhat hasty conclusion to draw from Barad’s work.<sup>191</sup> Rather, again like the ontological work explored above, I want to suggest that what Barad offers here is a number of resources with which to account for the emergence of *multiple ontologies* (see Barad and Gandorfer 2021).

I would like to bring the various threads of our discussion together by concluding this section with an explicit alignment of Barad with posthumanist STS, courtesy of one of its main proponents, the STS scholar John Law. Honing in on Barad’s (2003, p. 817, emphasis added) provocative phrase that the world is an “ongoing open process of *mattering*”, Law (2004b, p. 2) points out that the word “*mattering*” signals to “at least three displacements”: (i) It merges two worlds; “the kingdom of facts and the kingdom of values”. It offers a move from Latour’s ‘matters of fact’ to ‘matters of concern’. (ii) It moves away from stable things-in-themselves to things-within-phenomena. (iii) It

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<sup>191</sup> Although, I do recognise, but cannot further elaborate on here, that there is a level of abstraction and generality to Barad’s work that would make some STS scholars rather uncomfortable.

moves towards “enactment”. Multiple *worlds* are continuously being *done* and thus *enacted into being*. And, as Law (ibid.) notes, “this is not a business of wilful construction – there is nothing quixotic about world-doing, world-re-doing”.

Having offered a number of conceptual reorientations centring around the notion of ontology, we are now better placed to begin clarifying and justifying the purported ontological nature of the preceding analysis. This will be the central aim of the remaining sections.

#### **4 Steps towards ontologizing the enactive multiple**

How exactly does the work discussed above and the conceptual reorientations they offer help clarify and justify the ontological nature of our analysis? The central aim of the following sections will be to answer this question. With the above discussion on the table we will first clarify the notion of ‘enactment’ by aligning it with STS. This alignment will then serve as a means to *clarify* the ontological nature of the analysis. The following two sections will then attempt to further flesh out the analysis by thinking-with and through how it ontologically reconfigures the enactive project more broadly and the role of the researcher more specifically.

#### **5 From enactive to ontological enactment**

The notion of ‘enactment’ has been a constantly recurring theme throughout this work and I am sure that it has not gone unnoticed that, despite its recurrent use, little time has been dedicated to the notion itself. As noted above, this has been deliberate and strategic: I deliberately left this notion unspecified and ambiguous throughout the preceding discussion – allowing it to occupy a liminal space between two areas of research – precisely because (i) I wanted to first introduce and discuss the transmutation of ontology into practical ontologies and (ii) further encourage the reader to re-turn to previous discussions featuring the term in light of (i).

The reader would therefore not be blamed for thinking that throughout the preceding discussions I was simply playing fast and loose with the enactive notion of enactment. However, I now want to clarify that my usage of the notion is informed by work in STS and feminist science studies rather than enaction. To do so we will first distinguish and

contrast two different understandings of enactment and then, in the following section, clarify how an STS understanding (rather than an enactive one) effectively helps clarify its intended ontological meaning. There we present a brief sketch elaborating on and clarifying the exact ontological nature of the analysis and some of its motivations and implications. This preliminary sketch will then be further fleshed out in the following two sections.

Since understanding the exact meaning of the notion of enactment is crucial for how one understands the preceding analysis, the first point that needs to be noted is that the term is *not* equivalent in meaning across these two areas of research. Indeed, so much so that one's reading of the preceding analysis will vary significantly depending on how the notion of enactment is understood. Although there is some interesting overlap between how the notion is used within STS/feminist science studies and enactive theory, the differences between them are more important for current purposes. Thus, not unlike our discussions on ontology above, we can say that there is likewise two rather different understandings of enactment at play in these different areas of research. To draw the most schematic contrast possible: enactive scholars work with a distinctively *epistemic understanding* of enactment while STS scholars work with a distinctly *ontological* (in the empirical sense discussed above) *understanding* of the term. Let us briefly explore these in turn.

To get a sense for the specific (epistemic) enactive understanding of the term, it will be helpful to go straight to its root source and explore how it is first used there.<sup>192</sup> The term 'enactment', first introduced within the enactive literature by VTR, figures a total of six times within the main text and once in a footnote.<sup>193</sup> The notion is never explicitly defined and is more often than not deployed primarily as a means to foster specific intuitions about the relation of an organism to the world. It is primarily and very

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<sup>192</sup> Like many other enactive terms, the term is by no means used univocally across the enactive literature. Nonetheless, I do think that its introduction by VTR crystallises the core characteristics which have been taken up subsequently and continue to figure in much of its current deployment across the literature.

<sup>193</sup> Unlike enactment, the terms "enact" and "enacting", figure considerably more within the same text. In these instance it is most often directly aligned with the notion of "bringing forth" a world. Indeed, as we saw in Chapter Five, a number of enactive theorists routinely use "enact" and "bringing forth" interchangeably such that to enact a world is to bring it forth and to bring it forth is to enact it. But, despite its ontological overtones, we can now say that the ontology of concern in these discussions are, by and large, also theoretical in nature.

explicitly aligned with *cognition as a non-representational, yet interpretive, meaning-making process*, which prefigures most living entities and is not something exclusive to humans alone. Recall how VTR argued that “cognition is not the representation of a pregiven world by a pregiven mind but is rather the *enactment* of the world and a mind on the basis of a history of the variety of actions that a being in the world performs” (p. 9, emphasis added). This is the first introduction of the term in the main text.

The next use of the term appears much later in the text. Aligning hermeneutics with enaction, the authors clarify that even though the notion (of hermeneutics) was first used in relation to the interpretation of ancient texts, “it has been extended [within the enactive approach] to denote the entire phenomena of interpretation, understood as the *enactment* or the *bringing forth* of meaning from a background of understanding” (p. 149, emphasis original). A few pages later the authors reaffirm this alignment of interpretation with enactment by arguing that we can understand Bittorio’s (a cellular automata) actions as interpretive in nature. With regard to these actions, VTR argue that “we can say a minimal kind of interpretation is involved, where *interpretation* is understood widely to mean the enactment of a domain of distinctions out of a background” (p. 156, emphasis original).

The next deployment of the term comes in the context of a discussion of perception, which for the authors is “not simply embedded within and constrained by the surrounding world: it also contributes to the enactment of this surrounding world” (p. 174). A “world”, let us not forget, which is uniquely meaningful for the organism. Still on the topic of perception, VTR argue that, “[w]hereas Gibson claims that perception is direct detection, we claim that it is sensorimotor enactment (p. 204). The term is then used for a final time on the very next page where VTR insist that cognition in general, and not just perception, is the “enactment or bringing forth of a world by a viable history of structural-coupling” (p. 205).

Two points need to be highlighted from the outset regarding this conception of enactment. Firstly, enactment has two distinct but mutually complementary core dimensions: (i) that of *meaning and interpretation* on the one hand and (ii), that of *action and performativity* on the other. In line with VTR, most enactive theorists insist



that both ‘dimensions’ need to be taken into account, since every action is necessarily meaningful and every interpretation is necessarily an action (see Di Paolo et al. 2018; Thompson 2007). Secondly, and more importantly for current purposes, in all these quotes the notion is used *epistemically* in at least two distinct yet connected senses. On the one hand the notion is employed primarily as an *alternative and more accurate way to explain and describe* how organisms relate to the world: not by means of internally representing the world (*à la* cognitivism) but by *acting* with it in a such a way that whatever it interacts with is intrinsically *meaningful for* the organism itself. While on the other hand the interpretive dimension renders an organism’s engagement with the world *asymmetrical*. Let us unpack these points a bit further.<sup>194</sup>

When these two points are taken together, it becomes apparent that, while action and performativity<sup>195</sup> are generally regarded as key characteristics of the enactive understanding of enactment, almost all the quotes above show that it is meaning and interpretation which are more often emphasised. Indeed, so much so that explicit mention of action and performativity often needs to be made when using the term. Evan Thompson (2011b) recalls how, whilst working on the *Embodied Mind*, “Varela would write that the organism enacts its world, [and] I would try to rewrite the sentence to say that a world is brought forth or enacted by the structural coupling of the organism and its environment” (p. 29). For Thompson, making the performative dimension explicit is important precisely as a means to not lose sight of the environment the organism interacts with (is structurally coupled to) and finds meaningful.

However, note that the active-cum-performative dimension, *vis-à-vis* this structural coupling, is always rendered asymmetrical precisely due to the meaning dimension.<sup>196</sup> Thus, even with Thompson’s rewrites, it is still the individual agent who gets the bulk of

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<sup>194</sup> Much has already been said on the representational nature of enactive concepts and ideas in previous chapters and we will have more to say on it the next section. I will therefore focus mostly on asymmetry here.

<sup>195</sup> See section below “The role of a researcher: From representation to intervention”, for further discussions on action and practices within the enactive approach. I would thus encourage the reader to return to this section after reading that final section.

<sup>196</sup> This is, of course, not inconsequential. We have already noted some implications of this asymmetrical enactments in previous chapters and I would encourage the reader to re-turn to these at this point. Here we will simply point to the observation that, by virtue of this necessary asymmetry, enactive theorists tend to be significantly more interested in the agent rather than the environment (but see Cummins 2018; McGann 2020). Di Paolo et al. (2018) arguably provide the most comprehensive example of this.

the attention while the environment serves merely as the backdrop for action; that with which the organism is structurally coupled with. The agent inevitably takes centre stage precisely because there is an asymmetrical meaning-cum-interpretive dimension built into the enactive understanding of enactment. Consequently, this epistemic understanding of enactment ends up tilting the analytic/explanatory balance considerably towards the side of the organism while leaving the environment generally unspecified and unexplored (cf. Heft 2020).

This is something which many theorists have long recognised and taken issue with. For example, James (2020) notes, “[e]nactivists thus speak about the ‘structural coupling’ of organism and environment (...). But accounts of the structure that make up the environmental side of the coupling are admittedly underwhelming”. Similarly, Marek McGann (2014) observes that, “understanding the mind requires an account of the psychological environment as detailed and comprehensive as our accounts of the cognitive system. I believe that enactivists have yet to provide such an account” (p. 1). While Kirchhoff (2018) goes further and argues that there is an inherent “internalism” to these accounts which end up “reducing the role of the environment in homeostasis” (p. 2522).<sup>197</sup>

Although my interest here is not to take issue with this purported neglect of the environment by enactive theorists, it nonetheless needs to be highlighted precisely because it seems to be a direct consequence of an epistemic understanding of enactment. It tacitly prioritises meaning-making and interpretation rather than practice and performativity, even though both dimensions are important in the account. And yet, even when practice and performativity are emphasised by means of the structural coupling between organisms and environment, the interest is never with the environment *qua* environment but only with the environment *qua* meaningful world for the organism. The environment is necessarily there, it forms the backdrop for different types of action, but it is simply taken for granted *as that on the basis of which*

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<sup>197</sup> This ‘neglect’ of the environment by enactive theorists has been more recently reflected in an ongoing debate with ecological psychologists. A particular bone of contention for the latter theorists is precisely the little time and effort the account dedicates to the environment (cf. Fultot et al. 2016; Heft 2020; McGann 2020). Whether ecological psychologists fare any better in this regard, as they insist, is also very much open to debate. And here I will merely point towards reading ecological psychology and STS conceptions of the environment along/with/through each other.

*organisms meaningfully engage with the world.* Let us now turn to the STS understanding of enactment.

The term ‘enactment’ was first used within STS and feminist science studies as a means to move away from *social* constructivism which insisted that this or that phenomenon was “socially constructed” (see Hacking 1999). Like enactivists, STS/feminist science studies scholars also introduced the term as a means to emphasise the performative (not merely theoretical) nature of worldly engagements. However, unlike enactive theorists, these do so on an *ontological register* which foregrounds both material practices *and* the continued materialisation of entities. Doing so explicitly rejects any form of a priori asymmetry that would (i) prioritise the human or the subjective and (ii) neglect or indeed take for granted environmental materialities. For STS these are never in opposition to each other and the notion of enactment also helps to emphasise this observation. Thus the notion of enactment within STS is very closely aligned, and indeed goes hand in hand, with the notion of empirical ontology as discussed above.

Moreover, by virtue of this alignment, *ontological multiplicity*, as explored above, is also at the core of this understanding: it is always *realities* in the plural which are “enacted in practices”. Indeed, by moving ontology from a theoretical to an empirical register, STS scholars have used the term ‘enactment’ precisely as a means to emphasise that entities are *materialised* in and through *different* practices. Thus, in contrast to the epistemic understanding, Woolgar and Lezaun (2013) insist that entities “do not acquire a particular meaning in, or because of, a given context; they cannot be accounted for by reference to the external circumstances of their existence. Rather, objects are brought into being, they are realized in the course of a certain practical activity, and when that happens they crystalize, provisionally, a particular reality, they invoke the temporary action of a set of circumstances” (p. 324). In this ontological rendering, to enact something is to *make it and remake it in and through very specific, temporal, multiple heterogenous material practices.*

From an ontological understanding then, to suggest that something is enacted thus and so, is to draw attention to the *generative power* of multiple material practices in the heterogenous constitution of more-than-human world-making. To highlight, in other

words, how realities (subjects and objects) are materially made, remade and unmade. Unlike an epistemic understanding, the focus is not on interpretation, meaning-making or indeed representation. Although, of course, these are often also part and parcel of the broader assemblages within and through which new types of entities are enacted.

So, although both enactive and STS scholars use ‘the same’ term, we can now see that it not only does significantly different work in each area of research but also that each understanding of the term leads to considerably different implications: one which introduces a (tacit) asymmetry that prioritises subjectivity, meaning and interpretation, the other which explicitly undoes asymmetries by focusing on human/nonhuman assemblages, their heterogeneous multiplicities and the continuous hard work involved in the performative materialisation(s) of entities with and through different material practices.

Somewhat curiously, it is worth noting that while Thompson had concerns that the notion of “enact” places too much emphasis on the side of the (en)actor, STS scholars generally draw the very opposite conclusion. Mol (2002, p. 33), for example, prefers the term precisely because, she insists, it does not imply a “performer”. The focus is always on the relations between things rather than a specific actor who does certain things. Moreover, as we explored above, because different objects are enacted *in and through* different practices, the actors involved always remain vague and unspecific. Similarly for Law (2004a), enactment does not emphasise or draw special attention to a lone performer since it is always through material assemblages composed of diverse bodies, objects, theories, tools and technologies, that particular realities are shaped, materialised and thus brought into existence.

## **6 Bringing the ontological analysis to light; a broad stroke sketch**

With these two different understandings of enactment on the table, we can now shift focus towards clarifying how it should be understood and how it has been used throughout this work. Once this is done, we can then begin the more important task of unpacking how this conception of enactment helps to both ground, and hopefully also clarify, the *ontological nature of the preceding analysis* wherein the term has figured. In this section I will therefore provide a first broad stroke sketch of what an ontologically

reconfigured analysis looks like which will then be further fleshed out in the next two sections.

The first point to make and clarify from the outset is that, when using the notion of enactment in this work, I have been and will continue to do so, from within a specifically *ontological understanding*. But what exactly does this mean in the context of this work? Although we have been hinting at a very specific answer throughout this work, we have of course not strayed beyond these hints. We can now begin changing this. Put simply, when claiming that enactive theorists *enact* both a rejection and reproduction of certain core modernist tenets, I am making the rather strong claim that these are specific, concrete and material, *ontological realities* which are being created and brought into being by these authors within and through different enactive specific practices. This work has mainly explored textual practices but these are only a subset of all the enactive practices which create specific realities (see the next section).

In a rather literal sense I am claiming that the enactive project, here broadly construed, is something of a *construction site*, or rather *multiple construction sites* to be more precise, from which *multiple practical ontologies* with diverse and divergent entities and realities emerge; some of which are familiar, unsurprising and expected, while others are substantially less so. Some of these different entities and realities were, of course, brought to light and made explicit in the preceding chapters. Thus, more generally speaking and somewhat indirectly, the analysis also shows how ‘enactivism’ like any other ‘entity’ can be, and routinely *is*, ontologically enacted differently in different practices and situations.

With a nod to Mol (2002), we have called this the *enactive multiple*. Note, however, how this specific understanding of the preceding analysis is only possible when enactment is cast within an ontological rather than enactive register. By using and mobilising the former, the focus shifts away from epistemology (meaning, interpretation and representations) towards empirical practical ontologies through which different realities are *performed* and *materialised*. Thus, world-making practices are not only reconfigured as materialising practices which materially constitute the world in various

ways rather than others but also practices which bring about new and novel worlds – *new realities*.

Let us unpack and expand upon these general points a bit further. Beginning with the different enactive ontologies I've been working through in the preceding chapters. Three different but connected points need to be made here with regards to these ontologies before moving any further. Firstly, I want to (re)emphasise the move from epistemology to practical ontologies.<sup>198</sup> What is particularly important about this is that, ontologically speaking, enactive rejections and reproductions of the modern Constitution do *not* just refer to or represent different parts or aspects of reality, but rather help create and thus *materialise different realities*. These are, in other words, distinct practical ontologies which give rise to different conflicting *concrete realities*. In the broader context of this work, this means that neither enactive theorists nor a researcher working on the enactive project are simply attempting to represent their objects of study as accurately as possible (we re-turn to both points below).

Secondly, the different conflicting realities (enacted through the specific ideas/concepts/arguments that constitute the specific practical ontologies) explored throughout this work, are enacted *simultaneously*.<sup>199</sup> Within certain texts, specific ideas and arguments, as we have seen, enact different realities at the same time: modernist tenets are thus often both rejected *and* reproduced *together*. For this reason, these realities also overlap in places, routinely cross paths at times and often, albeit rather uncomfortably and deep in the margins, certainly co-exist.

Finally, although these realities are often enacted simultaneously and uncomfortably co-exist, they are by and large *mutually exclusive* realities. So much so that they clearly contradict and undermine each other. In a more traditional philosophical (epistemic) register, these contrasting realities would be cast precisely in terms of 'contradictions', 'inconsistencies', 'aporias' or general 'logical inconsistencies' that need to be avoided

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<sup>198</sup> See footnote 177 for further clarifications on this notion of practical ontologies.

<sup>199</sup> Note that *coherence* (e.g. proposing enaction as a unified alternative framework *qua* single object of knowledge) is also something which is routinely enacted within the enactive project. It is something which has, however, not been explicitly explored in this work. Nonetheless, that too is a specific reality enacted in specific places. As such, enaction is therefore *both* singular *and* multiple. See below.

altogether, critiqued or rectified. This has, of course, not been the path taken in this work. To do so would be to remain wedded to an epistemic-cum-representationalist register where the central focus is the “correspondence between descriptions and reality (e.g., do they [descriptions/representations] accurately mirror nature or culture?)” (Barad 2007, p. 133). Thus, by shifting the focus towards an ontological register, we have also been able to avoid these representationalist concerns.

Indeed, it is thanks to the opening created by this shift of focus, that the opportunity to explore, to think-with and through, what turns out to be two very different diametrically opposing ontologies<sup>200</sup> at play within the enactive framework, presented itself. One of these ontologies was obvious, actively approved, endorsed and thus very much living out in the open. The other, by contrast, is barely visible, seldom acknowledged and living completely in the margins of what is enactively acceptable. This particular reality is especially vulnerable, fragile, unstable and, as a consequence, more open to attack, critique and general exclusion. In this work I have attempted to do justice to both these realities by treating them both symmetrically in the STS sense; attempting to bring them both out into the open and thus rendering them both equally valuable in their own right and equally worthy of exploration.

This ambition for symmetry and desire to bring less visible and marginalised realities into light, is motivated by the STS suggestion to “attend not just to ontologies enacted but also to their shadowlands of alterities; (...) to attend to the textures of the margins” (Law and Lien 2013, p. 373). We did, of course, attend to the specific ontologies which are deliberately enacted, but we also attended to the “textures of the margins”. The “textures” I have attended to have revolved around the barely visible multiple enactive entanglement with the modern Constitution. These have been “the shadowlands of alterities” I have attempted to bring to light. As noted, the realities which reinforce, reinscribe and tacitly perpetuate modernist tenets are realities which naturally reside in the margins; never fully quite realised. In the specific case of the

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<sup>200</sup> By “opposing ontologies” I mean the different worlds created by AE theorists which we have been roughly aligning with the reproduction of the modern Constitution on the one hand and its rejection on the other.

enactive approach, we see how deliberately enacted ontologies overflow with unintended and unexpected consequences and implications.

So, there we have it: two different realities where ‘the same’ ideas, concepts and arguments were one thing in a specific configuration and something completely different in another. One in which enactive ideas and concepts enact a rejection and subversion of the central core tenets of the modern Constitution and one which enacts the opposite. This should come as no surprise if one accepts the STS insistence that “‘the same’ object may be one thing in one place, and another somewhere else” (Law 2016). Or, if one accepts Barad’s (2007) similar insistence that *anything* can be *many things all at once*, depending on where “the cut” is made. In this work we have tentatively but extensively explored how enactive theory can be *both* modernist and non-modernist at the same time; showing how enactive specific ideas, concepts and arguments can *be and do* many different things all at the same time.

Following Barad we can now say that enactive specific ideas, concepts and arguments are *not* fixed and determined once and for all by the decree of enactive theory and theorists. Rather, in light of the above discussions, we can say that these are *ontologically indeterminate*, and only become *temporarily* determinate and thus acquire very specific meaning, within and through very specific materialising practices. They become determinate, either as rejections or as reproductions of the modern Constitution, only under very specific material-discursive conditions. Neither one of the distinctive realities (modernist/non-modernist) explored in this work therefore constitutes a general or universal fixed truth about the enactive project. They only become determinate and fixed in specific ways depending on the specific material-discursive apparatus.

Again I will (re)emphasise, but now with the help of Barad, that once determined and fixed in a specific way, it is a *concrete reality* which is being enacted and *not a mere description* of a pregiven fixed reality. Thus, as Barad (2001) argues, “[w]hich material-discursive practices are enacted matter for ontological as well as epistemological reasons: a different material-discursive apparatus materialises a different agential reality as opposed to simply producing a different description of a fixed observation-independent world” (p. 236). Which is all to say that, in this work, I have staged diverse



material-discursive apparatuses which have *materialised different realities* rather than simply represented what was always-already there waiting to be discovered. We will return to and expand on this point in the final section below.

Let us pause here to add one final point of clarification, this time regarding what sorts of ‘things’ can be enacted in and through practices. Within ontological understandings of enactment, it is not only material objects which are enacted in and through specific practices. This is important to bear in mind because, even if one accepts the ontological understanding of enactment, it might be tempting to argue that theories (including concepts and ideas) are precisely the sorts of things which *cannot* be enacted in this manner due to their abstract and thus non-material nature. Indeed, so the reasoning might go, theories would be the sorts of things which would lend themselves more easily to an enactive understanding of enactment.

We will re-turn to this particular concern below. For now, I simply want to note, as Woolgar and Lezaun (2013) argue, that “[i]n principle, there seems to be *no limit* to the kinds of entities that might be treated as susceptible to enactment. Objects, persons, things, facts, theories, instruments and so on, can all be enacted” (p. 325, emphasis added). This work has therefore developed under the assumption that all of these very diverse types of entities can and routinely are enacted in a multiplicity of ways.

If this is indeed the case, then *any* entity, including abstract knowledge, theories and ideas, can be enacted in a number of different ways and as a number of many different things: these can be talked about, written about, or different actions can be taken that are connected to them. As already noted in Chapter Two, theories are certainly no exception. If, as these STS scholars argue, there is no limit to what entities can be enacted, then enactivism(s), its concepts, ideas and arguments, can and *are* routinely variously enacted. Indeed, as we have seen throughout this work, enactive theories, arguments and ideas have all been primarily enacted in and through different texts in a number of different ways and as different things. This leads to a distinctly materialist and non-representationalist understanding of theory and abstract knowledge which we will re-turn to and further elaborate on below.

Let us conclude this section by bringing the various threads of this discussion together. This section has attempted to provide a sketch of how an ontological conception of enactment allows us to provide a rather different, ontologically grounded, understanding of the preceding analysis. One where different enactive realities are enacted and thus materialised within different texts through various ideas, concepts and arguments. At the core of these preliminary clarifications was a twofold suggestion that (i) the enactive project enacts multiple ontological realities and (ii) that I, as a researcher working with, within and through the enactive project, brought these realities to light. Now, implicit here is an ontological reconfiguration of both the enactive project *in general* and the role of the researcher in particular. So, in order to further flesh out the broad stroke sketch presented here, we will dedicate the following two sections to thinking-with and through these two interlinked reconfigurations. We begin with the enactive project in the next section.

## **7 The enactive project as practical ontologies**

As a means to further flesh out the broad stroke sketch of our ontological analysis proposed above, I now want to think-with and through how it reconfigures the enactive project itself more broadly. That is, I want to explore in a bit more detail how an ontologically grounded analysis inevitably changes our common understanding of the enactive project; from an epistemic framework concerned with theories *about* life and mind to sets of practical ontologies implicated in the making, remaking and unmaking of different realities. In this section, by way of narrowing the focus, I will specifically centre the discussion around how enactive theorists enact their objects of study.

One implication of the ontological analysis proposed above is that, by virtue of emerging within and through different practical ontologies, enactive objects of study are not ready-made fixed entities which could be discovered and accurately captured and described. This is *not*, however, how enactive theorists tend to cast their objects of study. Indeed, when it comes to cognition *qua* object of study, for example, the intuition regarding its ‘true’ nature is markedly different.<sup>201</sup> For the sake of space and time, we will provisionally narrow our focus to how enactive theorists conceive one particular

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<sup>201</sup> Despite the generalised tone of this sentence, I will once again emphasise that this is not univocally and universally the case for every enactive theorist all of the time and across all texts.

object of study – cognition – and then contrast it with how an ontological analysis reconfigures this conception. As the section develops we will then consider and explore how other objects of study are also often conceived within the literature. So how *do* enactive theorists conceive the notion of cognition *qua* object of study?

According to a number of influential enactive (AE) theorists, if one wants to truly understand what cognition is, one needs to first be able to identify which systems are genuinely cognitive from those which are not. As Di Paolo (2018) argues, “[t]heories of cognition should be able to provide the operational conceptual categories with which to describe their objects of study and distinguish them from those outside their remit. They should be able to say in concrete terms what sort of system, event, or phenomenon counts as cognitive and in which cases it does not. Accounts that do not meet this mark are pre-scientific” (p. 75). Such a theory would thus be able to provide what Adams and Aizawa (2001) call a “mark of the cognitive”. As we have seen in several places across this work enactive theorists routinely argue that the enactive framework has developed a number of resources and theoretical tools which enable researchers to do just that.<sup>202</sup>

Behind the enactive requirement for a mark of the cognitive, albeit perhaps tacitly, is the presupposition that there *are* distinct types of (cognitive) systems in nature with a set of identifiable intrinsic properties which mark them apart from other (non-cognitive) systems. Cognition is, therefore, treated akin to what philosophers refer to as a “*natural kind*” (see Steiner 2021).<sup>203</sup> That is, a phenomenon which exists objectively in nature independently of any human intervention and is metaphysically well-defined (cf. Allen 2017). Indeed, it is worth noting here that discussions involving criteria used to ontologically individuate classes of systems (i.e. living/nonliving, agent/non-agent, cognitive/non-cognitive and so on) within the enactive literature often appear to be

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<sup>202</sup> For a more in-depth discussion on the enactive “mark of the cognitive”, see Villalobos and Palacios (2021). For a discussion on some of the issues this sort of requirement brings up, see Allen (2017).

<sup>203</sup> Natural kinds are taxonomic schemes which are said to correspond to actually existing (organism-independent) divisions in nature. As Bird and Tobin (2018) argue “[t]o say that a kind is *natural* is to say that it corresponds to a grouping that reflects the structure of the natural world rather than the interests and actions of human beings”. Objects of study *qua* natural kinds can thus explain a broad class of phenomena by virtue of participating in scientific laws or generalisations. As noted in previous chapters, scientists are the ones generally tasked with discovering natural kinds. Now, of course, I do recognise that there are enactments of enactive theory which outright reject the very notion of natural kinds (cf. Vörös et al 2016). But again, the point is that there are different enactments of enactive theory all of which enact distinct ontological realities. Here we have an example of an enactment otherwise.

underpinned by a tacit commitment to the idea that nature is constituted by natural kinds.

Recall, for example, how cognitive systems are said to be adaptively autonomous systems which constitute themselves and their worlds by virtue of being operationally closed and precarious (e.g. Di Paolo and Thompson 2014). Many enactive theorists argue that these characteristics are ontologically<sup>204</sup> *objective properties* of the system itself and not something projected onto the system by an outside observer (see Di Paolo 2005, Thompson 2007). In the words of Stapleton and Froese (2016), these systems exist “independently of our epistemological choices and distinctions” (p. 118). As such, Di Paolo and Thompson (ibid.) argue, this allows enactive theorists to legitimately “answer empirically the question of whether a system is autonomous” (p. 72). And since (adaptive) autonomous systems are also cognitive systems, they can also “answer empirically the question of whether a system” is cognitive or not. Thus, by virtue of these ontological characteristics, enactive theorists maintain that they have legitimate empirical grounds for the claim that “sense-making *is* the basic mark of the cognitive” (Thompson 2011b, p. 211, emphasis added). For this reason Villalobos and Palacios (2021) argue that cognition within the enactive approach “form[s] (something close to) a natural kind, in the sense that [its] distinctive features are ontologically objective, and therefore empirically and operationally recognisable”.

Two important points need to be highlighted here regarding this enactive conception of cognition: (i) cognition is an ontologically objective, metaphysically well-defined (natural) kind which (ii) can be (must be) described and represented as accurately as possible. The *true* nature of cognition *can* be adequately captured with the right methods and tools and accurately described and represented with the right concepts and theories. As Di Paolo et al. (2017) argue, “a theory of mind should (...) tell us with some precision what a cognitive system *is* and which systems are not cognitive, no matter how complex” (p. 3, emphasis original). An enactive theory of mind does just that and more; it tells us that *only* autonomous systems *are* cognitive systems and that

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<sup>204</sup> In these discussions the term(s) ‘ontology’ and ‘ontological’ are used in a theoretical sense as discussed above. So living systems have a particular ontology insofar as they have these aforementioned enactive specific characteristics (i.e. autonomy, adaptivity, operational closure etc).

cognition *is* embodied sense-making. While computers, for example, are *not* cognitive systems and computational representationalism is *not cognition*. However, in this respect at least, the enactive project is no different from other approaches to cognition such as the cognitivism it rejects. While both approaches have very different definitions of what cognition is, they both tend to operate under the assumption that cognition *is* at its core a metaphysically well-defined natural kind which can be captured with the right methods and theories.<sup>205</sup>

In light of our ontological analysis, it becomes apparent that this particular enactive conception of cognition is underpinned by a representationalist epistemology which separates the object from how it is represented: it assumes a distinction between the world (cognition/cognitive system) and our knowledge(s) of it (sense-making/computational representationalism). Moreover, it assumes that certain knowledges are better than others insofar as they are more *capable and able to represent and describe the true nature* of the phenomena under investigation. Thus, enactive theory is better than computational representationalism, because the former, unlike the latter, is capable of capturing the *true nature* of cognition more adequately and thus more accurately. This is driven, albeit perhaps tacitly, by a very modernist impulse to *reveal the true fundamental nature of things*. The ontological analysis proposed throughout this work and clarified above disrupts this story and, in the process, reconfigures how enactivism as a research project is commonly understood.

Perhaps the best, and certainly the starkest, way to illustrate this disruption is by highlighting how cognition *qua* object of study gets reconfigured by an ontological analysis. The preceding analysis suggests that, when cognition is enacted as sense-making, then it *ontologically is* sense-making. But, and this is the important take-home

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<sup>205</sup> Vörös and Bitbol (2017), however, argue that, while this is indeed true for other enactive approaches (e.g. REC and SE), it is not true of enaction (AE). This is because, according to the authors, what they call the enactive “meta-subject” is a sense-making and “sense-bestowing” agent which constitutes its own meaningful world whereas the cognitivist meta-subject is a simple computational mechanism lacking these sense-bestowing abilities. While I do not wish to argue against this point, I do nonetheless want to point out that the authors also insist that both enaction and cognitivism *are* “naturalised *epistemologies*”. As such, and in the authors’ own terms, the difference here remains squarely at the level of representationalist epistemology. Hence the reason the authors find it necessary to explain “why the (scientific) metaphor of ‘enaction’ can be said to be a more appropriate ‘conceptual evocation’ of the experience of non-duality than the cognitivist metaphors of ‘representation’ and ‘computation’ (...)” (ibid., pp. 36-37).

point here, when cognition is enacted as computational representationalism, then it *ontologically also is* computational representationalism. Thus, unlike the enactive approach, the ontological analysis does not allow for two separate levels of reality; one apparent and not real (the cognitivist), the other really and truly real (the enactivists). Doing so is precisely what allows representationalism to flourish here. By contrast, the ontological analysis eschews this representationalism, collapses these two levels of reality and renders them *equally real*. Cognition *qua* computational representationalism therefore *does exist* and *is real* precisely because there are a multitude of socio-material practices – practical ontologies – across a range of places and spaces which *ontologically materialise* it as such. The same applies equally, but differently, to cognition *qua* sense-making.

Here we need to note that this ontological multiplicity of phenomena is precisely something which enactive theory *forecloses* by enacting its object of study as if it is a natural kind, methods as tools which *access* their true nature and theories and concepts as *representations of* certain phenomena. Put differently, enactive theory's demand for a mark of the cognitive leaves no room for the possibility that cognition is the result of *ontological work* and thus *ontological multiple*.<sup>206</sup> Because of its underpinning representationalism, it fails to recognise that “the very act of mathematically representing [for example] helps create the object or phenomena rather than represent a pre-given object” (Apffel-Marglin 2011, p. 52). As noted in Chapter Six, this representationalism renders ideas, concepts, models and representations as essentially *descriptions of* phenomena incapable of being ontological constitutive of the phenomena. We will re-turn to representationalism in the next section. For now, it might be helpful to probe, a bit further, what happens to *other* enactive objects in light of this ontological reconfiguration.

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<sup>206</sup> And here, as already hinted at in the Introduction, we also begin to see another modernist side of the enactive project, one tied to a very modernist conception of (scientific) progress. A side perhaps even more deeply set in the margins than what has been explored in this work. Thus note how enactive-specific concepts are generally presented, often tacitly, as “units with fixed contents” (Jensen and Bowker 2022); stable entities which progressively come to replace outdated/inadequate/flawed ideas/concepts (e.g. computationalism and representationalism) with newer, more adequate and appropriate ones (e.g. sense-making and autonomy). This stems in large part from a progressive and representationalist understanding of science whereby the primary job of the scientist is to represent, in incrementally more accurate terms, target systems and phenomena (see Pickering 1995). Much of this has of course been bubbling under the surface in many of our previous discussions. Elaborating on this with the attention it requires and care it deserves is, however, beyond the scope of this work. I note it here simply as another opening for possible further exploration.

Or, to put the matter in somewhat different terms, what happens to the enactive project *in general* when our ontological analysis is applied more broadly? What happens to the *other* enactive objects of study *if* the project is reconfigured in terms of practical ontologies? With the help of our discussion above, we can say that, in the first instance, enactive theorists are offering *concrete but diverse ontological materialisations* – enactments – of their distinct and distinctive objects of study. Take the distinctions between the cognitive and non-cognitive, the living and nonliving, the agent and non-agent so crucial within enactive theory. These are all distinctions which, in many respects, form the foundations of and for the enactive framework. As noted above and in previous chapters, these distinctions are often deeply entangled with a desire for naturalisation which would scientifically legitimise them. Naturalisation would, however, not only make these distinctions scientifically respectable but also render them objective and fixed intrinsic properties of the natural world given in the order of things, in contrast to mere “projections of the observer”, as enactive theorists like to say.

However, thinking-with our ontological analysis, a question mark is placed over the conviction that these distinctions exist ready-made in the order of things to start with. As STS scholars insist, in principle, the real can be made *and* remade in many different ways. Similarly, I am suggesting that the enactive project *qua* practical ontologies, also enacts the real in many different ways. Thus, these enactive specific distinctions, rather than merely describing what the world is really like, partake in making them in very specific ways. This means that these enactive distinctions, in order to carry any sort of weight, legitimacy and influence, require a lot of *practical work* on several fronts. Given the prominence and broad acceptance of these distinctions, it is fair to say that enactive theorists have done a good job at not only bringing these into existence, but also maintaining and sustaining them in existence.

The point is that these distinctions *do ontologically exist* precisely because of the various enactive ontological practices which materialise it in very particular ways and not others. The same goes for enactive entities such as autonomous sense-making systems, which *are* very real indeed. But their existence is constituted by enactive theory/practice itself rather than by virtue of being pre-existing ahistorical, universal

natural (kinds) entities. Or, to put the point slightly differently, without the practical ontologies which constitute enactivism(s), there are no autonomous sense-making entities. Furthermore, it should be emphasised once again that all these enactive specific entities and the practical ontologies which constitute them, are always underpinned by and complexly entangled with, particular *socio-material infrastructures*. They are not, in other words, merely abstract theoretical posits devoid of any materiality. We will return to the ‘materialisation of theory’ in the next section, however, a few extra words on these infrastructures – in relation to the enactive project – are in order here.<sup>207</sup>

Two points in particular need to be highlighted here with regards to these infrastructures. Firstly, like most other budding academic disciplines, the enactive project operates *within and through traditional* academic infrastructures. As Geoffrey Bowker (2017) points out, these infrastructures are the “network of institutions, people, buildings, and information resources which enable us to turn observation and contemplation of the world into a standardized set of knowledge objects: journal articles and monographs” (ibid., p. 391). These are the socio-material “knowledge infrastructures” (ibid.) which need to be in place in order for enactive “knowledge objects” to circulate within and across different areas of research. Note, however, that these infrastructures are not ready-made, rigid or fixed systems, but malleable heterogeneous socio-material practices, constituted by arrays of human and nonhuman agencies, which are continuously being worked on. This means that the enactive project is not only constituted by but also constitutes these more traditional infrastructures in very particular ways towards their own particular ends.

Secondly, the enactive project also operates *alongside* these more traditional knowledge infrastructures. By this I mean that the enactive project itself, as it grows, develops and becomes increasingly influential, also creates, produces and reproduces *new*

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<sup>207</sup> It goes without saying that much more could and should have been said on (enactive) infrastructures here. Space constraints however prevent me from doing so. Nonetheless, I hope that these brief remarks suffice to illustrate the core point I wish to make: that the enactive practical ontologies discussed throughout this work cannot be divorced from these material infrastructures. Not only because they enable the enactive project’s distinct knowledge objects to circulate within specific academic circles but also because the project itself is deeply entangled with the production and reproduction of these infrastructures. Which is, of course, yet another way of saying that enactive ideas are *not* mere theoretical abstractions circulating in the ether but deeply embedded in and *entangled* with socio-material practices; hence the suggestion that enactivism(s) is sets of *practical* ontologies.



infrastructures within and through which these enactive ideas emerge and can further circulate. Thus new buildings are made, new institutions, research centres, laboratories and departments are created, new academic programmes are introduced and new positions and posts are created to oversee and run all of these. Note therefore that, whether within traditional infrastructures or ‘along side’ them through enactive specific infrastructures, what circulates here are not simply ‘free floating’ abstract ideas, devoid of materiality, but precisely the sets of socio-material practices which enact them into being. The two are “intra-actively entangled”, as Barad would say, and do not and *cannot* come apart (see below).

Now, going back once again to enactive distinctions, categories and entities more specifically, we can say, after Latour (2005), that the enactive project is “at once *extending* the range of entities, categories and distinctions at work in the world and actively participating in *transforming* some of them into faithful and stable intermediaries”<sup>208</sup> (p. 257, emphasis original). Understood in this manner, enactive theorists are doing much more than discovering and representing the *truly real* nature of, say, cognition and cognitive systems. Rather, ontologically reconfigured, they are actively and constructively populating the cognitive sciences and the philosophy of mind with a number of innovative new entities and categories to think and create new worlds with.

Just as traditional psychologists have populated “the psyche with hundreds of new entities—neurotransmitters, the unconscious, cognitive modules, perversions, habits” (Latour 2005, p. 257), so too have enactive theorists successfully populated the cognitive sciences and related fields with notions of adaptive autonomy, autopoiesis, sense-making, participatory sense-making, linguistic bodies and so on. Enactive theory owes much of its success and influence to the manner in which some of these entities have gradually but assuredly been transformed into intermediaries and successfully

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<sup>208</sup> Latour (2005) describes an intermediary as a “black box”, an object that can be viewed in terms of “inputs and outputs” without any knowledge of its internal workings. According to Latour, an intermediary, thus “transports meaning or force without transformation” (p. 39). This is contrasted with “mediators” which “transform, translate, distort, and modify the meaning or the elements they are supposed to carry” (ibid.). Mediators, therefore, are said to transform meaning whereas intermediaries do not transform. The success of theories are thus dependent on the active transformation of objects into intermediaries.

black-boxed. Moreover, not only do these black-boxed entities increasingly circulate widely and extensively in the more standard and traditional knowledge infrastructures, they have also contributed to the materialisations of new, important and increasing influential, infrastructures.

All of this should also make it fairly clear that these enactive entities are not fictions, they are not invented and created ‘out of thin air’, nor are they phenomena magically willed into existence by enactive theorists. As these brief comments clearly indicate, a lot of hard work and dedication is needed to configure and mobilise these distinctive human/nonhuman assemblages in order not only to enact these into existence, but also to successfully maintain and sustain them in existence. As already noted above but worth re-emphasising once again: firstly, there is the labour of creating, maintaining and sustaining knowledge infrastructures. Institutions of various kinds need to be in place, or created, but either way, they need to be constantly produced and reproduced. Journals need to be run, conferences need to be organised, academic departments and laboratories need to be established and maintained, PhD programmes need to be developed and attended, alliances need to be forged, friendships and oppositions need to be fostered and so on and so forth. Then there is the labour of enacting new entities and categories and having to sustain them in existence: Papers and books need to be written, arguments need to be made and re-made, seminars need to be attended, lectures need to be given, classes need to be run and so on.

Note, however, as hinted at above and in previous chapters, within and as part of this multiplicity, also resides a strong ambition for unification and coherence (e.g. Di Paolo et al. 2018; Stewart et al. 2010; Thompson 2007). There is a strong underlying desire by many within the field to render enactivism(s) a *unified framework* for cognitive science. This too is however also a very specific enactment that requires specific types of human/nonhuman configurations and infrastructures which can give rise to this very specific kind of practical ontology. Unified theories or ‘frameworks’, such as ‘enaction’, are also recurrent ontological enactments which help constitute unique worlds rather than merely provide resources for disclosing entities, properties and relations which are already there. In this work we have explored but a minuscule subset of these practical

ontologies. Thus, as noted above, enaction is *both* singular *and* multiple *at the same time*.

Finally, we need to emphasise, once again, that the reason for exploring how the analysis reconfigures the enactive project ontologically is not normative in nature; I am not suggesting that this is the way that enactive theorists must or should understand their own project. Rather, the aim here has been to stage a particular discussion around one specific implication of our ontological analysis, as a means to further flesh out the analysis itself. In the process we saw how the enactive project changed from an alternative epistemology for grounding scientific understandings of life and mind to practical ontologies which enact their objects of study. Whether one accepts this understanding of the enactive approach or not will therefore depend on whether one accepts an ontological analysis or not. Either way, the point is that I am *not* recommending an alternative (better) understanding of enactivism, but simply opening up a space for its possibility vis-à-vis our ontological analysis. A possibly to simply sit alongside many others.

In sum. This section has explored how an ontological analysis reconfigures the enactive project more generally vis-à-vis a discussion of its objects of study. It was suggested that, within an ontological register, the enactive object of study stops being something akin to a natural kind and is reconfigured into an object multiple where its concrete materialisation is brought into existence through practical ontological work. Enactive work was thus transformed into *ontological work* whereby research actively partakes in processes of world-making within and through distinct practical ontologies. Note that if this is indeed the case then the researcher is also an intrinsic part of these practical ontologies. However, ontologically speaking, this does not constitute a reflexive loop in the traditional epistemic sense. Rather it similarly suggests a reconfiguration of what researchers are doing when they conduct their research.

In the next section, I want to turn our attention precisely towards the role of the researcher and explore in more detail how this changes in light of the ontological considerations discussed thus far. This will also be done as a means to further flesh out and illustrate the analysis itself.

## 8 The role of a researcher: From representation to intervention

In this final section we will explore how the role of the researcher gets reconfigured by our ontological analysis. To do so, we will think-with and through a potential objection to the analysis and what I take to be its central motivation. Identifying what is motivating this objection should make it easier to address, and at the same time, clarify the role of the researcher within an ontological register. As above, the main purpose of staging a discussion around these specific issues is to continue fleshing out the analysis itself.

So, what exactly is this potential objection and what is motivating it? The objection I have in mind runs as follows: on the one hand, despite calling it ‘ontological’, the analysis has been essentially theoretical-cum-conceptual, dealing only with concepts, ideas and arguments. Moreover, my sources have been exclusively discursive and textual in nature. On the other hand, I cannot circumvent my own subjectivity and its mediating access to the world and consequently the priority of epistemology. Therefore, it would be more accurate to claim that this work is *essentially theoretical* and thus *epistemic in nature*.<sup>209</sup> As such, what is on offer here is *two contrasting theoretical interpretations* of the enactive project: one perfectly feasible (the rejection of the modern Constitution) the other somewhat questionable (the reproduction of the modern Constitution). This then, the objection might go, is the best and perhaps the *only* way to understand the preceding analysis.

This objection is a particularly good tool to think-with in the current context because it tacitly paints the researcher in a very particular light. The objection tacitly presupposes that the researcher is someone who stands ‘outside’ of, reflecting on and representing, their object of study. This, however, contrasts rather sharply with how the researcher figures within an ontological analysis. Before exploring this contrast any further, it might be helpful to first consider what is motivating the objection to begin with. In what

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<sup>209</sup> Part of this objection was succinctly raised by an anonymous reviewer to a paper of mine (De Jesus 2018) as follows: “when making ontological claims about the structure of other worlds, we cannot bypass the question of epistemic access to these worlds”. For the reviewer, the ontological in effect collapses into the epistemic, because the former is only attained through the latter. As such, what ultimately needs to be explained is *our epistemic access to the world*. Although the objection here is cashed-out in terms of “epistemic access”, the central issue seems to be that one cannot escape the priority of epistemology.

follows I will make the case that the motivating force here is a tacit commitment to a theory/practice duality which casts theory (and indeed practice) as essentially representationalist in nature.

The duality between theory and practice has roots in Greek philosophy and remains so pervasive across many domains of study to this day that it often goes completely unnoticed. At the core of this duality is the conviction that theory is ultimately *separate from* practice and vice versa. Indeed, theory is not only *contrasted* with practice, but is also routinely placed *above and beyond* practice. As Richard Edwards (2012) notes, “theory is positioned as somehow concerned with the ethereal, the abstract, the decontextualised, and the general and, more specifically, theory exists solely in the realm of ideas”. While practice, he continues, “is positioned as concrete, it is about what we do, and it is material” (p. 526). Theory is thus construed as somehow “out of touch with the “real” (ibid.), with the material and the practical, such that there is an *essential gap* between the two. As Sandelands (1990) rather dramatically puts it, “[b]etween them is an unbridgeable gulf. Theory is of the mind, practice is of the body, and the problem of relating them recapitulates the problem of relating mind and body” (p. 253).

Let us illustrate this theory/practice duality with two examples, one from enactivism, the other from embodied cognitive science. The first example comes from notable enactive theorists Tom Froese and John Stewart (2012), who insist that there is an essential distinction between the abstract-cum-theoretical and the concrete-cum-practical which needs to be maintained in order to avoid problematic confusions. According to the authors (ibid.), “if we are not careful about maintaining the *essential distinction between a concrete phenomenon and its abstract description*, then it may eventually happen that the description unwittingly takes the place of the phenomenon” (p. 64, emphasis added). Although not expressed in these precise words, it is clear that this requirement entails an “essential distinction” between theory and practice. This distinction needs to be maintained in place, as already noted at the end of Chapter Six, in order not to confuse the referent with the sign. But in doing so, the authors cast the latter as essentially abstract, at a distance from the real, and something which merely *describes* the world. While the former is cast as concrete, material,

situated in the world and devoid of theory. Thus world and word, meaning and matter, theory and practice come apart, are separate and separated.

Another variation on this theory/practice dualism is often found in broader embodied cognition circles where a distinction is routinely drawn between know-*how* and know-*that* as a means to enact a central tenet of the approach. This distinction has its roots in the later work of Wittgenstein and is premised on an inherent divide between propositional/theoretical and practical knowledge. There is thus, for example, a distinction between the theoretical knowledge you might have about bicycles and the practical knowledge you have when you know how to ride a bicycle. As Di Paolo et al. (2017) argue, quoting Michael Polanyi, “we *know* more than we can tell” (ibid., p. 12, emphasis added).

Although not altogether unrelated to Froese and Stewart’s very specific desire, the motivation here is not to keep referent and sign apart, but rather to capture the difference between two very distinct types of approaches to cognition within cognitive science: one representational and cognitivist, the other nonrepresentational and embodied. As Dan Hutto (2005) observes, “the binary divide between traditional and enactive approaches [to cognition] is presented in terms of their respective commitments to understanding cognition as based on knowing that as opposed to knowing how” (p. 389). However, just like Froese and Stewart, this also reproduces a theory/practice dualism which *prioritises practice* over theory. Practice here “constitutes a kind of truth itself, based on unformulated, unwritten experiences and tacit knowledge, owed and embodied by the practitioners themselves” (Lenz Taguchi 2010, p. 21).<sup>210</sup> Thus theory *qua* detached abstraction is on one side and practice *qua* embodied material concreteness on the other of a great divide; they might meet, cross paths and shape each other, but are ultimately destined to remain *essentially and ontologically distinct*. They form, in the words of Gad and Ribes (2014), an “oppositional pair”.

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<sup>210</sup> The same could be said for theory, which can be written and formulated, as abstract, conceptual and nonmaterial. Cognitivists similarly also retain the distinction but prioritise the theoretical over the practical.

The purpose of introducing these two brief examples here is not to throw shade at them but rather a means to crystallise some of the important features of this dualism in order to relate these to the objection. Thus, if theory is indeed separate from the messy world of embodied practices, if it does only deal with the realm of ideas, the ethereal and the abstract, and serves only as a means to describe the world, then it follows rather naturally that my project is indeed best understood as epistemic in nature and essentially separate from practice. Protestations to the contrary notwithstanding, my proposal is merely theoretical and epistemic and not practical and ontological, because it only offers a set of epistemic proclamations/descriptions/representations based on my personal subjective interpretation/reading *of* the enactive project.

But it should now be apparent that the objection not only appears to be motivated by this sort of duality, it is also clearly *representationalist* at its very core. A representationalism which stems precisely from a prior separation between the epistemic and the ontological and tacitly prioritises the former over the latter. Moreover, note that when this happens, both theory *and* practice are enacted as two *distinct epistemic standpoints*: the former abstract and ethereal, the latter embodied, material and concrete. This sort of representationalism is particularly evident in the two examples used above in that they also enact both theory *and practice* as two different types of knowledge *about* the world. As such, the notion of practice itself (just like theory), is also rendered representationalist in nature.<sup>211</sup> Thus, whether practice is prioritised over theory or theory over practice, the dualism and its underpinning epistemic representationalism remain fully intact.

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<sup>211</sup> Within the context of enactive and embodied cognition more generally, the practical in ‘practices’ often tends to be cast epistemically, as simply another *type* or *source* of knowledge. Speaking of everyday practical abilities and activities, Daniel Hutto (2005) for example points out that, “[i]t follows that we cannot say, even in principle, how we achieve such feats by articulating the set of tacit rules or maxims followed since there are none. Even so, such *knowledge* is normative in that our performances are still subject to assessment in terms of achievement or failure” (p. 390, emphasis added). Hutto’s position is therefore what we might call a ‘top-down’ philosophy-driven theoretical analysis which uses pre-established concepts to explain what is going on in practice. Thus both theory *and* practice are cast as *two different sources of knowledge*. Practices are wedded to a “representationalist idiom” (Pickering 1995) By contrast, the STS scholars explored above, use a ‘bottom-up’ empirical approach which not only aims to derive its concepts *from* specific practices but also explore how practices ontologically constitute different worlds. Practices are here wedded to a “performative idiom”, aligned with practical ontologies and thus concerned with the world(s) rather than simply with our knowledge of it (see Gad and and Jensen (2014) for discussion). These scholars would therefore caution against theorists (e.g. Ryle 1949) who challenge the theory/practice divide but do so on epistemic grounds vis-à-vis theory *and* practice *qua* two types of (theoretical) knowledge. As Edwards (2012) points out, representationalist epistemology’s concern with “how well the world has been represented produces the very gap between theory and practice (...) that it enacts as a problematic” (p. 524).

Before we move any further, a point of clarification is needed. A point of clarification which I will make by first urging the reader not to lose sight of the representationalism involved here. Doing so will help quell a possible misunderstanding that might arise at this stage: are the scholars I have been drawing from in this work not equally committed to and reproducing a theory/practice dualism? Do they not, after all, also prioritise practice *over* theory just like enactive theorists purportedly do? This being the case, do they not also succumb to the sorts of issues highlighted above? While I am sure there are places where this does happen, it is not univocally the case, especially when and where practices (and theory) are *not* cast in a representationalist register. However, while I think this point of clarification is sufficient to quell the possible confusion, it might be worth dwelling on this a bit further. Particularly with regards to how this binary pair figures within the work of the STS and feminist science studies scholars explored above.

As already noted throughout this work, but needs re-emphasising once again, all the theorists discussed above, in some way or other, explicitly take issue with the theory/practice distinction *and* the representationalist register it is premised on. On a more general level, they do so by rejecting the epistemology/ontology distinction and effectively ontologizing epistemology. Thus while practices are indeed central in both STS and feminist science studies, they are *not prioritised over theory* but rather, theory is itself always cast as practical as much as practices are also always theoretical. Practical ontologies of the sort discussed throughout this work, for example, are at once epistemic *and* ontological, practical *and* theoretical, always constituted by inextricable webs of matter *and* meaning which fold, unfold and refold into itself (cf. Stengers 2010). As we noted in Chapter Two, Donna Haraway has been arguing for decades that “everything, from metaphysical concepts to coffee makers, insofar as they act and thus exist, are relational, semiotic and material entities—all at once” (Gad et al. 2015, p. 75). For these scholars, theory and practice are not an “oppositional pair” but rather an “unstable hybrid” (Jensen 2014).

This disruption of the theory/practice duality and its underlying representationalism is also built into the very ontological understanding of enactment discussed above: since



enactments are not immaterial abstractions but concrete material processes which unfold within specific practices, theory and concepts are therefore also not immaterial abstractions outside practice and materiality. What is particularly important here is that casting theory in terms of enactment substantially changes its common sense (representationalist) understanding. Theory stops being primarily and essentially representational, referential and thus epistemic in nature. Theory is no longer simply “that which describes the world” (Barad and Gandorfer, 2021, p. 16) from a distance as accurately as possible. As Barad and Gandorfer (ibid.) argue, thinking of theory in terms of accurate descriptions *of* something, “implies that theorizing is outside the world rather than being part of what the world *does*. It also holds that the world is (in) a particular way” (p. 16, emphasis original). Casting theory in terms of ontological enactments clearly disrupts this view.

At this point we should note that this reconfiguration of theory is not meant to be a rejection or an attempt to overcome epistemology and all that comes with it: theory, concepts, description and representation in general. Even the turn to ontology, despite some of its more exuberant articulations, is not strictly speaking a rejection of epistemology but rather an ontological reconfiguration of it. Epistemology itself now also gets recast in terms of *ontological performative enactments*. Epistemologies, even the most ‘abstract and cerebral’, are always ontological enactments which develop, unfold and manifest within and through heterogeneous situated material and *materialising* practices. In the words of Gad et al (2015), “[e]pistemologies, ideas, and concepts too, are ontological building-blocks” (p. 77). All of which is to say that materialities, insofar as they are ontologically enacted, are never just epistemic-cum-theoretical or indeed just material-cum-practical, but always both at the same time. Hence Barad and Gandorfer’s (ibid.) insistence that: “[t]heorizing is a particular form of intra-acting and as such part of the world” (p. 15). Matter and meaning never come apart and theory is therefore as much a matter of substance as it is of representation and signification (Barad 2007).

Finally, and also particularly important in the broader context of this work, it should be noted that since theory is cast as *constitutive* of reality, it is no longer something which is or could be *applied to* reality, As Law (2004a) succinctly argues: “it is not possible to

separate out (a) the making of particular realities, (b) the making of particular statements about those realities, and (c) the creation of instrumental, technical, and human configurations and practices, the inscription devices that produce these realities and statements. Instead, all are produced together” (p. 31). In other words, theories do not represent a stable and universal reality but rather are ontologically implicated in materialising specific worlds whilst at the same time foreclosing the very possibility for others. The distinction between the world and our knowledge of it completely comes undone with this understanding of theory.

So, in the hands of STS and feminist sciences studies scholars, theory is no longer simply a set of propositions/descriptions or representations *about* the world but rather an *ontological process of materialisation* which directly intervenes in and through more-than-human worlds. As we saw in the previous section, theories, depending on their success, mobilise and are mobilised by distinctive sets of heterogeneous more-than-human material processes which help configure, reconfigure, shape and reshaped and thus bring into existence very specific worlds. There is no theory without practice and no practice without theory, no matter how abstract the theory (see Suchman 2007).

With these clarifications on the table, we can now re-turn once again to the objection we started off with. Firstly, it is of course true that my primary source materials have been discursive and textual, based exclusively on enactive texts. But, it should now be clear that ontologically speaking at least, discursive and textual categories are always constituted by material artefacts. Hence my insistence throughout this work in referring to ideas, arguments, concepts and their respective materialisation as special types of *material technologies*. Written texts and theories are therefore no less material, less real, or consequential, than making tables or staging physical experiments, for example. Texts, like any other actor, are also multiply effective: they not only present new ways to think about the world but also offer new ways to act, transform and ontologically reconfigure the world. Some texts clearly more than others, as I hope this work amply demonstrates; enactive texts are nothing if not multiply effective.

Secondly, and this follows directly from these ontological considerations and reconfigurations, the analysis *is* theoretical but *not* in the representational sense

envisioned by the objection. Theory is no longer simply a reflective detached process whereby one aims to describe and represent the world as best and accurately as possible, but rather, an ontological performative enactment, which materialises certain realities. Theory and practice no longer come apart but are always forming unstable hybrids of matter and meaning. We will re-turn to this specific point shortly, first, let us take stock of the discussion thus far.

We started this section with an objection to our ontological analysis: since my research is essentially performed in the ‘armchair’, deals only with theories, concepts and representations, it can only be epistemic and, by and large, severed from practice and concrete materiality. We then suggested that this objection is grounded on a theory/practice duality which casts theory as essentially epistemic; abstract and devoid of materiality. We argued that if this duality and its inherent representationalism is problematised, then an alternative reading is not only possible but perhaps also *necessary*. For, once the gap between theory and practice is collapsed *and* representationalism is eschewed, we can no longer simply continue to maintain that research is simply either theoretical or practical. Consequently, neither can we continue to prioritise our access to the world.

This now finally brings us face to face with the main issue, the core matter of concern, of this section: how an ontological analysis also reconfigures the role of the researcher. This is because the undoing of the theory/practice duality and its representationalism directly touches upon, becomes deeply entangled with, and subsequently begins to reconfigure the researcher in ontological terms. It suggests that researchers are not merely accurately reporting on the dynamics of a stable, independent reality, but rather, through their theories and methods are also actively involved in the very *production and reproduction of many different reals*.<sup>212</sup> Researchers do not stand outside, but are deeply entangled with, the world(s) they are attempting to *make* sense of. In the words of Puig de la Bellacasa (2017), “ways of studying and representing things have *world-making effects*” (p. 30, emphasis added).

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<sup>212</sup> In order to focus our discussion, I will pay more attention specifically to *my role qua* researcher. This is not meant to be an exercise in self-indulgence but rather a means to further clarify, vis-à-vis our ontological analysis, what I have been doing throughout this work. This is also to offer a direct answer to the objection.

Thus, since all practices make realities, the particular practices which have constituted this work are no exception. Rather than interpreting enactivism from a distance and providing new and more accurate representational based knowledge *of* it, I have been *actively configuring and reconfiguring* it in many ways. And in this respect I am therefore ontologically entangled with, not separate from, the enactive realities I have helped create and brought to light. This, in turn, implies that I am intimately *responsible* for what I have produced and created: I am responsible for the resources I have sourced and the manner in which I have mobilised them *qua* material-discursive apparatus. Had I staged different material-discursive apparatuses, assembled and thus constituted with different resources, the outcome would no doubt have been different. As Barad (2007) notes, “[w]hich practices we enact matter—in both senses of the word” (p. 91).

Therefore, when exploring the various ways that enactive theorists have both rejected and reproduced core tenets of the modern Constitution, I have not been simply documenting these differences as if they were already there, fully formed. Rather, I have actively participated in their materialisation through the staging of distinctive material-discursive diffractive apparatuses. Which is to say, following STS and feminist science studies scholars, my research practices have themselves been ontologically constitutive of very particular material realities to the exclusion of others.

Thinking in terms of practical ontologies and enactments thus not only repositions the researcher *within* these ontologies but also renders them an *active intervener* in and through them. It suggests that the researcher is also doing ontological work; always working with, within and through, multiple materialities which ontologically enact different reals. As Woolgar and Lezaun (2013) point out, concentrating on ontological enactments brings to the forefront “the in-principle impossibility of establishing analytic distance from that practice”. This suggests that we *qua* researchers are therefore not only furthering scholarly understandings of a particular topic or research question but also directly intervening in and through it (cf. Zuiderent-Jerak 2015).

For better or for worse, there is simply no way of erasing myself from the preceding enactments of enactivism nor of knowing beforehand the various and varied possible

consequences of this impossibility. As Susan Leigh Star (1995) notes, “we can’t know about the consequences of including ourselves in the analysis until we try” (p. 25). Note, however, that this is not a nod to reflection and/or reflexivity. Or, perhaps more accurately, it is not a nod to representationalist forms of reflection and reflexivity. If this were the case, we would certainly be falling back on concerns about our ‘access to’ the world, as the objection insists. Rather, in keeping with the general *ontological theme* of this work, this is instead an acceptance and acknowledgement of the *ontological work performed* by the researcher.

This is ontological work which, in the current project, has been performed largely with and through diffraction rather than reflection. At this point it might be helpful to *re-turn* to the notion of diffraction one final time and fold it into this current discussion. This will be helpful not only because it is directly relevant to discussions on the role of the researcher, but also because, in light of the discussions on ontology and Barad above, we can finally clarify and emphasise its ontological dimension, which was absent from previous discussions and articulations.<sup>213</sup>

As we have seen at various points throughout this work, Barad insists that “[r]eflection is insufficient, *intervention is the key*” (2007, p. 50, emphasis added). This is essentially because, according to Barad (*ibid.*), reflexivity is representationalist in character. Thus, with the benefit of the discussions above, we can now say that “intervention” is an inherently *ontological* material-discursive process which opens up a space for *interference* and difference. Diffraction *qua* process of intervention therefore becomes a technology for the “mapping of interference not of replication, reflection or reproduction” (Barad 1992, p. 300). This directly resonates with the general STS insistence that “methods are not a way of opening a window onto the world, but a way of interfering with it” (Mol 2002, p. 155).

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<sup>213</sup> Recall how, in Chapter Two, it was noted that a diffractive methodology did not only involve diffractive readings. We can now explicitly note that what is missing is precisely the ontological dimension of the methodology. This is something we have been strongly suggesting all along by repeatedly insisting on the *making of difference* with and through diffraction. However, having discussed Barad’s work in more detail above, we can now see that this is a thoroughly ontological process rather than a merely interpretative-cum-hermeneutic one. Diffraction is a material-discursive process which ontologically configures and reconfigures material worlds.

Recall that, whereas reflection and reflexivity *document* difference – differences which are located in pre-existing entities and predefined categories – diffraction is part and parcel of the process with and through which difference(s) is *ontologically made*. As Davies (2014) observes, “reflexivity might *document differences*, [but] diffraction is itself a process whereby a *difference is made*” (p. 734, emphasis original). Subject and object, meaning and matter, ontologically interfere and intervene in and through each other; crisscrossing and overlapping like ripples in a pond to create new patterns; to create and thus be a part of the very process of *making* and thus *materialising differences*.

This point is succinctly captured by Barad’s discussion on experimental research on the physics of light: “while it is true that [diffractive] apparatuses measure the effect of difference, even more profoundly they highlight, exhibit, and make evident the entangled structure of the changing and contingent ontology of the world, including the ontology of knowing. In fact, diffraction not only brings the reality of entanglements to light, it is itself an entangled phenomena” (Barad, 2007, p. 73). For Barad this shows that researchers are *ontologically entangled* with the objects of their research. Researchers are part and parcel of the “entangled structure of the changing ontology of the world” (ibid.).

This not only further clarifies the notion of diffraction as used throughout this work and how it reconfigures the researcher, but also provides a different problematisation to the objection that this work is merely abstract, theoretical and, as a consequence, devoid of any concrete materiality vis-à-vis my role *qua* researcher. To come back to the theoretical but nonrepresentational nature of our ontological analysis: this means that I *qua* researcher am an intervener *on* rather than an interpreter-cum-representer *of* the enactive project. Moreover, since the focus is now on ontological interventions and the continuous material-discursive materialisation of differences, it also circumvents concerns regarding our (my) ‘access to the world’. A diffractive reading/methodology effectively renders this a non-issue.

Finally, I hope this now also makes it a bit clearer why I began by suggesting that this work would be best understood as an experimental world-making exercise. Indeed, we

are now, or we should be, significantly better equipped to appreciate the full *ontological force* of this suggestion. We can now also say that this work is a practical material experiment, or set of practical material *experiments*, which are at once *entanglements of matter and meaning variously generative of different worlds*. It cannot therefore be separate and/or separated from practice because it is itself an effect of these experimental practices. All of which is to say, to re-turn to the objection yet again, that *theorising is always experimental* in nature.

In Barad's (2007) words, “[t]heorising, like experimenting, is a material practice (...) both theorists and experimentalists engage in the intertwined practice of theorising and experimenting (...) *experimenting and theorising are dynamic practices that play a constitutive role in the production of objects and subjects and matter and meaning*” (pp. 55-56, emphasis original). So, to *do* theory is to always partake in experimental practices of world-making. Moreover, as already noted above, the consequences and implications of these experimentations – like any experiment – are never fully known or indeed knowable in advance. The preceding chapters vividly illustrate this with regards to the enactive project specifically, but the same can now also be said about the current work. Most of what does/can/will follow from what I have written here is now out of my hands.

To sum up. In this section we have presented an alternative ontological understanding of the role of the researcher by thinking-with and through the potential concern that my analysis, despite my insistence to the contrary, is essentially epistemic in nature and thus merely offers a specific interpretation of the enactive project. We made a case that this concern is the direct result of a tacit commitment to a theory/practice dualism which holds within it a very particular representationalist conception of theory. We highlighted the instability of this duality, presented an ontological and nonrepresentationalist conception of theory, and explored how these reconfigured the role of the researcher. All of which, in turn, helped us clarify in what way the researcher can be understood as an intervener and active producer of ontological realities rather than a mere documenter of them.

## **Conclusion**

In this appendix we turned our attention towards clarifying and justifying the analysis of the previous chapters. To do so we have turned to ontology within STS and Barad's agential realism. We suggested that the enactive project can be understood ontologically as the enactment of multiple realities. We concluded by exploring how disrupting the theory/practice distinction with and through ontology thoroughly reconfigures traditional enactive understandings of both the researcher and their objects of study.

















