2-2-2017 12:00 AM

A New Framework for Enactivism: Understanding the enactive body through structural flexibility and Merleau-Ponty's ontology of flesh

John Jenkinson, *The University of Western Ontario*

Supervisor: Christopher Viger, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Philosophy

Abstract

The enactive approach to cognition and consciousness offers a valuable alternative to the standard approaches dominant in the sciences of mind. As a type of embodied account, enactivism incorporates a variety of theoretical perspectives on the body from phenomenology, cognitive science, and biology. This broad interdisciplinary scope offers a unique interpretation of embodiment with critical insight into the embodied nature of cognition and consciousness. Nonetheless, I argue that several revisions need to be made to the enactive approach to cognition and consciousness in order for it to be viable within the context of the sciences of mind. The account of subjectivity on which the enactive approach relies is problematic in light of various arguments developed in Maurice Merleau-Ponty's later texts, and implicitly supports a dichotomy of subject and object rather than undermining it. I demonstrate that by incorporating the conceptual framework for embodiment that Merleau-Ponty introduces in his later works, according to which body and world are deeply intertwined, the implicit dualism can be resolved. However, this new framework presents a unique challenge of understanding how body and world can be separate in experience. This creates a problem of breaking with the world. I provide a solution to this problem by way of developing revisions to the enactive account of cognition, which I argue is problematic in its generality and in being counterintuitive. I offer a new interpretation of enactive cognition modelled on structural flexibility that overcomes the difficulties of the previous account. The revisions to enactive cognition that I develop can provide a way of understanding how body can break with world, but only if cognition and consciousness are understood as co-constitutively intertwined. This results in an account of the enactive body as not only deeply intertwined with the world, but yields an understanding of the body as expressing a massive integration of its different ways of being in the world, as cognitive, conscious, affective, and agentive. These revisions, I argue, provide a more consistent and plausible articulation of the enactive approach that is also more amenable to guiding the sciences of mind.

Keywords

Embodiment, Enactivism, Phenomenology, Maurice Merleau-Ponty, Subjectivity, Consciousness, Cognition, Philosophy, Cognitive Science, Philosophy of Biology.

Acknowledgements

Each member of my committee has guided my project in a variety of ways. Gillian Barker set me on the path by providing the resources to explore the biological roots of the enactive approach. Helen Fielding led me through Merleau-Ponty's texts so that I could begin to grasp his phenomenology. Chris Viger, my supervisor, helped me appreciate the limitations of conventional analytic philosophy of mind relative to the questions I explore in this project, and has pushed me to both broaden and deepen my understanding of research in the sciences of mind. I am thankful to the members of the Merleau-Ponty reading group, past and present, for giving feedback on my work, some of which appears here, and for providing an environment that has allowed me to work through Merleau-Ponty's philosophy. My father and sister, Derek and Jessica Jenkinson, have supported me with love and encouragement throughout this project. Kimberly Dority has read and edited just about every piece of academic writing I have written and has spent countless hours helping me work through many ideas. She has believed in me and my project, which has given me the confidence and strength to complete it. Kim is my inspiration and I will always be grateful for her love and companionship.

Table of Contents

Abbreviations of Texts by Maurice Merleau-Ponty

EM	"Eye and Mind," in *The Primacy of Perception*
IP	*Institution and Passivity*
PhP	*Phenomenology of Perception*
SB	*The Structure of Behavior*
VI	*The Visible and the Invisible*

Chapter 1

1 Introduction

The scientific study of consciousness, understood as a presence of self to oneself in experience, has recently been invigorated through a growing body of research in a variety of areas including its importance in relation to emotion (Craig 2009; Seth et al. 2012), cognition (Greicius et al. 2003; Konishi et al. 2015), and in clinical contexts concerning the study and treatment of serious brain injury. (Owen et al. 2006; Boly et al. 2007; Naci et al. 2015) At the same time, a chorus of researchers have established the importance of the body to consciousness and cognition, and as a result, embodied accounts have become influential in the scientific study of the mind. (Clark 1997; Hurley 1998; Nöe 2004; Damasio 2010; Shapiro 2011) The focus of the present project is one such embodied account: enactivism. The enactive approach offers a valuable embodied alternative to some of the standard approaches to understanding mind, which can be understood in the present context as the sum total of all things commonly associated with our mental lives or mentality including consciousness and cognition. Part of enactivism's value as an approach to understanding mind stems from the broad and interdisciplinary perspectives that it incorporates, including phenomenology, cognitive science and biology. This interdisciplinary perspective can be attributed to the fact that as an embodied account, enactivists are concerned with the relationship between body and mind. The body can be understood through a plurality of perspectives, including: the first-person perspective each of us enjoys as we engage with the world through our body, the physiological processes that make up and sustain our body at a biological level, and the role that the brain plays in generating our awareness of and control over our bodies. In order to understand the relationship between body and mind, we need to account for the body under all of its relevant descriptions. The broad interdisciplinary background of the enactive approach is particularly valuable, then, in its deep understanding of embodiment that this broad background affords.

The recent return to an interest in the scientific study of consciousness is particularly fascinating given the understanding of consciousness that many scientists adopt is

grounded in accounts that have historically been, and arguably still are, unsatisfactory in their treatment of consciousness as a constitutive part of mind. Enactivism is uniquely positioned to offer critical guidance at such an exciting time. This is why, however, it is crucial that the enactive approach be consistent with its own goals and capable of application within these scientific and clinical contexts. I argue that several revisions need to be made to the enactive approach to cognition and consciousness. The account of subjectivity on which the enactive approach relies is problematic in light of various arguments found in Maurice Merleau-Ponty's later texts, and implicitly supports a dichotomy of subject and object rather than undermining it. Incorporating the conceptual framework for embodiment that sees body and world as deeply intertwining, developed by Merleau-Ponty in his later works, resolves this implicit dualism, but presents a unique challenge of understanding how body and world can be separate in experience. This amounts to a problem of breaking with the world. Much of the remainder of the project is devoted to resolving this problem by way of developing revisions to the enactive account of cognition, which I argue is problematic in its generality. The revisions to enactive cognition that I develop can provide a way of understanding how body can break with world, but only if we understand cognition and consciousness as co-constitutively intertwined. This results in an account of the enactive body that is not only deeply intertwined with the world, but yields an understanding of the body as expressing a massive integration of its different ways of being in the world, as cognitive, conscious, affective, and agentive. These revisions, I argue, provide a more consistent and plausible articulation of the enactive approach that is also more amenable to guiding the sciences of mind.

In this chapter, I set up the project by outlining the enactive approach and the structure of the chapters to come. But in order to motivate the discussion, I begin by contextualizing enactivism in relation to contemporary research in the sciences of mind as developing out of a cognitivist framework, and the difficulties that arise from understanding the mind via cognitivism as revealed by phenomenological accounts of consciousness.

1.1 Cognitivism in the 21st Century

In the past quarter-century, the number of publicly funded and high profile research projects dedicated to understanding the functioning of the brain has increased dramatically (e.g. the Decade of the Brain 1990-1999 (US), the BRAIN Initiative 2013-present (US), the Human Brain Project 2013-2023 (EU)). Indeed, just a few months ago in September 2016, Western University received its largest research grant in the university's history from the Canada First Research Excellence Fund for the BrainsCAN research initiative that is intended to boost ongoing research in cognitive neuroscience and imaging. The kind of research that these projects engage in and have proposed strongly indicates a recognition of the importance of the brain not just as an organ of the body, but as the physical basis of our mental lives. Unlike the scientific study of other bodily organs, such as the heart or kidneys, the scientific study of the brain goes beyond anatomy and physiology by wading into existential waters. The study of the brain in these contexts concerns not only the study of its anatomy as a way to help treat illness, for example, but also attempts to understand who we are. As such, understanding the brain is at least partially an existential project.

More generally, there has been some success and progress in deepening our understanding of the brain and its organization and dynamics as playing a significant role in our mental lives through earlier initiatives like the Decade of the Brain. However, the relationship between physical and mental processes is still largely unaccounted for by these neuroscientific accounts. It would be wrong to consider this an outright failure given the immense complexity of the brain and the richness of our mental lives. A proposal for a new decade of research devoted to understanding the mind has been put forth by ten significant neuroscientists, called The Decade of the Mind (2007). While there have been large advancements in our understanding of the brain, as the physical basis for mind much work still needs to be done to develop an understanding of the mind in a way that is amenable to explanation by these neuroscientific accounts. The stated goals of the proposal are:

(1) healing mental disorders

(2) understanding "uniquely human" aspects of mind including "the notion of self, rational thought processes, theory of mind, language and higher order consciousness"
(3) "enriching the mind through education"; and
(4) "modeling the mind by means of computational models and artificial intelligence." (Albus et al. 2007, 1321)

These goals develop out of a particular understanding of the mind not explicitly stated in the proposal, which is a form of *cognitivism*. We can interpret the cognitivist account of cognition as a claim that "[m]ind is the total set of an organism's cognitive states and processes that are causally responsible for, but not identical to, its overt behaviour." (Sullivan 2014, 48) This brings with it a set of assumptions: humans have specific kinds of cognitive capacities that involve "representational structures and processes," these structures and processes carry information about what they represent, and thinking of the mind as an information-processing device is a fruitful analogy. (von Eckhardt 1993; Sullivan 2014) Within this context, the mind is understood functionally and causally, and to a greater or lesser extent, as supervening on brain activity. As a way of understanding mental states in relation to the causal role they play and their causal relation to other states, this is thus a kind of functionalism.

While cognitivism is certainly not the only account of mind that scientists and philosophers adopt in attempting to understand the relationship between our purported mentality and its physical basis in the brain, it would not be a stretch to understand it as the dominant position taken up by researchers, especially given the extensive publicly funded initiatives that attempt to understand the brain in light of a representational and functional understanding of the mind. Because the account of mind that cognitivists provide is functional or causal, it tends to emphasize the behavioural effects of cognition, and as such cognition is examined almost entirely from a third-person perspective. But thinking about the mind and mental phenomena in this way is problematic at least partly because "cognitive neurobiologists fail to take an organism's mental states seriously once they have identified an experimental paradigm that seems to produce robust behavioural effects." (Sullivan 2014, 59) This is the case because the cognitive capacities being

studied in the experimental context are in a strong sense born out of theory in the sense that theory provides a preliminary framework through which cognitive phenomena can be identified and probed. If, for example, researchers want to locate the neural correlates of consciousness (i.e. what parts of the brain display significant activity during tasks that elicit consciousness), they develop an experimental paradigm that consistently produces conscious behaviour in a way that does not conflict with the method of probing (i.e. what kind of imaging is being used). What counts as consciousness within the context of the experimental paradigm and thus what tasks and behaviours are thought to elicit its presence are determined largely in advance by the theoretical commitments of the researchers investigating the phenomenon. This is just to say that often when we attempt to understand phenomena within an experimental paradigm we need to have some sort of hypothesis about a given phenomenon already operating in order to test it.

Part of what makes mental phenomena difficult to study is that to a great extent they are private and our access to them in experimental contexts is largely available only through the self-report of participants. But the experimental paradigms used to study such phenomena more often probe objective properties of phenomena that can be functionally isolated and described, especially when the verbal reports of experiment participants cannot be used as evidence or data, as in the case of studies involving non-human animals. What this means is that behaviour other than self-reporting is used as a measure of internal states because the access of researchers to those states is limited if any access exists at all. When a paradigm is created that consistently yields significant data based on what have been deemed as relevant behavioural effects, researchers assume that the cognitive function they are investigating has been individuated sufficiently to begin attempting to understand the physical basis of those behaviours. (Sullivan 2014) We can understand the internal states of an individual as corresponding to one or more of the following: (1) the state of activity taking place within an individual's brain, (2) the state of the totality of processes going on within the individual's skin-boundary, (3) or the subjective and cognitive states of the individual. Typically, understanding (3) is the end goal of cognitive research and in the context of cognitivism understanding (1) is the means to understanding (3). This tends to place more of a focus on neural and metabolic

behaviour going on in the brain to the relative neglect of other internal states of the individual that arguably drive such behaviour and that are included in (2). Importantly, (1) and (2) are both, at least partly, capable of being measured based on behaviours internal to the individual, such as neural activity or heart rate. But given that the subjective internal states that give rise to and are constituted by these behaviours are part of what is in need of explanation (since the investigation of brains is at least partly an endeavour in understanding our mental lives), the picture becomes problematically limited. This is because the phenomenon studied becomes confined within the relatively isolated limits of the cognitive function individuated as a particular behavioural effect. The experiment, which is intended to help probe and understand a given phenomenon, ends up limiting our understanding of such mental phenomena through the implicit theoretical commitments that guide the research. Understanding the role that such theoretical commitments play in guiding research is thus crucial in understanding the phenomena themselves. In the context of the cognitivist approach to research in the sciences of mind, one of the key issues is a failure to take seriously the subjective states of the organism due to an overemphasis on the functional elements of those states that tend to produce measurable behavioural effects. This issue, of course, is not necessarily intractable, but it persists nonetheless.

1.2 The Phenomenological Approach

The limits of the experimental paradigm and the theoretical assumptions in guiding research was well understood by French phenomenologist Maurice Merleau-Ponty. The radically embodied philosophy that Merleau-Ponty developed throughout his life (1908-1961) has been influential to many researchers working in contemporary cognitive science, and especially to enactivists. (Varela et al. 1991; Gallagher 2005; Thompson 2007) The relevance of Merleau-Ponty's work to contemporary cognitive science will be emphasized in the pages to follow, but he was also actively engaged in the psychological literature of his own time, in the middle of the twentieth century. One of the focuses of his first book, *The Structure of Behavior*, was a critical commentary on much of the research of his contemporaries into human and non-human cognitive and perceptual

behaviour. While the discussion was aimed at his contemporaries (as well as more classical accounts), it remains relevant within our contemporary context as well. A critical comment on the research on reflex behaviour resonates particularly well with the present discussion:

> The reflex as it is defined in the classical conception does not represent the normal activity of the animal, but the reaction obtained from an organism when it is subjected to working as it were by means of detached parts, to responding not to complex *situations* but to isolated *stimuli*. Which is to say that it corresponds to the behaviour of a sick organism—the primary effect of lesions being to break up the functional continuity of nerve tissues—and to "laboratory behaviour" where the animal is placed in an anthropomorphic situation since, instead of having to deal with those natural unities which events or baits are, it is restricted to certain discriminations; it must react to certain physical and chemical agents which have a separate existence only in human science. (SB 44)

There are a few distinct lines of criticism that can be drawn out of the above passage, but the most pertinent is the ecological concern expressed in relation to the experimental context. Merleau-Ponty's embodied phenomenology was significant in many ways but arguably most notably in its rejection of a dualistic dichotomy of mind and body. Instead, Merleau-Ponty argued that as embodied subjects, our mental lives are borne out through our being oriented in and toward the world. What this means is that "mind" is more about the kind of relationship an individual, as embodied, bears with the world than the stuff it is made of. The body is our means of being in the world, both as an object among objects but also as a subject that is sentient and agentive and oriented toward things and other subjects.

If we take seriously this kind of embodied philosophy, certain features of the experimental context become immediately problematic. Some accounts of consciousness articulate it as a subjective quality inherent to experience that makes our perceptions *feel* a certain way; the hotness of heat or the redness of red, for example. (Nagel 1974; Chalmers 1996) For Merleau-Ponty, consciousness has a thickness that extends much

more deeply than "a *quale*, a pellicle of being without thickness, a message at the same time indecipherable and evident, which one has or has not received, but of which, if one has received it, one knows all there is to know, and of which in the end there is nothing to say." (VI 131) Rather, in order to understand consciousness, we need to take into account its situation, which involves an embodied history that the subject brings to her interaction with the world. Indeed, this interaction is ongoing, and consciousness does not occur privately within the confines of the skull, but lived as a relation with the world. (Cf. Gibson 1979) Arguably, the emphasis on the private nature of consciousness as partly involving an interiority has allowed the sense in which consciousness is also public to go largely overlooked in contemporary discussions. This has led to a failure to understand the constitutive role of world in consciousness (and vice versa) and instead has led to the development of a dichotomy in opposition between subject and world (whether implicit or explicit). If, on the other hand, we adopt an account of consciousness as instituted (i.e., set in motion or developed over time through interaction) through the relation between subject and world, where world is understood as the social and natural environments that the subject inhabits, then a dichotomizing understanding of consciousness and world can potentially be avoided. This is, at least partly, related to the idea that Merleau-Ponty is articulating in the earlier passage. Consciousness is instituted through engagement with the social and natural environment of the individual, and the experimental context is removed from this situation. The clinical contexts of universities and hospitals, for example, within which experiments are carried out, are largely alien to human subjects, especially given that such contexts are often related to health and illness, and can provoke anxieties in some individuals. For non-human animals, these contexts are completely alien given that they are "anthropomorphic situations." This amounts to an ecological concern insofar as it concerns the relationship between the organism and its world.

Ecological concerns matter particularly when we study individuals, human or non-human, to reveal the physiological causes of a given behaviour. Because experimental and clinical contexts are largely foreign to the individuals studied, reactions to a stimulus may be different than in a context they normally inhabit. Studying the effect of music on a human may produce varying results in different contexts, such as at a live concert,

running on a treadmill, or attentively listening to a favorite album. We would expect the physiological expression to vary in each context at least partly because each context involves a distinct manner in which the body interacts with its world. And we should expect, similarly, that in a clinical context, one would also have a unique physiological response. To a certain extent these ecological concerns have also been recognized within the contemporary scientific context. For example, Snow et al. (2011) have demonstrated a difference in brain activity corresponding to whether participants interact with a real tool or an image of a tool. What the object is and how the subject relates to it is part of the context in which perception occurs. This is, in effect, a recognition of the importance of ecology. There are, however, tremendous barriers to developing a truly ecological experimental context within which mental phenomena can be studied, including the limitations inherent to the technologies used (e.g. fMRI has huge space and cost limitations, and can limit the ability of the participant to interact with her world).

Beyond the ecological issues that result from failing to take the body in interaction with the world as constitutive of consciousness, taking phenomenology seriously points to another serious methodological issue. The experimental context is often one in which the individual is taken not as a subject, but an object. What is meant by this is that the states of the individual are taken as measured, whether via imaging techniques that detect objective properties of behavioural states such as changes in blood flow in the brain, or motor response time. The information collected with these measures amounts to third-person data of the phenomenon being investigated that are physical-functional descriptions of the behaviour. For most physical phenomena, a physical-functional description, such as the crystalline structure of quartz, can sufficiently explain the studied phenomena given that the kind of physical-functional information collected and used to explain quartz exhausts what there is to know about quartz. Quartz crystals are not conscious and so there is no first-person data that would need to be collected in creating our scientific account of quartz. The case is a bit different when the target phenomena involve mentality, broadly construed. Much like the physical properties of quartz, we can collect physical-functional information about an individual's consciousness in terms of third-person data, which amount to physical-functional descriptions of an individual's

behaviour not only in terms of imaging but bio-behavioural measurements as well. (Colombetti 2014) As we have seen above, cognitivism construes mind in terms of such functional descriptions. But in studying mentality, and especially consciousness, we also need to incorporate first-person data about the phenomena from the perspective of the individual being studied in terms of self-reports and lived experience. (Varela 1996; Colombetti 2014) Given that consciousness is almost always defined as involving some form of subjectivity that is at least partially qualitative, these first-person data need to be integrated into the scientific investigation of consciousness. If the goal is to understand the relationship between specific patterns of neural activity and consciousness, we need to incorporate all relevant data about consciousness in order to explain the relationship in a way that is not problematic because of a bias toward or against certain kinds of information about consciousness.

If, on the other hand, we fail to take experience as it is lived by the individual seriously and do not incorporate first-person data into the scientific investigation of consciousness, we run the risk of perpetuating an explanatory gap between consciousness and the brain. Because the cognitivist picture of the mind reduces mentality to computational cognitive processes, understood as sub-personal information processing involving the rule-based manipulation of internal symbols relative to given inputs and the desired outcome and that purportedly reduces to brain processes, it is unclear how subjective mental phenomena are supposed to fit into the picture. (Thompson 2007) The problem emerges right from the start; if we define consciousness in functional terms we fail to articulate the fundamental aspect of consciousness that uniquely defines it, namely subjectivity, given that subjectivity at least partially involves qualitative aspects of experience not captured in functional terms. At the same time, I have said above, following Merleau-Ponty, that we should not think of consciousness as a "pellicle of being" defined exhaustively by its subjectivity, but as involving a co-constitutive relationship between subject and world. This involves taking first-person data seriously.

Because consciousness is our primary means of knowing the world, insofar as our interaction with the world is fundamentally mediated by our experience of and in it,

scientific approaches included, Merleau-Ponty argues for the ontological priority of the perceived world and the phenomenal body, given that "all being that has a meaning for us is to be conceived on the basis of the perceived world." (IP 126) This is to say that first and foremost my body is lived and the world is experienced according to and with my lived body. To begin the scientific investigation of consciousness with a physical-functional description of consciousness is thus to miss the explanatory target right from the start. A functional description of the body alone does not capture its phenomenal nature because it is caught up in an objectivist ontology through which we "discover the perceived as residue." (IP 133) If we think about consciousness in this way, consciousness becomes something left over that is made to fit into the picture after the fact, if it is not left out altogether. (Cf. Pylyshyn 1984) Taking the phenomenal body seriously does not, however, mean there is no value at all in the functional approach taken by cognitivism or in the scientific study of consciousness more generally. It means that consciousness is not exhausted by functional properties and that first-person data need to be incorporated in order to effectively guide research.

A more substantial incorporation of first-person data would effectively allow for a mutual constraining of first- and third-person data. In such a context "first-person data should be collected to shed light on, or interpret, physical activity, whereas third-person data should in turn be used to guide experiential reports and to help subjects discover and report on previously unnoted aspects of their experience." (Colombetti 2014, 136; Varela 1996) This approach to integrating first- and third-person data within experimental contexts was proposed by Varela (1996) and is called neurophenomenology. While I do not intend to explicitly defend neurophenomenology as an alternative methodology within the sciences of mind, it is clear that revisions need to be made to the standard cognitivist approach that predominantly favors third-person data. These revisions need to come, at least partly, in the form of a more substantial integration and valuing of first-person data given that the phenomena studied by the sciences of mind involve, to a greater or lesser extent, the first-person perspective. As we have seen so far, the failure to properly incorporate the first-person perspective is one of the fundamental criticisms raised by phenomenological approaches to consciousness, especially given that phenomenology involves the study of

the first-person perspective and the structures that comprise and constrain it. This is to say that while there are significant criticisms being mounted against some of the practical and theoretical constructs of the experimental paradigms within which mental phenomena are investigated, these criticisms are not necessarily intractable. While there are limitations that technology introduces, the methodological and theoretical concerns can be addressed by adopting approaches that are phenomenologically oriented.

1.3 Enactivism

Neurophenomenology has been proposed by Varela (1996) as a method for incorporating first- and third-person data within the experimental context in order to provide a more robust and accurate account of the mental phenomena being studied. Neurophenomenology by itself is part of the methodological revisions that are necessary to properly account for the first-person perspective within the sciences of mind. It is, however, grounded in and reliant upon certain theoretical commitments in the same way that cognitivism motivates much of the contemporary research in the sciences of mind. More specifically, neurophenomenology develops out of an understanding of consciousness and cognition that emerges out of the phenomenological tradition, as well as ongoing research in the sciences of mind and the biological sciences. To a large extent, such an account is an extension of the phenomenological approach that is developed by phenomenologists like Merleau-Ponty who espouse a deeply embodied account of consciousness. Given that the body is amenable to description not only from the phenomenological perspective, but from the frameworks developed in the sciences of mind and the biological sciences, it makes sense to incorporate a plurality of perspectives in order to reach an understanding of our relationship with the world built upon a consilience between such approaches. The neurophenomenological method that Varela proposed develops explicitly out of the account of mind-body-world interaction that he, along with Evan Thompson and Eleanor Rosch, articulate in *The Embodied Mind*, called *enactivism*. (Varela at al. 1991) The enactive approach that Varela et al. (1991) lay out is intended to be a continuation or extension of the project that Merleau-Ponty began in its effort to facilitate an interaction between a phenomenological understanding of

embodiment and the understanding of the body as a biological system (elaborated below). (xv)

There are a variety of contemporary approaches to cognition and consciousness that could be considered enactivist, broadly construed as the view that world-directed action and perception, and mind more generally, are co-constitutive. My focus, however, is specifically on the brand of enactivism that develops out of the research program articulated in *The Embodied Mind*, a view currently championed by individuals such as (but not limited to) Evan Thompson (2007), Giovanna Colombetti (2014), Ezekiel Di Paolo (2009) and Dorothée Legrand (2006). As such, any reference to enactivism should henceforth be understood as directed at this approach in particular unless otherwise stated. One of the strengths of this brand of enactivism as a theory of embodied cognition is its diverse roots in analytic philosophy of mind, phenomenology, biology and the sciences of mind. This broad background provides a unique perspective on the relationship between mind and body that makes enactivism valuable as an alternative to standard approaches to cognition. Following Colombetti (2014), we can characterize enactivism by its commitment to three core tenets: embodiment, the continuity between mind and life, and lived experience.

1.3.1 Embodiment

All theories of embodied cognition explicitly reject any ontological separation between mind and body. (Gallagher 1995; Clark 1997; Hurley 1998) Enactivism goes beyond this by incorporating the stronger claim that the brain by itself is not a minimally sufficient physical basis for the mind. (Cosmelli and Thompson 2010; Colombetti 2014) This stands in contrast to many of the accounts of mind adopted within experimental contexts such as cognitivism that seek to reduce mental phenomena to patterns of neural activity. Instead, enactivists argue that the mind is enacted by the organism through its self-maintaining organization and through its interaction with the world in which it is embedded. The very self-maintaining organization that is crucial to mind is structurally coupled with the world so that the embeddedness of the organism in its world takes place at even cellular levels. This is because the processes that constitute the organism as a

unified whole have an infrastructure and dynamics that operate in a state that is thermodynamically far-from-equilibrium. To maintain this organization and dynamics, constant interchange between the organism and its world is required given that material systems have a tendency to seek equilibrium. Importantly, understanding the body as an autonomous system "allows for the possibility that any given body need not be constituted exclusively by its biochemical or physiological process" so long as its parts contribute to the organization and dynamics that perpetuate its self-maintaining activity. (Di Paolo and Thompson 2014, 72) This is supposed to allow for the possibility of bodies with a physical basis radically different than our own, which is becoming an increasing reality as research in robotics continues to progress.

Although an organism's sensorimotor coupling, which is the dynamic relationship between perception and action that is the physiological basis for an organism's interaction with the world, is constitutive of enaction, it does not exhaust it. Our embodied interaction with the world incorporates bodily processes that extend beyond this sensorimotor coupling, including homeostatic systems that help to maintain viability and generate affective signals via interoception. Indeed, Bower and Gallagher (2014, 2013) have recently argued that as such, sensorimotor accounts are by themselves insufficient to explain perceptual phenomena given that the affective states feature strongly in the motivational aspects of embodied perception. As such, they argue, sensorimotor accounts (e.g. O'Regan and Noë 2001; Noë 2004) cannot by themselves provide a sufficiently embodied account of mind. Instead, mind is enacted as a result of the various bodily processes and systems that comprise the organism's total engagement with the world, including its self-regulatory systems (e.g. homeostatic regulation). (Colombetti 2010, 2014) Given that these systems incorporate bodily processes that are realized throughout the entire organization of the organism, cognitive processes cannot be understood as strictly reducible to brain processes. (Anderson et al. 2012) The entire body, including but also beyond the brain, is necessary for consciousness and cognition. This view of embodiment entails a rejection of the "brain in a vat" thought experiment that raises concerns about skepticism by leaning on the intuition that one could be a "disembodied" brain in a vat that is fed a world simulation and not know otherwise. The

strong form of embodiment that enactivism entails would require that such a brain would indeed be embodied in order to for the simulation to be coherent, given that it would require homeostatic systems, sensorimotor systems, interoceptive and proprioceptive systems, and exteroception more generally. Simply put, in order for the thought experiment to be coherent, it would require the brain to be "encased" within a living body, which would be to undermine the intuition that drives the thought experiment.

Further, the body is constitutive of mentality and so the kind of body one has affects the kind of mind one has. Certain kinds of bodies may be necessary for the development of minds, and even within-species variation in bodies is likely to have a significant effect on one's mind. The ways in which the body can interact with the world has an effect on how one moves into and inhabits the world. In turn, how an individual inhabits the world influences the way in which the world opens to the individual. The world also functions as a constraint upon the individual and the possible interactions between the two given that structural coupling between organism and world is conditioned at least partly by world-generated activity. In this sense cognition and consciousness cannot be understood independent of the world in which the individual is embedded.

1.3.2 Mind in Life

The self-maintaining activity that organizes the organism's interaction with the world in an effort to maintain viability places certain normative constraints upon the organism in interaction. The consumption of material resources is required by the organism in order for it to stay alive and so certain parts of the world, ones that have resources that are needed to this end, become more or less valuable to the organism. What this means is that to varying degrees the world is a meaningful place to all organisms as they interact with the world to meet the conditions of their own survival. Following the phenomenological tradition, enactivists have understood this behaviour as *sense-making*, which is defined in this context as behaviour in relation to the environmental meaning that is brought about on the basis of the internal norms of an organism's self-maintaining activity. Interestingly, enactivists claim that cognition is a kind of sense-making. (Thompson 2007; Thompson and Stapleton 2009; Colombetti 2014) The motivation behind this is a

re-centering of the importance of cognition not as a method of information processing, which models cognition after computation, but as a way in which an organism facilitates meaningful interaction with its world. This is to say that cognition is not supposed to be a kind of way in which an organism processes information but a method of interacting with the world in relation to the organism's own self-generated norms. Contrary to cognitivist approaches, "[b]asic cognition, on this view, is not a matter of representing states of affairs but rather of establishing relevance through the need to maintain an identity that is constantly facing the possibility of disintegration." (Di Paolo and Thompson 2014, 73) When cognition is grounded in such fundamental bodily activity not only does it provide a basis for understanding how cognition is embodied, but it also provides a way of understanding how other aspects of our mental life, such as consciousness and emotion, are capable of being integrated with cognition rather than as pieces that need to be fit back into the picture after the fact.

Grounding meaning and normativity in the activity of the organism via sense-making is an idea that develops fairly explicitly out of SB, where Merleau-Ponty claims, for example, that if internal activities of the organism

> always tend to re-establish certain states of preferred equilibrium, these latter would represent the objective values of the organism and one would have the right to classify behaviour as ordered or disordered, significant or insignificant with respect to them. These denominations… would belong to the living being as such. (SB 38)

Meaning in terms of valuation is thus inherent to the activity of the organism and the processes that constitute it rather than an objective property applied from without. As such, organisms, in virtue of their self-maintaining activity, are bringing their own meaning into the world, at least in a very minimal sense. This idea is elaborated according to the enactive framework by arguing that cognition ought to be interpreted as an activity of sense-making rather than as a function of computation. Not only does this mean that the simplest organisms are in some sense minded, but grounding cognition in sense-making also entails that cognition is inherently *affective* insofar as, following Colombetti (2014), we can define affectivity as "a lack of indifference, and rather a

sensibility or interest for one's existence." (1) The rigid dichotomy between affect and cognition that cognitive science has traditionally supported cannot be sustained since the norms and meaning generated through the organism's autonomous self-organization entail a pervasive affectivity. Cognition is deeply intertwined with the homeostatic processes that guide environmental interaction and as such cognition is fundamentally world-oriented and accomplished *through the body*. This pervasive affectivity is not necessarily a claim about feelings or felt emotions that would entail that even simple organisms feel pain. Feeling implies that there is a subject of that feeling (i.e. the pain that I feel is *my* pain), but at the level of single-celled organisms there is not yet something like a subject to which these bodily states could be given as feelings. Affectivity and emotion, at their most basic levels, would involve a responsiveness to or engagement with the environment based on the internal states of the organism and how they relate to the organism's continued persistence. While there is certainly something like a separation of interior and exterior that begins to develop at the site of the cellular membrane, this separation is not yet sufficient to yield any form of subjectivity.

1.3.3 Lived Experience

As an account of cognition and consciousness that develops out of Merleau-Ponty's phenomenological account of embodied subjectivity, enactivists understand experience as lived through an individuals' embodied interaction with its world. (Varela et al. 1991; Legrand 2007b; Thompson 2007; Christoff et al. 2011) The incorporation of phenomenological accounts of consciousness and cognition through philosophers such as Merleau-Ponty, but also Jean-Paul Sartre and Edmund Husserl, sets enactivism apart from many other extant accounts of embodied cognition. Lived experience is a technical phrase that expresses the sense in which experience must be understood always with reference to the embodied subject to which it corresponds rather than as a disembodied object of investigation. Many accounts of consciousness focus on conscious states in terms of qualia as qualitative states of the organism that bear no constitutive relation to any temporality inherent to experience, or to the underlying embodied structures that organize perception as a background against which "qualia" can appear (e.g. Chalmers 1996). This way of thinking about consciousness creates a dilemma whereby

consciousness is reduced to a "pellicle of being" that ends up having no relation to the world or subject (cf. Dennett 1988), or consciousness is taken as a disembodied object reducible to functional properties without remainder. But insofar as the enactive mind is partly grounded in self-regulatory systems, the mind is enacted by the *living* body. This physiological grounding enriches the sense of subjectivity that (partly) constitutes our experiences and mental states by incorporating agentive *and* affective dimensions. Further, experience cannot be fully understood as a disembodied *object* of investigation and must be investigated as *lived* by the embodied subject that is created by the co-constituting interaction between organism and world. (Zahavi 2005) The subject, while not strictly reducible to intentional relations, is generated through the organism's orientation toward and active engagement with the world. The mind is thus constituted by a situated, world-oriented subject and cannot be reduced to a collection of disembodied mental states. Neither world nor subject is disclosed independently, and as such they cannot be understood separately.

Taking lived experience seriously means that, contrary to many contemporary accounts of consciousness, it cannot be understood as reducible to a form of object-intentionality (e.g. through the act of a higher-order mental state taking another state as its object). (Cf. Carruthers 1996; Lycan 1996; Rosenthal 2005) To reduce consciousness to a form of intentionality would effectively be to reduce it to an object, given that intentionality can be understood broadly as a relationship where one state takes the other as its object. Normally, intentionality is taken as a relationship that obtains between subject and object, whereby the subject stands in an intentional relation to an object, meaning that the current state of the subject is about that object. We can think of this kind of "being conscious" as transitive insofar as it involves being conscious of an object. But consciousness is also intransitive, insofar as one can be conscious simpliciter. This kind of intransitive consciousness arguably involves the presence of some form of subjectivity. On higher-order accounts of consciousness, such as Rosenthal's (2005), a mental state's being intransitively conscious involves being transitively aware of it as the object a higher-order thought. The requirement of higher-order thought for even minimal (intransitive) subjectivity seems like a relatively high bar that contrasts with the spirit of any sort of

deep continuity claim. Further, there is a difficulty in explaining precisely how it is that higher-order thoughts confer intransitive consciousness to their target mental states. Conscious states are normally experienced as having a first-personal givenness, which is to say that they are experienced as being states that *I* am having. Zahavi (2002a) argues that this feature of subjectivity pushes higher-order accounts into a dilemma: either we commit to the presence of the subject in the first-order state itself or fall into an infinite regress. Such an infinite regress would come about due to a problem inherent to grounding intransitive consciousness in transitivity: in order for a higher-order state to identify a first-order state as belonging to it (i.e. to the self-same subject), a further higher-order state would be required in order to compare and identify the two states as belonging to the same subject. But this comparator state would also need to be compared and identify by a further state, and so on. The simpler solution, and the one that is more phenomenologically plausible is to recognize subjectivity as intransitively implicated in the state itself, which does not require higher-order thought. The phenomenological approach not only sees subjectivity as constitutive of perceptual interaction with the world (rather than a product of such engagement), but also of higher-order thought more generally.

1.3.4 Two Points of Disambiguation

Articulating enactivism as a research program committed to embodiment, lived experience, and the continuity between mind and life provides enough detail to understand how enactivism can be understood as an alternative to the standard cognitivist approach to cognition that is dominant in the sciences of mind. I will explore each of these commitments much more deeply in the chapters that follow. At this point, however, it is necessary to clarify a few points about where enactivism stands with respect to other embodied accounts and to the functionalism of cognivitism.

Understanding cognition as grounded in the self-maintaining organization of autonomous systems would at first pass seem to be compatible with a functionalist interpretation, given that cognition is defined by its function in facilitating behaviours that maintain the viability of the system. Di Paolo and Thompson (2014) stress that autonomy, which is the

property of a system to create and maintain the conditions of its own continued survival, is not a functional property. This is because, they argue, autonomy is always a struggle against the precariousness of living systems. What they mean by this precariousness is the unavoidable property of materiality to be impermanent. Any positive property of the system is insufficiently permanent and will eventually break down. This precariousness of the system "cannot be 'revealed' as a positive property and yet its negative effects are what the system is constantly acting against." (Di Paolo and Thompson 2014, 73) Precariousness could be *partially* modelled in functionalist terms but never fully, given that if the system is autonomous then any conditions that could be described as satisfying its functional approximation would themselves be precarious as well. (Di Paolo and Thompson 2014, 73) As such, functional accounts, by design, cannot fully capture the precarious nature of material systems that create a constant striving within the system to maintain its far-from-equilibrium state. Importantly, Di Paolo and Thompson (2014) argue that because precariousness, which is necessary for autonomy, cannot be functionally described it is also not possible to model full autonomy in traditional computational terms.

In the discussion above I mentioned that enactivists consider their account as extending beyond sensorimotor accounts such as Noë's (2004) by grounding cognition in the body's homeostatic processes that also generate affective awareness of the body. Antonio Damasio (1994, 1999, 2010) has similarly defended an account of consciousness and cognition as rooted in the homeostatic systems that help maintain the organism's viability. Damasio has been a great advocate of embodied accounts of consciousness within neuroscience, and specifically for integrating affectivity via feeling and emotion into cognition and consciousness. The account he develops builds consciousness in stages. The lowest level lacks anything that would be considered consciousness because it lacks cognitive capacities and the right kind of neurological organization to represent the body in a way that would yield feelings. It does, however, involve affective states that help the organism interact with its environment based on its ongoing demands and the state of its internal milieu. In order to get from these homeostatic (as well as sensory and motor-related) states to the conscious feelings of those states, Damasio (2010) argues that

> What is being added to the plain mind process and is thus producing a conscious mind is a series of images, namely, an image of the organism (provided by the modified protoself proxy); the *image* of an object-related emotional response (that is, a feeling); and an *image* of the momentarily enhanced causative object. *The self comes to mind in the form of images, relentlessly telling a story of such engagements*. (216)

While there are certainly themes that resonate between enactivism and Damasio's account, the specifics of his account of the emergence of consciousness paint a picture much closer to the higher-order accounts mentioned above. The language of imagery that Damasio uses is not just metaphorical, it involves taking the body as an intentional object in order to generate consciousness, which effectively reduces subjectivity to object-intentionality. While discussing the inseparable attachment of the brain and body proper, Damasio claims that this "attachment underlies the generation of primordial feelings and the unique relationship between the body, as object, and the brain that represents that object." (Damasio 2010, 212) This articulation of the relationship between brain and body is problematic because it creates a new dualism between the brain and the body. Where Cartesian dualism relegated mentality to the immaterial substance of the mind, this form of dualism puts the mind back in the brain without changing the fundamental framework implemented to understand their relationship. Embodied consciousness would result from the objectification of the body through the activity of the brain. This is to say that subjectivity does not reside in the body proper, but via the brain's objectification of the body. While it is possible that Damasio is speaking in a very loose way that unintentionally expresses a dualism, it nonetheless conveys such a position.

1.4 The Plan

At this point enough has been said about enactivism to allow for a clear picture of the project at hand. Enactivism is positioned as a viable alternative to the cognitivist approach that is dominant in the sciences of mind. At least part of what enactivism offers is a solution to some of the problems that were highlighted in the first two sections. By grounding consciousness and cognition in the co-constitutive relationship between body and world, enactivists are cognizant of ecological concerns that ought to motivate

experimental paradigms to a greater extent given that the importance of world. Further, given that neurophenomenology develops out of the enactive approach, it should be clear that enactivists take lived experience seriously and value first-person perspective in creating experimental designs and first-person data as relevant to the results of such experiments. This is to say that enactivists take ecology seriously and they take the first-person perspective seriously. Such a position is, for the most part (although certainly not entirely), lacking in the sciences of mind, and so enactivism offers an alternative to the dominant positions that inform many experimental paradigms and designs.

To state it clearly, I think that enactivism is extremely valuable in its actual and potential contribution to the sciences of mind. It offers a position that takes seriously phenomenology in a way that no other extant account of cognition currently operating within the sciences of mind does. This is a shame, given the extensive work phenomenologists have completed over several decades in order to understand the nature and conditions for our phenomenology. Such work should be valued by scientists seeking to provide an empirical understanding of mental phenomena. But enactivism also does not stray from the biological roots of our embodied engagement with the world, and rather strengthens them by seeking to provide an account of cognition that is grounded in the very organization and activity of life to perpetuate its own persistence. The project I undertake is critical insofar as I point out problems with the enactive account, but these criticisms should be viewed from within the broader enactivist framework. What I attempt to create is an account of consciousness and cognition that is still in keeping with enactivism but that is more plausible and more robust than has been articulated. By resolving difficulties with the account, I hope to provide a contribution to the enactivist literature that yields further opportunities for research within the broader enactive framework rather than undermining it.

In Chapter 2, I discuss the enactive account of consciousness as grounded in pre-reflective bodily self-awareness. While the account draws significantly from Merleau-Ponty's earlier works, it neglects any treatment of his later works whatsoever. This is significant because these later works represent a critical development in his philosophy

that involved revisions to and a deepening of the earlier account of embodied subjectivity that he developed in SB and PhP. This oversight, along with too strong a reliance upon Sartre's phenomenology, results in an account of enactive subjectivity that is inconsistent with enactivism's ontological commitments to embodiment and embeddedness. I revise the account of enactive subjectivity by incorporating Merleau-Ponty's later conceptual framework of flesh that expresses a radical intertwining between subject and world. Integrating Merleau-Ponty's later works into the account of subjectivity yields a much more radically embodied account of subjectivity that is more deeply committed to an ontology of embodiment and embeddedness. I show how the difference between the current enactive account and the one I develop is not just semantic by "testing" the account of enactive subjectivity as flesh as a means of interpreting research on bodily consciousness in immersive virtual reality. The account does, however, create a unique problem. The deep intertwining between body and world that underlies our bodily being in the world creates a difficulty for understanding how subject and world are ever distinguishable. I provide a provisional response to this problem based on Merleau-Ponty's work, but set up the next three chapters as laying the groundwork for a more robust response.

Chapter 3 and 4 concern the deep continuity claim held by enactivists that entails life is sufficient for mind. While there is value to such a naturalistic account of cognition, there is also risk in casting the net of cognition so broadly that it loses its utility and explanatory power. I argue that the enactive account of cognition is too broad, given that differences in the kinds of behaviour that simple organisms and humans engage in display too strong a contrast for such an overarching definition of cognition to be explanatorily useful. This is, of course, not to say that there is no continuity between life and mind, but that it is not as deep as articulated through the enactive approach. Indeed, Thompson (2011b) suggests that more care is needed in discussing the relationship between cognition and the kind of sense-making upon which it is grounded. To that end, I spend the majority of Chapter 3 explaining Merleau-Ponty's articulation of sense, which is also the account that motivates the enactive approach. This exploration reveals several themes that are crucial to the discussion. First, sense is not constituted in each

sensorimotor act, but instituted over time through the organism's activity in the world and passive openness to the world. Second, the discussion reveals two types of sense-making that are relevant to the discussion at hand. The first is a kind of passive sense-making, which I call basic sense-making, and is, as the name suggests, the simplest form of sense-making that a living system could be capable of. The second kind of sense-making, which I call adaptable sense-making, concerns the ability an organism has to institute sense differently at different times, such that the meaning an object takes can change over time. The latter, I suggest, is a form of cognition, while the former is not.

Building off of the distinction between kinds of sense-making, I argue in Chapter 4 that the kind of behavioural flexibility an organism exhibits either is or is not indicative of cognition. This involves detailing the enactive account of cognition as grounded in adaptive autonomy, which involves the regulation of structural coupling with the environment that is necessary to maintain an organism's self-maintaining organization. I argue that the kind of behaviour adaptive autonomy produces is not sufficient for cognition because it only allows an organism to execute different behaviours in different contexts or relative to different stimuli. I argue that this is not sufficient for cognition, but that the ability to behave differently in *similar* contexts is, which would signify something like a minimal ability to learn. This latter kind of flexibility I call structural flexibility, which indicates that it is the organism's structures of behaviour themselves that are flexible. The former kind of flexibility I call situational flexibility, which expresses the sense in which an organism has a range of behaviours that can be deployed but only relative to its situation. I show how structural flexibility can be considered a minimal form of cognition through a discussion of self-directed interaction and its relation to learning. (Christensen 2004a) To drive the point home, I discuss the kinds of flexibility that I distinguish relative to the complex fermentation behaviours of *Saccharomyces cerevisiae*, one of the most studied single-celled organisms (also known as brewer's yeast). I argue that while the behaviour of *S. cerevisiae* should not be considered cognitive, it displays a complexity and concern for its own existence that suggests a capacity for basic sense-making. The revisions I make to the deep continuity thesis suggest a more conservative understanding of cognition, but I argue that they are

still consistent with a continuity claim. This is because the capacities for cognition develop out of the same processes that maintain life. In order to show how a continuity can be understood as bridging the minimal form of cognition that structural flexibility affords and the kind of behaviour that humans are capable of, I frame the discussion in terms of Daniel Dennett's work on the evolution of cognition and sentience in *Kinds of Minds*. Using the model he develops, I suggest that many of the complex cognitive capacities humans enjoy, such as language, reflective thought, and culture, can be seen as emerging out of the openness and plasticity that structural flexibility creates.

In revising the continuity thesis central to enactivism by incorporating structural flexibility, Chapters 3 and 4 also provide the groundwork for the solution to the problem of breaking with the world I introduce at the end of Chapter 2. Based on Merleau-Ponty's work, the solution I suggest at the end of Chapter 2 relies on taking into account the inherent temporality of subjectivity as well as the need for a minimal reflexivity in intentionality. In Chapter 5, I argue that understanding subjectivity and structural flexibility as co-constitutively intertwining allows for a relative decoupling of body from world in a manner that creates a hiatus or interval through which the subject develops and becomes differentiated from world via the flexibility that underlies the body's intentional relation to the world. I show how something like this breaking with the world through which a subject can emerge probably also happens in non-human animals and can be seen as grounded in many of the same processes that organize and maintain life. Given that the account developed relies to a great extent on human phenomenology, I also demonstrate how this breaking with the world can be seen as taking place at the pre-reflective level as well. To that end, I discuss Legrand's (2006) account of pre-reflective bodily self-awareness as grounded in action monitoring. I argue that although there are important contributions in this articulation of the physiological grounding of bodily subjectivity, it is only part of the picture. Affective bodily subjectivity, I argue, is also necessary for bodily subjectivity more generally, but also for the account of agentive bodily subjectivity that she develops. Drawing on relevant literature in affective neuroscience, I show how the intertwining of subjectivity and cognition can be understood as occurring at the pre-reflective level, whereby the two ways of being in the world mutually structure

and constrain one another. The inclusion of affective bodily awareness in the manner that I suggest also opens up space for an understanding of subjectivity as fundamentally social, and influenced to a great extent by social norms, even at the pre-reflective level. This is made clear through a discussion of inhibited intentionality as a result of oppressive social norms.

I conclude in Chapter 6 by summarizing the revisions made to enactivism. These revisions have several implications that make it a more viable account of cognition that is particularly valuable as an alternative to the standard cognitivist accounts adopted in the sciences of mind. In summarizing each of the revisions and extensions of the enactive approach, I draw out important implications the account has for research in scientific, clinical, and social contexts. These include, but are not necessarily limited to: a different perspective on certain disorders of consciousness, such as locked-in syndrome, that offers different possibilities for intervention and attributions of consciousness in affected individuals; an extension of the work of feminist phenomenologists on the relationship between the social body and its physiological grounding through an understanding of the role of cognition in subjectivity; and questions about the use of non-human animals in experimental contexts and our moral obligations to them, and our obligations to living systems in general.

The project I develop can thus be framed around three interrelated goals. First, I seek to extend Merleau-Ponty's project by bringing his later works into the contemporary context. These texts are difficult, but valuable for our contemporary context and so I attempt to incorporate them in a way that also makes them more accessible. Second, I revise the enactive approach by developing the enactive account of subjectivity and of cognition in light of Merleau-Ponty's later works, which offers new ways of understanding and integrating contemporary research in cognitive science and the philosophy of biology. Not only do these revisions make enactivism more plausible, they also create new paths for further research by providing a unique interpretation of the enactive body. Third, I develop a unified account of enactive subjectivity that provides a means to understand the relationship between our various ways of being in the world.

Part of Merleau-Ponty's project involved understanding the interrelation of our various manners of embodiment, and the enactive approach can be characterized as sharing a similar commitment. The account that I develop through the revisions I make to the enactive approach provides a means of understanding this interrelation and massive integration between our different modes of embodiment through the enactive body.

The philosophy of embodiment Merleau-Ponty developed was importantly engaged with the relevant scientific literature of his time. He incorporated this research, but was also critical of it insofar as the causal explanations of approaches like behaviourism and Gestalt psychology failed to capture the phenomenology of embodiment. Yet, insofar as we are embodied, or rather, bodily, physiological explanations provide important insight into the nature of perception, cognition, and consciousness, and physiology provides important constraints on phenomenology (e.g. there are physiological reasons why we cannot see light above or below certain wavelengths). As such, phenomenology and physiology must be understood not in opposition but as mutually informing and mutually constraining; physiology is not the whole story but it is part of the story. The project I develop is thus an extension of Merleau-Ponty's critical engagement with the sciences insofar as it incorporates neurophysiological explanations of certain phenomena such as agency and affect. These neurophysiological explanations are not intended to be exhaustive of the phenomena they help explain. Rather, these explanations are interpreted *through* the phenomenological framework of enactive subjectivity I develop and are intended to help inform phenomenological considerations about enactive subjectivity. These causal explanations help contribute to an understanding of how physiology partially determines the manner in which an individual inhabits the world and so contributes to a phenomenology of embodiment.

Chapter 2

2 Enactive Subjectivity as Flesh

Maurice Merleau-Ponty's philosophy of embodiment has been widely adopted by enactivists seeking to provide an account of cognition that is both embodied and embedded. Indeed, Francisco Varela, Evan Thompson, and Eleanor Rosch (1991) view their seminal text, *The Embodied Mind* (and enactivism more generally), as a continuation of the project Merleau-Ponty began. (xv) This makes sense, given that enactivism is an account of embodied cognition that articulates cognition as enacted through the organism's co-constitutive interaction with the world. This is the general framework that Merleau-Ponty develops through his phenomenological account of embodied subjectivity, which can be found, among other works, in *The Structure of Behavior* (SB) and *Phenomenology of Perception* (PhP). These texts are arguably the most popular and accessible to cognitive scientists advancing embodied cognition, and the ones that enactivists largely draw on as well. Given the explicit endorsement and adoption of Merleau-Ponty's work and the framework for embodied subjectivity that he develops, it is surprising then, and perhaps even troubling, that Merleau-Ponty's later works receive very little attention by enactivists. In these later works, especially *The Visible and the Invisible* (VI), Merleau-Ponty substantially revises the conception of embodied subjectivity that he developed in his earlier works. Briefly, he argues that this revision is necessary because by attempting to understand consciousness through the concepts of subject and object, as his earlier account did, we implicitly ground consciousness in a framework that irreconcilably dichotomizes subject and object in a way that is problematically dualistic. (VI 200) As a result, Merleau-Ponty more fully develops the radically embodied ontology implicit in his earlier work by introducing the concept of 'flesh' as a means to overcome the dichotomy between subject and object and to emphasize the chiasmic intertwining of body and world. (VI 139, 147) This reformulation makes Merleau-Ponty's later account of embodied subjectivity even more radically embodied and embedded.

In what follows I argue that the enactive account of subjectivity is troubled by the same difficulty Merleau-Ponty finds in his earlier work because it too adopts a dichotomizing framework of subject and object. In particular, the concept of pre-reflective bodily self-consciousness[1] that is often used to ground the enactive account of consciousness is susceptible to the same criticisms that Merleau-Ponty levels against his earlier work and the works of Edmund Husserl and Jean-Paul Sartre. This is arguably because the enactivist account of bodily self-consciousness has its roots in the phenomenology of Husserl, Sartre and Merleau-Ponty's earlier account of embodied subjectivity. As a result, enactive subjectivity ultimately reifies the antinomy between subject and object that Merleau-Ponty argues allows dualism to creep back in. Consequently, the enactive subject, as stated, is not embodied to the extent intended, nor is it as deeply embedded in the world. Incorporating the ontology of flesh into the enactivist account of subjectivity, I argue, can overcome these difficulties by grounding the enactive subject in what Merleau-Ponty comes to call the chiasmic relationship of body and world.

As discussed in Chapter 1, this project is intended as revision rather than bare criticism. While I provide revisions to the enactivist account of subjectivity, they are intended to be revisions *consistent* with enactivism. Enactivism offers an important, and I think largely correct, alternative to the standard approaches to cognition and consciousness dominant in the sciences of mind. I am sympathetic to the enactivist project and so my intention is to provide an account of enactive subjectivity that is very much still in keeping with enactivism but that incorporates the insights of Merleau-Ponty's later works, leading to what I would argue is a more embodied and embedded account of subjectivity. Given that enactivism is grounded in phenomenological accounts of subjectivity, it is important that this phenomenology is consistent and accurate. As such, what I aim to do in this chapter is develop and extend the phenomenological roots of enactivism in order to support the ontological commitments central to the enactive account. Importantly, this chapter sets up the discussion for the remainder of the dissertation. While the topics I discuss in other chapters go beyond the enactive account of subjectivity, the account that I develop here is

[1] It is also often referred to as pre-reflective bodily self-*awareness* and as such I'll use them interchangeably.

foundational in that the questions that further chapters take up are in service of a deeper understanding of the account developed here.

I begin by laying out the account of enactive subjectivity under discussion. I show how this account is related to Merleau-Ponty's own account that he developed in PhP and to Sartre's account of consciousness. This makes it susceptible to the criticisms of embodied subjectivity that Merleau-Ponty raises in his later works, especially in relation to the inherent, but often overlooked, passivity of subjectivity. I show that incorporating the insights of Merleau-Ponty's later works can help to develop an account of enactive subjectivity that is not prone to the same problems and that more effectively expresses the ontological commitment to embodiment and embeddedness. In order to show that these revisions are not just semantic in nature, I argue that it can offer further insights into the nature of subjectivity by discussing it in relation to research in immersive virtual reality aimed at augmenting the sense of self by creating illusions of bodily ownership over virtual bodies. I argue that such experiments can lend insight into the chiasmic intertwining of body as sensible and body as sentient and additionally, that understanding the relationship between body and world as flesh can help guide such research.

2.1 Embodiment and Embeddedness

Before I fully articulate the enactive account of subjectivity, it's worth briefly highlighting more explicitly how enactivism can be understood as deeply committed to embodiment and embeddedness. The rejection of an ontological distinction between mind and body is arguably the minimal requirement for any embodied theory. Given that many contemporary theories of consciousness and cognition attempt to articulate the brain as the physical realizer of our mental life, in one way or another, this minimal requirement casts a very large net. Enactivism, however, is committed to a much stronger claim that the brain *by itself* is not a minimally sufficient physical basis for the mind. (Cosmelli and Thompson 2010; Colombetti 2014) Because the mind is enacted by the organism through its self-maintaining organization and through its interaction with the world in which it is embedded, the body outside of the brain plays a much more crucial role. This engagement is supported by the various self-regulatory processes that help maintain the

organism's viability and not *just* a result of the sensorimotor systems of the organism, upon which many embodied accounts have too heavily focused (e.g. O'Regan and Noë 2001; Noë 2004). (Colombetti 2010, 2014) Given that these systems incorporate bodily processes realized throughout the organism beyond the confines of the skull, cognitive processes are not strictly reducible to brain processes. Cognition and consciousness are deeply intertwined with the homeostatic processes that motivate environmental interaction in relation to the current needs of homeostasis. As such cognition is fundamentally world-oriented and accomplished *through the body*. This means that having a body is necessary for cognition and consciousness, and that the type of body one possesses impacts the kind of mind one has and how one inhabits the world. How one inhabits the world influences how the world opens to the individual, which amounts to the claim that cognition is *embedded*. Embeddedness can be understood as the claim that "the mode of activity on which [cognition] essentially depends simultaneously constitutes both the cognitive life of the subject, and the environment to which the subject is responsive." (Ward and Stapleton 2012, 99) The world constrains the subject and the possible interactions between the two and in this sense cognition cannot be understood independent of the world in which the subject is embedded.

Insofar as the mind is partly grounded in self-regulatory systems, the mind is enacted by the *living* body. This physiological grounding enriches the sense of subjectivity that (partly) constitutes our experiences and mental states by incorporating agentive *and* affective dimensions. It also means that experience cannot be isolated as static moments that can be objectified—taken as an object—that can be reductively analyzed. This is to say that experience is *lived* by the body. As such, taking lived experience seriously means that, contrary to many contemporary accounts of consciousness, it cannot be understood as reducible to a form of object-intentionality (e.g. through the act of a higher-order mental state taking another state as its object). (Cf. Carruthers, 1996; Lycan 1996; Rosenthal 2005) Rather, experience must be investigated as *lived* by the embodied subject that is created by the co-constituting interaction between organism and world.[2]

[2] I will call into question the extent to which this claim is established by the phenomenology that supports the enactive account of subjectivity.

(Zahavi 2005) The subject, while not strictly reducible to intentional relations, is generated through the organism's orientation toward and active engagement with the world. The mind is thus constituted by a situated, world-oriented subject and cannot be reduced to a collection of disembodied mental states. Neither world nor subject is disclosed independently, and as such, neither can be understood completely in isolation. This reinforces the embeddedness claim, but through a phenomenological analysis of subjectivity rather than the physiological grounding of consciousness.

2.2 Enactive Subjectivity

The picture painted thus far gives an impression of cognition and consciousness as radically embodied and deeply embedded in the world. What I will argue is that despite an explicit ontological commitment to the radical embodiment and embeddedness of consciousness, the phenomenological analysis of consciousness that many enactivists develop (e.g. Legrand 2007b, Thompson 2007; 2012; Colombetti 2011) does not support such a strong ontological claim. This is arguably a result of the reliance upon the phenomenology of Sartre (1978 [1943]), Husserl (1960 [1931]; 1989 [1952]) and the Merleau-Ponty of SB and PhP. For example, Thompson (2007) explicitly defends his use of Husserlian phenomenology despite earlier hostility. (Cf. Varela et al. 1991) The renewed interest in Husserl comes, Thompson states, from a more careful reading of Husserl both on his part and from the influence of Dan Zahavi (2002b, 2003a, 2003b, 2005). Drawing upon a variety of phenomenological approaches to consciousness can undoubtedly allow for a richer, more nuanced, account of consciousness. But precisely because of this, and because of its relevance to these accounts, it is disappointing that so little attention has been paid to Merleau-Ponty's later work, and VI in particular. In VI we find important conceptual revisions and a significant evolution of the ontological project that Merleau-Ponty was beginning to develop in SB and PhP. I will argue that because enactivism is susceptible to the criticisms that Merleau-Ponty develops in VI, incorporating his new ontology and revisions to embodied subjectivity would greatly enrich the enactivist commitments to embodiment and embeddedness. To that end, I begin by articulating the enactive account of subjectivity as grounded in pre-reflective bodily self-awareness (PRBSA).

2.2.1 Pre-reflective Bodily Self-Awareness and the Body Schema

The enactive account of consciousness is often grounded by a bodily self, where 'self' is understood as the subject of experience rather than the more robust narrative self that populates our memories. (Legrand 2006; Thompson 2007; Colombetti 2014) The model for consciousness as grounded in PRBSA that Legrand has developed (cf. Legrand 2006, 2007a, 2007b, 2010, 2012) has been adopted by many enactivists writing on various aspects of bodily subjectivity, including but by no means limited to Christoff et al. (2011) to help specify the self for cognitive neuroscience, Colombetti (2011, 2014) to develop an account of affective bodily consciousness, Mandrigin and Thompson (2015) in relation to own-body perception, and Thompson (2007) as a basis for bodily self-consciousness. As such I will largely use her account as a model for the enactive articulation of the bodily self.[3] She begins by distinguishing between two different ways in which we can be aware of ourselves: through observational and reflective self-consciousness (self-as-object) and through non-reflective forms of self-consciousness (self-as-subject). Observational self-consciousness is not sufficient *by itself* to ground one's self-consciousness because it is possible to be mistaken about attributions of self based solely on observational self-consciousness (e.g. not recognizing oneself in a mirror). (Legrand 2007b) One of the purported features of the kind of self-consciousness being investigated is a so-called immunity to error through misidentification.[4] (Shoemaker 1968) One cannot be mistaken that it is me who is having a given experience, but one can be mistaken that it is me that is the object of the experience. This observational self-consciousness is *grounded* by pre-reflective self-consciousness, for even while it is possible to mistakenly think that I am

[3] I do not mean to imply that the enactive account of consciousness is *necessarily* grounded in Legrand's account of bodily self. However, many enactivists adopt her account given that it appears to express and support an enactive approach to consciousness. This is, of course, not to say that there *cannot* be alternative enactive accounts, but I will identify the type of enactive approach that adopts her account of bodily self as 'the enactive account' for ease of reference.

[4] I'm not convinced by the claim that the relevant kind of self-consciousness is always immune to misidentification in this manner, for reasons that will hopefully become apparent closer to the end of the chapter. However, it is nonetheless how the philosophers in question often individuate pre-reflective self-consciousness.

looking at someone else in a mirror, in the same act of self-observation I am pre-reflectively aware of myself *looking* at the mirror. (Interesting, this way of individuating self-consciousness can already be seen as setting up a dichotomy between the body-as-object and the body-as-subject.) In this sense, pre-reflective self-consciousness is constitutive of consciousness insofar as pre-reflective self-consciousness is necessary for and constitutive of reflective self-consciousness and consciousness more generally. (Zahavi 2005; Legrand 2006; Thompson 2007; Colombetti 2011, 2014). Pre-reflective self-consciousness is *bodily* insofar as it is the body in its agentive and affective dimensions and "corresponds to the bodily mode of givenness of intentional objects of consciousness." (Legrand 2007b, 505). Perception, and intentionality more generally, are possible by means of the perspective that opens onto the world, and that perspective is nothing other than the body itself. As such, any experience of the world simultaneously already corresponds to a bodily experience at the pre-reflective level.

In developing her account of PRBSA, Legrand also draws on Merleau-Ponty's account of subjectivity developed in PhP. The extent to which PRBSA is pre-reflectively bodily is at least partially owed to Merleau-Ponty and parallels can certainly be drawn when, for example, he states that "[c]onsciousness is being toward the thing through the intermediary of the body." (PhP 140) The notion of the body schema[5] (also referred to as the 'corporeal schema') that Merleau-Ponty develops is very close to PRBSA, albeit significantly more robust (the body schema arguably has a more substantial temporal thickness, and incorporates the individual's history in a way that goes far beyond PRBSA); "I hold my body as an indivisible possession and I know the position of each of my limbs through a *body schema* [*un schéma corporel*]." (PhP 100-1) Merleau-Ponty maintains that during experience, the body schema is pre-reflectively present as a system open onto the world (PhP 526n115) and in this sense is certainly not simultaneously accessible to consciousness *in experience* as an *object* of experience. But for Merleau-Ponty, the body schema is, however, grounded in the experience of my bodily presence in

[5] As a point of disambiguation, the body schema I refer to here is not the body schema as discussed by Gallagher (1986) in contrast to the body image.

the world (PhP 191), which is to say: "the body schema is not merely an experience of my body, but rather an experience of my body in the world." (PhP 142)

As a form of self-consciousness,[6] Merleau-Ponty's body schema is fundamentally world-oriented: "the "body schema" is, in the end, a manner of expressing that my body is in and toward the world." (PhP 103) In this sense we can understand the body schema as a pre-reflective contact of self with world. Indeed, in his *Nature* lectures, Merleau-Ponty explains that the "relation with the world is included in the relation of the body to itself" (Merleau-Ponty 2003, 224) and that the body schema is a relation of being between body and world (Merleau-Ponty 2003, 278). Because the body schema brings the world to bear in the body, it expresses the ecstatic nature of the body and the intertwining and insertion of body and world. The body in ecstasy is outside itself and bound up in the world. As such, the body schema expresses the body's *situational* spatiality, which is to say that the body is in and *toward* the world and so takes up the world as it is *lived* by the body and is fundamentally the manner in which we *inhabit* the world. (PhP 103) This contrasts with how self-consciousness is often understood (pre-reflective or otherwise), as a contact of self with self. Indeed, in VI Merleau-Ponty argues that such a pre-reflective contact of self with self is impossible. I'll elaborate on this in the next section, but first I bring out some parallels between the enactive account of PRBSA and Merleau-Ponty's body schema.

What Legrand (2010) describes as the "body-as-subject-in-the-world," which is one dimension of PRBSA, corresponds very closely to the body schema as articulated above, for she claims that it "corresponds to a form of bodily-consciousness which goes beyond the body proper, as it corresponds to the experience of the world as disclosed by the body… [and is] pervasively experienced as it *structures* any experience, by anchoring it to the spatio-temporal location of the experiencer's body." (190) In the same way that the body schema grounds motor intentionality as an original intentionality and as such

[6] I do not mean to imply that the body schema is *only* a form of self-consciousness, but as a pre-reflective system that opens onto the world self-consciousness is one of its dimensions.

structures our engagement with the world, PRBSA is fundamentally anchored to consciousness of the world (Legrand 2006, 113) and for this reason Legrand argues that it incorporates self-relative rather than self-specific information. Self-relative information involves not just sub-personal information about the body qua self, but information about the world relative to the self via the reciprocal modulation and coherence of perceptual feedback and motor intention. (Legrand 2007b, 513; Thompson 2007, 252) So, much like Merleau-Ponty's body schema, I think that PRBSA is intended to be understood as a pre-reflective contact of self with world.

2.2.2 The Tacit Cogito

In VI Merleau-Ponty levels various criticisms against several accounts of consciousness, most notably his own, which could be regarded as a rejection of the account he develops in SB and PhP. It is more likely, though, that these criticisms and revisions represent an evolution and deepening in his thoughts on consciousness and Being (Dillon 1988, Evans 2008, Hass 2008, Morris 2010, Marratto 2015). Specifically, his later work can be seen as an attempt to fully develop the ontology of bodily being in the world that is implied in his earlier works. The difficulty in bridging his works comes with the realization that the phenomenology he developed was structured by a conceptual framework that ultimately reified a dualistic ontology that he had sought to reject. As such, with his ontology of the flesh he sought to overcome the dichotomy of subject and object through a rejection of previous notions of consciousness and subjectivity.

The criticism most pertinent to the discussion at hand involves Merleau-Ponty's rejection of the tacit cogito, which he describes as "a pre-reflective contact of self with self (the non-thetic consciousness [of] self…) or a tacit cogito (being close by oneself)." (VI 171) Insofar as the cogito is the stated "I think" of reflective consciousness, the tacit cogito is the implicit self-awareness that the cogito presupposes (the reflexive "I" of the "I think"). Merleau-Ponty attributes this tacit cogito to Sartre's account of consciousness, but also to his own account as it is developed in PhP, as an implicit form of self-consciousness already operative prior to reflective consciousness and rooted in the "I can" of my body. (Marratto 2015, 161) The tacit cogito that Merleau-Ponty later rejects is thus understood

as the form of self-awareness that is implicit in and necessary for self-consciousness. As one can see, the account of PRBSA is strikingly similar to the tacit cogito that the later Merleau-Ponty rejects. This is likely because the enactivist account of subjectivity is largely modelled upon Sartre's phenomenology of consciousness, and this Sartrean account is one of Merleau-Ponty's targets of critique. Zahavi, following Sartre, argues that PRBSA is disclosed through one's interaction with objects and the world insofar as consciousness is always *of* something. (Sartre 1978 [1943]; Zahavi 2005) Consciousness on this account is thus grounded in an intentional relation between subject and world. One important difference between Sartre's account and the enactive account is that rather than grounding consciousness in a Cartesian subject, as Merleau-Ponty argues Sartre's account does, enactivists ground consciousness in a bodily self. (Legrand 2006, 2007b, 2012; Zahavi 2005) Drawing on the accounts of PRBSA that Legrand (2007a) and Zahavi (2005) develop, the enactive account of consciousness can be interpreted as an application of Sartre's insights on pre-reflective self-awareness to the body so that the subject of experience is the body as agentive and affective. On the enactive account, the subject in the intentional relation that grounds consciousness is the bodily self.

Merleau-Ponty claims that adopting the tacit cogito commits us to an understanding of consciousness that is fundamentally dualistic. In articulating his phenomenology of self-consciousness Sartre argues that reflective consciousness (the cogito) is grounded upon a pre-reflective consciousness (the tacit cogito), much in the way that consciousness (self-consciousness included) is grounded in PRBSA as discussed above. (Sartre 1978 [1943]) For Sartre, consciousness is always a "consciousness of" and so the tacit cogito is parasitic upon the world, and more specifically, the intentional object, which means that "I am a pure consciousness *of* things." (Sartre 1978 [1943], 257; cf. Legrand 2012) However, this dependence of consciousness on the object does not necessarily entail a co-constitutive relationship; consciousness is a lack or negation of Being that comes into being only in the presence of the object. (Hass 2008, 129) Consciousness, the for-itself, is the internal negation or nihilation of the in-itself (objects). This is not, strictly speaking, an endorsement and reinstituting of Cartesian dualism, given that the for-itself (consciousness) is the negation of a thing, or a *no-thing*. It is in this sense that Sartre

proclaims that "I am my own nothingness." (Sartre 1978 [1943], 260) As such Sartre's ontology is supposed to be monistic insofar as there is only one kind of substance in play. However, there is still a dualism in terms of being: the for-itself (consciousnss) is activity and the in-itself (object) is passivity. (Sartre 1978 [1943]) Sartre's philosophy is thus considered one of negation and his account of consciousness is grounded on a bifurcation of subject and object insofar as subjectivity is negation, and world, or object, is the positivity that brings consciousness into being. Subjectivity is thus articulated precisely as standing against objects and the world.

Two problems arise from Sartre's articulation of consciousness. The first is the problem that Merleau-Ponty identifies in VI when he claims that the "problems posed in PhP are insoluble because I start there from the "consciousness"-"object" distinction." (VI 200) Here the dichotomy between subject and object is irreducibly dualistic but not strictly in the Cartesian sense in which the mind stands out against the body. Rather the subject stands against the world. If consciousness and world, subject and object, are articulated precisely as standing *against* one another in this manner, it creates an ontological gap between them. Perceptual experience would be grounded in an *opposition* that reifies the dichotomy between subject and object. (Hass 2008, 130; Landes 2013, 167) Merleau-Ponty's body schema, as a pre-reflective contact of (bodily) self with world, is not a dichotomy in opposition to the same degree as Sartre's account of consciousness, but because it is still articulated in terms of subject and object it nonetheless reifies their distinction. The conceptual framework of flesh can, however, provide a means of articulating the body schema in a way that is not dichotomizing.

The second problem is that the openness to the world that characterizes embodied perception (indeed perception in general) becomes impossible on this picture. If we follow Sartre's account of consciousness as negation, no distance between subject and world is possible and perception collapses in on itself from a lack of differentiation "since he [sic] who thinks, being nothing, cannot be separated by anything from him [sic] who perceived naïvely, nor he [sic] who perceived naïvely from what he [sic] perceived." (VI 88-9) Merleau-Ponty argues that this model of consciousness makes the subject too much

outside itself, lacking distinction from the world. As parasitic upon the world, Sartre's consciousness is thus a philosophy of "activism." (Merleau-Ponty 2010, 150) For Sartre, consciousness is always an act on the side of the subject that is oriented toward the world. (Sartre 1978 [1943]) But understood as such, the active subject does not let the world "speak" for itself and instead posits the subject as wholly active and in so doing betrays our rootedness, or embeddedness, in the world. (Morris 2010) Our embeddedness in the world requires not just our active engagement in and toward the world, but that the world reciprocally constitutes our subjectivity. To extend the metaphor of "rootedness," the activity of rooting *equally* involves being passively guided by the terrain and soil quality in which the plant roots, and so "things help constitute our bodies insofar as the bodily responsivity required for the revelation of a thing is a power that is not simply given but must be developed, and insofar as that development is in large part guided by the thing to be revealed." (Maclaren 2014, 98) Put another way, consciousness understood as activity essentially becomes an act of projection upon the world. Interpreted as activity, subjectivity is not embedded, and consciousness grounded in a tacit cogito that is parasitic upon the world ends up betraying the openness to the world that characterizes perception in general. Sartre's account of consciousness, Merleau-Ponty argues, still begins with this subject-object distinction and in so doing ultimately allows that dichotomy to ground our relation of openness in the activity of the subject. (VI 99) As a result, Merleau-Ponty argues instead, "it is through openness that we will be able to understand being and nothingness, not through being and nothingness that we will be able to understand openness." (VI 99)

Grounding consciousness in a tacit cogito is thus problematic because it either precludes the possibility of (embedded) perception or it commits us to a dualistic ontology that presupposes the very phenomena it tries to explain (consciousness). A similar line of argumentation is what drives Merleau-Ponty to undergo a re-examination of the notions of "subject" and "object" (VI 23) and the relationship between body and world. The dualism and activism implicit in theories of consciousness such as Sartre's ultimately motivated Merleau-Ponty to reject the framework for consciousness that relies on a dichotomy of subject and object, and to revise his own earlier account of consciousness.

While it is not an outright rejection of his earlier account, the philosophy of the flesh that Merleau-Ponty develops in VI presents a novel account of our bodily being in the world that was not fully developed in these previous accounts, and that affords new ways of thinking through our embodied relationship with the world. As such, any account of consciousness that relies on Merleau-Ponty's earlier accounts (or that of phenomenologists such as Sartre) will be susceptible to the same criticisms. I discuss the ontology of the flesh in §2.3, but before that I explain more explicitly how Merleau-Ponty's criticisms of the tacit cogito and consciousness apply to enactive subjectivity.

2.2.3 Pre-Reflective Bodily Self-Awareness as Tacit Cogito

Insofar as PRBSA is Sartrean, it is undoubtedly susceptible to Merleau-Ponty's critique of the tacit cogito that I detailed above. But PRBSA is not *only* Sartrean given that the phenomenology of PRBSA also draws heavily from Merleau-Ponty's own articulation of the body schema, which I explained in §2.2.1. While the general structure of consciousness is adapted from Sartre, I do not think, strictly speaking, his philosophy of negation is carried over to PRBSA. Consciousness, as grounded by a bodily self, is not an absence of being. However, the activism also found in Sartre's philosophy does appear to feature prominently in the phenomenology of PRBSA. This is not surprising, given that David Morris notes how Merleau-Ponty's discussion of the body schema "can misleadingly invite an all too activist reading, as if the theory of the body is already a theory of perception and the world because the body actively communicates its schema to the perceived world in a one way fashion...[t]his activist reading forgets that the body's inherency in the world is a two-sided, two-way opening." (Morris 2010, 156). Indeed, Legrand (2007b) claims in the section on *The Transparent Body* that at "the pre-reflective level, the body is lived insofar as it *projects* itself on the world…[i]n normal circumstances… we *project* ourselves to the world." (Legrand 2007b, 505; my emphasis) Interestingly, this claim is made in relation to Merleau-Ponty's philosophy of embodiment. Further, it is precisely in this section (on the *transparency* of the body) that one would expect to find an articulation of the body as involving a passive openness to the world. To reiterate the point made in the previous section, if consciousness is construed in terms of a philosophy of activism, this overlooks the passivity of our body in

relation to the world and the manner in which the world presses upon us. This is to say that it betrays our embeddedness in the world and so does not account for, or leave room for, our embeddedness in it. (Morris 2010)

To push the point a bit further, the characterization of transparency is also potentially problematic; "[t]he *transparent* body is the sense that one looks *through* it *to the world*." (Legrand 2007b, 504; cf. Mandrigin and Thompson 2015) This is meant to complement a second dimension of PRBSA as performative. The articulation of the body as performative-transparent would lend itself well to an interpretation of the body as active in the world and passively open to it, but as articulated above, this is not the route taken. The act of looking *through* the body to the world renders subjectivity as active and is also in danger of setting up an odd dichotomy between subject and world whereby the body is merely instrumental, or a means to the ontological relationship between subject and world. Further, in a discussion of the subject's openness to the world, Legrand (2012) claims that in relation to the "'openness' characteristic of subjects (versus objects)…the subject experiences objects by reaching *out*, transcending himself [sic] in intentional experience of the world out there, beyond the subject himself [sic]." (293), given that "the object is understood phenomenologically as what is aimed at by the intentional act of consciousness." (287) While Legrand explicitly acknowledges the importance of the openness of the subject to the world, the phenomenology used to articulate this openness does not express passivity but rather the very kind of activity that is inconsistent with openness insofar as the subject constitutively *reaches out* to objects. As such, even though PRBSA goes beyond the tacit cogito in that it is grounded in a bodily self, the structural parallels between the phenomenology of PRBSA and Sartrean activism render it susceptible to Merleau-Ponty's criticism of the tacit cogito. The susceptibility arguably comes about because the philosophy of activism is built into en*activism*.

I attribute the problems above to a tension that arises from an inconsistency between the phenomenology of PRBSA and the stated ontological commitments of enactivism. As articulated above, the phenomenological account of perception that is built into enactivism sets up an opposition between subject and object in a way that cannot be

reconciled with the stated ontological commitment to the embeddedness of subject in world, as articulated in §2.1. Further, one of the implications of this activist reading of PRBSA is that the relationship between the body and itself becomes problematic; the nature of the relationship between body-as-subject and body-as-object as developed through the articulation of PRBSA becomes obscured in light of the above criticism. This obscured relationship between the subject and its body comes about because, on the enactive account, our contact with the body-as-object would not be distinct from that of other objects. This leaves the body bifurcated between subject and object and causes tension with the commitment to a radically embodied subject, as articulated in §2.1. Legrand (2010) explicitly states that "[t]he distinction between body as-intentional-object and body-as-subject is not ontological but phenomenological" (188) and that body-as-object and body-as-subject are constitutively intertwined (190) insofar as one cannot see without being visible.[7] (191) But beyond stating *that* they are intertwined and *that* the distinction is not ontological, it is unclear how body-as-subject and body-as-object are to be articulated in a way that leaves room for an understanding of the body-as-object as constitutive of consciousness. The ontology of the flesh that Merleau-Ponty develops in VI offers a way of explaining the relationship between body-as-object and body-as-subject as grounded in the chiasmic intertwining of the sensing and the sensible and in so doing also expresses our openness to the world in a way that roots the body in the world. To that end, I will articulate flesh. But very briefly before discussing flesh I will mention a similar line of criticism pursued from a less phenomenological perspective.

2.2.4 Passive Touch

That enactive accounts are often articulated as one-sidedly active is an idea that has been explored elsewhere as well. Frederique de Vignemont (2011) has argued that enactive accounts (broadly construed as accounts unified by the claim of an interdependence between perception and action) have difficulty accounting for passive touch. The kinds of tactile sensations in question can be broadly grouped under instantaneous passive touch, and include sensorially sparse experiences such as a small leaf briefly brushing against

[7] Interestingly, here Legrand is explicitly assenting to Sartre's phenomenology.

one's arm. Importantly these sensations are supposed to be considered sparse because they are not supposed to be actionable in the sense of giving rise to action or a desire to initiate movement (e.g. to flick the object off of one's arm). Instantaneous passive touch does not involve any *action* on the part of the subject and so no sense of agency underlying the experience. Because any latent coupling of action and perceptual systems is not supposed to be able to account for instantaneous passive touch, de Vignemont (2011) argues (drawing on empirical research), it is implausible that the sensations generated via instantaneous passive touch could have any bearing on action. As such, these sensations are supposed to be so brief and information-impoverished that there is no sense in which they could be constituted by action-oriented bodily activity. To draw out the thrust of the criticism as it applies here, it's unclear how to account for the passivity of some forms of touch if perception is fundamentally activity. Whether or not one finds this criticism particularly damning of the enactive account, it is certainly worth pointing out that the relative absence of passivity within enactive accounts has been noticed by other researchers as well. Once I articulate Merleau-Ponty's account of flesh and show how it can be incorporated into enactive subjectivity I will return briefly to the apparent problem of passive touch to show how easily it can be addressed if we adopt the conceptual framework of flesh.

2.3 Flesh

To resolve the issues discussed in the previous section, Merleau-Ponty argues that the relation between subject and object must not be dichotomous, but chiasmic; "subject" and object intertwine and overlap indivisibly. While Merleau-Ponty sought to undo the insoluble dichotomy that results from framing consciousness around a subject-object distinction by eliminating the subject or subjectivity as classically defined, it is not strictly correct to say there is no self or subject on his later account. Rather, I qua subject *am* my body and my situation. (VI 60) "Subjectivity" is the contact of my body (as a sensible for-itself) with the world, and this intertwining of body and world is *flesh*. As such, there can be no pre-reflective contact of self with self "because our flesh lines and even envelops all the visible and tangible things with which nevertheless it is surrounded, the world and I are within one another, and there is no anteriority of the *percipere* to the

percipi, there is simultaneity or even retardation." (VI 123) This shifts perception from the sphere of the perceiver to Being as a whole. (Morris 2010) To understand this, I need to articulate more fully the chiasm and the reversibility of flesh.

2.3.1 The Chiasm

Articulating the relationship between body and world as chiasm is both an ontological and phenomenological project. As a relation, chiasm designates a point of contact, or weaving together, within a crossing over whereby an exchange is made. (Hass 2008, 132n13) In the context of our being in the world, the crossing over and exchange is between body and world (or other). What this is meant to express is the mutual insertion and intertwining of body and world. As detailed above, one's contact with the world is simultaneously a contact with oneself and reciprocally, "the body feels the world in feeling itself." (VI 118) Indeed, Merleau-Ponty articulates the body as a "porous being", or a hollow, to illustrate the sense in which the world permeates the body, and yet the body nonetheless has its own infrastructure. (VI 101-2) This adherence of body and world is not, however, a "fusion or coinciding" of body and world, which would make perception impossible for the reasons detailed in §2.2.2. Rather, it is a proximity at a distance (spatial or temporal), which allows one to be "of the world" without being identical to it. (VI 127) The distance, *écart*, or thickness, that separates and simultaneously brings together body and world is the flesh; "[i]t is that the thickness of flesh between the seer and the thing is constitutive for the thing of its visibility as for the seer of his corporeity; it is not an obstacle between them, it is their means of communication." (VI 135) Because I am a sensible thing among things, I am inalienably part of the world and so the world is immanent, yet because I perceive the world I am distant from it and so transcend it. It is precisely that my body is both sensible and sentient which makes this chiasmic relationship possible "because a sort of dehiscence opens my body in two, and because between my body looked at and my body looking, my body touched and my body touching, there is overlapping or encroachment, so that we must say that the things pass into us as well as we into the things." (VI 123) This divergence (*écart*) that splits my body into object and "subject" is subtended by the reversibility that characterizes the body in the world.

2.3.2 Reversibility

The chiasm is the description of the structure of being that bridges body and world. But what makes the chiasm possible is the reversibility of the flesh. Both the unity of the body and its dehiscence into sentient and sensible are possible because of reversibility. (VI 138) The divergence of sentient and sensible is importantly not two different *kinds* of being that would reinstate a dichotomy, but rather "two divergent ways in which being *is*." (Morris 2010, 145) The relationship can be characterized as a reversibility of the body as passive and of the body as active, and as such by the ability to modulate between these different modes of embodiment. By characterizing reversibility in this way, we can understand how the two aspects of the chiasm are "incongruent counterparts" that can never fully coincide. (VI 147; Morris 2010) Passivity and activity are not simply different points on a scale whereby passivity just is the absence of activity and vice versa. (Morris 2010, 150) Indeed, Morris (2010) argues that "[a]ctivity and passivity are inseparably counterpart (since neither is devoid of the other), yet incongruent (since they are nonetheless irreducible to one another)." (Morris 2010, 153-4; Maclaren 2014, 100) My very hand that actively touches the surface of a table is also passively open to the surface it touches in such a way that my active exploration of it is guided by what the table reveals to me to prompt my exploration. (Maclaren 2014) And when I touch my right hand with my left, I witness the dehiscence of my body between passive object and active subject. But this is not a split in being; "[w]hen one of my hands touches the other, the world of each opens upon that of the other because the operation is reversible at will, because they both belong (as we say) to one sole space of consciousness, because one sole man touches one sole thing through both hands." (VI 141) The non-coincidence of sensible and sentient is marked by a hiatus between touching and touched, seeing and seen, precisely because they are different ways that being is. This hiatus, or interval, is the temporal thickness of the flesh that is our bodily being in the world. (VI 148)

2.3.3 The Enactive Subject as Flesh

We are now in a position to understand how the new ontology of the flesh and the revisions to bodily being in the world that it brings can be incorporated into enactivism to

overcome Merleau-Ponty's criticisms that show how PRBSA implicitly supports a dualistic ontology and undermines the embeddedness of enactive subjectivity. There are (at least) two ways in particular that adopting the conceptual framework of flesh can benefit enactivism in this regard. First, by articulating the reversibility that grounds the chiasm between body and world in terms of activity and passivity, bodily being in the world provides an account of our being in the world that is not one-sidedly activist. Instead, the chiasmic relationship between activity and passivity in perception reveals the sense in which the body is both active in perception and passively open to the world, so that "consciousness" is chiasmically grounded in world and body. The inclusion of passivity grounds the inclusion of world in body in a way that allows us to articulate the body as rooted, or embedded, in the world. Rather than consciousness—pre-reflective or reflective—projecting itself onto the world, body and world stand in a chiasmic relationship that co-constitutively brings forth our bodily being in the world.

Secondly, the nature of the chiasm and the reversibility of sentient and sensible provide an explanation for the relationship between body-as-subject and body-as-object that the enactive account lacks. As discussed in §2.2.1, Legrand (2010) mentions the intertwining of self-as-subject and self-as-object without providing a basis for that relationship. This relationship, between sentient and sensible, was laid out in the previous section (§2.3.2), but I will elaborate it more explicitly in relation to PRBSA. Just as our pre-reflective contact with self always happens in the context of the world—or rather is co-constitutively bound up with the world, sensible and sentient, body-as-object and body-as-subject, are co-constitutively bound up with one another. These two descriptions of bodily being in the world are not separate or independent. Legrand (2006) argues, for example, that our pre-reflective bodily experience of agency comes from the coherence of perception, intention to act, and sensorial consequences of that action. Within the coherence of intention, perception and action, self-as-object (the body as sensible) is *already* specified within embodied perception and the sensorial consequences of the initiated action such that our experience of agency, *at the pre-reflective level*, is already

an experience of a unified bodily being in the world.[8] PRBSA cannot be understood as a mode of bodily being in the world independent of the body as sensible. The chiasm provides us with the structure of the relationship between body-as-subject and body-as-object and reversibility provides the means of their cohesion. In this way, we can express enactive subjectivity as flesh.

At this point we can see how the problem of passive touch (briefly discussed above) is almost immediately resolved if we incorporate flesh into enactive subjectivity. Passive touch is only a difficulty if the body is construed strictly in terms of activity. The very openness of our bodies to the world requires that our bodies are passive to allow for the solicitation of the world. The intentional arc that Merleau-Ponty discusses in PhP reveals the interconnection between motricity (action), perception, cognition and affect, and reveals a unified body that exists in and toward the world. The philosophy of the flesh elaborates on the intentional arc by showing *why* perception cannot be reduced to an activity of motricity; each activity of motricity is always also passively sensitive, and each passive sensitivity to the world is simultaneously an activity (either through motor exploration or a focusing of attention, for example). Passive touch is a problem only once we bifurcate action and perception into distinct parts that are grounded in activity. Instead, the body as flesh is comprised of a chiasmic intertwining of its different ways of being in and engaging with the world. Adopting the conceptual framework of flesh allows for an account of perception that is not strictly active because it integrates the passive dimensions of perception as well, e.g. through the incorporation of passive touch into tactile perception.

[8] It might be argued that the body specified in this context is a pre-reflective body-as-object, which is not the body-as-object proper given that it is not fully thematized. This does not hurt the point I am making. For even if the sensible body in this context is not thematized, it is still part of a presentation of a unified body whereby awareness of the sensing body is constituted by the sensible body, even if pre-reflectively.

2.4 Flesh, Presence and Whole Body "Illusions"

So far I've argued that adopting Merleau-Ponty's philosophy of the flesh can help bridge the divide between phenomenology and ontology that is implicit in the enactive approach to consciousness. As mentioned in Chapter 1, enactivism is an interdisciplinary approach to cognition that draws on and engages with the cognitive sciences. As such, incorporating flesh should not sacrifice that engagement. And it does not. What I argue now is that articulating enactive subjectivity as flesh allows for a different and more plausible interpretation of some research in the cognitive sciences. Specifically, I focus on illusions of other-body ownership generated in immersive virtual reality (IVR).

There is a growing body of research on the use of IVR to investigate the nature of body representation[9] in behaviour and cognition through the augmentation of individuals' sense of bodily ownership over virtual bodies where individuals feel as if they are *in* the virtual body. (González-Franco et al. 2010; Slater et al. 2010; Yuan and Steed 2010; Normand et al. 2011; Kilteni et al. 2012) These investigations are a natural extension of the rubber hand illusion whereby individuals are made to feel a sense of ownership over a rubber hand through spatiotemporally congruent multisensory feedback of a rubber hand being stroked (the stroking of the rubber has to be visually synchronous with a stroking felt on their actual hand that is hidden from view). (Botvinick and Cohen 1998) Similar experiences can be generated with individuals' entire bodies in IVR, and more interestingly even with bodies that are radically different from their own in shape, size and color. (Normand et al. 2011; Kilteni et al. 2012; Kilteni et al. 2013) When ownership over these different virtual bodies occurs a noticeable change in behaviour and attitude often follows, such as changes in height strongly correlating with feelings of confidence. (Yee and Bailenson 2007) This phenomenon, dubbed the "Proteus Effect," shows that individuals experience a measurable behavioural and attitudinal change based on the sense of self they experience through observational self-consciousness. Crucially, these illusions are only generated through spatiotemporally congruent multisensory and

[9] Cognitive scientists often problematically conflate bodily subjectivity with body representation. Part of my analysis of this work relies on critical work already done on this issue, but it is nonetheless how these researchers characterize their work.

sensorimotor feedback with respect to the individuals' physical body (Kilteni et al. 2013); there has to be a coherence between perception, action, and the perceptual consequences of those actions. Indeed, the success of the illusion depends on how strong a feeling of 'presence' of being there in IVR is, which is generated by this sensorimotor coherence.[10] Presence in the context of IVR is a technical term used to refer to the subjective sense of the reality or immersion in a virtual world and the sense of self in that world (Metzinger 2003; Sanchez-Vives and Slater 2005; Seth et al. 2012) and is thus a way of articulating *being in a virtual world*.

To give an example of these IVR body ownership experiments, one study was able to demonstrate that ownership over a virtual arm up to three times the length of an individual's physical arm could be experienced in IVR. (Kilteni et al. 2012) The experiment involved five conditions: the first two involved virtual arms the same length as participants' physical arms but with congruent and non-congruent visuo-motor feedback; the other three conditions involved the growth in length of one virtual arm to twice, three times and four times that of the physical arm, all with congruent visuo-motor feedback. These latter conditions induced a strong asymmetry in participants' bodies given that only *one* of the virtual arms grew to an augmented length, but nonetheless ownership was induced over the augmented arm (as well as the rest of the body) up to three times the length of the physical arm (the four-times length condition was roughly split 50/50 over whether or not ownership was induced). (Kilteni et al. 2012) These conditions were able to elicit proprioceptive drift, where proprioceptive feedback is experienced as being displaced beyond the physical arm and felt in the virtual arm, as well as defensive motor responses to perceived threat to the virtual arm. This defensive response, in conjunction with participants' responses to the study's questionnaire, indicate that participants felt a sense of ownership over the virtual body even when one arm was asymmetrically three times the length of the physical arm. (Kiltani et al. 2012)

[10] Interoceptive information is arguably also instrumental in generating presence, but a discussion of that research goes beyond the scope of this paper. (Cf. Seth et al. 2012)

In a discussion of immersive virtual reality, Legrand (2007b) has described presence as a pre-reflective experience of being there in virtual reality insofar as it is not an intentional object of consciousness. She goes on to argue that the dynamic interactions between body and world and as such the coherence between perception (proprioception specifically) and action is what matters to the experience of presence in a virtual world. Building from these ideas, Mandrigin and Thompson (2015) have argued that discussions of the significance of the experimental findings such as those outlined above to "understanding own-body perception and bodily self-awareness have been hampered by a failure to distinguish clearly between two modes of bodily self-experience," namely the body-as-object and body-as-subject. (523) Recall that on this view, body-as-subject "structures perceptual experience and grounds higher-levels of self-consciousness" whereas the body-as-object is a perceived object within the perspective that the body-as-subject provides. (Mandrigin and Thompson 2015, 523) Their claim is that many of the experimental paradigms involved in experiments such as those above manipulate not the body-as-subject, which is constitutive of self-consciousness and our embodied perspective on the world, but the body-as-object, which is just how the body appears as a perceptual object within that perspective. They argue that many whole-body illusion experiments involve "atypical perceptual experience of the body-as-object" which is a "change in the perceptual presentation of the body, but does not necessarily require any change in the embodied perspective itself." (Mandrigin and Thompson 2015, 526) The sense of ownership that individuals feel over the other/virtual body is thus ownership "for the perceptually presented and experimentally manipulated body-as-object." (Mandrigin and Thompson 2015, 527) However, "in some cases the experimental procedures do affect the body-as-subject of perception or the embodied perspective itself… In these cases, the subjects experience changes to their embodied perspective or body-as-subject, specifically to their sense of self-location as perceiving subjects and to their egocentric (visuo-spatial and vestibular) perspective." (Mandrigin and Thompson 2015, 527) On their account (i.e. the enactive account), self-location, understood as the experience of being located at the origin of an embodied visual-spatial (egocentric) perspective, is constitutive of body-as-subject whereas bodily ownership is not (it is a property of self-as-object). This implies that research in immersive virtual reality is not effectively

probing self-consciousness since the research is concerned largely with ownership over a virtual body-as-object.

Incorporating the conceptual framework of flesh allows for a different interpretation of the significance of the experimental results. Given that body as sensible and body as sentient are co-constitutively intertwined in a chiasmic relationship it would be implausible that the manipulation of the body as sensible would not have a significant effect on the body as sentient. Indeed, if we take the ontology of the flesh seriously, we would expect that any drastic change in the body as sensible would have an effect on the body as sensing and, further, that one's experience of self-location at the origin of an egocentric perspective would be conditioned by *both* dimensions of bodily being. If we change the sensible body, we change the perspective that the body has on the world and so the point of origin would have to shift accordingly (given that my *whole* body provides my perspective). What I think successful illusions of bodily ownership in immersive virtual reality are capable of showing is precisely how our change in embodiment affects our change of perspective. If the sense of presence in a virtual world is strong enough that an individual is made to feel ownership over a virtual body with properties different from their own physical body (through spatiotemporally congruent multisensory and sensorimotor feedback with respect to the physical body) to the extent that their behaviour and attitude change (both while immersed and even for a period of time after) it would seem to be the case that one's perspective within that world was modified through the ownership over a virtual body. As sentient, my perspective extends as far as my body's reach and this condition of intentionality, the "I can," is constitutive of my perspective on the world and my ability to inhabit it.[11] (PhP 139; Morris 2006) Indeed, the roots of this idea can be seen in Merleau-Ponty's discussion of the "blind man's cane" in which the cane ceases "to be an object for him…it increases the scope and the radius of the act of touching and has become analogous to a gaze." (PhP 144) The locus for the

[11] One reviewer for the paper (Jenkinson 2016) that gave birth to this chapter has pointed out that this interpretation also suggests that understanding 'sense of agency' and 'sense of ownership' as, in some sense, opposed is a problematic articulation of their relationship. Arguing the point in sufficient detail, however, would go beyond the scope of the present project.

origin of one's perspective is the entirety of one's body, and the very boundaries of the body can be extended to broaden or restrict that perspective. When we experimentally manipulate the intentional reach of individuals into the world in which they inhabit (i.e. the virtual world) by inducing a sense of presence within and ownership over a virtual body with arms that are longer than one's physical arms, for example, we are providing them with a perspective within a world that is distinct from that of their physical body. (Kilteni et al. 2012) We are thus augmenting the body-as-subject through the modification of bodily ownership—body-as-object. This interpretation becomes possible when we articulate our bodily being in the world and our relationship with our self as a chiasmic intertwining of sentient and sensible through the reversibility of flesh.

2.5 Awakening to the World and Breaking with the World

I have argued that the criticisms and revisions of subjectivity developed in Merleau-Ponty's later works, especially VI, through the ontology of flesh ought to be incorporated into the enactive account of consciousness in order to avoid the problems associated with PRBSA that were discussed above. Incorporating the ontology of flesh into enactive subjectivity can provide an account of subjectivity more consistent with the ontological commitments to embodiment and embeddedness that is central to enactivism. Subjectivity as flesh is nothing above my body and situation and the enactive "subject" would be characterized by a chiasmic insertion and intertwining of sentient and sensible, unified through the reversibility of flesh. Articulating our bodily being in the world through the conceptual framework of flesh affords a novel characterization of the relationship between body as sentient and body as sensible that is valuable for empirical research on the nature of self-consciousness, such as experiments with augmented virtual bodies in immersive virtual reality. Re-interpreting enactive "subjectivity" in this manner represents a more radical philosophy not fully appreciated until VI, through Merleau-Ponty's understanding of flesh and the chiasm of body and world that structures it. Indeed, it reformulates the very structure of perception and consciousness: the problem of understanding our relationship with the world is not how we get to the world, but how we ever break from being immersed in it. (Morris 2006)

The problem of the relationship between subject and world has traditionally been how one gets to the other, specifically how the subject is capable of relating to the world intentionally, in order for perception to be possible. This is to say that the subject and world traditionally stand as wholly differentiated from the start and perception involves some means of communication between them. Understanding our bodily being in the world through flesh as the chiasmic intertwining of body and world reverses the problem by making the difficulty a matter of determining how the body ever breaks with the world to allow the distinction between self and world that is present in perception, and especially in reflective thought. If we articulate our embodied phenomenology as a deep chiasmic intertwining of body and world, we need an account of how the two remain distinguishable in experience so that they do not completely overlap. One might be concerned, then, that on this account body and world become so entwined that no distinction is possible at all. The full response to this problem will be worked out over the next three chapters, as I lay the groundwork in relation to the enactivist account of the continuity between mind and life. The shorter response, which I will briefly explain, requires understanding that the openness characteristic of perception is not simply given; it is developed. This can be seen if we incorporate an important dimension of bodily being in the world that I've yet to properly discuss: temporality. I will use this briefer discussion of the solution to help set up the next three chapters by illustrating the importance of temporality and divergence for an understanding of embodied subjectivity.

The problem of the separation between body and world is present elsewhere in Merleau-Ponty's work, most notably in "The Child's Relations with Others" where, as the title suggests, he develops an account of the intersubjective nature of perception. He argues there that "the perception of others is made comprehensible if one supposes that psychogenesis begins in a state where the child is unaware of himself [sic] and the other as distinct beings" (119) and that "the child confuses himself [sic] with his situation." (Merleau-Ponty 1964 [1960], 146) On this account, consciousness of oneself as a unique individual is not primitive to perception. (Merleau-Ponty 1964 [1960], 119) His solution to the problem of differentiation in this context comes as a result of a process of objectification whereby the child's gaze falls upon *itself* and the body is witnessed as a

specular image, i.e. as an object among objects with clearly defined boundaries. This objectification introduces the child to the world as an object among other objects and in this moment perception is not fully ecstatic. The account Merleau-Ponty provides here is developmental, but its general solution appears to be applicable to the more general concerns about breaking with the world as well. But this breaking with the world is not *just* mediated by witnessing the body through a specular image; it occurs through the temporal dynamics of flesh, which afford the possibility for a differentiation of body and world.

Merleau-Ponty, following (yet importantly distinct from) Husserl and Kant, has argued that "[s]ubjectivity, at the level of perception, is nothing other than temporality and this is what allows us to leave to the subject of perception his opacity and his history." (PhP 248) This is because in the present moment the subject is extended both toward a horizon of the future in anticipation of the outcome of an action or the end of a motor goal, for example, and yet also anchored in the previous moments by which the action has an end or through which a movement comes about through the body's habits. (PhP 141) On this account there is no knife's edge present; the present moment is bound up in anticipation of some unknown (but perhaps expected) future and in retention of the imminent (or even distant) past. (VI 267-8) Experience, then, is oriented by the past and pulled toward an anticipated future. Temporality as constitutive of "subjectivity" is one of the aspects of Merleau-Ponty's account of consciousness that persists through his own self-criticism and features in VI. (Kelly 2015) Indeed, the temporal thickness of the body as flesh provides an interval by which sensible and sentient can be differentiated in experience. The reversibility that makes possible the chiasmic relation of sensible and sentient is one that is only ever immanent and never realized (VI 147); there is never full coincidence, but only a "partial coincidence." This partial coincidence "is a coincidence always past or always future, an experience that remembers an impossible past, anticipates an impossible future." (VI 122-3)

The hiatus that prevents the coincidence of body and world is constitutive of flesh as formative medium between body and world. Without it there would be no differentiation

and perception would collapse in upon itself. The temporal thickness of bodily being in the world also provides the means by which our body knows itself, i.e. self-consciousness; the "explosion or dehiscence of the present toward a future is the archetype of the relation of self to self." (PhP 450; Kelly 2015, 209) Bodily being in the world is thus necessarily characterized through the temporal thickness that allows for the possibility of reversibility and grounds the chiasm of body and world. The apparent difficulty of breaking with the world, the appearance that the structure of the chiasm blends body and world into one another, comes about precisely when we neglect to provide a place for the temporal thickness of flesh. The solution to breaking with the world is thus manifest in the very structure of the flesh as involving an interval or hiatus, which, as a result, reveals the rich temporal dynamics that characterize our subjectivity as bodily being in the world.

There are, then, two key themes that will need to be developed in order to provide a solution adequate to the depth and complexity of enactive subjectivity as flesh. This longer solution will require an understanding of one's ability to stand in an intentional relation to oneself, such as is suggested in "The Child's Relation with Others." The reflexive intentionality that allows for the objectification of one's body simultaneously requires and enriches a temporal thickness that is constitutive of embodied subjectivity. Simply put, the solution will need a more fully developed account of the temporality and intentionality of bodily being in the world. I will discuss both of these themes over the next two chapters by way of revisions to the deep continuity thesis held by many enactivists, which states that life is sufficient for mind. Perhaps a bit more carefully, the view amounts to the claim that the self-maintaining behaviours of even the simplest organisms are cognitive because they are brought about in accordance with the norm of self-preservation. I argue that a more conservative criterion of cognitive behaviour is needed, and propose underlying capacities that are needed to fulfil this criterion. Importantly to the discussion in this chapter, the account of cognition that I develop ends up amounting to an ability for the organism to break with the world. As such, the next two chapters lay the necessary groundwork for the solution to the problem of breaking with the world. In Chapter 5, with all the groundwork complete, I return to the problem

and present its more developed solution and discuss the implications it has for enactive subjectivity.

Chapter 3

3 Instituting Sense

One of the more radical expressions of embodiment and embeddedness that enactivists make is contained within the "deep continuity thesis." Put briefly, the thesis is that mind is continuous with life. What this means is that the very processes that make up our rich cognitive life are grounded in the processes of the body that keep it viable and well-functioning. But further than that, it is also the claim that all living things are cognitive insofar as their world is manifest as an expression of their metabolic needs. The argument is more nuanced that this, and I will elaborate below, but it should be apparent how radical the claim is. As articulated in Chapter 1, one of the virtues of enactivism is that it provides an important and viable alternative to the standard approaches to cognition and consciousness prevalent in the cognitive sciences. But the account is valuable only insofar as it is plausible. By arguing that all living things, including plants and single-celled organisms, are cognitive, enactivists run a risk in providing an account of cognition that is counterintuitive and that makes cognitive behaviour so broad that it loses its utility within the human paradigm. While there are certainly similarities between human behaviour and the behaviour of single-celled organisms, there is also a significant divergence. This difference becomes trivialized if we adopt such a general account of cognition. Further, given that bacteria are not ordinarily thought to be cognitive, there is a significant burden of proof for any account attempting to claim that they are. Over the next two chapters I will provide an alternative account of the continuity thesis that is a bit less deep. In doing so I will also lay the groundwork for a solution to the problem of "breaking with the world" that arises when articulating enactive subjectivity as flesh.

I begin by more fully explaining the deep continuity thesis in §3.1 and motivating the problems with it that I will discuss later in the chapter and in Chapter 4. In §3.2 I more carefully develop the phenomenological account of sense-making that enactivists rely on to make the claim of continuity by drawing on Merleau-Ponty's work on sense, which is a kind of embodied meaning, in order to understand the problem with the enactivist account as stated and provide the phenomenological impetus for the alternative account I

develop. To that end, I elaborate on how sense ought to be understood as instituted rather than constituted, for reasons similar to those discussed in Chapter 2 in relation to the claim that subjectivity is instituted rather than constituted. The account of sense as instituted is advantageous also in that it reveals the manner in which the more passive bodily processes underlying perception are also constitutive of sense, and provides a depth and history to sense-making. But, as discussed in §3.2 in relation to the human paradigm, instituted sense is significantly more complex than the kind of sense instituted by simple organisms. As such, in §3.3 I discuss sense-making in relation to Merleau-Ponty's articulation of the orders of behaviour he develops in SB to help motivate a distinction between two different types of sense-making as grounded in the plasticity of the organism's structures of behaviour that institute sense. This distinction will be necessary for making the case that the continuity between mind and life is not so deep that all living things are minded, which I argue in Chapter 4.

3.1 The Deep Continuity Thesis

Central to the enactive account of cognition is the claim that life is sufficient for mind insofar as cognition is an activity of *sense-making*. As it is articulated by enactivists, and especially relative to the deep continuity thesis, sense-making expands on and extends ideas surrounding non-human embodiment and meaning developed in Merleau-Ponty's *The Structure of Behavior* (SB) where he claims, for example, that

> if it were established that the nerve processes in each situation always tend to re-establish certain states of preferred equilibrium, these latter would represent the objective values of the organism and one would have the right to classify behaviour as ordered or disordered, significant or insignificant with respect to them. These denominations… would belong to the living being as such. (SB 38)

Meaning in terms of valuation is thus inherent to the activity of the organism and the processes that constitute it rather than an objective property applied from without. The quote above clearly involves animals with a nervous system, but the point is extended by enactivists to simple single-celled organisms as well. Enactivists build on this idea by arguing that cognition ought to be interpreted as an activity of sense-making rather than

as a function of computation. In this context, sense-making is understood as behaviour in relation to environmental meaning that is brought about on the basis of the internal norms of the organism's self-maintaining activity. (SB; Thompson and Stapleton 2009; Colombetti 2014)

I will elaborate on the enactivist account of life in the next chapter, but it's worth noting that this self-maintaining activity whereby the organization of the organism creates the conditions that the organism itself fulfills in order to remain viable (i.e. alive) is referred to as 'autonomy' and the biological manifestation of autonomy carried out in a living system is 'autopoiesis'. This autopoietic/autonomous organization generates norms that govern the behaviour of the organism insofar as they ensure that the organism remain viable. The actions of the organism are thus guided by the need to compensate the threatening deviation from these norms of viability (that naturally occur as a result of entropy) and environmental processes are integrated into the interaction as *relevant* for the achievement of such compensation. (Barandiaran et al. 2009, 378) This means that the organism actively responds to valenced stimuli as either a challenge to its own continuation or as a means to its survival. As such, sense-making is the capacity an organism possesses to create a meaningful world within which it can act through its investment in the world as an embodied agent. Understood in this way, sense-making overlaps with the definition of cognition as "behaviour or conduct in relation to meaning and norms that the system itself enacts or brings forth on the basis of its autonomy," (Thompson 2007, 126) and as "an embodied engagement in which the world is brought forth by the coherent activity of a cognizer in its environment." (Di Paolo 2009, 12) Interpreting cognition in this manner makes it broad enough that all adaptive autonomous systems possess the capacity for cognitive behaviour. This is the deep continuity thesis; all living systems are cognitive systems.

Importantly, defining cognition in this manner also implies that cognition is inherently affective. In this context, affective states are grounded in the evaluative aspects of the self-maintaining organization of adaptive autonomous systems that also make the system cognitive. (Thompson 2011a) These are the same processes and aspects of adaptive

autonomy that allow the organism to make sense of the world in order to behave appropriately in different contexts. Things in the world matter more or less to the organism relative to their significance to the organism's autonomy. Insofar as all organisms have a pervasive interest in their own self-preservation, this lack of indifference toward persistence motivates the evaluative processes that help make sense of the world. These sense-making capacities are thus always already affective, and given that cognition is seen as arising out of sense-making, cognition cannot be understood properly absent of affectivity. As such, cognition and affect are not isolable aspects of an embodied agent; they are deeply intertwined and interdependent. The rigid dichotomy between affect and cognition that cognitive science has traditionally supported cannot be sustained since the norms and meanings generated through the organism's autonomous self-organization entail a pervasive affectivity. (Colombetti 2014)

This gives us the relationship between cognition and sense-making on the enactivist account: cognition is an activity of sense-making. Further, some enactivists have argued that sense-making is sufficient for cognition, which forms the core of the deep continuity thesis, given that enactivists typically argue that all living systems are capable of sense-making. I'll unpack the relationship between life and sense-making more fully in relation to cognition in Chapter 4, but at this point it is worth addressing a concern that has been raised about how broadly we ought to construe the capacity for sense-making especially in relation to cognition. In particular, Wheeler (2011) has raised concerns about Thompson's (2007) articulation of the deep continuity thesis whereby sense-making is sufficient for cognition, stemming from a general conceptual murkiness around the relevant concepts. He argues that in Thompson's writing it appears to be the case that adaptive autopoiesis is necessary as well as sufficient for cognition, which would mean that cognition is adaptive autopoiesis. From this perspective Thompson's view entails two problematic conclusions. The first is that there are no non-cognitive living entities. This "flies in the face of the most natural understanding of life-mind continuity" because it means that any ontogenetic or phylogenetic enrichment of cognition occurs already within the cognitive domain. (Wheeler 2011, 163) This is odd, given that cognitive facility is intuitively one way of distinguishing between different types of living systems.

Indeed, Wheeler claims, rightly so, that "the natural understanding of deep continuity is that there are certain non-cognitive properties of living entities that, when enriched in specific ways, generate phenomena of mind and cognition, phenomena that are exhibited only by a subset of living things." (Wheeler 2011, 163) The second conclusion is that there are no (nor can there be) non-living cognitive entities, which precludes the possibility of any other form of system capable of cognitive behaviour or of hybrid "organic-technological extended cognitive systems", which "displays an inconsistency between enactivism and [extended cognition]." (Wheeler 2011, 163) I would add that it's also in tension with robotics research that seeks to create intelligent non-living systems and with the articulation of subjectivity as flesh I developed in Chapter 2.

Wheeler's criticisms have prompted Thompson (2011b) to provide a clarification and revision of his original articulation of the continuity thesis. He now claims that "living is sense-making and that cognition *is a kind of* sense-making." (2011b, 217 my emphasis) To be clear, this revision is not intended to support the claim that some forms of life are non-cognitive; Thompson explicitly states that "cognition is necessary for life" and as such the continuity runs deep. (Thompson 2011b, 212) This leaves room for the possibility of non-living cognitive systems. The claim that "living is sense-making" should be understood to express the idea that life itself is a kind of sense-making rather than the claim that life is coextensive with sense-making. This would mean that there could be kinds of systems that are making sense without necessarily being categorized as living systems. Alternatively, even if we interpreted the claim more strongly as expressing life and sense-making as coextensive, Thompson could argue that the definition of life (as adaptive autonomy) is broad enough that it could be expanded to include robotic life forms, for example, should we design or discover such a system. But perhaps more relevant to our present concern, it also allows Thompson to distinguish between several types of sense-making that apply to all living systems, and types that require "intentionality in the proper phenomenological sense," which would apply only to humans, or other sufficiently phenomenologically complex beings. (Thompson 2011b, 217) This is supposed to provide a way of dealing with the first implication that Wheeler discusses, that Thompson's earlier articulation is counter-intuitive. All living systems are

cognitive, but not in the same way because the kind of intentionality that grounds their capacity for sense-making varies. We can still usefully distinguish between the capacities of different cognitive systems based on the kind of sense-making they can engage in, which is grounded in the intentional capacities of the system. If we accept these revisions, the deep continuity thesis is still on the table (more or less). But further conceptual clarification is needed regarding what separates the two types of sense-making Thompson discusses. This will require a more robust explanation of the different kinds of intentionality and also clarifying the relationship between intentionality "in the proper phenomenological sense" (just intentionality from hereon) and more basic sense-making, and the relationship between the kind of intentionality involved in basic sense-making and cognition. To that end, I'll start by laying out the phenomenological account of sense-making in order to develop a working account that applies to living systems at the most basic level, to be expanded upon in the next chapter.

Before I begin discussing sense-making, it's worth motivating the concern behind Wheeler's first conclusion, that Thompson's articulation of deep continuity is counterintuitive. Wheeler's criticisms point to an important question about why it matters whether or not cognition is a capacity enjoyed by all adaptive autonomous systems. Some of the motivation for enactivists to try to develop cognition out of the capacities that realize adaptive autonomy is a need to provide a naturalistically viable account of cognition. By building it into the basic organizational structures that guarantee a system's adaptive autonomy, no further explanation is required to fit cognition into their embodied account—if it's alive, then it's making sense; if it's making sense, then it's cognizing. There's certainly merit to this motivation, but it comes at the price of obscuring what cognition means in the context most relevant to the cognitive sciences—that of the human paradigm, which involves abilities such as abstract reasoning and language. Abilities such as these are arguably found elsewhere among non-human animals, but they are also entirely absent in many non-human animals. To capture what's unique about and fundamental to cognition in the human context we need to be able to understand what's different about the kinds of behaviour that single-celled organisms engage in and what humans are doing when they cognize. What counts as cognition should be broader than

the human context, but also specific enough that it captures something unique about cognitive behaviour. To identify cognitive behaviour as a unique kind of behaviour requires that the operating definition can successfully pick out those aspects that make it unique. And to call *all* behaviour that a living system enacts 'cognitive' is precisely to undermine any use of cognition as a distinct and useful explanatory concept. In this sense it could be considered somewhat premature to extend the cognitive domain to encompass *all* life, or worse, it could be seen as dodging the very difficult question: "what is cognition?" This is at least one concern motivating Wheeler's criticism, and it's something that Thompson's revisions do not address. What I'm going to develop is an account of sense-making and cognition that provides a principled means of distinguishing between behaviour that is and is not cognitive on the basis of the kind of flexibility of behaviour a system displays. This will help preserve some of what's intuitive about cognition being a highly complex and developed behaviour while still incorporating the insights of the enactivist account that grounds cognition in the organizational dynamics of living systems.[12]

3.2 Sense-Making

The kinds of sense-making an organism can engage with can be understood as developing out of the type of behavioural flexibility that the organism possesses. I'm going to argue this by revealing an important distinction between kinds of sense-making on the basis of capacities for kinds of intentionality. The kinds of intentionality that Thompson outlines above can be understood as grounding different capacities for sense-making. These types of intentionality, I will argue in the next chapter, depend on the kinds of decoupling that characterize the distinction between situational and structural

[12] It's worth flagging a concern that the enactive account of cognition is behaviourist given that cognition is defined as a kind of behaviour. While I do not wish to dismiss the concern outright, the purpose of this and the next chapter is to take the enactive account at face value and modify it as needed. That said, at least in the human paradigm, cognition is deeply intertwined with consciousness and so I do not think the criticism amounts to much within the human context. The revisions I make to the continuity thesis would, however, avoid these problems by making cognition co-constitutively intertwined with subjectivity, at least minimally.

flexibility. Before I can argue that, I need to first explain how sense-making rests on a conditioned freedom we possess that underlies our interaction with the world. I'll begin with human phenomenology and work my way toward the non-human context, starting with Merleau-Ponty's account of sense-making.

3.2.1 "Proper Phenomenological" Sense-Making

Merleau-Ponty's discussion of sense in PhP is focused largely on the human paradigm, though it can easily be extended to non-human animals as well—something Merleau-Ponty establishes in SB. The notion of sense he develops in PhP can be considered the fully developed phenomenological understanding of sense. Thompson (2011b) makes it clear that this understanding of sense is more robust than his use of it in the context of the deep continuity thesis:

> My aim would be to mark the difference between sense-making as such (comportment in relation to significance and norms), and the kind of sense-making that requires intentionality in the proper phenomenological sense—intuitive intentionality (empty and filled intentions in perception, memory, and imagination), signitive intentionality (pictures, signs, indications), and categorical intentionality (propositional and conceptual thought). (217)

This clarifies the distinction between different kinds of sense-making somewhat, but 'comportment' too is a phenomenologically loaded term, indicating a bearing oneself in relation to something. Comportment, as it's used in the context of phenomenology, brings with it a whole host of capacities and dimensions of being (memory, social subjectivity, etc.) that are not necessarily applicable in the context of many non-human organisms. What is needed for comportment in the present context (in relation to simple organisms) is not clear given that mere comportment in relation to norms is potentially far too liberal in application (e.g. thermostats might have a capacity for sense-making under this definition because they are programmed with and governed by specific rules). For the sake of charity, I think it would be fair to assume that the intended use is probably somewhere in between human comportment and the brute causal mechanisms regulating thermostats. This use is perhaps slightly richer than mere causal behaviour, broadly construed, given that the relevant norms involved would be endogenous to the system.

Nonetheless, for the sake of clarity, I'll discuss sense-making in relation to behaviour rather than comportment with the understanding that what follows is plausibly applicable to comportment as well, and that behaviour should be read as bearing some form of comportment, however minimal.[13] It should be clear, though, that lack of clarity surrounding concepts central to the debate strongly motivates revisiting the phenomenological literature on which the enactive account of sense-making is based. I'll do this by looking more closely at Merleau-Ponty's work.

3.2.2 Sense and Intentionality

Sense, for Merleau-Ponty, is a threefold concept expressing *sensation*, *meaning*, and our *orientation* toward the world and objects. Our orientation toward objects and the world is not just a manner of being open to the world in particular ways but rather, as embodied, we are *situated* in and toward the world as a result of our biology and our projects and experience, so sense only emerges through this situation that it simultaneously expresses. (PhP 81) To say that an object has sense for us (or that we sense an object) is to say that we are meaningfully oriented toward it within a given situation. But it also means that an object is never given in isolation, but as a figure on a background, for the object is always given within a field. (PhP 4) Importantly, the sense an object has is not discovered in the object, but arises through the co-constituting relationship between body (qua subject) and world: "the sensible does not merely have a motor and vital signification, but is rather nothing other than a certain manner of being in the world that is proposed to us from a point in space, that our body takes up and adopts if it is capable, and sensation is, literally, a communion." (PhP 219; Cf. SB 148) Sense, understood as such, is fundamentally intentional.

Just as our openness and orientation toward the object allows it to be taken up in experience, the object sensed reveals our investment in it and our situation with respect to

[13] Given that comportment is a narrower concept than behaviour as it's being discussed here, I don't think the assumption is problematic. Anything capable of comportment would be capable of behaviour, but it's not necessarily the case that anything capable of behaving would be capable of comportment.

it more generally. This situatedness draws not just on occurrent perceptual experience, but "our past, our future, our human milieu, our physical situation, our ideological situation, and our moral situation." (PhP 137) For example, the glass beside me occupies my experience not just as a glass cylinder, but as a mason jar I received at Cask Days 2014, and that I have positive feelings toward because the event was enjoyable, but that I also don't particularly enjoy drinking from it because of the shape of the lip and the trend that drinking from mason jars became a part of, and so on. While not all of this is necessarily part of the occurrent conscious conceptual content of my visual perception of the glass itself, it shapes my experience of the glass and affects my interaction with it like a figure against a ground. For Merleau-Ponty, intentionality integrates each of these dimensions of my experience of the glass, and it is in this manner that sense intends beyond the object itself. (PhP 4)

But what *gives* objects sense? For Merleau-Ponty, sense-making (or sense-giving as he uses it) arises *through* intentionality. Here intentionality is much more robust than traditional ideas of intentionality as "aboutness," as should be clear from the discussion above. Instead, it is grounded in the intertwining of cognition, perception, affect and motricity. This is to say that my *body*, in its orientation in and toward the world, is that through which we know the world and objects. Rather than being a *strictly* passive process, intentionality is an activity the subject engages in whereby the

> subject anticipates himself [sic] among the things in order to give them the shape of things. There is an autochthonous sense of the world that is constituted in the exchange between the world and our embodied existence that forms the ground of every deliberate *Sinngebung* [sense-giving act]. (PhP 466)

This exchange that gives sense to things is one of mutual influence; in exploring an object, the body meets the solicitation of the object and sense arises through this (temporally extended) exploratory movement against the background of the situation. (SB 155; PhP 222) In its capacity to allow the body to meet the solicitation of the object, motricity is an original intentionality, and it is through our movement that things have sense. In this way intentionality is not an "I think that" but rather an "*I can*." (PhP 139)

Further, that the object solicits our gaze through our recognition of it reveals that intentionality is deeply rooted in affect. It is through affect that our perception, motricity and sense are oriented toward things and the world, and in this way affect is also an original intentionality. (PhP 160)

At this point it is important to briefly discuss what sense is *not* on this account. For the same reasons that the subject of perception must not be construed as one-sidedly active, sense is not constituted by the subject. To articulate sense as constituted would be to fall into the same problematic articulation of perception that posits perception as an activity wholly performed by the subject and failing to account for the openness to the world and exchange between subject and object that characterizes perception. This is because constitution is taken as an activity of creation on the part of the subject whereby meaning is brought forth into the world. (IP 76) Rather, sense is instituted, and it is done so without "me." (IP 8) To say that sense is instituted without "me" is to say that it is instituted not *by* a reflective subject, but by the body through the structures that comprise its dynamic, and pre-reflective, coupling with the world. In this context, institution refers to "those events in an experience which endow the experience with durable dimensions, in relation to which a whole series of other experiences will make sense, will form a thinkable sequel or a history… which deposit a sense in me, not just as something surviving or as a residue, but as the call to follow, the demand of a future." (IP 77) Institution is thus meant to express how the individual is both active and passive in the genesis of sense; the body's history provides the inertia to set in motion a developmental trajectory for meaning that is nonetheless shaped and redirected by that which is sensed. Merleau-Ponty's use of institution also helps to clarify how we are passive in perception. In being physiologically and perceptually open to the world, the body is certainly in one sense passive to the world, insofar as the presence of stimuli are required to elicit perception. This is the sense in which the world contributes input, whether in terms of esters that stimulate olfaction or audible sound waves. But the body is also passive in that it provides the "invisible" background against which perception occurs. This includes (but is not limited to) my relevant personal history, conceptual knowledge and physiological orientation toward the perceived (e.g. if it is food, whether I am hungry)

and is always also present at the sides of the perceived. (IP 135) To illustrate the point, learning how to taste provides an interesting example.

As children we learn to taste, but in certain circumstances we learn to taste as adults as well. As a Certified Judge through the Beer Judge Certification Program (an internationally recognized organization designed to "rank beer judges through an examination and monitoring process, sanction [brewing] competitions, and provide educational resources for current and future judges" (bjcp.org)), I have had the opportunity to "learn to taste" anew. (In this context, and probably all contexts, learning to taste involves learning to smell as well since taste and olfaction are deeply intertwined and can strongly influence one another.) What this involves is simultaneously letting the beer "speak" for itself, by being open to what flavors and aromas it affords, and learning the range of flavors and aromas possible and characteristic of certain styles of beer. These two processes that unfold together—openness and perceptual categorization—mutually influence one another. Before I am able to identify the distinctive overripe mango and cantaloupe characteristic of Citra hops, I perceive Citra hops as an undifferentiated fruity, or "tropical fruit," character. But once I home in on that undifferentiated fruitiness as an overripe mango it provides an experience that, over time and through repeated experience, sediments my understanding of that characteristic and provides a durable dimension against which other experiences make sense. (IP 8) Much like the process through which sedimentary rocks are formed, this sedimentation of bodily knowledge occurs through behaviours or experiences that are repeated over time to gradually form new and enduring structures of their own.

My perception of how Citra hops smell and taste in beer is changed such that when I openly perceive a beer in which they are present I am no longer drawn toward an unidentifiable fruity character, but to overripe mango and cantaloupe (to the extent that I am able to blindly identify them in beer). This also reveals the sense in which institution is both a reactivation and transformation of preceding institutions. (IP 9) Each experience of Citra further sediments and/or transforms my experience of it (hop characteristics often vary from year to year based on crop quality that could add new, enduring, dimensions to

the experience, for example). But this only happens because I am *passive*, both towards my perception of the beer by being open to what the beer affords and insofar as perception is also instituted by the habitual body, as the mode of our sedimented bodily knowledge and behaviour that structures experience even in my openness. This passive instituting is never wholly passive, in as much as passivity and activity are never devoid of the other. But it is passive in the sense that my body does the work for me because it has sedimented my previous encounters. This is to say that my experience and knowledge is sedimented in the habitual body and this past bears upon my present by structuring perception. I do not need to relearn what Citra smells and tastes like; I am open to the world and the characteristic overripe mango and cantaloupe appears right there in the glass in front of me. Institution thus also involves a passive structuring of perception. My knowledge of Citra that becomes sedimented and structures perception need not, and probably in most cases is not, an explicit conceptual knowledge as it's *deployed* in perception because "perception can make sense without its elements being composed in an adequate thought." (IP 217) This is, of course, not to say that my knowledge of Citra is nonconceptual, but that in structuring experience it need not be present in experience as explicit conceptual knowledge.

The example of learning how to taste also helps to clarify an important aspect of the role of orientation in Merleau-Ponty's phenomenology. In a discussion of an experiment that intentionally induces perceptual disorientation, Merleau-Ponty argues that "perception accepts, prior to the experiment, a certain *spatial level* in relation to which the experimental spectacle at first appears oblique, and that, during the experiment, this spectacle induces another level in relation to which the whole of the visual field can, once again, appear upright." (PhP 259) For Merleau-Ponty, a level is a technical notion; a level operates behind perception as a way of providing orientation in and toward the world. In the case of visual perception, the body adopts a spatial level that orients the body toward up or down, for example. In the case of learning to taste, a specific experience (or set of experiences) can help to set up a level according to which future experiences make sense by orienting the body in relation to aspects of the world that are borne out in perception, such as the mango and cantaloupe aromas of Citra hops. Once that experience has been

sedimented it provides an anchorage point that can set up a level to orient future experiences (toward mango, and away from "undifferentiated fruitiness"). Understanding sense as instituted reveals the manner in which an experience, or experiences, can help to create a level that orients the body toward certain ways of being in the world. Sense is always instituted in relation to the levels that the body adopts.

So far we have seen how sense is rooted in the situation of the world my body inhabits, and sense-making is fundamentally tied to intentionality insofar as it is through my body's taking up and movement into the world that things appear to me as meaningful, i.e. as having a sense. Further, we've seen that activity on the part of the body is only part of the story. By incorporating an understanding of perception as instituted, rather than constituted, we also account for the passive aspects of perception that bring personal history into the perceived world. At this point, we must expand upon the contributions of institution and passivity by discussing the manner in which we are situated in the world, and how movement in the world is importantly *not* always a conscious activity. Objects often have a sense for me without my *choosing* that sense, and my interaction with the world more often than not is habitual rather than explicitly voluntary. Indeed, most of the time it would appear that sense-making is an non-, or pre-conscious activity. This is to say that we now need to understand the role that habit and freedom play in sense and sense-making.

3.2.3 Habit and Freedom

The motor and perceptual structures through which we inhabit and take up the world are for Merleau-Ponty the structures of habit. Habit expresses the very manner in which we are embedded in the world and in which our body organizes our experience and movement in the world relative to the latent structures of our body schema that are acquired and developed through our perpetual movement in and toward the world. (PhP 153) Insofar as our habitual body structures the world, it also actively interprets it, and so the possession of a habit is also the possession of a means through which the body understands the world. (PhP 145-5) Indeed, this frees us, as conscious cognitive agents, of the burden of constantly interpreting our experiences and so "this is what I express by

saying that I perceive with my body or with my sense, my body and my senses being precisely this habitual knowledge of the world, this implicit and sedimented science."[14] (PhP 247) Importantly, though, this habitual knowledge is not the passive structures of instinct or an innate biological knowledge. (PhP 147) Habit is acquired.

The form of understanding that the habitual body enables is fundamental to the notion of sense being used here. The structures in place between my body and the world (and the objects therein) that constitute a habit are also those that make sense of our experience. But, as stated above, habit is not a wholly passive, ready-made structure for the organism in its milieu. Rather, habits are acquired, which means that there is also an element of freedom involved. In this context, freedom is relevant in relation to a goal. It is because organisms have certain goals, or projects, that their behaviours are structured in the ways that they are as a means to achieve those goals. Some projects and goals will be relatively non-cognitive, non-conscious processes needed to sustain the organism's vitality. Within the context of the cardiovascular system, the heart's pumping blood could be interpreted as behaviour in relation to norms generated by the cardiovascular system and in relation to the organism's vitality more generally. These projects are not part of the organism's agentive grasp on the world, perhaps partly of necessity, but also partly because their specific milieu is relatively stable and simple and so the freedom and flexibility associated with habit is not needed. Habit, as it's used by Merleau-Ponty, is related to the concept of structural flexibility that I will develop in Chapter 4. Specifically, the plasticity of habit requires structural flexibility for structural flexibility allows for a situated freedom that is characteristic of habit.

Many of an organism's projects are embedded in a broader and more complex milieu, such as finding food.[15] In these broader contexts, "projects cut determinations out of the uniform mass of the in-itself and make an oriented world and a sense of things suddenly

[14] Interestingly, elements of the claim that habit structures perception can also be found in Hume's claim that causation is a *habit* of association. (Hume 1993 [1777])
[15] Again, depending on the organism and its milieu, this behaviour will be more or less simple. The behaviour of a plant finding food is exceedingly simple when compared to any mammal.

appear." (PhP 460-1) This is to say that, for Merleau-Ponty, freedom is not absolute, or unconstrained, since the very fact of our situatedness precludes it (PhP 481). Rather, our freedom is our manner of gearing into the world, and is conditioned and constrained by the way in which we inhabit the world. This gearing in is precisely the manner in which we are situated within a milieu, and our freedom consists in our ability to interact in and with the milieu. The sedimented bodily knowledge that organizes the body schema structures our engagement with the world by affording certain ways of moving in and toward it. Freedom, then, is the field of possibilities for our action in the world. (PhP 463) Our freedom is greater or lesser relative to what Merleau-Ponty calls our "lived distance" from the world and our behaviour (both spatially and temporally). (Cf. SB 120fn198) Because we are embodied and embedded in a world, our distance is always relatively proximal; our attitude and general intentions invest our milieu with some value and our behaviour more often than not is consistent with those valuations. In this way, our distance from the world is understood as lived, through our (dis)engagement with the world, rather than as a distance in absolute or objective terms. Indeed, many behaviours become sedimented as privileged in accordance with our attitudes, and so the field of possibilities for action is limited accordingly. As privileged, these behaviours become incorporated into the body schema and partly constitute the habitual body. In this sense, freedom, in allowing for the acquisition of habits, establishes the general structures of the world. (PhP 464)

Our distance is also never so close that world and subject collapse into one another. This would be "pathological," and is precisely what Merleau-Ponty claims is at issue in the impaired consciousness of one of the patients, Schneider, whom he discusses in PhP. As an adult, Schneider was injured by a piece of shrapnel that left permanent damage to the occipital region of his brain. (PhP 127) The injury left Schneider

> incapable of performing "abstract" movements with his eyes closed, namely, movements that are not directed at any actual situation, such as moving his arms or legs upon command, or extending and flexing a finger. He cannot describe the position of his body or even of his head, nor the passive movements of his limbs. Finally, when his head, arm, or leg is touched, he

> cannot say at what point his body was touched; he does not distinguish between two points of contact on his skin, even if they are 80 millimeters apart; he recognizes neither the size nor the form of objects pressed against his body. (PhP 105)

Merleau-Ponty offers an explanation of Schneider's condition as involving his intentional arc "going limp," which ultimately means that Schneider lacks the freedom to place himself in a situation and so is only reactive to situations that present themselves to him. (PhP 137) He cannot construct goals or projects for himself because he does not possess the flexibility to re-organize or re-orient his sedimented structures of behaviour. And so, when Merleau-Ponty claims that "freedom, that fundamental power I have of being subject of all of my experiences, is not distinct from my insertion in the world" (PhP 377), he means that this insertion must be, to some extent, done *by me*. (SB 162)

Further, it is exactly our motivations that make us free insofar as they help create goals and projects that open up more distant possibilities. (SB 175-6) The way we plan meals is a good example of this. Because we know we'll generally be hungry in the early evening, for example, we can plan our dinner well in advance relative to our current tastes, our projected tastes, the availability of food, the time needed to cook, etc. As such, a relative distance (in this case temporal, but potentially spatial as well) allows us to create goals in the future that can open up possibilities for behaviour that would not exist if our freedom were strictly imminently reactive. More distance means more time, which widens the field of possibilities for action. (SB 125) If we could not create our own goals, we would be stuck in the imminent and so our meals could only be made relative to our current needs. We would plan meals only as our hunger manifested, and if there were no food nearby or easily accessible, we'd be in a bad situation. Different animals also display differing capacities with respect to this kind of planning (e.g. hunting v. grazing) as a result of being more or less imminently reactive. To fully understand the relationship between this lived distance and sense-making as a form of decoupling to create greater freedom and more possibilities for interaction, we need to turn to Merleau-Ponty's later works on reversibility and the relationship between activity and passivity.

3.2.4 Lived Distance and the Reversibility of Activity and Passivity

Sense is generated in the co-constitutive relationship between body and world. But as mentioned, this inseparable closeness of body and world cannot be so close that the two coincide. Indeed, in PhP Merleau-Ponty states "[i]f man [sic] is not to be enclosed within the envelope of the syncretic milieu in which the animal lives as if in a state of ecstasy, if he [sic] is to be conscious of a world as the common reason of all milieus and as the theater of all behaviours, then a distance between himself [sic] and that which solicits his [sic] action must be established." (PhP 89) Perception is a distance in proximity. There are very good reasons for why this distance between body and world is necessary, which I developed in Chapter 2. Merleau-Ponty fully develops these ideas in VI, but even in PhP we find compelling reasons. A lack of distance between consciousness and the world would preclude any temporal thickness of the present moment and "my consciousness would penetrate the world all the way to its most secret articulations, intentionality would transport us to the heart of the object." (PhP 247) The issue that arises here comes about if we understand perception, and our relationship with the world more generally, strictly as an activity on the side of the subject. Merleau-Ponty argues instead that our openness to the world involves an interplay between activity and passivity. For example, as much as visual perception is an act of looking, it is also a passive seeing. (EM; Morris 2010) On the side of looking we can list off the various aspects that constitute the act of visual perception, such as visual attention, the various motor activities that dilate the pupils, move the eyes, turn the neck and head, the underlying neural activity, and so on. But there are also instituted structures in place that allow for the act of visual perception to occur. My sedimented knowledge of various object and colours, the coupling between the relevant sensory and motor circuits, the relevant neural pathways, etc., all converge in perception as passive structures without which the act of looking would not be possible. Each act of perceiving draws upon these structures as "those events in an experience which endow the experience with durable dimensions, in relation to which a whole series of other experiences will make sense." (IP 77) To be passively open to the world in the sense of seeing thus brings the history of the organism to bear in the present moment and institutes a sense for perception.

Importantly passivity and activity are not a dichotomy in opposition; passivity is not the absence of activity and vice versa. In the context of our engagement with the world they are not dichotomized at all. Just as each act of perceiving is equally a passive openness to the world (where the openness is conditioned by the passive structures within the subject), each passive structure is sedimented and maintained in acts of perceiving. Indeed, this is what learning is (more on this later). (Morris 2010, 152) It is precisely this divergence or gap between activity and passivity that allows for perception in the first place. By way of summarizing some of the discussion in Chapter 2, we can say that it is because they are different ways of being, not an excess or lack of one way of being, activity and passivity are not necessarily in opposition. Indeed, they are unified through the body in its engagement with the world. This unity, Merleau-Ponty argues, is brought about by a relation of reversibility between activity and passivity. The reversibility of activity and passivity is meant to be understood as a turning of one to the other, rather than a turning of one *into* the other given that their divergence is not spread along a continuous scale. Perception is reversible between passivity and activity in the sense that both are involved in perception but to varying degrees, as foreground and background. When I touch the surface of the table, my touching oscillates between a passive touch that feels the surface of the table, its texture and grooves, and an active touching that explores the surface along the path revealed by my touch's passivity. There is thus a turning of active touch to passive touch and back again. Importantly, even while passively touching the table I do not cease to actively touch, but the activity recedes into the background. This is the sense in which there is divergence but not opposition. Both aspects of perception as active and passive are necessary for perception, and the reversibility that characterizes their relation is thus an ontological grounding. Perception is only possible through the body as passive via its sedimented structures and the body as active via its exploratory movement in and toward the world.

Lived distance can be understood as grounded in the divergence or spread (*écart*) that underlies the reversible relation of activity and passivity. While there is indeed a spatial boundary that separates my body from the world, it is not the thickness of my skin that

provides a distance between my body and the world. The world and my body are of the same ontological stuff and so there is a proximity in my immanent contact with the world. The lived distance between my body and my world that makes perception possible should be understood as an *interval* that ensures that my body and my world do not overlap and collapse into one another. The interval between activity and passivity is thus a spread or divergence between two different dimensions of the body that are nonetheless unified through the body's engagement in the world; "[w]hen one of my hands touches the other, the world of each opens upon that of the other because the operation is reversible at will, because they both belong (as we say) to one sole space of consciousness, because one sole man touches one sole thing through both hands." (VI 141) Lived distance, then, is precisely the sense in which perception is *not* wholly ecstatic (outside of itself, or more specifically, transcending the body) and "one with the world." There is always a sense of ecstasy in perception insofar as the world is constitutive of our being in the world, but it is also always on the body's side of the world. Understanding perception as reversibly active *and passive* allows for this distance because without passivity perception is ecstatic.

In the case of Schneider, we might argue that insofar as he can be understood as still possessing a reversibility of passivity and activity, it is no longer reversible *at will*. Rather, to the extent that he has a passive openness to the world it is wholly conditioned by his active engagement with it. The world does not solicit anything for him outside of the goals he sets. Merleau-Ponty argues, of Schneider's disorder, that "we must acknowledge a personal core that is the patient's being and his power of existing. Here is where the disorder resides." (PhP 136) There is no solicitation of the world for Schneider, no temporality outside of the present, "[t]he future and the past are for him nothing but "shriveled up" continuations of the present." (PhP 137) He cannot get lost in his perception of the world or in a daydream. By contrast, Merleau-Ponty claims that

> [t]he normal subject's body is not merely ready to be mobilized by real situations that draw it toward themselves, it can also turn away from the world, apply its activity to the stimuli that are inscribed upon its sensory surfaces, lend itself to experiments, and, more generally, be situated in the

> virtual... for the patient, however, the field of the actual is limited to what is encountered in real contact or linked to these givens through an explicit deduction. (PhP 111-2)

For Schneider, the passive structures that help institute a sense in perception are slave to its activity. It would not be right to say that there is no sense for Schneider, but it has lost its fullness and is relatively sparse in comparison. This is because Schneider has lost the ability for the passive structures of his body to solicit or enable active engagement in the world. Again, by contrast, "for the normal person, every movement has a *background*, and that the movement and its background are 'moments of a single whole' … immanent in the movement, it animates it and guides it along at each moment. For the subject, the beginning of kinetic movement is, like perception, an original manner of relating to an object." (PhP 113) In order to move effectively, or meaningfully, Schneider has to try to engage in preparatory movements through the mediation of a conscious awareness of the location of his body. In this way, he can initiate the movement and provide a sort of temporary "kinesthetic background" through which the movement can unfold, but this kinesthetic background must be updated at each phase of the movement. (PhP 118) Merleau-Ponty understands our engagement with the world as happening through sedimentation and spontaneity—through an interplay between the grounding structures that organize our perception of and movement into the world, and a relative freedom from those structures that allows for a creative activity through which one can move beyond them. (PhP 132) Whereas "[f]or the normal person, the object is "speaking" [*parlant*] and meaningful, the arrangement of colors immediately "means" something…for the patient the signification must be brought in from elsewhere through a genuine act of interpretation." (PhP 133)

What this brief discussion of Schneider's condition reveals is that even in Merleau-Ponty's earlier works there are the beginnings of an understanding of the importance of the dynamic reversibility of activity and passivity. Perception, our relationship with the world, is not accomplished strictly by the activity of the subject, but also through institutions sedimented through development and one's history. Indeed, it appears as if these sedimented structures help to provide a background that guides our active

engagement with the world. Because Schneider's illness manifested as an adult due to the injury he sustained, he is still able to rely on structures that were sedimented prior to his injury. He still possesses a habitual body, but it lacks its former flexibility and plasticity. His habitual body and its sedimented structures have lost their connection with the world and as such "the world no longer suggests any significations to him and, reciprocally, the significations that he considers are no longer embodied in the given world." (PhP 133) These sedimented structures create the lived distance necessary for sense insofar as the sedimented structures that ground one in the world simultaneously allow for the possibility of existing in some sense beyond, or behind, it. Because these structures remain open and help to institute a sense in the world my active engagement in the world gets a sort of head start. The sedimented structures also allow me to wander through memories or daydream about places I've never been. My engagement with the world can go beyond immediate reactions or reflexes. Conversely, unlike Schneider, my active engagement in the world need not occur blindly. The ability to institute sense in the world is an activity, but it is simultaneously also a passivity. The nature of the body as unifying the reversibility of activity and passivity in perception is thus central to an understanding of sense-making. Sense is instituted.

The spontaneous activity according to which we engage with the world is thus equally grounded in the sedimented structures that comprise our habitual bodies and allow us to be open to the world. Because of this relationship of reversibility between our active engagement with and passive openness to the world we can understand freedom as an intertwining of spontaneity and sedimentation. Importantly, the sedimented structures that ground our active engagement are not fixed. Reversibility, as it's developed by Merleau-Ponty, is characterized by an intertwining and so, in as much as sedimentation grounds spontaneity, the reverse is also true. The structures that limit the possibilities for action and help institute a sense to the world are certainly active insofar as they structure perception, but also in the sense that they are plastic. They are not static—their sedimentation is always in process. This is the sense in which skills need to be maintained in order to be kept. Although I played guitar for several years, I have not practiced in probably just as many and if I were to attempt to play guitar right now I

would not be able to perform at even the modest heights of my ability when I was more practiced. As such, the stability of our sedimented structures of behaviour is relative; sedimented structures provide stability but this stability can be undone over time (or intentionally) unless the structures are maintained. Indeed, this plasticity provides the possibility for free and spontaneous behaviour that allows us to move away from a deterministic understanding of behaviour. If our sedimented structures were fixed like cement, this would preclude the kinds of learning that involve the modification or change of specific behaviours relative to contexts. Any sort of sedimentation of behaviour would happen independent of experience and interaction with the world and would amount to something like a biological *a priori*. This is not necessarily to say that there would be no sense. The case of Schneider would seem to caution against it given that Schneider does appear to have a meaningful relationship with the world, even if it is importantly different. But he is bound to the goals he sets. (PhP 136) There is no flexibility in his behaviour because the structures of behaviour on which they rely are relatively closed off from the world and fixed. This kind of cemented sense is likely what is instituted by simple organisms, which will be discussed further in Chapter 4.

Freedom, then, is grounded in the flexibility inherent in our structures of behaviour. This flexibility is variable in that it applies both to our ability to create and modify our goals, but also to learn and adapt our behaviours to better meet those goals. Because our structures of behaviour are open and capable of reorganization, they can be deployed in a variety of contexts. This is the sense in which our body schema is a system of equivalences (PP 142); if I am skilled at playing guitar, I am more likely to be skilled (than a musically unskilled individual) at playing piano as well even though the goal is, though similar, nonetheless distinct, and the dynamics of the behaviours required to realize that goal are, though similar, also distinct. If my behaviours were not "transferrable" to a great extent, my skill at playing guitar would have no bearing on my ability to play piano. Precisely because our sedimented structures are still flexible, our behaviour is free. In constraining our experience and the field of possibilities in certain ways, our situation and body also broaden the field and give us freedom in other ways. Freedom, defined as such, is built into the very structure of intentionality in the proper

phenomenological sense. The manner in which we move in and toward the world is simultaneously constrained and made possible by the structures of behaviour that comprise the body schema and our situation.

3.2.5 Freedom and Sense-Making

To reiterate the point made above, freedom relies on the flexibility of the sedimented structures of behaviour that comprise our habitual body. Freedom can be flexible both in the context of application and in our ability to make changes in the structures themselves. But it remains to be seen how this relates to sense-making. The very acquisition of a habit is grounded in our ability to augment our structures of behaviour. This is precisely what learning is. Habit in general, then, presupposes this kind of freedom. Recall, though, that habit is our body's manner of understanding the world. The world and the objects therein have meaning to us relative to the sedimented structures of behaviour that we possess. A staircase means something very different to an able-bodied person than to an individual with a physical disability, just as a guitar strung backwards means something very different to a skilled guitarist than to an individual unfamiliar with stringed instruments (or even to a left-handed person). The bodily skills we possess via our habitual body make sense of the world we inhabit and structure our engagement with the world by affording certain ways of moving in and toward it. This creates a field of possibilities for our action in and toward the world which amounts to our freedom. Freedom, as our flexible interaction with the world, is necessary for sense-making.

At the outset I tried to make clear that the above discussion of Merleau-Ponty's account of sense-making and its relation to freedom is from the perspective of *human* embodied consciousness. As a phenomenologist, Merleau-Ponty is largely using human experience as the basis for his phenomenology. Some of what he develops is undoubtedly applicable to non-human animals but some is not. The kinds of learning and goal-directed behaviours involved in habit formation are clearly beyond the capabilities of many of the simplest organisms. It is, however, broad enough to be applicable to many non-human animals. Hunting, for example, requires a structural flexibility (prey selection, stalking, planning, etc.) that would suggest the kind of sense-making involved falls broadly within

the purview of Merleau-Ponty's account. The enrichment of intentionality in the form of propositional or categorical thought undoubtedly marks a sharp distinction between the kind of sense-making humans engage in and all other non-human animals and so perhaps this is the line that should be drawn. Merleau-Ponty makes a similar distinction between the vital structures of behaviour that animals engage in and the human order that is characterized by symbolic behaviour. I now discuss this distinction within the context of instituting sense.

3.3 Instituting Sense

The discussion so far has revealed the ways in which we are both active and passive with respect to sense-making and the conditioned, or situated, freedom required to institute sense. Merleau-Ponty argues, and I agree, that institution is a more accurate description of the nature of perception and subjectivity precisely as a relationship between activity and passivity, as incongruent counterparts that are two aspects of a whole that never fully collapse into one another. As I've discussed above, institution is meant to contrast with the understanding of the subject as constituting/constituted, which Merleau-Ponty understands as an "activist" interpretation of consciousness. In the context of sense-making, the act of constituting sense would reduce sense-making entirely to an activity of the organism. For similar reasons to those discussed in Chapter 2, sense-making solely as activity is problematic. (IP 123) On such an activist account of sense-making there would be no exchange between subject and world. (IP 76) This would mean that perception, of which sense-making is constitutive, would occur without an openness to the world which would amount to a rejection of the presence of the world. (IP 121, 146). This is precisely what Merleau-Ponty cautions against. Rather, sense is an interval or divergence between subject and world, and never a pure act of the subject. (IP 136) Failing to incorporate the passive dimensions of sense-making would erase the past of the organism, and ignore the sense in which the instituted subject is temporally extended toward the horizon of the future and anchored in the past. (IP 117) Understanding sense-making as an activity of constitution not only fails to let the world speak, it fails to appreciate the subject as fundamentally temporal.

By developing an account of sense-making as instituting sense we can overcome these difficulties. As discussed in Chapter 2, incorporating passivity into the act of perception involves grounding our being in the world in activity and passivity as incongruent counterparts that are nonetheless unified through the reversibility of the perceiver as perceiving/perceived. This is true of sense as well. Merleau-Ponty argues that instituted sense is properly understood as divergence, difference, openness and deformation. (IP 6, 11) Perception as institution is, according to Merleau-Ponty, an "interiority-exteriority" (IP 62, 64), which is to say that it is the convergence of these two different aspects of our being in the world. But it is a convergence that nonetheless maintains the difference so that one does not collapse into the other. Just as the lived distance required for perception is an interval that extends perception beyond the immanent, so that perception is not an act in ecstasy, the divergence between perceiver and perceived, or body and world, is also fundamentally temporal in nature. Precisely because the body does not act in ecstasy, but is equally rooted in a physiological, experiential and cultural history, each act of perception also draws upon this history in the institution of sense. Indeed, Merleau-Ponty argues that the past is enclosed in the *I can* of one's body (IP 195), which is what we've already seen in relation to the habitual body as a manner of structuring the world in a meaningful way. Each perception goes beyond the instantaneous act of perceiving: "each perception is a vibration of the world, it touches well beyond what it touches, it awakens echoes in all my being in the world." (IP 165) In the human case, this bodily intentionality (the *I can*) is comprised of cognition, motricity, affect and perception. While we can certainly expect something analogous to be going on in the institution of sense in non-human animals, proper phenomenological intentionality arguably involves capacities that either go beyond that of simple organisms (discussed in the next chapter) or would ultimately be question-begging. If sense is grounded in intentionality, and intentionality is partly constituted by cognition (in the human case), to argue that cognition is an act of sense-making would be circular, which is obviously not helpful. In order to determine whether or not simple organisms are cognizing, we ought to start with the less controversial claim that they are making sense of their environment in order to understand what would need to be involved in sense-making in its most basic manifestation.

Merleau-Ponty divides behaviour into three orders: the physical structures that correspond to the law-governed interactions between constituents of the world; the vital structures created when physical systems become autonomously self-organizing and self-maintaining and the physical structures are modified or exploited to that end; and the human order wherein *new* structures of behaviour—culture, society, economy—are created. Each order is simultaneously grounded in the previous and yet also increasingly liberated from it. While the physical structures of behaviour are important, insofar as both the vital and human orders are rooted in and constrained by them, it is the vital and human orders that concern the present discussion, for it is in the vital order that the emergence of perspective occurs and is multiplied indefinitely in the human order. Merleau-Ponty's discussion of the vital structures very closely resembles the self-maintaining behaviour of adaptive autonomous systems that was briefly outlined in §3.1, and will more fully be developed in Chapter 4. For example, Merleau-Ponty claims that behaviour corresponds to the vital order "when equilibrium is obtained, not with respect to real and present conditions, but with respect to conditions which are only virtual and which the system itself brings into existence; when the structure, instead of procuring a release from the forces with which it is penetrated through the pressure of external ones, executes a work beyond its proper limits and constitutes a proper milieu for itself." (SB 146) This milieu carves out the organism's orientation toward the world. Yet, the organism is limited to this singular perspective (it cannot take on new ones) and as such, its behaviour is always wholly constrained by vital structures. (SB 118) Indeed, this is precisely what Merleau-Ponty argues distinguishes animal from human behaviour:

> It is this possibility of varied expressions of a same theme, this "multiplicity of perspective," which is lacking in animal behaviour. It is this which introduces a cognitive conduct and a free conduct. In making possible all substitutions of points of view, it liberates the "stimuli" from the here-and-now relations in which my own point of view involves them and from the functional values which the needs of the species, defined once and for all, assign to them. The sensory-motor *a prioris* of instinct bind behaviour to individual stimulus-wholes and to monotonous kinetic melodies. In the

> behaviour of the chimpanzee, the themes, if not the means, remained fixed by the *a priori* of the species. With symbolic forms, a conduct appears, which expresses the stimulus for itself, which is open to truth and to the proper value of things, which tends to the adequation of the signifying and signified, of the intention and that which it intends. Here behaviour no longer *has* only one signification, it *is* itself signification. (SB 122)[16]

There is an important distinction here that I think can help clarify the different kinds of sense-making that different organisms can possess. Merleau-Ponty makes reference to a distinction between the theme of a behaviour and the means of that behaviour. The themes can be construed as the context or subject matter of the behaviour. So, for example, we can say that the yeast "ate" the sugar because they were "hungry". Here the eating is the behaviour and the theme is a biological need to maintain viability manifested in hunger, broadly construed. Yeast does not consume solely for pleasure; they consume to stay alive. Now, presumably, the means by which a behaviour is realized refers to the specific action taken. So, if yeast are consuming glucose, the means by which they satiate themselves is glycolysis (the enzymatic breakdown of glucose), which happens in a biologically predetermined manner. But there are a large range of capacities that separate organisms whose means of realizing a behavioural theme are biologically fixed, and ones that can adapt their actions to realize that theme. Granted, the expression of the theme, or the perspective on the theme (which could perhaps be considered the goal of the theme) will be common across all such individuals but the realization can vary and be more or less successful based on an individuals' ability to learn and adapt to context. What I'm arguing is that there is enough difference between yeast, whose theme and means are both fixed by nature, and owls, whose theme is fixed but whose means are flexible and adaptable, that the *sense* that the two are making is different in kind and that the difference comes down to a flexibility, or plasticity, of the structures of behaviour. This still leaves room for a distinction between the animal and human orders of behaviour since humans are also capable of creating new themes of behaviour as well (e.g. dancing

[16] It's worth noting that this view appears to be somewhat uncharitable with regard to the cognitive capacities other apes exhibit, and is likely exaggerated. Merleau-Ponty does, however, appear to shift to a more generous understanding of non-human cognition in the *Nature* lectures and IP.

for the sake of dancing); "[w]hat defines man is not the capacity to create a second nature—economic, social or cultural—beyond biological nature; it is rather the capacity of going beyond created structures in order to create others." (SB 175) It's worth stating that it is entirely possible that some non-human animals may also be able to create new themes of behaviour, and so the line need not be drawn strictly between human and non-human in principle but rather between who can or cannot create these new themes of behaviour, but this is nonetheless how Merleau-Ponty draws it.

The end of the above quote also suggests an important point in relation to intentionality: "behaviour no longer *has* only one signification, it *is* itself signification." (SB 122) In the context of animal behaviour, the act intends the theme of the behaviour. The consumption of food has meaning in relation only to the vital norms that generate hunger. While eating is no doubt pleasurable for a dog (it certainly is for mine), that is not the reason it eats nor the meaning of the behaviour (at least according to Merleau-Ponty). It eats to stay alive. Human consumption, on the other hand, is often done not solely as a means to satiate hunger or store calories. Humans eat and drink for the pleasure of consumption itself.[17] This is because humans can intend the behaviour itself, which allows for the possibility of a plurality of themes of behaviour. What distinguishes the human from the animal, then, is a relative decoupling from the world. The animal's behaviour is always immersed in interaction and its object and goals are never removed from current interaction. By contrast, the behaviour of a human is grounded in a lived distance that decouples intentionality from the imminence of ongoing interaction with the world and allows for the possibility of behaviour intending distal objects and goals. This decoupled intentionality corresponds to the flexibility with which an organism can modify its structures of behaviour, which is to say that it makes an organism more or less free.

In simple organisms, the structures of behaviour that realize the themes of behaviour and constrain the means are outside of the control of the organism. This is to say that they are fixed, and relatively inflexible. These fixed structures of behaviour are likely realized

[17] "Nothing would be more tiresome than eating and drinking if God had not made them a pleasure as well as a necessity." –Voltaire

genetically and physiologically. There is certainly flexibility with respect to how and when genetic information is used in order to affect behaviour, but the scale at which genetic information can be modified in order to better adapt a behaviour to a given context extends well beyond the time frame of that behaviour. Genes are certainly adaptive, but the timescale at which adaptation occurs in many genes is relatively large (although there may be certain genes, such as those related to the immune system that adapt at a quicker timescale). As such, these genetic constraints on the structures of behaviour are not under the direct control of the organism itself. Behaviour can change relative to context, but the behaviour itself cannot change within a context as a result of a process of adaptation or learning. I think this is something like what Merleau-Ponty was referring to when discussing the sensorimotor *a prioris* of instinct and themes of behaviour being fixed by the "*a prioris* of the species." In most contexts, for simple organisms, this situation works well to maintain the organism's autonomy. But what it means is that sense for very simple organisms is relatively fixed and static and the organism itself is passive to the processes that make sense. No activity of the simple organism can change the sense that objects in the world take on for it. Sense is instituted by structures over which the simple organism has no control because for simple organisms there is not yet an interval between passivity and activity. An interval between passivity and activity comes about through their reversibility in perception and behaviour, and these simple organisms do not possess a capacity to modulate between passivity and activity as a result of experience and at the command of the organism itself. The kind of reversibility required here would imply a dedicated control system like a nervous system. Simple organisms are certainly passive as well as active in the world, but because the processes that underlie their activity and passivity are not relatively decoupled, there is no means to modulate their reversibility, and so no real unity between them. The passive structures of genetic influence, for example, affect the activity of the organism, but the influence is not mutual. Activity and passivity are not counterpart in simple organisms and as such there is no reversibility between them. Lacking the reversibility that characterizes human phenomenology does not, however, mean that simple organisms do not display flexibility of behaviour, but the behaviour is flexible in that the organism can behave differently in different contexts, with different stimuli (i.e. it does not do exactly

the same thing in all contexts). A different kind of flexibility would allow for organisms to behave differently in similar contexts, and would amount to a kind of learning. This suggests (at least) two different ways in which an organism can exhibit behavioural flexibility, which I will outline in Chapter 4. This behavioural flexibility corresponds to two different kinds of sense-making.

In IP, Merleau-Ponty claims that instituted sense is "not closed." (IP 6) What separates these two different kinds of sense-making is the corresponding plasticity of sense that is instituted. To be clear, this is not a denial of the statement that sense is not closed. For simple organisms, sense must be also open to and structured by the world the organism inhabits. This is the sense in which individual organisms can adapt to their local environment through phenotypic plasticity. But lacking the ability to learn and retain a record of past experiences in memory, for example, there is a certain sense in which simple organisms have an impoverished history. It is true that the past of the species of the organism is retained in the *I can* of its body, but this past is not plastic in the same way, and especially not at the command of the individual. Rather, the past is expressed in its genetic history and phenotypic manifestations, for example in the genetic structures that implement fermentation in *Saccharomyces cerevisiae* (that will be discussed more fully in Chapter 4). Merleau-Ponty famously stated that "[b]ecause we are in the world, we are condemned to sense" (PhP lxxxiv), and while this is true of all living things, there is also an element of destiny involved in the sense instituted by simple organisms. Because sense lacks the plasticity to change in simple organisms, it is more or less fixed at birth. The difference, I argue, between sense-making in simple organisms (i.e. within the vital order) and sense-making in humans comes down to the plasticity of the institutions involved in making sense. For example, if physiology and genetics are the primary structures involved in instituting sense for an organism, the sense instituted would not be plastic. Physiology and genes can and do change over time (at various scales), and a corresponding shift in sense would likely occur, but given that one of the important features of DNA is its fidelity, the plasticity is only relative and within a time-frame that extends beyond the life of the organism itself. Similarly, an organism's physiological design is adapted to operate within a certain (relatively narrow) range of

conditions in order to keep the organism viable, and so while change can and does happen it is not usually rapid or drastic. Genetics and physiology are arguably relatively stable and invariant. As such, if they are responsible for the institution of sense in simple organisms we can expect the instituted sense to be relatively stable and invariant as well. Conversely, if sense is at least partly instituted by structures that are malleable and plastic, such as the nervous system, it's plausible that the instituted sense would also be capable of change such that objects and stimuli can take on different meanings at different times. The sense instituted by an organism capable of learning can shift and augment based on the organism's interactions. A dog can learn, for example, that a pet rabbit is not food. What I propose is that different ways of instituting sense correspond to different types of sense-making. These different ways of instituting sense vary based on the different capacities with which an organism has to engage with its environment. In humans these capacities allow for sense to be plastic, whereas in simple organisms they institute sense to be relatively invariant. This follows fairly explicitly from Merleau-Ponty's articulation of bodily intentionality; given that sense depends on one's body, the type of body one has affects how one opens onto the world.

3.4 Conclusion

I will spend more time in the next chapter focusing on the processes that underlie the different ways in which sense can be instituted. For now, it will suffice to conclude by summarizing the relevant aspects of sense-making moving forward and outlining the distinction between the different kinds of sense-making. By thoroughly examining Merleau-Ponty's discussion of *sense*, spanning his entire career, we have seen that, contrary to the articulation commonly used by enactivists, sense-making is not simply an activity of the organism. This is not to say that sense-making does not involve activity on the part of the organism, but to frame it in this manner is to overlook the passive dimensions involved in sense-making. For this reason, Merleau-Ponty articulates sense as *instituted*, rather than constituted. Sense as constituted is constituted solely by the organism and is one-sidedly active. Sense as instituted involves a convergence between active and passive dimensions of the organism in its interaction with the world. Incorporating passivity into the genesis of sense allows for an openness to the world

precluded by constituted sense. Further, it creates a divergence between organism and world that opens to the horizons of the organism's past and anticipated future. This allows the organism to act based on past experiences and expected needs. But this picture of instituted sense is more or less robust depending on the underlying structures through which sense is instituted. Various processes interact to institute sense, ranging from the organism's genes, to its physiology, to its cognitive architecture. What this means is that the type of body that an organism has affects the way in which it opens onto the world and the corresponding sense that is instituted. Simple organisms, especially single-celled organisms such as yeast, I will argue in the next chapter, institute sense through structures that are largely stable and invariant (which works quite well for them in most contexts) whereas more organizationally complex organisms, such as humans, institute sense at least partly through structures that are flexible and exhibit plasticity, such as the nervous system. The invariance or flexibility of the instituted sense is correspondingly invariant or flexible relative to these structures. As such, we can distinguish between (at least) two types of sense-making that correspond to these different ways of instituting sense. I will discuss them further in the next chapter, but we can refer to the broader class of sense-making that applies to all living things that institute a relatively invariant sense as *basic sense-making* to indicate that it is the "simplest" form of sense-making out of which other forms can develop. The sense-making that institutes sense in a manner that leaves sense open and capable of taking on different meanings is *adaptable sense-making*, indicating its ability to change over time. I will argue that adaptable sense-making is cognitive but basic sense-making, by itself, is not.

Chapter 4

4 Structural Flexibility in Cognition

The previous chapter motivates a distinction in kinds of sense-making by looking closely at Merleau-Ponty's phenomenology, which has significant implications in relation to the enactivist claim that cognition is an activity of sense-making. All living systems, insofar as they are adaptively autonomous, are capable of making sense of their environment in a way that structures their world and creates meaning relative to the norms that their self-maintaining organization creates. Because of the complexity of the kinds of behaviours that adaptive autonomous systems generate, enactivists argue that adaptive autonomy is sufficient for cognition. In the previous chapter I began to motivate a case against this claim by using Merleau-Ponty's phenomenology to show that there are different types of sense-making, only some of which should be considered cognitive. This chapter builds off of the phenomenological arguments of Chapter 3 by developing a case against a deep continuity from perspectives in the philosophy of biology and cognitive sciences. Specifically, I argue that one way we can distinguish between types of behaviour is in terms of the types of flexibility certain behaviours exhibit and require. Certain kinds of flexibility, such as what I call structural flexibility, are good candidates for cognition since they exemplify capacities such as learning, while others are not. I use a discussion of *Saccharomyces cerevisiae* (brewer's yeast) to show that behaviour can be complex, and arguably indicative of sense-making, but nonetheless not cognitive. I argue that the capacity for structural flexibility, which is motivated by Merleau-Ponty's work that was highlighted in the previous chapter and further research in the philosophy of biology, is necessary for cognition and that *S. cerevisiae* do not display behaviour indicative of it. This allows for a distinction that frees enactivism from the claim that all living systems are cognitive and provides the basis for a continuity claim (between life and mind) that is more explanatorily useful than enactivism's deep continuity.

In order to show how the distinction that I make between kinds of flexibility is nonetheless consistent with a continuity between mind and life, I use a discussion of Daniel Dennett's *Kinds of Minds*, which concerns the evolution and development of

mindedness and sentience, to help bridge the gaps. This discussion suggests the importance of language to "higher" forms of cognition, and so the last sections of the chapter concern the relationship between structural flexibility and language and the role of language in higher-order thought. In attempting to show how there can be continuity between life and mind, as we know it, it is important that it is understood that I am not attempting to provide an exhaustive account of cognition. Rather, I argue that learning of the sort permitted by structural flexibility is necessary for cognition in general and sufficient for a minimal kind of cognition. As I will show, structural flexibility relies on a cluster of abilities present in varying degrees much in the way that cognition does. I will not provide a list of such abilities, but will discuss those that are relevant to the discussion at hand. Specifically, because cognitive behaviour can be realized in multiple different ways (in humans, cephalopods, and chickadees, for example) it is unhelpful at best and potentially problematic to attempt to devise such a list from the armchair. While a capacity for learning, for example, is necessary for cognition, I intend to leave a discussion of its physiological implementation relatively open. I will begin by discussing how enactivists see cognition as developing out of the adaptive autonomy of living systems.

4.1 Adaptive Autonomy and Normativity

When enactivists claim that life is sufficient for mind, they understand life to be explicable in terms of dynamic systems theory. More specifically, they understand living things to be adaptive autonomous systems and that sense-making arises through the self-maintaining activity of the adaptive autonomous system. This needs some unpacking. The enactivist account of life interprets organisms as adaptive autonomous systems. Within the current context, autonomy is understood as self-governance rather than complete independence, since autonomous systems are always structurally coupled with the environment within which they are embedded, and as such cannot be properly understood as completely independent from it (Di Paolo 2005). This means that the processes that comprise the system, while interacting in various important ways with the environment, are processes under the control of the system itself. These collections of related processes are interrelated in such a way that they constitute a single whole that

changes, but nonetheless endures, over time. In the case of autonomous systems, the constituent processes recursively depend on each other for their generation, and collectively constitute a *unified* whole that is *self-determining* with respect to the range of interactions possible between the system and its environment (Christensen and Bickhard 2002; Thompson 2007). Nonetheless, autonomous systems are both operationally and organizationally closed. Organizational closure is the self-referential nature of the enabling relations that obtain between the various processes that constitute the system. Operational closure refers to the "reentrant and recurrent dynamics" that create a unique and stable system. (Thompson 2007, 45) Together, organizational and operational closure express the manner in which a system can be open but have the kind of infrastructure that supports an interdependent network of processes that are mutually supporting in their organization and dynamics. As such, this closure does not imply a total independence from external processes, given that material exchange is necessary because of the system's tendency toward thermodynamic equilibrium, which would involve the breakdown of the processes that realize autonomy. (Di Paolo and Thompson 2014) As such, the independence that comes with autonomy is only relative given the precarious state in which organisms exist.

A system is autonomous, then, in its capacity to be self-determining. But this autonomy is precarious; the unity of the system is defined by the recursive interdependence of its constituent processes and the persistent material needs of these processes require that the system is in more or less constant interchange with its environment to maintain autonomy and as such the system is thermodynamically open. (Di Paolo 2009) This is to say that as long as the system is autonomous, it is thermodynamically far-from-equilibrium. This precariousness that conditions the system's autonomy is directly a result of its persistent struggle to fight the tendency towards equilibrium that would mark the breakdown of the system. It is specifically the system's operational closure that maintains its autonomy and as such, "[i]n the absence of the enabling relations established by the operationally closed network, a process belonging to the network will stop or run down." (Di Paolo and Thompson 2014, 72) Because of this precarious autonomy, normativity begins to enter the picture. Given that the system has a set of conditions that need to be met and

processes designed to fulfil those conditions in order for the system to remain autonomous, the system is functioning insofar as it meets the conditions of autonomy, either globally or locally. The system is functioning better or worse relative to its current state with respect to the conditions of its self-maintaining organization. Importantly, the norms that constrain the activity of the system are created by the self-maintaining organization and activity of the system and are thus *internal* to the system—they are not externally created or imposed.

Di Paolo (2005) has argued that autonomy by itself is not sufficient for sense-making because it cannot give an organism the ability to appreciate graded differences between differently viable states and equally viable paths of encounter with the environment. (Di Paolo 2005) This is to say that by itself autonomy does not yield the kinds of operational mechanisms necessary to effectively *regulate* internal processes and external exchanges in a way that implies a better or worse for the system. This kind of self-monitoring requires a capacity for *adaptivity*, which establishes an interactional asymmetry between organism and world as a result of the organism's ability to regulate its structural coupling with the environment. (Barandiaran et al. 2009; Froese and Di Paolo 2011) What this means is that tendencies toward states that result in a loss of viability can be differentiated and acted upon in order to more effectively maintain autonomy. This requires that the system be organized in such a way that a "relative decoupling between the dynamics of a regulatory subsystem and that of its basic constitutive organization" is possible. (Barandiaran and Moreno 2008, 8) This decoupling is what permits the possibility of acting upon those tendencies toward states of viability loss, for example, by "putting a distance and a lapse between the tensions of need and the consummation of satisfaction" before any loss of viability actually occurs and requires more "reactive" activity. (Di Paolo 2009, 17) Thus, adaptivity brings with it a more robust normativity than autonomy by itself because it allows for the system to actively differentiate between paths of behaviour that are better or worse for it relative to its current state. Adding adaptivity means that the system not only requires the ability to evaluate its current state with respect to the norms established by the necessity of self-construction but also the ability to evaluate how its states relate to a potential loss of viability and the means to

appropriately act in light of that evaluation (i.e. to control internal regulations and/or external exchanges). Because of this and the endogenous source of these norms, the use of normative language in this context is appropriate and necessary to properly characterize the structure and organization of such systems. (Christensen 2012) In at least a very limited sense, even the simplest adaptive autonomous systems possess something like a normative perspective on the world.

The presence of this normative perspective becomes relevant as a system interacts with its environment (e.g. via controlling external exchanges) in relation to the norms established through the organization of the system. In its most basic articulation, the stimuli with which the system interacts become valenced, producing either "attraction or rejection, approach or escape" (Weber and Varela 2002, 117). Indeed, it is only once a system possesses a normative perspective that we can understand certain stimuli as being of any sort of value to the system itself (rather than imposed from without). Thus, as a result of an organism's ability to evaluate its present state with respect to norms established by its particular, autonomous, organization, the system has a perspective on the world such that it has "preferences" with regard the presence of some stimuli, and for the absence of others. Further, the preferences embedded within this perspective actively aid the system in meeting the closure constraints placed upon it by its organization, and thus contribute to its continued autonomy.

The above articulation of adaptive autonomy provides the basis for a biological notion of agency, defined as "an autonomous organization capable of adaptively regulating its own coupling with the environment according to the norms established by its own viability conditions." (Barandiaran et al. 2009, 376) This is to say that the activities of adaptive autonomous systems can be properly considered *actions* given that such systems interact with the environment in order to fulfill norms created by the system itself (i.e. the norms of self-maintenance) and, further, that the capacity for adaptivity marks the move from structural coupling, which is symmetrical activity between world and organism, to behaviour, which is the asymmetrical regulation of the structural coupling with environment by the organism. (Di Paolo 2009) So, with adaptivity comes agency and the

activities of the adaptive autonomous system are properly actions or behaviours. This capacity to produce agentive behaviour in accordance with preferences the system itself enacts as a result of its autonomous organization can be understood as the capacity for sense-making. Adaptive agency, then, appears to be necessary for and also arguably sufficient for sense-making. (Froese and Di Paolo 2011)

As Di Paolo points out, adaptivity comes about as a result of dedicated mechanisms or as an emergent aspect of specific ways of realizing autopoiesis. (Di Paolo 2005) This is to say that adaptivity can be realized in a relatively simple manner and that the ability to regulate states and interactions, i.e. actively monitor and control states and interactions on the basis of that monitoring, does not, in principle, require anything approaching the sophistication of a central nervous system. Indeed, all organisms are adaptive autonomous systems regardless of their simplicity. What this implies, then, is that *all* organisms possess a capacity for sense-making. I do not take issue with this claim—I think it's compelling that insofar as an organism can to some extent regulate its own states and interactions with the environment it can make sense of the world around it. But it's also clear that the type of sense-making a single-celled organism is capable of is very different than that of a multicellular organism or a vertebrate and so this calls for a way of distinguishing between types of sense-making, which I introduced in Chapter 3. To help understand what separates the behavioural abilities of simple organisms from more complex ones we need to distinguish between different kinds of flexibility that organisms can exhibit.

4.2 Types of Flexibility

As it is discussed in the philosophy of biology and cognitive science, flexibility can be understood broadly as behaviour that is functionally complex, in the sense that in different contexts an organism can behave differently, or heterogeneously. (Godfrey-Smith 1996, 240) This means that the world of the organism is sufficiently complex that it can behave in different ways given the appropriate stimuli. If a change in the world occurs such that different stimuli appear to it, then the organism can change its behaviour to interact appropriately with them. Godfrey-Smith (2002) argues that this kind of

flexibility is found in effectively all living systems but the capacities permitting this flexibility are not properly cognitive (they are, he claims, proto-cognitive). I'll refer to this kind of flexibility as *situational* flexibility to mark an important distinction between it and a more robust kind of flexibility that I'll discuss shortly. Situational flexibility is so called because a situationally flexible organism's behaviour is flexible only relative to its situation or context. If there is no situational change, there is no behavioural change and as such the behaviour is flexible because it is different in different contexts. Situational flexibility roughly corresponds to 'adaptivity' as it's used by enactivists, which was discussed above, in §4.1, and has been defined as a system's capacity to monitor and regulate its interaction with the environment such that it can act in a manner that preserves its viability and distinguishes the implications of equally viable paths of behaviour. (Di Paolo 2005)

It's worth pointing out that Di Paolo's (2005) articulation of adaptivity is perhaps too strong given that it requires an organism to interpret and act upon the optimal path of behaviour the organism can take. The kind of processing required for optimality involves a level of sophistication that goes beyond what simple organisms would be capable of, especially given that in most contexts a behaviour that is satisfactory will be sufficient to maintain autonomy. Indeed, as I will discuss in §4.5, the behaviour of simple organisms in many cases is not optimal but satisfactory. The behaviours in question are largely determined prior to interaction through the phenotypic variability that the genetic structures (in interaction with the environment) of the organism afford. This would largely involve selecting from possible behavioural pathways already contained within the organism's behavioural structures. In large part, this selecting is not some voluntary act but a direct response to the presence of a given stimulus such that different stimuli elicit different responses. Understood in this way, adaptivity allows the organism to act upon a behaviour in a given environmental context that satisfies its current metabolic needs, effectively allowing the organism to behave differently in different contexts. As such, adaptivity can be seen as a type of situational flexibility that all living organisms possess.

In arguing that bacteria and plants display flexible behaviour because their responses to environmental variation are flexible, Godfrey-Smith (1996) claims that these organisms display a first-order flexibility of behaviour insofar as their responses to different stimuli vary. But an organism can also be flexible in a second-order way, such that its very structures or systems of behaviour are flexible. A more robust form of flexibility would incorporate not only varied behaviour in different contexts but also varied behaviour in *similar* contexts as a result of the organism's "experience." (Godfrey-Smith 1996, 26) This kind of flexibility goes beyond complex behaviour that varies relative to context or stimulus and ensures that the organism can adapt its behaviour even in the same context or relative to the same stimulus in order to optimize its interaction further. To distinguish this more robust form of flexibility from situational flexibility, I'll refer to it as *structural* flexibility to indicate that it is the structures and constraints that underlie and determine the behavioural responses themselves *independent* of a change in context or situation that are flexible—it is the regulation of the structural coupling itself that is flexible.

Importantly, structural flexibility displays a kind of adaptivity to specific contexts that can be characterized as a form of learning since the system is able to change its method and pattern of performance based on information fed back to the system in interaction. (Oyama 2000, 136) Within the process of interaction, an organism can evaluate its performance and modify its behaviour according to that evaluation so that it can perform differently, and hopefully better, within the same context. As such, structural flexibility enables and incorporates a cluster of abilities such as anticipation and memory that help to increase the possibilities for behaviour by expanding the temporal window within which the organism can act. This allows for the possibility of behaviour that is not strictly reactive, and is grounded upon an important decoupling from the environment insofar as the normativity that governs this kind of behaviour is relatively underdetermined by metabolic values. (Froese and Di Paolo 2011) The relative decoupling from the environment would increase the temporal window for interaction by extending and increasing the number of the intervals at which behaviour can intervene in interaction and have an effect on the organism's viability. These decoupled processes are, of course, still coupled to the homeostatic processes that comprise the organism's metabolism, for

example, given that they ultimately serve the global interests of the organism (e.g. to stay alive) and require the physical maintenance a homeostatic system provides. Behaviour that is structurally flexible can be considered locally decoupled from but globally coupled to the organism's homeostatic processes.

The kind of structural decoupling that occurs with structural flexibility is more dramatic than the decoupling that is required for adaptivity at least partly because adaptivity does not require a decoupling of processes from homeostatic norms. The goals of adaptive autonomy are very much still constrained by the norms that develop out of the organism's self-maintaining organization in such a way that the object of these norms is always the organism itself rather than any distal phenomenon. In simple organisms the level at which behavioural interaction (called the interactive level) with the environment originates and occurs is not sufficiently independent of the constructive (i.e. metabolic) level of the organism. As such the behavioural structures of simple organisms are not sufficiently decoupled to generate structural flexibility. In order to understand what kind of decoupling is required for structural flexibility, we need to discuss the importance of the neuron and its effect on the hierarchical organization of living systems.

To recap the discussion thus far, the importance of adaptivity to behaviour is that it provides some degree of freedom of behaviour from the immediate constructive demands of the organism. This independence is such that the activities of the behavioural or interactive level (at which the organism engages with world) can vary independently of the activities of the constructive level (at which self-organization is realized) that carry out the self-maintenance of the organism. But the behaviours of the interactive level in simple oraganisms are nonetheless largely "context-specific regulatory systems and mostly genetically specified." (Barandiaran and Moreno 2008, 10) One of the important features of DNA is its fidelity and relative stability by contrast to the flux of environmental interaction continually occurring. But this also precludes the plasticity needed for structural flexibility. The "information" latent in the complex structure of DNA according to which the phenotypic traits of the organism are constructed (in interaction with environmental factors) is of necessity relatively invariant. Of course, the

nature of a phenotype depends on several structures, processes and environmental factors that extend beyond the boundary of its genetic base. (Oyama 2000) But the skeletal structure that phenotypic variation is built upon is relatively fixed and stable, and more or less guarantees that certain simple organisms will act predictably in specific contexts (more on this later). The genetic specification of these regulatory processes greatly limits the complexity of behaviours capable of being produced by the organism as a result of size, coordination, and interference. This is because they are grounded in chemical reactions that are necessarily relatively slow and localized, which means that coordination between multiple systems is easily confused by local interference (of other ongoing chemical reactions) and becomes increasingly difficult as the size of the organism increases. (Barandiaran and Moreno 2008) This becomes especially problematic in multicellular organisms as size and the need for coordination become increasingly significant.

In what follows I'm going to provide an example of how structural flexibility can be realized in a biological system using a discussion of the abilities that a nervous system affords. Why I discuss nervous systems in particular is because it develops out of the enactive account of adaptive agency articulated by Barandiaran and Moreno (2008), who discuss the importance of the development of neuronal systems in this context, and also because it is perhaps more relevant in the context of human cognition. But to be clear, this is not intended to be read as a claim that only organisms with nervous systems are capable of structural flexibility. A nervous system is neither necessary nor sufficient for structural flexibility. It is not by itself sufficient for structural flexibility because abilities required for structural flexibility are at least partially constituted by a variety of processes outside the organizational boundaries of the nervous system, such as the organism's homeostatic processes. Also, a nervous system is not necessary for structural flexibility because structural flexibility can be realized in different kinds of systems that are non-neuronal. Some examples of such non-neuronal structurally flexible systems might include the immune system, and organisms like slime moulds, which are single cells that lack a nervous system but appear to be able to learn. Slime moulds have been shown to change behaviour based on experience in a process of habituation to certain innocuous

repellents. (Boisseau et al. 2016) Interestingly, this adapted behaviour appears to be able to be shared between cells such that cells lacking the requisite experience for such habituation acquire the adapted behaviour through transfers made in cell fusion. (Vogel and Dussutour 2016) This amounts to a non-neuronal system for learning. As such, there are certainly cases we can draw upon to argue that structural flexibility can occur absent a nervous system. Nonetheless, I discuss nervous systems below because they provide a stark and well-understood example of the kinds of capacities required for structural flexibility and the abilities they afford.

The development of the neuron can provide a solution to the problem of coordination by allowing for a level of interaction independent of the constructive level that can efficiently coordinate between the sensory mechanisms of the organism and its motor system. Because the means of communication between neurons within the nervous system differs from that of the rest of the organism's metabolic processes, interference is greatly limited and communication can occur with less disruption. This allows the neural systems to have greater plasticity and flexibility than the underlying metabolic processes and means that these neural systems can be considered hierarchically decoupled from the metabolic system. Neural systems are decoupled in that (a) "neurons minimize interference in their local metabolic processes with their ion-channeling capacities and (b) that the metabolic-constructive organization of the organism (digestion, circulation, etc.) under-determines the activity of the [nervous system], which depends on its internal dynamics and its embodied sensorimotor coupling with the environment." (Barandiaran and Moreno 2008, 11) The ion-channeling capacities on which the nervous system relies provide a means of rapid communication between cells. The transmission of signals through ion channels occurs (relatively) independent of metabolic constraints given that the relevant ions (membranes are selectively permeable to specific ions) travel through channels across electrochemical gradients as a function of ion concentration and membrane potential rather than metabolic energy. (Damasio 2010, 40) This allows for the transmission of signals via ions across and between cells at an increased speed, allowing for broader coordination across different systems that rely on the nervous system (e.g. sensory systems and motor systems), and a faster response time to the presence of

stimuli. Ion-channeling, while still reliant on metabolism in a global sense insofar as the viability of the cell in general requires it, can thus be understood as allowing for a decoupling of the nervous system from metabolism because the activity of metabolic processes under-determines the activity of neuronal processes. The coordination and behaviours that are possible through the capacities that ion-channeling affords are not directly tied to metabolism, and so cells can communicate outside of the constraints of metabolic activity. This, eventually, gives us a kind of worldly interaction that is determined by a relatively offline and conservative structure that can learn different and better behaviours for interaction even within the same context.

To discuss the nervous system in abstract terms is in some sense unhelpful given that there is diversity in both cell type and organization in different parts of the nervous system (in the same individual) and in different kinds of nervous systems (across individuals). Even in relatively simple nervous systems (which are still complex in their own right) there is differentiation between kinds of neurons, including sensory and motor neurons, and association neurons in slightly more complex nervous systems. (Cajal 1995) As organizational complexity increases these neurons concentrate in ganglia and the association neurons help coordinate behaviour by linking different (e.g. sensory and motor) ganglia together. (Cajal 1995, 7) The evolution of a fourth kind of neuron, the psychomotor neuron, makes an important change in the way that behaviour is coordinated. These neurons, which develop out of association neurons, are "able to modulate behaviour based not just on external stimuli, but also on internal conditions, and not just on current stimulation but also past experience." (Anderson 2014, 293) Crucially, the important role of these psychomotor neurons comes a result of the centralization of neural structures and the relationships that define them. This is to say that structure and organization play a prominent role in providing the kinds of capacities that are necessary for structural flexibility. As such, when I discuss nervous systems it should be understood that they are not monolithic structures.

The coordination and adaptability of behaviour that a nervous system with the right kind of organization affords can give rise to structural flexibility. An organism's world-

directed behaviours are coordinated and modulated by a system with an organization and dynamics that are capable of being modified to improve interaction. While still globally coupled to the organism's metabolic processes, neurons can be organized in such a way that they are functionally isolated from the metabolic processes that feed them. This functional isolation, however, is not specifically what is important about the role of neurons in organizing behaviour, given that other organs in an organism's body are relatively functionally isolated as well. What is important is the relationships between neurons that comprise neural networks, and that the organization of activity between them is flexible and adaptable based on experience. This is to say that the networks, or structures, that govern behaviour are capable of being reorganized based on the success or failure of interaction. The possibility for this reorganization is at least partly because the organization of activity in these networks is created and maintained by continued patterns of activation such that the connections between two neurons are strengthened, so to speak, through repeated instances of sequential firing (the inverse also being true). (Hebb 1949) As such, the organization of neuronal activity can be modified in experience based on the success or failure of interaction. Given that these neural networks play an important role in behaviour, their flexibility and adaptability can provide a significant biological basis for the flexibility of structures of behaviour and so for the capacity for structural flexibility as well. Indeed, research into the nervous system of *Caenorhabditis elegans* (a species of roundworm), which was the first animal to have its entire connectome (map of neural connections) mapped, suggests that flexibility exists even in the most rudimentary neural network. It was discovered that even with a fixed connectome, *C. elegans* is able to flexibly modulate behavioural output of experience-dependent chemotaxis (movement up or down a chemical gradient) as a result of neuro-modulation, which modifies synaptic strength or engages distinct circuits. (Luo et al. 2014; Bargmann and Marder 2013)

While the determination of what systems realize structural flexibility is an empirical matter, there are compelling reasons to argue that a nervous system can afford structural flexibility. Because structural flexibility requires a relative decoupling of behaviour from metabolic processes in order to operate independently of them, an organism's behaviour

must be able to be directed, at least partly, by a system that is locally decoupled from the organism's metabolism. Because information can be passed between neurons via ion channels and synapses that are underdetermined by metabolic activity, large-scale coordination between systems that rely on, or are interdependent with, the nervous system is possible that in some sense goes beyond metabolic constraints. This means that the nervous system is capable of being decoupled in the relevant manner through the relative independence of the means of cellular communication (and coordination) from the organism's metabolism. This provides a level of control over behaviour that can operate outside of immediate metabolic concern. So, while it would be a mistake to attempt to settle an empirical question a priori, there are compelling reasons to think that one instantiation of structural flexibility occurs through the nervous system, however simple or complex. This means that structural flexibility is probably prevalent, but less so than life in general.[18] There may be, then, many simple organisms that are situationally flexible but not structurally flexible.

4.3 Flexibility and Sense-Making

The structures of behaviour that characterize the vital order (§3.3) do not exhibit structural flexibility precisely for the reasons outlined in the previous section regarding the importance of the neuron for creating a system capable of directing behaviour decoupled from metabolism. Prior to a nervous system, all behaviour is directly tied to the vital structures that sustain the organism and keep it viable. As such, organisms lacking a nervous system, or at least a system relatively decoupled from metabolism like a nervous system, can be understood through the structures of behaviour that comprise the vital order. These behaviours may indeed be flexible but only to the extent that the vital structures that generate and constrain behaviour afford, and the flexibility will only be relative to the variability of contexts within which the organism can interact; i.e., in different contexts the organism will be able to behave differently. The decoupling of behaviour from vital structures that the nervous system affords opens the possibility for

[18] I have not explicitly argued that a nervous system, however simple, is sufficient for structural flexibility, but it would certainly be worthwhile to investigate the extent to which the two overlap.

more complex and adaptive forms of interaction and generates a kind of freedom and flexibility not directly constrained by the organism's viability and not limited to imminent needs or threats. This allows for new structures of behaviour such as learning.

The structural decoupling that underlies structural flexibility amounts to a kind of lived distance discussed in Chapter 3, both as a distance in proximity and as the interval between passivity and activity. Insofar as the nervous system is hierarchically decoupled from the organism's metabolism while still remaining globally coupled to it, the organism's interaction with the world is not strictly reactive. Indeed, decoupling provides a gap between the appearance of a stimulus and the organism's reaction to it given that the organism's behaviour is under the influence of the activity of the nervous system rather than its metabolism. To be clear, this gap is not necessarily meant to indicate that the organism's response would be *slower*. The effective coordination between an organism's sensorimotor systems and local decoupling from metabolism would facilitate a quicker response via anticipatory mechanisms, which is to say that in many cases the behavioural response can be *pre-planned*. But because the action is not wedded to the stimulus, behaviour, while world-oriented, is not world-governed. This structural decoupling is a first step in breaking with the world that creates a distance between the organism and the world. Further, the ability of the nervous system to facilitate communication and coordination between the organism's sensory and motor systems creates a bridge between these distinct manners of being in the world, as passively open to it (sensory) and actively engaging with it (motor). This coordination and communication look something like the beginnings of the reversibility between the body as active and the body as passive that underlies sense and subjectivity on Merleau-Ponty's account of flesh.

Distinguishing between two different ways in which behaviour can be flexible also affords a corresponding interpretation of sense-making in terms of the plasticity of the structures that institute sense for the organism. While simple organisms only capable of situational flexibility are still arguably making sense of their environment, which I will argue below, they are not doing so in the same manner as organisms capable of structural

flexibility. As above, sense-making is always an act performed by the organism, whether it is instituted by genetic structures or by processes capable of modification in "real time." But it can vary in being more or less open to modification by the organism through experience. For humans, sense is plastic; the habits that structure perception, while sedimented, are capable of changing in a way that can change the corresponding sense associated with objects in my environment. As a child, for example, I did not like broccoli, but as an adult I do because my taste preferences have changed (indeed, the perceived taste of food can easily be changed by how the food makes us feel, which is probably why I like broccoli so much more now). That tastes change expresses the sense in which sense-making can adapt to new situations or ways of being. This is why we can call this type of sense-making 'adaptable sense-making.' For simple organisms that only possess a capacity for situational flexibility, sense-making is not flexible and does not change as a result of an organism's experiences in interaction (arguably, experience would not even properly apply in this context). The self-maintaining activities of simple organisms institute sense insofar as things in the world contribute more or less to their ongoing persistence, but it is only through these activities that there is sense for them. Given the immediate and persistent metabolic demands that guide these activities in simple organisms, it is for good reason that such activities are not capable of modification as a result of "experience." But it nonetheless means that intentionality has little (or nothing) to do with this kind of sense-making, which I have called 'basic sense-making.' The remainder of the chapter will be devoted to arguing that cognition is a form of adaptable sense-making that is structurally flexible.

4.4 Flexibility and Self-Directed Interaction

With the distinction between situational and structural flexibility in place, we are now able to understand how structural flexibility can ground simple forms of cognition. The capacity for structural flexibility allows for the possibility of self-directed interaction, which develops out of simple directed interaction. Recall that directed action is essentially the capacity for adaptivity discussed in §4.3.1. As the processes that comprise directed interaction increase in number and complexity (perhaps, though not necessarily, as a result of either increasing environmental complexity and variability, and increasing

internal complexity and variability), the need for greater integration and control over those processes increases as well. (Christensen 2004b, 2010) Just as the ways in which the organism can interact with its environment multiply, the opportunities for behaviour do as well. In a way, the world opens for the organism more or less relative to the ways in which it can interact with and navigate it. But this creates new demands. As Christensen (2004a) points out, the "general pressure driving the evolution of cognition is the need for integrative context sensitivity when modularised reactive rules cease to be effective." (664) Self-directed interaction helps accomplish this through "the addition of integrative processes that provide onboard means to improve the coordination between actions, opportunities and requirements, allowing the agent to act in a more flexible, 'proactive' way." (Christensen 2004a, 664) Importantly, the behaviour involved is self-directed because rather than the regulation being concerned with how an interaction is actively sustained by the organism (as in adaptivity), the regulation concerns which behaviour(s) the organism will deploy in order to optimize the interaction and how to improve the success rate of those behaviours.

The kind of flexibility Christensen (2004a) discusses is made possible by the capacities for anticipation, evaluation and action modulation, and also gives rise to the capacity for interactions that are goal-directed. These capacities develop out of an increased integration between the same processes that direct interaction and allow specific interactions to be increasingly influenced by a greater number of environmental and internal factors. (Christensen 2004a) Indeed, these capacities are present in adaptive autonomous systems, but increased sensorimotor complexity and integration via the organism's nervous system allow for regulation of behaviour in a way that adaptivity by itself is not capable of. Self-directedness brings with it improvements in the ability to integrate affective and contextual information and to anticipate interaction, which expands the time window available for directed interaction by reducing context-dependency and improving context-sensitivity. (Christensen and Hooker 2000) By creating and sustaining a lived distance between organism and world, this temporal window makes room for the flexibility we associate with cognitive behaviour.

Interaction is also enhanced by an organism's ability to evaluate the success and failure of its performance during interaction through the ability to interpret affective signals normatively; pain (or negative valence) implies the presence of a harmful stimulus or failure, whereas pleasure (or positive valence) indicates the success of an interaction. The ability to tease these normative signals apart from their particular instantiations, and to retain the information gained from such interactions can allow the organism to learn behaviours more conducive to meeting its homeostatic needs. Using anticipatory abilities, the organism can learn to adapt and refine its behaviour to better achieve its goals by becoming more sensitive to smaller variations in context. By being sensitive to behavioural cues in prey animals, predators can more effectively hunt and ambush their prey, for example. This requires that the predator not only understand, or recognize, indicators for flight in prey, but also to be sensitive to its own behaviour in order to stalk without detection. The enhanced sensitivity provides additional affective and contextual information gained through the interaction that can then be integrated to better refine the organism's behaviour and adapt it to relevant contexts, thereby increasing its ability to both modify and reach its goals. (Christensen and Hooker 2000, 2002) The integration of affective and contextual information into processes such as motor planning will subsequently require more elaborate systems for information processing and control in order to incorporate the relevant information and modify existing structures accordingly. This process of learning that is grounded by self-directed interaction establishes a positive feedback loop that continually improves the effectiveness of the organism in realizing its goals, and is called self-directed anticipative learning. (Christensen and Hooker 2000) As such, more complex forms of cognition are also capable of developing through an extension and increased integration of the capacities that permit self-directed interaction. Importantly, the behaviour involved is self-directed because it concerns which behaviour(s) the organism will deploy in order to facilitate successful interaction and how to improve those behaviours themselves. Rather than being fundamentally world-oriented, these behaviours concern the activity of the organism itself, initiating a breakage with the world that is crucial to the understanding of enactive subjectivity developed in Chapter 2.

The picture outlined in the preceding paragraph about the evaluative ability that allows organisms to tease affective and contextual information from their instantiations and integrate the information to better serve interaction would plausibly involve some sort of capacity to acquire and use labels. In this context, I mean 'label' to be understood broadly as standing for, or indicating "something else," and need not necessarily develop out of something internal. Through learned associations, my dog has come to interpret the sound of cling wrap as indicating the presence of cheese. The sounds of cling wrap could thus be interpreted as a kind of label for cheese, however rudimentary. It's probably through a similar process that the specific sounds or gestures that I make when I give him a command, such as 'sit,' come to indicate a desired behaviour (and subsequent reward). But my dog, however smart he is, cannot flexibly apply and reorganize labels (also probably because to him they are not yet labels as such). There are a significant number of capacities that he would have to possess that would involve language use and acquisition, the ability to take an object as an in-itself, and all the perceptual cognitive systems upon which those abilities rely. But more generally, he cannot flexibly and apply labels because he does not have the sufficient degree of *control* over the processes that allow him to generate and apply these labels in novel contexts. A greater degree of control over the processes that enable the acquisition and use of labels, would involve a kind of reflexivity where the labels themselves can come to be taken as objects that can be further refined, reorganized, or applied differently. This would endow the organism with an increased flexibility through an increased context-sensitivity but also context independence that would arguably make a large difference for planning and organizing behaviours. To foreshadow the discussion later in the chapter, the flexible control over label acquisition and use could be seen as providing something like the roots for language, understood in the broad sense (which involves all of the mechanisms that support the language faculty). (Cf. Hauser et al. 2002; Fitch 2010)

The form of learning articulated above suggests the capacity to decouple the structures of behaviour from their environmental milieu, and the ability to adapt the structures themselves. (Cf. Sterelny 2003) This amounts to a form of structural flexibility. Much in the way that the regulation of structural coupling appears to be necessary for adaptive

behaviour, the second-order regulation of the structures of behaviour themselves appears to ground a simple form of cognition. Jointly, the capacities required for abilities such as evaluation, anticipation and action control appear to be sufficient for a minimal kind of cognition (self-directed anticipative learning). Cognition is not a single capacity, but rather a cluster of capacities that are present in varying degrees. No single capacity is sufficient for cognition and the entire set of capacities often associated with cognition (e.g. memory, internal representation, perception, learning, etc.) are not going to be jointly necessary and sufficient. (Godfrey-Smith 2002) As such, we can expect that in different organisms there will be a different variety and robustness of cognitive capacities.

These cognitive capacities involve two distinct aspects. First, there are the physiological structures the capacities rely on, and second there is the embodied control over those structures (this is of course not to suggest that these two aspects are wholly separable). To clarify through analogy, we can construe the physiological structures as a tool, such as drum sticks, which afford new kinds of behaviour (i.e. certain kinds of drumming). Any body with the right physiology (e.g. a dexterous hand with opposable thumbs) can use a drum stick, but there are varying degrees of control over drum sticks that afford distinct ways of using them. A skilled drummer with years of practice has developed extensive control over drum sticks that allows for ways of using them that go beyond what a beginner can accomplish. This is to say that in order to accomplish the behaviour (e.g. drumming), you need the right physiological structures but also skilled control over those structures. Cognitive capacities work in much the same way: the right kind of body (and organization) is necessary for cognition, but a certain degree of control over those structures is also necessary (which, in some sense is also afforded by certain properties of those structures). This control could be interpreted as providing a means of distinguishing between cognitive processes and the life processes out of which they develop. A recent study gives perhaps a more salient example of the distinction being made between the physiological capacities and the control over those capacities. Fitch et al. (2016) argue that "the inability of macaques and other primates to speak is a reflection not of peripheral vocal tract limitations but of their lack of neural circuitry enabling

sophisticated vocal control. In short, primates have a speech-ready vocal tract but a lack speech-ready brain to take advantage of its latent operating range." (4) The reason non-human primates cannot speak, they argue, is not because they lack the right kind of vocal anatomy but because the neural structures that support their anatomy do not allow the flexible control of the vocal tract that would enable speech.

It becomes difficult on this picture, and perhaps foolish, to try to pinpoint exactly what cluster of capacities is necessary and sufficient for cognition. Nonetheless, the kind of self-directed anticipative learning outlined above seems to be a good candidate for early forms of cognition and develops via structural flexibility out of the basic adaptive autonomous organization of living systems. It is plausible, then, that structural flexibility, regardless of what capacities it brings, is necessary for cognition insofar as the kinds of behaviour that characterize cognition such as learning depend on it. As such, grounding cognition in structurally flexible self-directed interaction preserves the continuity between life and mind without articulating cognition in a way that runs against common intuitions that would make all life cognitive. In order to demonstrate how the account discussed above is more intuitive than the enactivist account, I discuss the behaviours of *Saccharomyces cerevisiae*, which is a well-studied single celled yeast used for brewing and baking.

4.5 Yeast Are Not Cognizers

As it stands, the implications of the enactivist account of deep continuity seem counterintuitive insofar as cognition would be necessary for life. This becomes readily apparent when we look more closely at instances of complex behaviour in single-celled organisms. While it's clear that some kinds of behaviour are sophisticated, and perhaps indicative of something like sense-making, I argue that they are not cognitive. I'll discuss some of the metabolic behaviours of *S. cerevisiae* to illustrate this point. *S. cerevisiae* exhibits a complex context-sensitive metabolic flexibility, but I will argue that it does not possess the right kind of structural flexibility for cognitive behaviour.

4.5.1 *Saccharomyces Cerevisiae*

S. cerevisiae is a species of yeast commonly used industrially (and recreationally) in the fermentation of alcoholic beverages and is one of the most thoroughly studied eukaryotic microorganisms. (Ostergaard et al. 2000) That *S. cerevisiae* have become pervasive as biotechnological production organisms is partly a result of their capacity as facultative anaerobes to undergo both aerobic and anaerobic respiration. Anaerobic fermentation (which produces carbon dioxide and ethanol) is carried out in response to low environmental oxygen, but *S. cerevisiae* can also shift its metabolism to allow fermentation as a result of high concentrations of external glucose. (Otterstedt et al. 2004) While *S. cerevisiae* has a displayed preference for glucose as a source of carbon and energy, it is capable of consuming several different types of sugars (through fermentation). One of its most common industrial uses is to ferment maltose in the production of beer, which is a sugar that ranks relatively low preferentially for *S. cerevisiae*. Indeed, the "evolution of this yeast in natural environments rich in [glucose and fructose] (e.g. fruit and nectar), has led to a complicated, multilayered regulatory programme that only enables metabolism of alternative carbon sources (e.g. maltose, ethanol and galactose) when these preferred carbon sources are dwindling." (van den Brink et al. 2009, 1340) One can hypothesize that the greater prevalence of glucose and fructose in *S. cerevisiae*'s natural environment was the driving force behind its preference, but these simpler sugars also have lower metabolic cost as food sources than maltose. This is to say that while an evolutionary preference may exist stemming from availability, there is also a metabolic motivation behind the preference. (White and Zainasheff 2010) Either way, genes encoding maltose transporters and maltases (enzymes that catalyze the breakdown of maltose into glucose) are active *only* in the absence of glucose and in the presence of maltose. (Needleman 1991)

Interestingly, the consumption of glucose (glycolysis) has also been shown to suppress *S. cerevisiae*'s ability to consume maltose through the inactivation of its maltose transport system in a process called catabolite repression. (Ernandes, D'Amore et al. 1992; Gancedo 1998) This means that if *S. cerevisiae* is placed in an environment rich in both glucose and maltose, it will first consume (through fermentation) all of the available

glucose and then attempt to ferment maltose. However, given the inhibitory effect of glycolysis, the maltose fermentation will be significantly challenged and may fail. Importantly this catabolite repression is not bidirectional; if maltose is consumed prior to the introduction of glucose no inhibitory effect is seen in glycolysis. As such, we can summarize the relevant patterns of behaviour as follows: maltose will not be consumed if glucose is present, there is an inhibitory effect on maltose fermentation occurring after glycolysis, and there is no inhibitory effect on glycolysis occurring after maltose fermentation. These behaviours are clearly complex, and display a context-sensitive ability to adapt to the present environmental circumstances relative to homeostatic demands.

The behavioural complexity detailed above clearly meets the enactivists' criteria for cognition. The preferential consumption of glucose expresses the organism's ability to behave in relation to its metabolic norms, which are norms fundamentally tied to the organism's self-maintaining organization. Further, the adaptability to present environmental constraints, both in terms of being facultatively anaerobic as well as being able to consume different sugars relative to their external concentrations, demonstrates the sense-making capacities that Thompson (2007) would claim are cognitive. But, I argue, by distinguishing between situational flexibility and structural flexibility, we can distinguish between behaviour that is and is not cognitive. While it's plausible that *S. cerevisiae* are indeed making sense of their environment, they are doing so in a manner that is not cognitive. I'll illustrate this by discussing one of the industrial contexts in which *S. cerevisiae* is commonly used.

4.5.2 *S. Cerevisiae* Is Not Cognitive

Beyond the plethora of information available as a result of the extensive study of *S. cerevisiae*, I have also chosen to discuss this yeast specifically because of its industrial application. *S. cerevisiae* is remarkably consistent in its behaviours, which makes it well-suited to use in brewing (and baking), which requires relatively consistent results across products. The cluster of behaviours detailed above is well understood and exploited by many breweries and recreational brewers that produce beers with a high concentration of

alcohol. Glucose is often used by breweries as an adjunct when brewing beer with high concentrations of alcohol (usually exceeding 7% alcohol by volume) in order to increase alcohol content without adding further malt-derived flavour. Glucose adds more fermentable sugar, and so more alcohol, and has a relatively low flavor impact compared to malted grains which are relatively high in soluble flavor compounds such as melanoidins. As such, brewers have had to learn to adapt to the catabolite repression that occurs after glycolysis by "feeding" yeast glucose only *after* the fermentation of maltose is largely complete (since glycolysis is possible even in relatively high concentrations of alcohol and with little available nutrients and oxygen). As illustrated above, if glucose was present in the maltose-rich wort[19] before it was inoculated with *S. cerevisiae*, the glucose would be consumed first and much of the maltose left behind unconsumed, resulting in a "stuck" fermentation where the yeast cannot ferment all of the available sugars (and an undesirably sweet product).

When glucose is used as an adjunct fermentable in brewing, a larger amount of total sugar can be consumed by the yeast if glucose is added at (or near) the end of the primary maltose fermentation rather than prior to fermentation (i.e. when glucose is added to the wort prior to inoculation with yeast). While perhaps oversimplified, this would *prima facie* seem to suggest that in fermentations where adjunct fermentables like glucose are used, the "optimal" behaviour for the yeast in an environment rich in both maltose and glucose would be to consume a certain amount of maltose prior to glucose so that a larger total amount of sugar can be consumed given the metabolic costs associated with maltose and the catabolite repression that occurs after glycolysis.[20] This is to say that if *S. cerevisiae* were in control of its sugar-consuming behaviour, the most optimal behaviour would be to consume the maltose *first* since it can still easily consume the glucose after (but *not* vice versa) leading to a larger amount of sugar consumed in total. The optimal behaviour within such a context would arguably be for the yeast to take advantage of a

[19] The sweet, maltose-rich liquid that becomes inoculated with yeast and is then fermented to become beer.
[20] This might seem excessively demanding, but the point is simple: there really is no choice between behaviours for the yeasts, and so no real control. *S. cerevisiae*, by nature of its genetics and biological structures, will always consume the glucose first.

greater access to and use of a potential food source by either inhibiting catabolite repression or delaying glycolysis. But that is not how *S. cerevisiae* behaves. We might say that if *S. cerevisiae* had a capacity for structural flexibility, it would adapt its behaviour to take advantage of a food source that is available, whether by consuming glucose after maltose or by "disabling" the catabolite repression, given that access to a food source impacts viability.

Further, if *S. cerevisiae* displayed the flexibility associated with cognition, one would expect significant variation in its behaviour, given that billions or trillions of individual *S. cerevisiae* cells are involved in fermentation, depending on the scale of production. Tebbich et al. (2010) make a similar point, arguing that innovation rate can be used as a measure, or indicator, of flexibility. Even if there were some other relevant environmental or metabolic benefits of consuming glucose first that I have not articulated (e.g. a quicker drop in pH to create an environment inhospitable to competing microorganisms), one would expect that if a behaviour is flexible there should be at least some noticeable variation across individuals, especially in a context that would have an impact on viability. Indeed, in a *large* population one would expect variation that would be *significantly* noticeable (to the point where stuck fermentations would not occur or would at least be less frequent or marked). But, again, this is not the case. The fermentative behaviours of *S. cerevisiae* are remarkably consistent in a way that indicates these behaviours are fixed—i.e. inflexible. And so, while it's possible that their fermentative behaviours are indicative of something like basic sense-making insofar as different kinds of sugars take on a different meaning for the organism, these behaviours are not flexible in the manner that is a hallmark of cognitive behaviour.

Indeed, behavioural change with respect to the co-consumption of maltose and glucose appears to happen only as a result of genetic manipulation. Because *S. cerevisiae* has been so extensively studied and is used in many lucrative industrial contexts, its complete genome has been sequenced. This has allowed for the creation of genetically modified populations. One such population has been genetically modified so that maltose can be consumed in the presence of glucose and without the inhibitory effects of glycolysis.

(Klein et al. 1997) This effectively illustrates the case against interpreting *S. cerevisiae*'s behaviours being viewed as cognitive since their behaviours are passive and fixed, corresponding to, as Merleau-Ponty put it in SB, an "*a priori* of the species," rather than as emerging through flexible interaction with the world. While complex, these yeasts are not structurally flexible. Indeed, that the manipulation of *S. cerevisiae's* behaviour only happens as a result of genetic manipulation, which could be interpreted in relation to basic sense-making as involving an organism's lack of control over its own passive structures that institute sense. The behaviours of *S. cerevisiae* are fixed at least in part by its genetic make-up. This is to say that its structures of behaviour are genetic structures, which means that no activity on the part of the organism itself can reorganize or create new structures of behaviour based on experience, broadly construed. There is certainly flexibility in the behaviour of *S. cerevisiae*, but it is not the kind of flexibility associated with cognition whereby an organism displays control over their behaviour to the extent that it can learn to behave differently through experience. *S. cerevisiae* do not cognize.

4.6 A Less Deep Continuity

The goal I stated at the beginning of this chapter was to provide an account of the continuity between life and mind that was still broadly enactivist but that was not counterintuitive and too broad in granting cognitive facility to all living things. By using Merleau-Ponty's discussion of sense-making and the reversibility of activity and passivity that characterizes flesh to motivate a distinction in the ways in which behaviour can be flexible, I have managed to preserve the core of the continuity claim while constraining it sufficiently to make it more intuitive. What this means is that while cognition is a kind of sense-making (Thompson 2011a), not all sense-making is cognitive. Even simple organisms make their own sense, but it does not thereby follow that their behaviour is cognitive. Insofar as these simple organisms' capacity for sense-making is grounded only in situational flexibility, they should not be interpreted as cognitive agents.

Cognition, then, can be understood as incorporating the kind of control over behaviour I've argued is inherent to structural flexibility. This would mean that cognition involves

more than behaviour in relation to norms generated by the self-maintaining organization of a living system, which enactivists argue is sufficient for cognition. Instead, cognition would be understood as the capacity to flexibly interact with the environment in accordance with the self-generated norms that constrain interaction and institute sense. This flexibility is both the context-variability of behaviour (situational flexibility) and the plasticity of the structures of the behaviours themselves (structural flexibility). Importantly, because the account I provide is still, like the enactivists' account, grounded in an organism's adaptive autonomy, the flexibility of behaviour characteristic of cognition is still enacted in accordance with self-directed norms generated as a result of an organism's self-maintaining organization. Again, given that cognition is a cluster of abilities, we can expect many forms of cognition to go beyond those involved in self-directed interaction. Nonetheless, if we amend the enactive account of cognition to incorporate this structural flexibility, it becomes clear that behaviours like those of *S. cerevisiae* would no longer be mistakenly interpreted as cognitive. The behaviours they exhibit, while complex and indicative of a more primary and inflexible form of sense-making, are strictly reactive—they are not anticipatory and do not modulate action in the way a cognitive agent that expresses structural flexibility is capable of. It is important to note that all of this is entirely compatible with enactivism. Cognition would still be grounded in the same sorts of regulatory processes that maintain the organism's autonomy, and so there would indeed still be continuity between life and mind. However, the continuity would not be as deep as has sometimes been articulated given that cognition is not identical to these processes.

As I stated at the end of §3.1, the concern with the enactivist account of continuity is not *just* about intuitiveness, it is about its generality as well. In no way is cognition exclusively a human phenomenon, but it is certainly a trait that humans display in excess of all known species. Insofar as cognitive scientists are human, the chief concern of the cognitive sciences is to characterize cognition in the human paradigm, which involves abilities such as higher-order, or reflective, thought and language. By no means is this intended to imply that studying cognition in other animals is not valuable, but to cast a net so wide that all living systems are cognitive makes the concept so broad that it

sacrifices its productivity, given the enormous differences in the capacities for behaviour between single-celled organisms such as *S. cerevisiae*, behaviourally complex insects such as bumble bees, and humans. The capacity to develop abstract mathematical concepts and the capacity to consume different sugars in a context-sensitive way are different in important ways that the more general account of enactive cognition (i.e. as behaviour in relation to environmental meaning enacted by the organism in relation its self-maintaining activity) does not capture. The ability to make distinctions in general is a valuable tool for understanding the nature of a given phenomenon and in the case of cognition there is enough difference in the kinds of behaviour that different organisms engage in, as argued in §4.5, that distinctions are not just warranted but needed. As such, distinguishing between situational flexibility and structural flexibility, as they relate to sense-making and cognition, is valuable for providing an account of cognition that is not so liberal in application that it loses its utility. In this way, I have not drawn a line in the sand arbitrarily.

It could, however, be argued that it is question-begging to call structural flexibility but not situational flexibility cognitive. This is not the case. What counts as cognition must be broad enough to extend beyond the human context, but specific enough that it still captures something unique about cognitive behaviour. To individuate cognitive behaviour as a unique kind of behaviour requires that the operating definition pick out what makes it unique. And to call all behaviour that a living system enacts 'cognitive' is precisely to undermine any use of cognition as a distinct concept. As such, I characterize cognition by the control over behaviour and the structures of behaviour that both afford and constrain behaviour to the extent that the system can learn from experience. This involves a plasticity and control that I have called structural flexibility. Not only is this way of thinking about cognition more intuitive, relative to the more conventional understanding of cognition, it is significantly more useful than the account developed by the enactive approach that I have been discussing.

As should be apparent, as much as there is difference, there is also continuity between cognizers. I've stated how there is continuity between situational flexibility and structural

flexibility, and so also between life and simple forms of cognition. I have not yet articulated how this continuity bridges the gap between life and human cognition. Using Dennett's *Kinds of Minds* as a template, I will devote the remainder of the chapter to further extending the continuity to human cognition by focusing on language as an extension of the abilities that structural flexibility affords.

4.7 Kinds of Minds

Daniel Dennett's discussion of the evolution of mind and sentience in *Kinds of Minds* (1996) is a useful guide in navigating the discussion of what should and should not count as cognitive. Dennett distinguishes between four primary kinds of creatures and the kinds of minds they exhibit, which I will discuss in turn. Importantly the abilities of the later kinds of creatures do not appear *ex nihilo*, but develop out of the previous abilities of the "lower" creatures, much like how Merleau-Ponty understands the "higher" orders of behaviours as developing out of the lower orders. On Dennett's account, *Darwinian creatures* are the most basic kind of creature and their behaviour is largely hardwired, but the physiological basis of their behaviours can be influenced by events occurring in the organism's development and life (i.e. the development of a phenotype can be influenced by the environment in which the organism is embedded). *Skinnerian creatures* possess an ability to adapt behaviour through trial and error and the positive reinforcement of successful behaviour. This starts to look like a very simple form of learning via operant conditioning. *Popperian creatures*, instead of adapting behaviour through trial and error, are capable of preselecting among possible behaviours, which gives them a better than chance success rate for the initiated behaviour. According to Dennett, something of an inner environment is necessary in order for Popperian creatures to entertain various hypotheses about which behaviour would yield the highest success rates in a given context, and would have to be rich with information about the organism's outer environment. Over time and across generations Skinnerian and Darwinian creatures would also enjoy a better than chance success rate given as successful behaviours become selected for and the organism adapts to its environment. But for Darwinian creatures this adaptation would occur beyond the time-scale of the individual organism, unlike the adaptation of Skinnerian and Popperian creatures. Finally, *Gregorian creatures* possess

the capacity for tool use, which increases the probability of a successful "first move" and the speed at which such success is achieved. For example, words, which are interpreted as tools of the mind on Dennett's account, are not only a sign of intelligence but also confer it. We are Gregorian creatures.

To summarize: Darwinian creatures learn across generations through evolution but not individually; Skinnerian creatures learn through environmental interaction via reward systems; Popperian creatures are sometimes able to learn without direct environmental engagement through planning; and Gregorian creatures can learn better ways of learning through an increased ability to manipulate labels and models of the world. Before we continue, it's important to be clear that these distinctions are not supposed to delineate natural kinds or fixed categories according to which we can neatly group different kinds of organisms. Rather, they provide a general framework for thinking about differences in cognitive facility, much in the same way that social contract theories are effective models or frameworks in political philosophy despite the original position or state of nature being hypothetical rather than actual. Indeed, I advocate for a version of the continuity thesis that grounds cognition in the self-maintaining organization of living systems. Given that cognition involves a cluster of abilities, we can expect these underlying abilities to manifest differently in different organisms. This would support a staggered continuity more than dramatic leaps between different kinds of minds. Nonetheless we can use Dennett's framework for thinking through the impact of different kinds of abilities on cognition.

It's an open question as to whether Darwinian creatures have minds. Their behaviour does not display any indication of an inner life robust enough to be understood as something mind-like from the ordinary understanding of the term. But on the other hand, there is an immanent purposiveness to their behaviour that leaves room for an interpretation of simple organisms as minded. Whether or not their behaviour can be understood as "cognitive" is a separate issue. The enactivist articulation of deep continuity would entail that all Darwinian creatures are cognitive, but I doubt any enactivists would claim they have minds proper. Nonetheless, Dennett's discussion can

be useful in articulating a few divisions that helpfully delineate different types of cognitive behaviour. Darwinian creatures cannot learn. Their behaviour may be complex, but it is dictated largely through the expression of genetic information and environmental context. They are passive to their own structures of behaviour and as such no amount of activity on the part of the organism can change those structures for the organism itself. A genetic mutation, or the presence of a normally under-utilized gene in a unique environment, may confer some adaptive advantage to a given organism that would allow the gene to propagate significantly, subsequently structuring the behaviour of the *descendants* of that organism. Conversely the expression of a gene with deleterious effects on such an organism would have a lower probability of surviving across generations to structure behaviour from the grave. So, while there is certainly room for change in the structures of behaviour in even simple Darwinian creatures, that change happens either at a time scale that surpasses the life of the individual organism, or is out of the control of the organism itself (i.e. via environmental factors). Because they have no degree of control over their structures of behaviour—no ability to learn except as a species through evolution—based on the discussion above, I do not think Darwinian creatures can be considered cognitive.

Skinnerian creatures can learn, but in a very rudimentary way. They can learn to behave differently in similar contexts, but in a very limited and slow way that is strictly confined to the context of a given interaction and on the basis of trial and error. There is context sensitivity but not much context-independence. Popperian creatures learn in a way that is at the same time much more context-sensitive and less context-dependent. The systems involved in interaction are capable of being engaged independently of interaction, which allows for greater freedom and a much sharper learning curve. I think the line between Skinnerian and Popperian creatures is less clear than between Darwinian and Skinnerian, but there are important differences. Both Skinnerian and Popperian creatures require the coordination and modulation of behaviour through something like a nervous system (or a system with sufficient organizational plasticity). The difference, I think, between these two types of creatures is that the behavioural control system (i.e. the nervous system) of Popperian creatures is not entirely stimulus-bound and is capable of operating

independently of interaction. So while the Skinnerian creature is distinct from the Darwinian insofar as further "distance" is spread between the behaviour of the organism and its homeostatic processes via a relative decoupling of the nervous system, the Popperian creature is distinct insofar as it displays a greater distance or decoupling of its behavioural control system (nervous system) from the interaction itself. It might turn out to be the case that Popperian creatures have minds while Skinnerian creatures do not but as Dennett points out, there is a difference between intelligence and thinking. The behaviours of Skinnerian creatures could be intelligent in their adaptation and flexibility without implying anything like reflective thought. Either way, it would not be a stretch to understand the behaviour of Skinnerian creatures as cognitive.

The discussion about flexibility can be understood as attempting to distinguish Skinnerian from Darwinian creatures. While it is plausible that Skinnerian creatures are cognitive, I do not think a similar claim can be made about Darwinian creatures. The difference, I argue, lies in the ability to learn. Learning represents not only an ability to respond appropriately to events in the world, but to adapt behaviour itself to more effectively respond to events in the world. In the context of the present chapter, I intend the ability to learn to be broadly construed as the ability to augment behaviour based on experience (also broadly construed), or, in the context of the previous chapter, the ability to reorganize or create new structures of behaviour based on experience. As such, learning amounts to the ability to change the structures of behaviour and corresponds to what I called structural flexibility above. The distinction between Skinnerian and Popperian creatures, on the other hand, could be interpreted in terms of degrees of control over these structures of behaviour. Skinnerian creatures have control over their structures of behaviour insofar as they can learn (via positive reinforcement of successful behaviour), whereas Popperian creatures have some degree of control over the very process of learning itself insofar as they can develop and implement hypotheses in order to improve environmental interaction. Not only can Popperian creatures learn, they can learn more effectively.

The kind of environmental adaptation that characterizes learning, I argue, is not only essential to cognition, but sufficient for a minimal form of cognition as well. As it relates to the continuity thesis, given that not all organisms are capable of learning, not all organisms would be capable of cognition. But given that learning is a form of adaptive behaviour developed through experience, cognition would still be continuous with the processes that underlie the self-maintaining organization of living things. Learning develops out of these processes, but it is not identical to them. We can thus maintain the continuity thesis in a more restricted form. Indeed, I argue that the difference that separates all four types of creatures that Dennett details is a varying degree of control over and plasticity within the structures of behaviour through which the organism interacts with the world. This is to say that the capacities that we associate with higher cognition, such as reflective thought, come about as a result of an increased degree of control over and plasticity inherent to the structures of behaviour that institute our meaningful relationship with the world. In order to show how this preserves a modified version of the continuity thesis, I'll discuss the role of language in cognition and consciousness in order to show how Popperian and Gregorian creatures can be bridged under the general, revised, model of enactive cognition that I am advocating. As such, I will use a discussion of language to bridge the gap between cognition as structural flexibility and cognition within the human paradigm. To be clear, I am not attempting to provide an account of language or speculate on the evolution of language and its role in the evolution of consciousness and cognition. Instead, I am expanding on an understanding of how incorporating structural flexibility provides a continuity between mind and life through a discussion of the role of language in cognition and consciousness.

4.8 Language and Structural Flexibility

In the case of highly sophisticated cognition, such as it is present in humans and many other mammals (arguably cephalopods and some birds as well), the control over structures of behaviour takes on a unique characteristic. As discussed in Chapter 3, the body schema is a system *open* on to the world that contains a habitual knowledge of the organism's world-oriented engagement as sedimented structures of behaviour. Not only

is the body schema open to the world, it is *plastic*, insofar as the structures that manifest its schematization can be changed and reorganized. Merleau-Ponty has discussed the manner in which artifacts and objects, such as a hat with a tall feather or an organ, can be incorporated into the body schema so that the incorporated object is no longer experienced *as* object but part of the subject's reach into or sensitivity to the world. Tool use is well-documented in a variety of animals, and signifies an important kind of flexibility of the body schema to modify the dimensions of bodily subjectivity so that the skin is no longer the barrier between the subject's engagement with the world. This extension of bodily subjectivity modifies previous ways of being in the world through the incorporation of tools into the body schema that institutes and structures our engagement with the world.

What is unique to human cognition goes beyond the ability to incorporate objects into the body schema to extend the reach of the embodied subject. Our body schema can incorporate novel structures themselves through the integration of tools. Such structures are not simply modifications of previous structures (though they do depend on them), but develop out of the body schema's latent structures and afford new ways of being in the world. There are many such structures that could be discussed in this context, including art, dance, music, and political and social structures. The difference between the incorporation of a tool and the incorporation of a new structure can be illustrated in contrast between the abilities afforded through the incorporation of chopsticks into the body schema to more effectively eat certain foods, for example, and the abilities afforded through the incorporation of the structures that comprise classical Western music theory and performance into the body schema. These latter structures will involve not only a general style of playing an instrument, but also an internalized understanding of theory that both constrains and affords new ways of approaching the instrument that can be used to perform Bach's Toccata and Fugue in D Minor or to improvise like Miles Davis. In both cases there is sedimentation of structures through the incorporation of an object that extends one's reach, but in the latter a *new* type of structure becomes available that allows for new modes of expression and new ways of relating to the world (i.e. musically). As such, it is not just the ability to incorporate tools into the body schema, but

certain kinds of tools allow new ways of relating to the world that matters. Much like structural flexibility, language provides an openness to the organism but more significantly decoupled from the situation. Language involves an open and indefinite power of giving significance that transforms and extends the natural powers of the body without leaving it behind.[21] (Gallagher 2005)

Language is an example of a structure that, once incorporated, affords new ways of relating to the world. One of the ways in which language offers new ways of relating to the world is by offering new ways of cognizing. Dennett, I think rightly, makes the point that tools are often not only a design of intelligence, but also confer it. (1996, 99-100) In this sense, the incorporation of new structures can not only provide new ways of being in the world but allow for the possibility of other novel ways of being in the world. Given that, in many cases, these structures are not simply readymade and awaiting incorporation into a capable body schema, we should follow Merleau-Ponty in claiming further that "[w]hat defines man is not the capacity to create a second nature—economic, social or cultural—beyond biological nature, it is rather the capacity of going beyond created structures in order to create others." (SB 175) What distinguishes those organisms that have a capacity for cognition much closer to the human paradigm is not any specific cluster of abilities, but rather the production of new structures of behaviour. (SB 162) This not only presupposes an ability to take a multiplicity of perspectives upon the world, but it confers new perspectives as well. Being able to take multiple perspectives within a situation, which the capacity for structural flexibility allows, "liberates the 'stimuli' from the here-and-now relations in which my own point of view involves them and from the functional values which the needs of the species, defined once and for all, assign them." (SB 122) Language is arguably the paradigm of this opening of possibilities that comes with liberating stimuli from the immediacy of the situation within which it occurs. (SB 176) Indeed, Merleau-Ponty claims that "the act of speaking expresses the fact that man

[21] Gallagher (2005) here speaks of language "transcending" the natural powers of the body without leaving them behind. This wording, however, I think can easily lend itself to a misreading that bifurcates the cognitive from the bodily that I am specifically trying to undermine. Language does not transcend the natural powers of the body, it extends them.

ceases to adhere to the milieu." (SB 174) Given that many of the structures listed above (social, political, musical) are to a greater or lesser degree mediated by the capacity for language, language can be understood as affording these other structures. This is to say that language allows for the possibility of these other structures, and, following Dennett, we can see that language, as a tool, not only is a new way of being in the world but also confers further ways of being in the world.

There are various abilities that the addition of language enhances and affords. Among the capacities affected by language use, Dennett argues that

> [t]he improvements we install in our brains when we learn our languages permit us to review, recall, rehearse, redesign our own activities, turning our brains into echo chambers of sorts, in which otherwise evanescent processes can hang around and become objects in their own right. Those that persist the longest, acquiring influence as they persist, we call our conscious thoughts. (Dennett 1996, 155)

One of the abilities language enhances is an ability for finer grained distinctions. Recall the discussion in Chapter 3 about learning how to detect Citra hops. Because our conceptual knowledge is mediated linguistically, being able to discriminate between different aspects of an experience by labelling them allows them to be distinguished further in experience as well. Where initially I had perceived Citra as an undifferentiated tropical fruitiness, because I am able to label different aspects of experience as being floral, or mango-y, cantaloupe-y, I can refine my perceptual experience by drawing on this conceptual knowledge. This ability to make fine grained distinctions in experience amounts to an increased ability to be sensitive to contextual information, which is an ability necessary for self-directed anticipative learning, as discussed above. The more we can take in during interaction, the more possibilities we have to intervene and the greater chance of a successful interaction as a result.

Language provides these finer grained distinctions because it affords the relative decoupling from a given situation. As discussed in Chapter 3, this decoupling from a stimulus helps provide a distance between subject and object that permits a temporal

openness such that we can reminisce (or reflect) or anticipate, to help one learn better or plan accordingly. But the decoupling also permits the reach of our intentionality to transcend immanent perceptual stimuli to concepts themselves. This is to say that we can treat a concept as an in-itself and take it as an object (Dennett 1996, 159), and as such we are not bound to the immediate in a spatial sense as well. Interestingly, what follows from this is that even as language, and the greater openness and plasticity it provides, gives distance from the immanent, it draws us in at the same time. Through this ability to label and attend to finer-grained details that provide greater flexibility as a result, we are pulled deeper into the world at the same time by opening it to more extensive and subtle means of understanding and interacting with it. At a phenomenological level, attending to experience requires having structures in place according to which experience makes sense. The more deeply probing and exhaustive those structures are, the more the world institutes sense with us. Just as the ability to attend to further and greater detail allows for increased possibilities for intervention during interaction, it also gives voice to the world by making us responsive to it in more ways. As such, while language does indeed offer a decoupling, it is certainly not absolute. The increased distance that language provides comes at the same time with greater proximity as well.

Not only does language extend the flexibility with which organisms can interact with the world by facilitating communication, learning, etc., language exponentially broadens the openness of the organism. This openness offers the ability to incorporate tools that function as external memory systems that offload the need to retain information about interaction and allow for the retention of information with great detail and high accuracy (e.g. books). (Damasio 2010, 307) This offloading serves to both decrease the work required by the individual in interaction, and increases the probability of success in interaction and avoid incurring unnecessary costs or risks (e.g. by reading the instruction manual before attempting to use the chain saw). While language is certainly not necessary for structural flexibility, one can clearly see how language extends an organism's capacity for structural flexibility. As I have articulated it, structural flexibility describes an ability to behave differently in similar contexts based on experience, or past interaction. To accomplish this flexibility, an organism must have a capacity to decouple,

relatively speaking, from interaction. Structural flexibility also requires an ability to make increasingly fine grained distinctions in order to predict behaviour and learn from experience. The need for decoupling from world (context-independence) on the one hand and context-sensitivity on the other begins to take on the shape of a simple capacity to label events and experiences, and is likely accomplished relative to affect-laden body states. For example, my dog is able to associate the sounds of cling wrap being unwrapped with the prospect of cheese, which he enjoys. (Cf. Damasio's [1994] somatic marker hypothesis.) This is not exceptional by any means,[22] but what it reveals is that the sound of the cling wrap unwrapping takes on the role of a sign, which to him signifies cheese because of the positive valence associated with cheese and the preceding sounds of cling wrap that herald its presence. While this is not a linguistic label, it is easy to see how a word can come to signify an object or event, given that to my dog the sounds of cling warp are in effect indicating beyond the sounds themselves to the cheese that has yet to appear. Labelling, of course, is not language. But one can see how a linguistic system can begin to emerge out of capacities that afford the ability to label events and experiences, and the ability to label is continuous with an organism's capacity for structural flexibility. In this way language not only extends structural flexibility, but can be seen as extending out of the abilities required to decouple from interaction that are necessary for structural flexibility. It could also be argued that collectively these capacities that allow decoupling already form a structure that can be considered language in the broad sense. (Hauser et al. 2002) Either way, the relationship between structural flexibility and language acquisition and use runs very deep.

4.9 Language and Reflective Self-Consciousness

As mentioned earlier, Dennett, I think rightly, makes the distinction between intelligence and mindedness. In this case I think what I've been discussing under the umbrella of 'cognition' would overlap fairly well with how Dennett discusses intelligence. The importance of the distinction is that Dennett sees thought as necessary for mind as we know it, but not necessarily for intelligence since intelligence does not require thought. In

[22] Indeed, Ivan Pavlov (1902) studied this phenomenon extensively.

this case Dennett has something like reflective thought in mind and language is arguably necessary for reflective thought. So, language is necessary for mind, or at least a mind like ours. This leaves open the question of whether the mind is mediated by a so-called Language of Thought. (Fodor 1975) Given the massive integration of the body and the systems that make it up it is entirely possible that the capacities that enable thought are highly integrated with the ones that enable language without thereby entailing that thought is always linguistic. For what enables thought could be the extensive decoupling afforded by language and the systems on which it depends, but this does not entail that thought is comprised of words and structured syntactically. But it also does not entail that there is not a Language of Thought.

Whether or not thought is structured linguistically, language possession (or at least the capacity for it, i.e. in individuals that can no longer use language) permits reflective thought. In allowing us to take a concept as an in-itself, an object, that can be the target of one's intentional gaze, language allows for reflective thought. Reflection in this context amounts to the ability to decouple thought from situation to isolate and analyze the components of the situation (embodied subject, world, or their interaction). As such, reflection encompasses the conceptual analysis involved in the discussion of subjectivity that makes up this dissertation, but is also involved in the process of learning to taste Citra insofar as my concept of Citra itself is capable of becoming an object that can be probed and modified based on my interaction with it. The decoupling that language builds off of and in turn enhances thus allows us to take a step back from the urgency of our immediate situation. In providing this decoupling and flexibility, it also offers a reflexivity that allows us to take our embodied subjectivity (in interaction) as an object. Language is thus necessary for reflective self-consciousness, which can be understood as the narrative self that makes up our thoughts and memories. (Zahavi 2005)

Damasio (1999, 2010), for example, has also argued that language is necessary for the sense of self that we possess as humans. This sense of self goes beyond the minimal pre-reflective self that accompanies experience as discussed in Chapter 2 and incorporates our personal history, and the social, political and cultural selves that make up our robust

narrative selves. This narrative self can be considered an autobiographical or reflective self. Specifically, Damasio (2010) argues that it requires the capacity for symbolic processing in order to represent oneself as a self, independent of context, and in terms of a coherent narrative structure. (306) While the manner in which he articulates the autobiographical self as a function of object-representation is, I think, problematic (as outlined in Chapter 1), the central theme upon which it rests is illuminating. An instrumental feature of an autobiographical, narrative, or reflective self is the ability to decouple stimuli from context. In the case of self-awareness, the generation of a narrative self-structure would need to extend beyond the immediate as a decoupling of stimuli from context. In this case, the stimuli would be the self itself, presumably as witnessed in experience as the self-as-object and also as the various bodily processes that help constitute the self-as-subject. The ability to decouple this self-awareness from its specific instantiation (both spatially and temporally) would allow for there to be a self that extends in some sense beyond the immediacy of the milieu to which it normally adheres. And of course, to create a narrative structure within which one's autobiographical sense acts as protagonist, one would need to take temporality as an object, in a more general sense, in order to label events as taking place earlier than or later than other events. What this amounts to is an ability to radically decouple from the immediate and immanent.

I would argue that it's not language specifically that is necessary for the autobiographical self, but the kind of flexibility it brings that allows for it. This is to say that my narrative self is not mediated by words and syntax, but comes about via the decoupling from context possible only through the structures such as language, broadly construed. In a strong sense, language is necessary for this kind of decoupling and structuring, but given the tendency even in embodied accounts such as Damasio's (2010) to couch the autobiographical self in terms of an autobiographical novel, it ought to be clarified that autobiographical selfhood is not written like a novel. Language offers the capacity for reflection through its relative decoupling and flexibility that permits reflexivity, and in this sense allows for the emergence of a protagonist within my reflective thoughts and experience. But through the body schema, my experiences are already structured with a temporality and sense within which this protagonist is situated. Language undoubtedly

provides the ability to create a coherence across my experiences, but in an important sense the narrative is already written through my embodied engagement with the world.

4.10 Cognition and Consciousness

As Merleau-Ponty claims, with each addition of a new faculty, or rather the slow development of new faculties, there is a corresponding change in the structures that enable that faculty; "not being a new substance, each [order] had to be conceived as a retaking and "new" structuration of the preceding one." (SB 184) This reciprocal insertion of each order of behaviour undoubtedly involves a deep intertwining between distinct structures of behaviour which guarantees that new skills, for example, are never learned entirely de novo. To a great extent different skills are transferrable across behaviours and contexts. This is true of structural flexibility and of language as well. The evolution of cognition does not proceed modularly, by adding new components that increase cognitive facility overall. Instead, each new development proceeds out of some pre-existing structure, and restructures the extant faculties as well. (Anderson 2010, 2014) This already amounts to a kind of continuity claim insofar as it postulates structures as depending on preceding structures rather than developing ex nihilo. As such, we would expect to find the roots of cognition in the very self-maintaining structures that keep an organism alive. Enactivism has rightly attempted to fill out the details of this picture and in so doing has developed an account of cognition as continuous with life. I have argued that while this account of the continuity between mind and life is valuable in many respects, it goes too deep and loses its explanatory utility as a result of too liberally attributing cognition. I have argued that by looking closely at the kinds of behaviour that are and are not indicative of cognition, we can understand the role of different kinds of flexibility in behaviour. In particular, structural flexibility, the openness to world and plasticity of structure that allows for behaviour to be modified in accordance with experience, is necessary for cognition and sufficient for a minimal kind of cognition. Given that not all organisms possess a capacity for structural flexibility, the continuity between mind and life is not as pervasive as has sometimes been articulated by enactivists.

In a restricted sense, structural flexibility offers a brief moment of discontinuity between

mind and life by providing a means of distinguishing between living systems simpliciter and living systems that are also cognitive. But more generally, structural flexibility provides a means of understanding a continuity between the self-maintaining organization of living systems and the capacities that enable reflective thought. Given that structural flexibility develops out of adaptive autonomy there is continuity with life. Further, through a discussion of the relationship between structural flexibility and language I have shown how language can be understood in a general sense as an extension of the very abilities that structural flexibility affords and the capacities it relies on. This is important because the development of language, and what language confers (reflective thought, culture, philosophy) is one of the larger milestones typically invoked to separate what is "special" about human cognition and the kinds of cognition enjoyed by non-human animals. As such, showing how it is in fact continuous with the most minimal form of cognition is crucial to articulating a continuity between mind and life.

While the bulk of this chapter has been devoted to addressing a concern about the continuity between mind and life, it has also paved the path for the solution to the problem of breaking with the world discussed at the end of Chapter 2. The distinction between situational flexibility and structural flexibility can not only be used to understand the phylogenetic roots of cognition but of subjectivity as well. In the next chapter, I will string the threads of the last three chapters together to show how the discussion of continuity has made significant progress toward understanding how subject and world become differentiated in experience.

Chapter 5

5 Breaking with the World

The previous two chapters were focused on providing revisions to the enactivist account of the continuity between mind and life by more fully developing the discussion around sense-making and cognition that the continuity claim relies upon. Following Thompson's (2011b) suggestion that there are different kinds of sense-making, only some of which are relevant to the discussion at hand, I explored Merleau-Ponty's account of sense-making as it applies to the continuity thesis and showed that we must follow his understanding of sense as instituted in order to properly capture how organisms create, and change, meaning in the world. The discussion reveals at least two relevant kinds of sense-making: basic sense-making and adaptable sense-making. The former looks something like what all organisms are capable of insofar as they can act in accordance with the self-generated norm of self-preservation in order to maintain viability. This means that basic sense-making yields meaning that is largely static or incapable of change once instituted, such as how (non-modified) *S. cerevisiae* will always display a stronger preference for glucose over maltose. Adaptable sense-making on the other hand, expresses the relative plasticity of instituted sense. Many "tastes" are acquired, such as one's preference with regard to food or drink, which is to say that one must *learn* to like them. Over time, the initial unpleasantness experienced from the acidic bitterness of coffee can be shifted such that it comes to be enjoyed through its various pleasant flavors and effects. Due to one's prolonged exposure, a general embodied familiarity with coffee develops and begins to modify the underlying structures that gave rise to one's initial reaction to the taste of coffee. Gradually, coffee takes on a different sense, and in this way sense-making can adapt to new situations or ways of being in the world.

In Chapter 3, I built off the distinction between basic and adaptable sense-making to argue that different kinds of behaviour should or should not be considered cognitive based on the kind of flexibility that they exhibit. Situational flexibility corresponds roughly to the ability to act differently in different contexts, which is to say that it allows the organism to have unique responses to unique situations rather than a generalized

behavioural program that would invoke the same response in all contexts. Situational flexibility involves basic sense-making insofar as the kinds of behaviours indicative of situational flexibility correspond mostly to behaviours meant to keep the organism alive (such as glycolysis in *S. cerevisiae*). While these kinds of behaviours are undoubtedly complex, I argued that they are not cognitive. Cognition, I maintain, minimally requires a degree of control over behaviour that looks something like the ability to learn, or to behave differently in *similar* contexts, which I have called structural flexibility. This amounts to a revision of the enactive account of cognition as meaningful behaviour in accordance with the norms generated through the self-maintaining organization of living systems. The amended definition of cognition, and the one I am using for the remainder of this project, can be understood as the capacity to flexibly interact with the environment in accordance with self-generated norms that constrain interaction and institute sense, where flexibility is understood as structural rather than situational. (As such, any subsequent discussion of cognition, unless otherwise stated, should be understood as applying to this definition.)

I have intentionally avoided drawing a line in the sand separating specific organisms into cognitive and non-cognitive categories but the discussion makes a strong case for the coordination and modulation of behaviour via a system with sufficiently centralized and flexible organization (such as a nervous system) as necessary for cognition. This is because the kind of engagement with the world needed to have sufficient context sensitivity but also context independence requires a system decoupled from immediate metabolic concern so that the behaviour the system initiates can go beyond being imminently reactive to the situation. More generally, what structural flexibility is indicative of is an openness and plasticity of the structures of behaviour through which an organism interacts and institutes a meaningful world. This openness and plasticity is important because it underlies one's ability to incorporate other subjects and objects into one's body schema and allows for the reorganization and creation of new structures of behaviour. These abilities are crucial to an understanding of subjectivity as flesh, which is characterized by an openness to the world and others.

While these revisions offer a development of the enactivist account of cognition and the continuity claim, I have also made it clear that the discussion of enactive cognition also serves to lay the groundwork for a solution to the problem of breaking with the world that was introduced at the end of Chapter 2. To summarize the problem, the account of enactive subjectivity as flesh that I provide reverses the problem of perception from how a subject gets to world (or vice versa) to how the two are ever capable of being distinguished. This problem is a direct consequence of the account of bodily being in the world that Merleau-Ponty develops in his later works as an explicit rejection of previous philosophies of consciousness and that sees one's relationship with the world as a chiasmic intertwining of sensing ("subject") and sensible ("object"). This intertwining is meant to overcome the dichotomy of subject and object by expressing our bodily being in the world through the reversibility of activity and passivity that characterizes flesh. As a sensing sensible the body cannot be expressed through the dichotomy of subject and object without creating an ontological bifurcation of being, and as such "subjectivity" must be expressed through the conceptual framework of flesh that I have incorporated into the account of enactive subjectivity discussed in Chapter 2. This is, of course, not to say that body and world are one and the same, and so the problem of breaking with the world involves specifying their relative separation without invoking a problematic dichotomy.

Although this intertwining of sensing and sensible plays a prominent role in all of Merleau-Ponty's works, it is not expressed as deeply as in VI. It is clear from his other works, particularly "The Child's Relation with Others," that the phenomenological starting point from which perception is developed in the individual initially exists as a muddling of body (as subject) and world (as object) to the point where they are not distinguishable. This to say that the situation from which the ontogenesis of a perceptual subject begins is one in which subject and world lack sufficient differentiation and that subjectivity itself is developed, not given. At the end of Chapter 2, I suggested that the solution to the problem of articulating how body and world are capable of differentiation on this account is tied to the temporal nature of flesh qua subjectivity and the capacity for

reflexive intentionality. Having laid the groundwork in the previous two chapters, I am now in a position to articulate this solution in more depth.

I begin by arguing that the discussion developed in the previous chapters indicates that consciousness (understood through the framework of flesh) and cognition (as structural flexibility) cannot be understood separately, but rather as constitutively intertwined. This intertwining happens both at the reflective level and the pre-reflective level. I argue that even in non-human animals, the capacity for cognition, which we can witness in behavioural displays characteristic of cognition such as tool use, requires some form of subjectivity, or presence of self to oneself. But subjectivity, as flesh, equally requires cognition, for it requires a decoupling of world and body that allows for an interval to open in interaction through which a subject emerges and to which experience is given. To understand the relationship between cognition and subjectivity in humans, I discuss, once again, Legrand's account of pre-reflective bodily self-awareness but in relation to what she posits as its physiological grounding in action monitoring. I argue that this description of subjectivity is not adequate for reasons discussed in Chapter 2, but also because it does not adequately express the richness of human subjectivity. I argue that some of this richness can be captured by incorporating affective bodily awareness. Incorporating affectivity provides not only a more robust account of the bodily basis of subjectivity but also shows how cognitive processes influence subjectivity, and conversely, how subjectivity influences cognition through the augmentation of salience in perception. Finally, I discuss the social dimensions of our subjectivity in relation to inhibited intentionality. This reveals not only how the social body is experienced pre-reflectively, but also another manner in which cognition is bound up with subjectivity at the pre-reflective level through the integration of social norms into the structures of behaviour that govern our actions and comportment within a society.

As a caveat, it should be understood that unless I am discussing a specific account of subjectivity, the use of the terms 'subject,' 'subjectivity,' or 'consciousness' should be read through the framework of flesh that I incorporate in Chapter 2 and more closely corresponds to sensibility, the sensing body, or the body as sentient. I have tried to follow

the terminology of Merleau-Ponty's later project as closely as possible, but this is difficult at times given that my project partly involves revisions to extant accounts that are problematic in precisely the ways of which Merleau-Ponty is critical.

5.1 Massive Integration

As discussed in Chapter 1, part of the project of enactivism is to provide a viable alternative to the computational approaches prominent in the cognitive sciences. One of the main problems that enactivists attribute to these computational approaches is that they often articulate consciousness as fundamentally divorced from cognitive processes. Cognition becomes a form of information processing: syntactical rules govern the manipulation of internal symbols relative to given inputs and the desired outcome, and these symbols themselves are physical items that are representational. (Cf. Fodor 1981; Marr 1983; Pylyshyn 1984) The emphasis on explaining cognition in terms of symbol manipulation leaves little room for an explanation of the subjective aspects of experience given that these processes are explained objectively in functional terms. Consciousness is more or less added to the picture by donating some functional property to it, or it is left out intentionally. (Cf. Pylyshyn 1984) This ultimately leaves an explanatory gap between consciousness and cognitive processes.

This computational model for thinking about cognition, and which neglects consciousness (and often leaves out affectivity as well), is strongly rejected by enactivists. (Colombetti 2014) Understanding cognition not as a form of information processing but as an activity of sense-making is meant to provide a framework through which consciousness and cognition are unified rather than separated. The organism's self-maintaining organization, which is responsible for the norms that govern an organism's interaction with its world, also serves to set up a distinction between internal and external that is manifested through the organism's activity. On the enactive account, this activity is identical to cognition, which is to say that cognition is the very activity that provides an interiority to the organism. Of course, this interiority is not yet consciousness or subjectivity but it is arguably the first step in its creation. Nonetheless, it can be understood as foundational for subjectivity given that it sets up a distinction of sorts

between organism and world even if it cannot yet provide the means for experience as lived by an embodied subject. (Weber and Varela 2002) Given that the enactive account of subjectivity is grounded in a bodily self, we can see how there is continuity between the bodily processes that underlie subjectivity and cognition, understood as behaviour in relation to environmental meaning that is brought about on the basis of the internal norms of the organism's self-maintaining activity. This self-maintaining activity corresponds to homeostatic processes that maintain an organism's autonomy, and in more complex organisms also contributes to a bodily self.

As is apparent from the previous two chapters, I am critical of aspects of the enactivist articulation of cognition, but the general framework, which grounds both the body as sentient and cognition in the self-maintaining organization and activity of life itself, is one which I endorse. The framework I develop offers a way of understanding the relationship between cognition and consciousness that does not simply relegate consciousness to a secondary role in the organism's interaction with the world. The discussion over the previous three chapters suggests a much stronger claim: consciousness and cognition are co-constitutively intertwined. This intertwining effectively means that subjectivity cannot be understood absent the capacities that cognition affords. But this understanding of the relationship is only available if we adopt the framework for the enactive subject as flesh that I have developed over the previous chapters. Subjectivity cannot be understood as such, but rather must be reinterpreted through the framework of flesh. As discussed in Chapter 2, this new framework for understanding subjectivity clearly outlines the chiasmic relationship between subject and object, or rather sensing and sensible. Flesh is introduced specifically to overcome the dichotomy of subject and object but also to properly account for the openness of "subjectivity." The openness highlighted here is not just to the world, but to our various modes of being in the world (perceptually, cognitively, affectively) in the sense that each mode is mutually influencing and constraining. Subjectivity as flesh is not a closed, pre-constituted being, but a porous being that is massively integrated with all bodily dimensions.

Indeed, the massive integration of the different ways in which one is in and toward the world is something explicitly defended by Merleau-Ponty. In his discussion of bodily intentionality in PhP, he claims that

> the life of consciousness—epistemic life, the life of desire, or perceptual life—is underpinned by an "intentional arc" that projects around us our past, our future, our human milieu, our physical situation, our ideological situation, and our moral situation, or rather, that ensures that we are situated within all of these relationships. This intentional arc creates the unity of the senses, the unity of the senses with intelligence, and the unity of sensitivity and motricity. (PhP 137)

Flesh as subjectivity is grounded in capacities that make up cognition as I have defined it (in terms of structural flexibility) and all of the new structures it affords. And similarly, as was hinted in the previous chapter, some form of subjectivity is necessary for an organism to be able to cognize. The capacity for structural flexibility requires a minimal form of subjectivity and subjectivity requires the openness and plasticity that characterizes structural flexibility. I will outline the evidence for this co-constitutive relationship between subjectivity as flesh and cognition as structural flexibility in what follows, beginning with the role of subjectivity in structural flexibility.

5.2 The Sensing Body and Structural Flexibility

As discussed above, structural flexibility as a form of cognition permits a break from the world that allows for a differentiation between self and world (or other). In Chapter 4, my emphasis was on structural flexibility permitting an organism the control to behave differently in similar situations as a result of experience, which amounts to a capacity for learning. What this involves is an ability to tease apart world-generated from self-specific information so that the organism can modify its behaviour, or react differently to some feature of the environment that influenced interaction. This is to say that in order for self-directed interaction to occur, the organism would need some sort of model or awareness of itself. This self-awareness would likely come in the form of self-specifying information about the organism's sensory and motor systems used by the nervous system to coordinate perception and action. (Damasio 2010) While the self-specifying

information used in this context would not be anything robust enough to ground a narrative self, it would be rich enough to allow for a very basic differentiation between self and world.

In order to behave differently in similar contexts, an organism would need (1) the intention to behave in a certain manner (broadly construed as information about the behaviour to be initiated such as a motor plan, however minimal), (2) live sensorial feedback about the behaviour as it is occurring (such as proprioceptive and interoceptive information), and (3) sensorial information about the consequences of the behaviour. Determining the sensorial consequences of a behaviour is necessary in order to determine whether or not the goal has been achieved, and if not, then the organism can determine whether the failure was a result of a poor execution of the behaviour. If so, the behaviour can be attempted again with greater effort focused toward its execution. If not, the organism can modify its behaviour by updating, for example, the motor plan accordingly so that a different behaviour can be attempted within the same context. This might seem to go beyond what we might think simple cognitive systems are capable of, but it need not. The system only requires an intention to behave (presumably motivated by a norm generated by the organism's self-maintaining organization), an execution of behaviour, and feedback about the consequence of that behaviour, all within a structure capable of changing.

While this is a very generalized picture, it should be apparent that in order for such learning to occur, there needs to be a distinction between self-specific information and world-generated information. Otherwise, the organism would not know whether a failed motor goal was the result of an error of execution on its part or because the world responded differently than anticipated (e.g. whether the organism underestimated the distance between it and an object, or whether the object itself moved farther away). However minimal it is, there needs to be a self that is agentive and sensitive to the world to the extent that the organism can distinguish between a change in the world that it has initiated and a change in the world that it has not caused. In this way, there might be something like a minimal form of self-awareness present in minimally cognitive systems.

Given that in many cases such organisms would undoubtedly lack a capacity for reflection it would not be accurate to call this form of self-awareness pre-reflective, which would imply that the organism could, in principle, become the object of reflective consciousness. Instead, the kind of self-consciousness available to such organisms would be grounded in a kind of bodily self that is reflexively present in its experience as it interacts with the world in the sense of being self-referential (but not yet, strictly speaking, autonoetic). Indeed, to argue that the form of self-specification involved here is pre-reflective would be to fall back into the problematic account of subjectivity of which I was critical in Chapter 2. There is a self that is present but not one that is pre-reflectively available in experience because self is not constituted prior to worldly engagement. The form of subjectivity involved is the body as sentient, as sensitive to the world and to the organism's own body and that provides the ontological and phenomenological basis for the self that is reflexively present in experience. This minimal form of self-awareness as an embodied sensitivity would nonetheless be capable of providing a way to distinguish between organism and world in perception.

But how is this minimal form of self-awareness as a bodily sentience capable of setting up a distinction between organism and world given that this distinction is precisely grounded in the problem of breaking with the world that we have yet to solve? Structural flexibility, I argue, offers a way of breaking with the world. It is important to briefly note that this reasoning is not circular. Structural flexibility, as a minimal form of cognition, requires some form of subject to be in and toward the world, but this is not the same as saying that structural flexibility is *grounded* in subjectivity such that structural flexibility develops out of the processes that underlie subjectivity. Prior to the objectification—the taking of the body as a specular image—that Merleau-Ponty posits as necessary for the institution of a phenomenal subject, a decoupling between body and world needs to take place. This is to say that in order for the body to be taken as an object in the manner described, the individual needs to not only be able to recognize their body as an in-itself but also be able to stand in some sense behind or next to perception in order for this to occur. The ontological status of the body and things as existing in themselves can only take place when the individual is capable of distancing herself from objects and world

enough that she is not imminently reactive to them but open and sensitive to them. (PhP 89)

As discussed in the previous chapter, the decoupling of self from world requires a system that is capable of a local decoupling from metabolic norms that would otherwise constrain behaviour and must able to coordinate sensation and action, which the nervous system enables. (Again, this is not to claim that only a nervous system can enable this coordination and modulation of behaviour.) The relative decoupling from metabolic constraints allows for action to be initiated and governed outside of the timeframe set by metabolic need so that the window for interaction is capable of expansion through capacities for anticipation and memory. That this system coordinates sensation and action is also crucial. Organisms that lack an ability to decouple from situation are responsive to environmental or internal stimuli in a way that confines behaviour to the presence or absence of a relevant stimulus. For example, many simple organisms move strictly in response to the presence of certain chemicals in their environment in a process called chemotaxis. (Varela et al. 1991) These movements are stimulus-bound in the sense that the movement is a direct response to the presence of a given chemical. Now, this is not to say that in organisms with a nervous system behaviour is fully divorced from the organism's environmental milieu. Rather, the activity of the nervous system (with the right kind of organization) that governs such behaviour is underdetermined by metabolic activity because the nervous system has an infrastructure that can be organized and maintained relatively independently of the norms instituted by metabolism. (Barandiaran and Mareno 2008, 11) While all parts of the nervous system are globally coupled to metabolism, certain parts of the nervous system are organized in a way that allows for the creation and organization of structures of behaviour through more specialized pathways that are at least partly determined by interaction.

As discussed in the previous chapter, in some cases the coupling between certain neurons that make up a given part of the central nervous system is determined and strengthened or weakened at least partly based on use. (Hebb 1949) The more one neuron activates another, the stronger, or more weighted, their connection will be. This is to say that the

behavioural responses to a given stimulus are at least partly determined based on the success of previous interactions with that, or a similar, stimulus. Interaction thus becomes mediated by the organism's own history. Because the nervous system coordinates the relationship between sensation and action, we can see how behaviour can be other than strictly stimulus-bound. Given that the nervous system exhibits plasticity in its organization and dynamics, a given behaviour *need not* occur only in the presence of specific stimulus or a specific context. The structure that the network has is a result of either a deeper genetic or physiological influence (in which case it will probably be less plastic), or because that organization has led to successful interactions in the organism's past. This, of course, is not to say that an organism's response to an environmental stimulus will not be quick and automatic if their behaviour is coordinated by a nervous system. Indeed, in most cases it will be more effective for a response to be relatively fast and online, in the sense of operating almost as a reflex in a stimuli-driven manner, and that is precisely the purpose of connections between neurons and networks of neurons being strengthened through repeated use. What matters here is that the very coordination of behaviour across the systems that support it is, at least to some extent, flexible. This flexibility, which is underscored by the plasticity of organization such as in certain kinds of nervous systems, frees behaviour from being strictly stimulus-bound in a way that allows the organism's history, and so temporality, to enter the picture.

What this separation of organism from world allows, then, is for the world to elicit *different* behavioural responses within the same organism. And this is only possible if the relative decoupling of the nervous system is seen as freeing the organism from being bound to the moment of interaction and setting up a temporality that exists outside of, or rather behind, interaction. Processes within the organism can be set up and maintained, such as the weighted connections between neurons, to serve future interactions. In an important sense, a nervous system is thus oriented toward the future by structures that reach into its past. Not only does the separation of behaviour and world allow for different kinds of behavioural responses (in the sense of new behaviours), it allows for different kinds of things in the world to elicit behavioural responses. As I mentioned in the previous chapter, my dog has learned to associate the sound of cling wrap with

cheese, given that our cheese is often stored in cling wrap. The sound of the wrap heralds the presence of cheese. But the cheese itself is not yet present immediately before him, and so his behaviour to come and beg for some is not triggered by the cheese itself. The sound of the cling wrap comes to take on a significance that intends beyond itself (to the cheese) only because of this capacity for decoupling. Importantly, these associations are learned. The association of the sound of cling wrap with the presence of cheese occurs so frequently that the consecutive experiences are sedimented as a kind of habit that organizes my dog's structures of behaviour. The cling wrap noise intends the cheese and so the sound constrains his field of action by motivating him to behave accordingly. My dog, then, can engage in interaction for cheese not only when the cheese itself is present and sensed but prior to that when some reliable environmental indicator, or sign, is detected. This greatly increases the time window available for interaction.

The expanded window for interaction affords more possibilities for interaction in the sense that it allows for more points at which the organism can intervene in an interaction to yield a favorable outcome. But an increase in possibility for action brings with it costly processing requirements. The organism now has to select between not only which actions to make, but also at which point to interact. There are different costs associated with each option in many cases, and so these need to be factored into action selection. All of this not only increases the workload of the nervous system, but it takes time as well. Behaviour is no longer an instantaneous response to the presence of an environment stimulus as in chemotaxis, it involves a moment of hesitation, or hiatus, in which the organism whittles the possibilities down to select a satisfactory response. This moment of hesitation creates a distance between the organism and its world by opening up a temporality that is not bound to the present moment that presses upon the organism. The organism draws upon its past in order to facilitate the realization of a goal that is not yet manifest in the world.

At the end of Chapter 2, I briefly discussed the role of temporality in the problem of breaking with the world. In order for there to be a distinction between self and world, there needs to be an interval within which that distinction can be made. As Merleau-

Ponty articulated in PhP, the "explosion or dehiscence of the present toward a future is the archetype of the relation of self to self, and it sketches out an interiority or an ipseity." (PhP 450) The decoupling from the world that I have discussed above allows for intentionality, as a being in and toward the world, that allows one to break through beyond the present moment to intend an object or an event that is not yet present. As such, structural flexibility and the decoupling from world it affords frees intentionality and our relationship with the world from the here and now. The awareness of self to self that characterizes even a minimal form of subjectivity requires the body to be imbued with a temporal thickness because "[time] is essential to subjectivity—in order for it to be subjectivity—to open up to an Other and to emerge from itself." (PhP 450) The world is distinguished from the body because the divergence between the sensing body and sensible things allows the subject to understand itself as transcending the world even in its immanence. The bodily dimensions of the body as agentive and affective, the experience of an *I can* or an *I desire*, are possible only insofar as an interval is opened up within which the subject is experientially distinguished from the world.

The relative decoupling from the world that is characteristic of the nervous system allows for the first steps in breaking with the world through the creation of this interval in interaction. To be clear, a nervous system *by itself* is not sufficient for the kind of decoupling necessary for subjectivity as flesh—it must also be coupled with other (homeostatic) processes within the organism to support structural flexibility as well. The decoupling that structural flexibility affords and that underlies the sensing body, however, is not yet sufficient for reflective thought or reflective self-consciousness. At the end of Chapter 4, I showed how structural flexibility could be extended to permit reflection. The kind of decoupling needed for reflective self-consciousness would require the sensing body to reverse the intentional relation completely and take itself as an object. But the kind of self-consciousness that the decoupling discussed above permits is much less probing and would correspond more closely to a pre-reflective contact of self with world similar to Merleau-Ponty's articulation of the body schema discussed in Chapter 2. What such decoupling allows is the first instance of the sentient body to occur, where intentionality can be understood as a relation between sensing and sensible (world). This

is to say that the decoupling offered by structural flexibility opens the window for interaction far enough that something like a subject is capable of developing. Phylogenetically prior to such decoupling, there would be no subject of experience and no experience proper because there would be no interval large enough for an experience of the world to occur. Interaction would be confined to an imminent reactivity, as in the behaviours of *S. cerevisiae*.

Of course, this is not to say that there is a complete lack of temporality or modulation of behaviour in organisms like *S. cerevisiae*. Insofar as behaviour unfolds over time and situational flexibility is exhibited, there will be a restricted temporality and modulation. In this sense, the difference can be interpreted as one of degree. The system in control of the modulation of behaviour makes a large difference in this case because if the control system itself is flexible or able to reorganize in a manner characteristic of plasticity (such as a nervous system), then it can not only modulate between behaviours but modify the behaviours themselves based on interaction. More simple organisms' behaviours are instead modulated by systems that are not as flexible and are more tightly coupled to the organism's homeostatic processes. But to get to the kind of cognition and subjectivity exemplified in humans, the temporality and modulation of behaviour requires a more extensive breaking with the world that structural flexibility affords.

The depth of temporality essential to subjectivity can thus be interpreted as the divergence that emerges from the decoupling of world and body (and of behaviour from stimulus) that structural flexibility affords, and which builds out of Merleau-Ponty's discussion of subjectivity as temporality. This does not quite get us to the objectification that occurs when a child's gaze reflexively falls upon itself and the sensing body is taken as an object among objects. (Merleau-Ponty 1964 [1960]) The kind of reflexive intentionality that is involved in this process can, however, also be seen as building out of the decoupling that structural flexibility affords (although certainly not in all individuals that possess it). The decoupling of stimulus from behaviour that allows different stimuli to signify other objects or events and different behaviours to become associated with a given stimulus is necessary for intentionality to become reflexive and for one to be

indicated as a sensing body to oneself. The objectification that Merleau-Ponty discusses involves the push and pull of two distinct processes, the result of which is my body as the boundary of my agency and sensibility as flesh. First, the body of the subject, understood as the sensing body, would be taken or recognized also as a body that has an objective existence among sensible things. This is to say that the body would be recognized as being a thing among things. But then this sensible object-body would then be taken as *my* body—the body reflected in the mirror as *me*. Because the body is taken as a sensible object existing among other objects that is nonetheless me, the perceptual mode of self-consciousness, or observational self-consciousness, becomes a way in which I know about and am conscious of myself. The boundary between subject and world is set up because my body is witnessed as a sensible object, but one that has a unique ontological status as the one in which I, as sentient, inhabit—or rather, is me.

It is probably not a fruitful question to ask whether this process of objectification-ownership occurs at the level of reflective thought or pre-reflectively because that distinction at least partially depends on the process outlined above. Understanding subjectivity in terms of flesh means that, like any faculty or ability, subjectivity is developed by the individual, not simply given. The distinction between pre-reflective and reflective self-consciousness is premised on a variety of abilities that include (but also go beyond) the decoupling from world that gives enough flexibility for reflexive intentionality to be possible. In Chapter 2, I argued that, following Merleau-Ponty, we ought to think of subjectivity as instituted rather than constituted. Because institutions are developed over time and incorporate passive dimensions of being, understanding subjectivity as instituted provides a temporal depth but also recognizes the sense in which, like perception, subjectivity itself is developed. I argue that this applies to cognition and cognitive processes in the human paradigm as well, which is certainly not a controversial claim. This is evidenced by our various education systems that are not only designed to provide students with (one hopes) useful information, but to teach them skills and better ways of learning. We certainly do not expect children to be capable of the cognitive abilities most adults exhibit, and this is an indication that cognition itself is developed over time. Beyond its development, cognition should be thought of not as

constituting a relationship between subject and world but as instituting it. The conceptual knowledge that partly structures my habitual body helps to organize the world in perception relative to my body. For instance, my perception of Citra hops is changed in the processes of learning how to taste and smell them, which is, among other things, a cognitive task that involves the revision of the concept I possess and the passive openness to what the hop expresses to my body in perception. Once sedimented, this latent knowledge structures my experience in a manner that is not constituted but instituted by my body as a subject. Cognition is also instituted.

If we understand both cognition and consciousness as institutions that develop over time and have a temporal depth that structures experience by being anchored in the past, then we can see that in some sense the question of at what point a child breaks with the world to gain subjectivity is not entirely productive. The ability to break with the world is developed, and depends on other abilities that are also in development. In all likelihood, then, breaking with the world does not happen in one fell swoop but occurs piece by piece as each faculty required for its execution is further developed. We can, though, point to what is needed for such a breaking with the world to occur, which I have articulated above as a decoupling from the world in a manner that creates a hiatus from which the subject develops and becomes differentiated from world through the flexibility that underlies the body's intentional relation to the world. The subject that emerges will be more or less robust relative to the capacities and control structures that the organism possesses, and so we should not expect to find the exact same degree, or perhaps kind, of subjectivity and sentience across bees, dogs and human children. But with the relevant institutions in place for the organism to break with the world, we can expect to find something, or someone, there. As should be apparent from the discussion in the preceding paragraphs, the flexibility that underlies the body's intentional relation to the world is crucial especially in the case of human subjectivity and is part of what sets humans apart from other animals with respect to the richness and depth of our interiority.[23]

[23] Again, I do not wish to perpetuate historically problematic distinctions between humans and non-humans that would erase any interior life or subjectivity as it applies to non-human animals. Far from this, I think what has been shown so far is the possibility

At risk of oversimplifying the discussion above, structural flexibility and the sensing body are co-constitutively intertwined insofar as the abilities upon which structural flexibility depends require at least a minimal capacity for self-specification in order to distinguish world-derived from body-derived behaviours (and to permit any form of learning through that distinction), and subjectivity as a bodily sentience requires the relative decoupling from world in order for a temporality to emerge in interaction through which the body can sense itself. I mentioned above that the co-constitutive intertwining of subjectivity as flesh and structural flexibility qua cognition occurs even at the pre-reflective level. Given that the discussion has not yet focused on a kind of subject that can thematize itself, and so the levels of reflective and pre-reflective have not yet come into play, I have not had the opportunity to show how this is the case. Having discussed the co-constitutive relationship between subjectivity and structural flexibility more generally, we can now discuss how it applies within the human paradigm. This will involve reopening some of the discussion surrounding the enactive subject that occurred in Chapter 2, but in light of the progress that was made in our understanding of enactive cognition as a form of *adaptable* sense-making.

5.3 Action Monitoring and the Bodily Self

The flexibility of cognitive processes and the plasticity of their underlying structures makes possible the hiatus from which a subject emerges and is distinguishable from its world. The openness of cognition allows for subjectivity to have a temporal thickness that allows the subject to change and adapt as it draws from its experiential past and reaches toward an anticipated future. The openness of subjectivity, at a pre-reflective level, is not appreciated by the enactive account because in order to be open the subject must be passive to the world. This becomes increasingly apparent when we understand PRBSA as a form of action monitoring.

---

for a rich inner life in a great many non-human animals. Nonetheless, there are differences and this is one of them.

When an individual produces a given action, efferent signals, understood as motor commands, are sent out by the motor systems of the central nervous systems to the organism's periphery in order to initiate the intended action. When this occurs, a copy of the signal, called the efference copy, is created. The efference copy has been interpreted as providing a goal state that can be compared to sensory inputs from the organism's movements in order to distinguish sensorial consequences stemming from the environment (exafferent signals) from those that result from the organism's own actions (reafferent signals) via an action monitoring mechanism (which is a comparator that compares the efference copy and the kind of afferent signal received). (Christoff et al. 2011; Niziolek et al. 2013) This is important for economy; being able to distinguish self-related and world-related sensory signals can help reduce cognitive load by attenuating sensory-processing of self-generated signals. (Pynn and De Souza 2013) For example, when one attempts, and fails, to tickle oneself, this yields reafferent signals (self-generated sensorial signals) since the individual initiates the tickling action (efference) and the subsequent perceived haptic changes (afference) result as a consequence of the organism's motor intentions (reafference). But when one is tickled by someone, or something, else, the haptic consequences (afferent) are produced by something other than the organism itself (i.e. no efferent signals related to tickling are generated), yielding exafferent signals (environment-generated sensorial signals).

This example illustrates the sense in which efferent signals are self-specifying: the presence or absence of efferent signals can partly distinguish the presence of self or non-self processes respectively. (Christoff et al. 2011) Legrand (2006) has argued that the sense of agency that is arguably constitutive of our sense of embodied subjectivity occurs from the coherence of intention, action and perception—when an intention to act is followed by the executed action, resulting in the appropriate sensorial consequences (Legrand 2006, 110). The subjective feeling of bodily agency that grounds the bodily self is a result of this action monitoring, that builds off the efference copy model discussed above. Legrand's accout has also been extended to incorporate the affective dimension of embodiment conveyed via interoception and homeostatic regulation but in a way that is structurally identical to the comparator model above. (Christoff et al. 2011) These

accounts are arguably Sartrean because of their overemphasis on the activity of the body, and which I have criticized, following Merleau-Ponty, in Chapter 2. I will provide an alternative interpretation of the relevant aspects of the model that is compatible with enactive subjectivity as flesh, but before I do, there are two relevant implications of the model that need to be drawn out and discussed in the present context.

First, the efference copy model of agency at least partially reveals the temporal dimensions of subjectivity I articulated above. Any experience of agency will involve an integration of a copy of an efferent signal that has initiated an action (past) and the sensorial consequences of the action itself (present), where the efference copy itself is understood as a protention of the intended goal state or sensorial consequences of that action (future). The empirical research on the subjective nature of agency thus expresses the sense in which subjectivity retains the imminent past and anticipates the imminent future in the manner that Merleau-Ponty discusses in PhP. Second, the distinction between self and world on the efference copy model of agency comes *through movement in the world*. Of course, in a sense this is trivially true—one cannot develop a sense of agency without action (although further consideration would be required for individuals with locked-in syndrome, for example, as I will discuss in Chapter 6). But the model does something more interesting than merely provide an empirical account of a sense of agency, it provides an empirical model for a self-world distinction that is grounded in an organism's world-oriented activity. (This picture, I will argue, is not complete specifically because it is entirely cached out in terms of activity.) Action monitoring, then, would be necessary for an ability to break with the world. However, grounding bodily self in action monitoring does not incorporate any discussion about when movement is inhibited, or of the affective nature of this kinaesthetic awareness.

One would predict that if the model of action monitoring is correct, then individuals with compromised action monitoring mechanisms should display, to some extent, an inability to break with the world. This is indeed the case for schizophrenic individuals who experience what are called "positive symptoms" such as hallucinations and delusions of alien control (Fletcher and Frith 2009). In the present context, the relevance of positive

symptoms is that many of them involve some breakdown between self and world. For example, those who experience delusions of alien control fail to experience self-generated movements, or their own thoughts, as self-generated and instead experience them as coming from without, or from someone else. (Fletcher and Frith 2009) Anatomically, these symptoms arguably occur as a result of widespread structural and functional abnormalities encompassing many brain regions that have been implicated in generating, sending, or receiving efferent signals that are involved in action monitoring. (Pynn and De Souza 2013) Interestingly, recent research has demonstrated that movement also appears to be necessary to some extent for a sense of bodily ownership (Burin et al. 2015), which further supports the claim that a distinction between self and world comes about at least partly through an organism's world-oriented activity.

The efference copy model at the heart of Legrand's account of PRBSA provides important empirical support for her model of subjectivity as grounded in bodily agency. In drawing on this research to support PRBSA as bodily self, Legrand reveals the importance of movement, or motricity, to subjectivity insofar as it helps to set up the distinction between subject and world. However, building off of the argument made in Chapter 2, this model of agency cannot by itself account for subjectivity even at the pre-reflective level. This is to say that action monitoring is not sufficient by itself for pre-reflective bodily self-consciousness. To reiterate the relevant points made in Chapter 2, the approach to subjectivity that is developed does not, and cannot, account for the passivity that is central to subjectivity and that affords an openness to the world. This is seen in the present context in the emphasis on action monitoring as a physiological grounding of bodily selfhood through the individual's *activity* in and toward the world. As I have also stated, this activity is also important, but it is only *part* of the picture. In order to complete the picture, we need to understand the bodily processes that at least partly make up the passivity inherent to bodily subjectivity. I will do this by showing that not only is agentive bodily awareness incomplete as articulated (i.e. through action-monitoring), but that incorporating the affective dimensions of bodily subjectivity via interoceptive awareness can provide the basis for an understanding of the body's passive orientation toward the world.

5.4 Affective Bodily Awareness

Incorporating the affective dimension of bodily subjectivity can help to remedy some of the problems that arise when enactive subjectivity is taken as too one-sidedly agentive and can support an understanding of subjectivity as flesh. The body's affective awareness of itself is generated largely via interoception, which provides information about the current state of the organism's internal milieu and viscera with respect to homeostasis. (Barrett 2006; Damasio 2010) Interoception functions in this context to alert and motivate the system to behave appropriately in order to keep it viable (to seek food, or protection) by providing information about the organism's viscera and internal milieu in the form of continuously generated *affective* signals ranging from optimal (full, alert) to problematic (thirsty, sleepy), yielding affective bodily awareness (Damasio 1999, 2010; Russel 2003). These signals become functional by augmenting behaviour in ways that satisfy the current constraints of the system (e.g. need food, or must flee from danger). Affective bodily awareness can thus be seen as generating a normative perspective by augmenting awareness of the meaning and saliency of features of the world relative to their significance to autonomy (e.g. my attention will be drawn more steadily to food when hungry than when full). The presence or absence of certain felt bodily states make a difference to the subject. Recall that Legrand (2006) claims that "bodily consciousness requires a specific match between (1) the intention, (2) the motor consequences of this intention, i.e., the executed action, and (3) the sensorial consequences of this action, including proprioception, but also exteroception." (110) She goes on to argue that while proprioception is not by itself sufficient for bodily consciousness, it plays a crucial role "in that it is integrated to information on the intention to act." (Legrand 2006, 110) As such, agentive awareness of the body requires the successful integration of appropriate sensorial consequences with the relevant *intention* to act. Legrand is right to build proprioceptive information into the intention to act, but I argue that the intention must integrate other forms of bodily awareness as well. Specifically, interoceptive awareness of the body is required to *form* the intention to act (e.g. moving my hand because it is in discomfort), as well as to *evaluate* the executed action (e.g. grasping for a cup of water and feeling the cold glass on my skin).

Recent neurobiological research supports these ideas. Interoceptive awareness has been associated with a high degree of activity in the insular cortex focused in the anterior right insula (aRI) (Craig 2003, 2009; Critchley et al. 2004; Seth at al. 2012). The aRI is thought to support a re-representation of interoceptive information that is made accessible to awareness, i.e. is made conscious, as subjective feeling states. Damasio et al. (2012) argue, however, that the insula more likely *refines* these states by relaying simpler and less connected *subcortically* generated interoceptive feelings to higher-order cognitive processes such as imagination and decision-making. Rather than functioning as the source of affective bodily awareness, the insula acts as a hub that integrates affective bodily awareness with other aspects of cognition. (Panksepp 1998; Panksepp and Biven 2012) This is demonstrated through Damasio et al.'s (2012) study of a patient with bilateral insular damage who, they argue, is nonetheless still aware of his affective states. As such, they suggest that affective bodily awareness first appears much earlier than in the context of insular processing. The subcortically generated affective awareness would be capable of providing an affective subjectivity, but would not be integrated with other cognitive states absent the integrative function of the insular cortex. This arguably implies that affective bodily awareness is deeply rooted, and interoceptive bodily awareness is likely phylogenetically prior to agentive bodily awareness.

Interestingly, there is reason to think that the anterior insula mediates a connection between affective bodily awareness and agentive awareness in virtue of the proposed integrative function (Craig 2009). This connection has been hypothesized to provide a "sense of embodied self that guides behaviour through progressive integration of salient afferent input." (Ganos et al. 2015, 2000; Craig 2009) This guidance would inform the intentions of motor actions and facilitate the evaluation of the consequences of those actions relative to the current background state of the body as provided by interoceptive awareness. (Freeman 2000; Bower and Gallagher 2013) Indeed, as mentioned above, the anterior insula, which has been hypothesized to integrate affective bodily awareness with agentive bodily awareness, appears to be routinely activated in tasks involving either *forming* intentions to act, or in *evaluating* the outcome of actions (Brass and Haggard 2010). This plausibly suggests that interoceptive information is being used either as a

means of constructing motor-related goals, or in evaluating whether particular actions have been accomplished accordingly.

5.4.1 Affect and Intention

A concern could be raised that there is an equivocation of "intention" being used in this discussion. Specifically, it could be argued that in the context of efference copy models of agency, or the action monitoring model that Legrand advocates, intention is understood more specifically as involving the efferent signal sent to the motor systems to initiate action, and which is *not* consciously available. Clearly as I have been using it in the past few paragraphs, intention is understood more broadly as the impetus toward action, or the broader motivations for the action. There is no equivocation here. The intention to act, understood as an efferent signal, does not exhaust the intention that becomes integrated to form the subjective experience of agency. This is important because our sense of subjectivity is not exhausted by agency. Indeed, it could be argued that the various cognitive processes occurring in the background during action monitoring are necessary to agency as well, including the role of local inhibitory cortical networks in regulating cortical excitability and selectivity. (Ferrè et al. 2015) As such, I argue that the sense of intention used here must not be so myopic as to include only the efferent signals relevant to action execution. Indeed, given the importance of temporality to subjectivity, as argued above, it would be necessary to broaden the intention to act in order to allow for aspects of bodily awareness and world interaction that go beyond the locality of the anticipated result of a given action. By opening up the intention in this way, we can incorporate relevant aspects of the individual's past, the influence of cognitively mediated elements such as social norms, and ongoing and previous affective states of the individual. Incorporating these aspects into the intention to act need not occur at the level of reflective thought, and they certainly would not be thematized in experience given that the intention discussed here ought to be understood as pre-reflective. The sense of subjectivity that is generated as a result of action monitoring would thus rely on and bring with it an individual's history as motivation and orientation toward the world within which she acts. It is worth noting that Bower and Gallagher (2013, 2014) make similar points with respect to the role of affect in providing

motivation for agency that goes beyond what sensorimotor approaches, or approaches that place too much emphasis on proprioception, can account for. In this sense, while these sensorimotor accounts provide some explanation in answering the *how* of perception and action, they cannot account for the *why* because they do not incorporate affect.

The modifications to the physiological grounding of enactive subjectivity as flesh that I have suggested are also consistent with Merleau-Ponty's phenomenology and indeed recommended when we pay proper attention to the constitutive role of the sensible body in subjectivity. The reafferent signals that are necessary for and constitutive of a sense of bodily selfhood are sensorial signals of the body in, or after, action and so are arguably objectifying of the body. This parallels the move Merleau-Ponty makes in arguing that the child needs to take its body as a specular image in order for it to develop a sense of self as distinct from others, since in order for a sense of agency constitutive of the bodily self to come about the body needs to be both the subject of the action (efference) *and* the object of the action (reafference). Interestingly, this also hints at the reversibility of the body as sentient and sensed, subject and object that defines flesh by providing something that looks like the beginnings of their intertwining. (VI 133, 141, 144, 147) As such, the reafferent signals that provide information about the sensorial aspects of the body, both internally and externally, must not be downplayed. Further, the so-called bodily self that arises as a result of action monitoring must be implicitly grounded in the body schema. If we interpret the bodily self as grounded in the coherence between intention, action, and perception (the coherence of which is determined by the action monitoring mechanism) then the body schema is implicated in the intention to act precisely in the sense relevant here. The "I can" that provides the latent impetus for the body's movement (the initiated action) is an intentionality that expresses the body's inhabiting and taking up of a world, and so already implies a sort of pre-reflective contact of self with world. This means that from the start the intention to act that is constitutive of the agentive bodily self presupposes something like the body schema of PhP, and so the world, including sensible body, is constitutive of subject qua flesh in this way as well.

Part of what incorporating affective bodily awareness brings to the picture is, if properly articulated, an openness to the world. While interoception is not necessarily the only medium through which this openness occurs, interoceptive information serves as a background against which the world can appear to the individual and in a way that is particularly salient. In Chapter 3 I briefly discussed affect as an original intentionality instrumental in the genesis of sense. Indeed, affect provides the orientation toward, or away from, the world. By this, I mean that it is through affect that we have an investment in the world. Colombetti (2014) characterizes affect as a lack of indifference and rather "a *sensibility* or *interest* for one's existence." (1) Because affect is grounded in an organism's self-maintaining organization, it can be understood as expressing an investment in the ongoing persistence of that organization. When something is felt negatively, as bad or harmful, it is because that stimulus poses some kind of threat, however small or large, to the viability of the organism. In most, but certainly not all, individuals, the experience of hunger is unpleasant enough to motivate one to seek food. The presence of hunger is ultimately rooted to the materiality of the autonomous organization that sustains life and which requires constant exchange with the environment to sustain its far-from-equilibrium state (given that the processes that underlie autonomy have a tendency to break down over time due to the tendency of material systems to seek equilibrium). As such, felt hunger motivates the individual to seek out food given that hunger manifests not merely a desire to eat but a norm expressing the *need* to eat. While certainly not all affective states are immediately tied to these imminent homeostatic demands—indeed, given the discussion above about the decoupling of the nervous system from homeostatic regulation we should expect that many affective states are also not—it is not a stretch to understand affect at its most basic as arising out of the normative constraints that emerge through an organism's self-maintaining organization and dynamics. Affect, then, can be construed as expressing a material concern for one's own existence.

Beyond a concern for one's own existence, affect can be understood as underlying our sensibility toward the world. Merleau-Ponty variously writes of subjectivity as a hollow, which is intended to express the openness of subjectivity without collapsing it into a

negativity, as Sartre's account does. As a hollow, the body has its own infrastructure that both enables the world to be present in and to the body but also constrains the style and extent of the world's being present to the subject. This is to say that the body has its own sensibility:

> The effective, present, ultimate and primary being, the thing itself, are in principle apprehended in transparency through their perspectives, offer themselves therefore only to someone who wishes not to have them but to see them, not to hold them as with forceps, or to immobilize them as under the objective of a microscope, but to let them be and to witness their continued being—to someone who therefore limits himself [sic] to giving them the hollow, the free space they ask for in return, the resonance they require, who follows their own movement, who is therefore not a nothingness the full being would come to stop up but a question consonant with the porous being which it questions and from which it obtains not an *answer*, but a confirmation of its astonishment. It is necessary to comprehend perception as this interrogative thought which lets the perceived world be rather than posits it, before which the things form and undo themselves in a sort of gliding, beneath the yes and no. (VI 101-2)

I argue that it is the body's affective orientation in and toward the world that allows for this kind of interrogative perception. Indeed, to reiterate the point just made, one of the problems with Sartre's account of consciousness was not only its overemphasis on activity, but the articulation of consciousness as a negation or a lack. By understanding the role of affect in our perceptual orientation we can see how consciousness cannot be a lack.

At a simpler level, the world becomes a place of significance for the organism because it has an investment in its own continued existence. Given that the organism needs to maintain its autonomous organization in order to remain viable, and given that it needs to interact with an external milieu in order to replenish depleting resources that sustain this organization, the world matters to the organism as a means of sustaining life. The distribution of resources needed to maintain autonomy is not homogenous and so certain

parts of the world matter more and some less to the organism. This is to say that even at the most basic level the world has an affective significance to the organism relative to its own continued existence. An organism needs to be open to the world relative to its current needs and the modulation of affective significance helps accomplish this. While the organism is open to the world, it is not an openness in terms of negation. The organism is not *entirely* passive to the solicitation of the world. Rather, each interaction is structured and constrained relative to the organism's current homeostatic demands and the affordances of its sensory and motor systems. These homeostatic demands help to constitute a baseline of the organism's current state (and that could be considered background or primordial feelings (Damasio 2010, 1999) in more complex organisms) in terms of bodily affectivity that organizes and structures perception in a way that reflects, to a greater or lesser extent, the needs (and eventually, desires) of the body.

In humans, something similar is undoubtedly the case, insofar as each perceptual interaction with the world is underscored by moods and feelings generated by interoceptive states, but also more complex emotional processes. The relative decoupling from the homeostatic system that a complex nervous system affords ensures that we need not always behave in a way that the affectively felt and pressing homeostatic demands are always and immediately met, but they can be experienced nonetheless. This relative decoupling also allows objects and events in the world to become associated with certain affective states such that when we perceive the immanence of danger in the presence of a bear a few feet away, we feel fear. This idea is echoed in Damasio's somatic marker hypothesis. As Damasio (1994) defines it, somatic markers are "a special instance of secondary feelings generated from secondary emotions. Those emotions and feelings have been connected, by learning, to predicted future outcomes of certain scenarios," (174) where a secondary emotion or feeling is a feeling formed by "systematic connections between categories of objects and situations, on the one hand, and primary emotions on the other." (139) The primary emotions, or feelings, at the root of Damasio's account are innate evaluative mechanisms that are responsive to environmental stimuli and elicit a bodily response appropriate to a given stimulus. These primary emotions are consistent with the discussion of affect in simple organisms in the preceding paragraph.

Damasio is careful to point out that primary emotions are not necessarily subjectively felt and require capacities additional to a basic emotional system to be felt by the organism as such. This is to say that an organism requires something over and above affectivity to be conscious, or subjectively aware, of their affective states. As I stated in Chapter 1, I do not think the way that Damasio articulates the emergence of subjectivity is correct, given that it sets up a dichotomy between body and brain that sustains the new kind of dualism characteristic of some neuroscientific accounts of embodiment. This dichotomy comes about because Damasio grounds consciousness in an intentional relation obtaining "between the body, as object, and the brain that represents that object." (Damasio 2010, 212) I have argued, following Merleau-Ponty, that the objective body too is constitutive of subjectivity, but Damasio's way of thinking about consciousness ultimately reduces consciousness to object-intentionality (i.e. it reduces the body to an object), which is to explain consciousness away.

The specifics of Damasio's account of consciousness aside, I agree strongly with the importance and role of feelings and emotions in consciousness and cognition. Through a process of decoupling interoceptive states from homeostatic regulation and their subsequent association with perceived stimuli, objects in the world take on an affective significance in terms of degrees of valence and arousal relative to their value to autonomy. For example, there is plausibly a positive somatic marker in place for my dog relative to the sound of cling wrap because of a learned association between the secondary emotion of cheese making him happy (because it is food, and also delicious) and the preceding noise of cling wrap. If he hears cling wrap, this triggers the somatic marker for the pleasant cheese experience and the requisite begging ensues. Following Damasio, we can infer that "[f]eeling your emotional states, which is to say being conscious of emotions, offers you flexibility of response based on the particular history of your interactions with the environment." (Damasio 1994, 133) My dog can initiate begging behaviour before cheese has even been detected, increasing the possibility of a successful interaction through early intervention. This demonstrates that affective bodily awareness, as a form of bodily sensibility, helps provide the structural flexibility associated with cognition discussed early in this chapter and in Chapter 4. More

importantly for the present discussion, the importance of affectivity also reveals the sense in which the sensing body, as subject, is never a complete negation, insofar as at its base it is always (at least) affective. The solicitation of the world is always relative to the individual's investment in herself.

5.4.2 Affect in Perception

Beyond Damasio's work, the importance of interoceptive awareness not only in the genesis of bodily subjectivity, but to our perceptual life in general has become increasingly studied and established. Following enactivism, I have argued that environmental meaning arises initially through the norms generated by the self-maintaining organization of the organism as a unified entity embedded in an environment. The salience of and focus on specific environmental features is at least partly determined by an organism's state relative to its homeostatic goals. This is to say that perceptual stimuli are "sorted" based on their affective value. (Barrett and Bar 2009; Damasio 2010; Bower and Gallagher 2013; Colombetti 2014) As such, how stimuli are anticipated to affect the organism makes a difference to how they are perceived. (Pessoa 2008, 2010, 2013; Vuilleumier and Huang 2009; Pourtois et al. 2013)

Rather than absolute passivity, the incorporation of affective subjectivity reveals the sense in which even our passive openness to the world also involves some activity. In order to passively attend to the world, we must actively turn to the world, and our affective investment in it is at least partly responsible for providing the orientation toward the world necessary to let it speak. Indeed, the affective body can be interpreted as providing the free space to allow things and the world to resonate in the form of feelings and emotions. Because we are embodied and because that embodiment is precarious, what we attend to in the world will always, to a greater or lesser extent, be relative to our bodies. Bower and Gallagher (2013) explain this point in relation to the affective phenomenon of boredom: "[a]ffected in this way, one finds oneself immediately embodying a certain meaningful stance towards one's situation, a pull that resonates with and perhaps already prepares, as a kind of crude 'pre-shaping,' for further courses of

action." (115) The boredom we feel affects the way in which we perceive and move into the world.

The idea that interoceptive awareness plays a significant role in regulating the salience of features of our mental life has also recently gained empirical support. For example, the dorsal anterior cingulate and bilateral insulae comprise a Salience Network, which responds to behaviourally salient events, with a specific role for the aRI in predictive error coding. (Ham et al. 2013) This is accomplished by organizing various neural responses to homeostatically relevant stimuli and modulating between the Default Mode Network when the organism is at rest, and executive control networks that engage in task-related processing. (Harrison et al. 2008, Spreng et al. 2010) The insula, which we have seen above has been hypothesized to serve an integrative function between different modes of bodily awareness, has thus been proposed to: (i) detect salient events, (ii) modulate between various large-scale networks (such as the Default Mode Network) to direct attention and working memory resources in the event of (i), (iii) assist in the modulation of autonomic reactions to salient stimuli through (iv) rapid access to the motor system via a strong functional coupling with the dorsal anterior cingulate cortex. (Menon and Uddin 2010) As such, the insula integrates subcortically generated interoceptive information with goals and plans in the prefrontal system to yield object salience that can be used to facilitate appropriate behaviour. (Palaniyappan and Liddle 2012) While these studies highlight the important role of affect in perception and action via the modulation of salience, it is important to note that they express this relationship in representational terms that could be regarded as conflicting with the phenomenological account I have developed so far. The extent to which I think it is valuable, however, does not require an adoption of representational language (or a representational framework). What these studies show is that regions of the brain strongly associated with affective bodily awareness are also active in tasks that involve the modulation of attention and the salience of objects, which suggests some significant role for affect in these contexts and serves as a sort of consilience with the phenomenological research discussed so far. This is just to say that affectivity plays a crucial role in motivating action via its role in modulating perceptual salience. (Bower and Gallagher 2014)

The importance of bodily affectivity to action via its influence on object salience is significant relative to the discussion above about the relationship between agentive bodily awareness and action monitoring. As I have argued, the intention to act, as well as the evaluation of the executed action, ought to be interpreted more broadly than as only including the efferent signals that are needed to produce a selected action. The research above highlights why affect cannot be left out of the account of subjectivity and perception without obscuring other relevant aspects of bodily awareness in its interaction with the world. What is attended to and what actions are initiated as a result of that attention is determined at least partly as a result of the affective significance an object or event has to the individual. Put simply: affect motivates action. As such, the context of a given behaviour, if not the behaviour itself, is going to be imbued with an affectivity that cannot be ignored when discussing the relevance of agency to bodily subjectivity. Affectivity, like agency, is constitutive of our bodily being in the world, and so the account of PRBSA as grounded in a mechanism of action monitoring is only part of the story. It is specifically because affectivity is a form of sensibility that it can take on this role. As passive, affect is responsive and receptive to the world relative to the needs and concerns of the individual. Certainly, in a context in which there are no pressing homeostatic or social concerns that invigorate perception with affect, the relative affective significance of the world and the objects contained therein appears to subside to the background. But this relative affective calmness is nonetheless also affectively mediated insofar as the bare experience of being alive in absence of pain or hunger or fear is itself pleasurable (and arguably often a privilege). The openness to the world that perception requires is at least partially mediated by an affective bodily subjectivity, or bodily sentience, that allows the individual to be passive to the world not in terms of a negation, but relative to the more or less urgent needs, concerns, and desires of the individual.

To tie the discussion about affective bodily subjectivity back to the concerns of the present chapter, namely the co-constitutive relationship between cognition qua structural flexibility and subjectivity qua flesh, the openness and plasticity characteristic of

subjectivity is both necessary for but also enhanced by affective bodily subjectivity, even at the pre-reflective level. As discussed above, that the world is imbued with affectivity requires a relative decoupling of affective signals (generated by the interoceptive system) from the homeostatic system such that an association between perceptual stimuli and affective states can be made. Prior to this decoupling there is no affective subjectivity properly speaking, as Damasio also claims, given that there is not yet a breaking with the world through which a subject can arise. All organisms are affective, insofar as they have displayed preferences for certain stimuli or objects, but the affective states they take up are not felt as such. Indeed, there is no need for affective feelings at the simplest levels because there is no decoupling of stimulus from response. Affective states need to be felt precisely when there is more than one behavioural response possible in a given situtation, which is to say when there is a flexibility of behaviour. As an organism's behavioural repertoire multiplies and it learns to interact with the world in different ways, affect becomes an increasingly important way of distinguishing between certain behaviours that have different impacts on the organism's viability. This is more or less the thrust of Damasio's somatic marker hypothesis. Importantly, these felt affective states could be interpreted as a form of pre-reflective bodily self-awareness insofar as they contain self-specifying and self-relative information about the general state of the organism and the state of the organism with respect to the world. The affective significance that my bodily states and objects in the world come to possess is not via some conscious effort or intentional act; it is right there in my experience of the world. Understanding affective subjectivity in this way relies specifically on the openness to the world and flexibility that cognition affords. That there are feelings and that the world is imbued with self-relative affectivity is because my interoceptive states can become relatively decoupled from homeostasis and associated with objects or events through learning, which structural flexibility affords. Structural flexibility, then, is necessary for affective subjectivity as well, even at the pre-reflective level. Just as cognition affords a decoupling of stimulus from response, it also allows for a decoupling of affect from need.

While action monitoring provides a contribution to the understanding of enactive subjectivity as grounded in the body, it is incomplete and problematic in this

incompleteness by expressing a one-sidedly active understanding of our bodily being in the world. I have shown how the incorporation of affective bodily awareness can provide an aspect of passivity needed to capture the sensing body. Importantly, I have also discussed the crucial role that the sentient body as affective plays in perceptual and cognitive processes. But so far I have only talked about the co-constituting relationship between cognition qua structural flexibility and the sensing body when it occurs at the site of the body, in its interaction with the world. If the discussion was limited to simple organisms, this would arguably suffice to understand the relationship between embodied subjectivity and inhabited world. But social animals possess a much more extensive sense of self insofar as their existence is also conditioned by others. For the most part the social identity we possess is encapsulated by what has been called the autobiographical (Damasio 1999, 2010) or narrative (Zahavi 2005) self, and is a form of reflective self-consciousness. However, social sensibility is also pre-reflective. To demonstrate this, I discuss inhibited intentionality as a way of bringing to light the way in which the co-constituting relationship between cognition (as structural flexibility) and subjectivity (as flesh) affords an understanding of the pre-reflective body as social, or at the very least, mediated by social phenomena. Because bodily sensibility, even at the pre-reflective level, is open and plastic in the way that structural flexibility affords, the manner in which we are able move in and toward the world is influenced greatly by our social identities as well.

5.5 The Social Body

As discussed in Chapter 4, cognition allows for far more than just an increased probability of a successful interaction with the world. It affords the possibility of language, reflective thought, and society. As a dynamic system of individuals co-existing in a sustained relationship, there are norms that govern the behaviour of individuals within a society in order to maintain its structure (regardless of whether it is beneficial to all of its members). Being part of a society means internalizing certain structures of behaviour and ways of being in the world as grounds for the intersubjective relationships of which that society is comprised. These structures guide the behaviour of individuals as

social norms. Importantly, social norms are acquired either explicitly or implicitly from other members of an individual's social groups.

The acquisition and internalization of social norms is mediated by higher cognitive processes including language or communication and but also less advanced forms of cognition that provide an ability to monitor and regulate one's own behaviour. This regulation involves not just learning what behaviours are appropriate in a given context, but also what behaviours are inappropriate as well. When children behave in ways of which we disapprove, we teach them of the inappropriateness of the behaviour in hopes to inhibit it. The inhibitory effect can and does subsequently affect one's experience of self. By implication, the converse would also be true, that any social norm that encouraged specific behaviour would be enabling of taking up our bodies and moving into the world in certain sorts of ways. What we might infer from this is that the effects of social oppression or privilege also have an effect on one's bodily being in the world. Interestingly, studies in natural pedagogy (involving an "innate" receptivity or tendency for infants to learn from their caregivers) also suggest that how a child's caregiver interacts with a child influences what objects are significant or valuable in general. (Csibra and Gergely 2009; Bower and Gallagher 2014) As a consequence, acquired social norms affect the way we take up our bodies and move into the world by directing behaviour and orienting the individual in relation to social significance.

If our bodily being in the world is taken as grounded strictly in physiological processes, such as proprioception or interoception, it is easy to lose sight of the sense in which the sensing body is also fundamentally social. The social dimensions of our embodiment, which bring social norms within the interiority of the body, also play a constitutive role in the institution of the sensing body. This requires that the sensing body be more than just a function of bodily processes. It requires an openness and a flexibility that allows structures instituted outside of the body of the individual, but that the individual nonetheless participates in, to shape and mold the very way in which her body expresses itself as a sensing subject. This openness and flexibility, I have argued above, comes as a result of the co-constitutive intertwining of subjectivity as flesh and cognition as a form

of structural flexibility. It is the relative decoupling from homeostatic concern that opens the body to the world, and the flexibility that comes as a result of the plasticity of structures of behaviour that allows the sensing body itself to take on a meaning that intends beyond its primary homeostatic significations to a world in which others also inhabit, and who's inhabiting reciprocally shapes our own. That subjectivity as flesh has the openness and plasticity to be structured and restructured by social norms is a direct result of the co-constitutive intertwining of subjectivity and cognition.

Iris Marion Young (2005) argues that the feminine existence (in the Western context) consists of modalities grounded in a lived contradiction between being a free subject and being a mere object. The modality most pertinent to the present discussion is inhibited intentionality. The lived contradiction emerges because, drawing on Merleau-Ponty, she argues that "it is the body in its orientation toward and action upon and within its surroundings that constitutes the initial meaning-giving act." (Young 2005, 35) This idea builds out of Merleau-Ponty's articulation of intentionality as fundamentally an "I can." However, she argues,

> [t]ypically, the feminine body underuses its real capacity, both as the potentiality of its physical size and strength and as the real skills and coordination that are available to it. Feminine bodily existence is an *inhibited intentionality*, which simultaneously reaches toward a projected end with an "I can" and withholds its full bodily commitment to that end in a self-imposed "I cannot." (Young 2005, 36)

So far, our discussion of subjectivity as flesh and the effect of intentionality on the body has been largely within the context of Merleau-Ponty's "I can." At the same time, we have seen that subjectivity ought not be construed strictly as activity but as a reversible relationship between activity and passivity, and further, that Merleau-Ponty's account of bodily subjectivity is grounded in a chiasmic intertwining of all the different ways in which our being opens onto the world, including motricity, affectivity, perception and cognition. This deep intertwining of our worldly engagement and the passivity inherent to perception and subjectivity would suggest a role for inhibition not fully appreciated by Merleau-Ponty and that Young draws out. The inhibitory effect of the "self-imposed "I

cannot"" that Young discusses would be a learned social norm, which is to say that it would be mediated by cognitive processes. What this means is that our experience of subjectivity itself is not devoid of the influence of cognition, and in this case its inhibitory effects.

Much of inhibited intentionality is likely at some point acquired in the same way a skill is learned, as I discussed previously, because social identities that impose norms, such as gender, are performed. (Butler 1990) As chiasmically intertwined with the world, we are at least partly defined by our situation, and as such "the particular existence of the female person is no less defined by the historical, cultural, social, and economics of her situation." (Young 2005, 29) The world in which we are intertwined is not just the "natural" world. In the context of contemporary Western society, social norms organize feminine structures of behaviour in such a way that the lived space within which the feminine body moves into the world is constricted. (Young 2005, 40). It is constricted specifically because the feminine body is "often lived as a thing that is other than it, a thing like other things in the world. To the extent that a woman lives her body as a thing, she remains rooted in immanence, is inhibited, and retains a distance from her body as transcending movement and from engagement in the world's possibilities." (Young 2005, 39) Inhibited intentionality in the context of the feminine body is, at least partly, a result of the overemphasis on or overdetermination of the sensible body, the body-as-object, to the relative inhibition of the sensing body. (Al-Saji 2014) It is through this overdetermination of the sensible body that the historical and contemporary marginalization of the feminine body is executed. Because of the imposition of oppressive social norms that organize and govern feminine structures of behaviour, the feminine subject is required to take an objectifying reflective stance with respect to her own subjectivity in order to fulfil the obligation of these norms. Importantly, this is a result of cognitively mediated social norms.

As with learned skills, inhibited intentionality becomes part of the body schema and shapes experience and behaviour independently of one's awareness of it through processes that are often cognitively mediated. If we follow the account of cognition that I

have been developing, as involving the ability to behave differently in similar contexts through the control over capacities that enable structural flexibility, we can see two senses in which inhibited intentionality requires cognitive processes. First, social institutions and their internalization rely on cognitive abilities such as language use and reflective thought, which are classically and uncontroversially associated with cognition. Second, the internalization of social norms occurs precisely as a way of regulating behaviour in the manner that structural flexibility affords. This process of internalization exploits the very capacities that allow us to behave differently in similar contexts, but the regulation of behaviour in this case is relative to society rather than homeostatic constraints. The bodily influence of social norms occurs through regulation of behaviour via the modification or constraining of an individual's structures of behaviour (inscribed within the body schema), and their intentionality, understood as the "I can," that expresses the body's orientation in and toward the world. Inasmuch as agentive bodily awareness is also affective, as argued above, one can quickly see how inhibited intentionality not only affects how one moves in the world but how the world is perceived as resisting one's movement. When one's intentionality is inhibited in this way, one's sense of agency is experienced as occluded by effort and obstruction, or at least is felt as less easy and less unobstructed. Agency is not an all-or-nothing experience of bodily subjectivity, but is rather experienced as being more or less effortless, more or less free, which is to say that inhibition plays a significant role in subjectivity and our being in and toward the world. Importantly, this happens at the pre-reflective level through affective bodily states; the feelings of effort and difficulty are charged with affectivity. Certainly, as social norms are learned, conscious effort is required to conform one's structures appropriately in a way that would require something like reflective thought. But once these norms become internalized and one's structures of behaviours are organized to conform to them, no thought is required. The social norms are lived through one's intentionality, and in the case of oppressive social norms one's intentionality is inhibited.

A recent study by Caspar et al. (2016) echoes the points made above. The study provided evidence that less agency is experienced over the harmful outcome of one's actions when

participants are given coercive instructions to carry out that action. (Caspar et al. 2016) Measures of the experience of agency were based on explicit measures such as self-report and implicit measures such as response time. In the experimental context, coercion was induced by an instructor giving an instruction and watching the participant carry out the instruction. The study thus suggests that the subjective experience of agency over the outcome of an action is reduced if an individual is coerced compared to individuals free to make their own decision. The study's authors suggest that "coercive *contexts* produce anticipatory reduction of sensory processing for action outcomes" which implies that the brain treats actions under coercion as passively triggered. (Caspar et al. 2016, 589) Obviously social norms are not coercive instructions in the manner used by the experiment, but they do arguably create coercive contexts in which individuals are made to act or behave in ways they do not wish to, or to inhibit their behaviour in situations they would not otherwise. It is not much of a stretch to extend the coercion induced by the instructor watching over the behaviour of the experiment's participants to an understanding of social norms as functioning in a similar manner like an internalized panopticon. (Cf. Foucault 1977 [1975]) The peer pressure that some individuals feel to behave in certain ways in order to fit into a social group would certainly constitute a coercive context, and so it's possible that individuals feel a diminished sense of agency, and consequently a diminished sense of self, in such contexts. It is also not much of a stretch, then, to suggest that social norms that influence individuals to behave against their intentions contribute to a diminished sense of subjectivity.

What the above study along with Young's account of inhibited intentionality points to is a pre-reflective sensibility that is bodily but also social. This makes sense, given that we are social animals, and as such, we would expect our sense of self to be mediated by social existence even at the pre-reflective level. But what it also suggests is an influence of cognitive processes that would carry social norms into the lived body operating at the pre-reflective level through the enrichment of the sensing body that cognition affords. Inhibited intentionality does not just affect our narrative selves, but the very way in which we move into the world through how we take up our bodies. If we feel our agency as inhibited by feeling weaker or more tired or generally "less than," or by the world

pushing back too firmly, our sense of self is impacted accordingly. Importantly, this inhibition is present as a structure that modifies and organizes perception, and through the affective body we can understand how this operates at the pre-reflective level. A space might feel unsafe or dangerous not just because of the presence of a bear, for example, but because we have been made to feel unsafe in those spaces through the institution of social norms that are carried out by the members of a society. The inhibition that structures our behaviour is learned first in a cognitive act of internalizing an external and inter-relational norm, and subsequently implemented parallel to one's own agency to inhibit subjectivity. Cognition and subjectivity can be seen as intertwined pre-reflectively even at the social level.

5.6 Conclusion

While body and world are deeply intertwined and inserted into one another in Merleau-Ponty's articulation of flesh, they are importantly separate and as such the sensing body still needs to be specified as an unique being. Yet this specification cannot be done independently of a world that is constitutive of the sensing body. The framework for thinking about embodied subjectivity that Merleau-Ponty develops gives rise to a unique problem of how the subject breaks with the world without sacrificing the chiasmic intertwining that is central to our bodily being in the world. Chapters 3 and 4 laid the groundwork for the solution to breaking with the world that I presented in the first half of this chapter. I have shown that if we take seriously Merleau-Ponty's claim of a massive integration and intertwining of all of the modes with which a subject interacts with the world, we need to take seriously that cognition and "consciousness" are co-constitutively intertwined. I have argued that even at a very minimal degree of structural flexibility, as a basic form of cognition, there needs to be a co-constitutive intertwining of subjectivity and cognition in order for either to be possible. Learning, for example, requires the presence of a self in experience to which one's actions can be attributed in order to improve interaction in the future. But at the same time, the capacity for decoupling behaviour from worldly stimuli is needed in order for the temporality that is constitutive of subjectivity to arise in interaction and allow for the possibility of experience.

Given that the account of subjectivity as flesh that we are working toward is one that is inclusive of human subjectivity I spent the last half of the chapter developing an account of this intertwining between structural flexibility and the sensing body at the human level. Just as the account of enactive subjectivity as flesh develops at least partly out of Legrand's account of pre-reflective bodily self-awareness, I structured the present discussion around her grounding of PRBSA in action monitoring. I argue that her account is not adequate to explain the richness of bodily sensibility we enjoy and extend it by incorporating affective bodily awareness. The intention to act, as well as the evaluation of a given action, requires affective bodily information provided largely by interoceptive awareness. Importantly, this gives an element of passivity to the account that Legrand's articulation lacked insofar as affectivity can be understood as a kind of sensibility to oneself and the world. Affective bodily awareness is also crucial to our perceptual engagement with the world and not only colours the world with affective significance but modulates attention by enhancing salient features of the world as they matter to us. This all happens, I argue, at the pre-reflective level, and so the influence of cognition on "subjectivity," and vice versa, is pervasive. This pervasiveness extends not only to our embodied engagement with the "natural" world, but to our social interactions as well, given that our existence is at least partially conditioned by our social situation. Using a discussion of Young's account of inhibited intentionality, I argue that we can understand the influence of social norms as also occurring at the pre-reflective level once we understand the sensing body as inherently affective and mediated by cognitive processes as well. I will conclude in the next chapter by summarizing the situation revealed by the discussion I have provided and by addressing concerns and potential implications for the account of enactive subjectivity of flesh as involving the reversibility of passivity and activity expressed through the chiasm of sensing and sensible.

Chapter 6

6 Conclusion

At the beginning of Chapter 1, I characterized enactivism as a valuable account of cognition within the sciences of mind in its ability to characterize the body under a variety of descriptions. These descriptions included the phenomenological body as the first-person perspective each of us enjoys as we engage with the world through (or rather as) our body, the biological body as the collection of physiological and cellular processes that make up and sustain one's physical body, and the neuroscientific body that defines the role that the brain plays in generating one's awareness of and control over their body. The revisions I have made to the enactive approach over the past several chapters have touched on each dimension of our understanding of bodily engagement with the world. In Chapters 2 and 3 I developed phenomenological revisions to enactive subjectivity through the incorporation of flesh and a deepening of the account of sense-making that enactivists argue gives rise to cognitive behaviour; Chapters 3 and 4 developed biological revisions to the enactive account of cognition as grounded in the self-maintaining activity of adaptive autonomous systems by showing the crucial role of structural flexibility in cognition; and Chapters 4 and 5 provided revisions to the neuroscientific body by articulating the relationship between the decoupling of behaviour from stimulus that a properly organized nervous system provides, and an understanding of the significant role of affective bodily awareness in agentive bodily subjectivity in light of research in affective neuroscience.

Beyond speaking to each distinct aspect of our bodily being in the world, I have also discussed the interrelation of each part and demonstrated their mutual integration that sustains the whole of our being. By developing an account of the co-constitutive intertwining of the sensing body and structural flexibility in Chapter 5, I have shown how each distinct aspect of our being cannot be fully appreciated in isolation but must be understood always as chiasmically related to the other parts. To echo Morris' (2010) discussion of the reversibility of flesh in terms of activity and passivity, these different descriptions of our body are not different kinds of being in the world, but different ways

in which our being in the world *is*. But to make this claim, one needs to show how these divergent ways of being are interrelated and intertwined. Chapter 5 is explicitly devoted to this concern, insofar as it details the co-constitutive intertwining of sensing body and cognition as structural flexibility, but it is also part of what unites the different threads of discussion in each chapter. The revisions I offer are not unrelated, but rather work together to provide an account of the enactive body that is more consistent with the ontological commitments of enactivism, but also more plausible precisely by demonstrating the relationship between these different descriptions of our embodiment.

Despite the broad reach of the revisions I make, it should be clear that the general enactive framework with which this project began remains relatively intact. The understanding of body and world as mutually specifying and co-constituting has not been challenged, but deepened. The continuity between life and mind is preserved, albeit in a slightly different form. The revisions I have made, rather than undermining enactivism have made the enactive approach more consistent with its commitments to embodiment and embeddedness. The revisions not only articulate a continuity between cognition and life but demonstrate a continuity between different kinds of cognition as grounded in the structural flexibility inherent to cognitive systems in general. By making these revisions I have made enactivism more consistent and more valuable within the sciences of mind. This revised framework for enactivism can provide new perspectives on contemporary research and open new paths for further work. I will outline the modifications to certain enactive themes as a way of summarizing the importance of the revisions I have made and will draw out the implications they have in clinical, scientific, and social contexts and the different paths of research these implications invite.

6.1 Attributing "Consciousness"

In Chapter 1, I characterized one of the problems with the cognitivist approach to mind as developing out of a tendency to reduce "consciousness" (and cognition) to function. As a result of this functional reduction of consciousness, the subjective states of participants and individuals in experimental and clinical contexts often go overlooked despite the value of this first-person data to research in consciousness and cognition. This is of

course not to say that there is no value in functional descriptions of consciousness, or in understanding what the behavioural correlates of subjective states are (and the corresponding physiological basis for those states). Rather the point, which Merleau-Ponty also makes throughout his works, is that "consciousness" and cognition cannot be reduced without remainder to such physical-functional descriptions. Instead, such descriptions make up *part* of our understanding of embodiment, relative to the physiological and neuroscientific dimensions of our bodily being in the world. This is to say that they are valuable in their own right, but not the final answer to what consciousness is (indeed, as we have seen understanding our bodily being in the world in terms of "consciousness" is problematic). There is a legitimate question that comes out of this response to cognitivism about whether or not the way of thinking about the sensing body that I adopt and develop in the preceding chapters commits us to a dualistic understanding of embodied subjectivity. If that were the case, it would effectively reify the Cartesian distinction between body and world that Merleau-Ponty sought to reject. Fortunately, it does not.

As was discussed in Chapter 2, the dualism of mind and body that Merleau-Ponty's philosophy of embodiment rejects comes about as a result of a dichotomy set up between them. In the Working Notes to *The Visible and the Invisible* Merleau-Ponty claims that

> The problems posed in PhP are insoluble because I start there from the "consciousness"-"object" distinction—Starting from this distinction, one will never understand that a given fact of the "objective" order (a given cerebral lesion) could entail a given disturbance of the relation with the world. (VI 200)

The solution to understanding consciousness and world chiasmically rather than dichotomously is to articulate the phenomenal subject "not as nothingness, not as something, but as the unity by transgression or by correlative encroachment of "thing" and "world."" (VI 200) This, of course, also involves rejecting the language of consciousness. Although the co-constituting relationship between sensing and sensible has been demonstrated through the phenomenological research that Merleau-Ponty developed in his earlier works, that research still implicitly adhered to a problematic

framework for thinking about consciousness. It's worth clarifying that this does not mean the earlier account of embodiment that Merleau-Ponty developed is entirely wrong. Indeed, I have relied to a great extent on these earlier works for their discussion of intentionality, the body schema, and sense-making, for example. But it does mean that these works cannot be treated as the final story, and must be examined through the framework of his later works that attempt to address the issues implicit in his earlier works. Merleau-Ponty's later works address these implicit problems by revealing the ontological relationship between sensing (subject) and sensible (world) through flesh, which grounds an understanding of sensing and sensible as chiasmically intertwined. It is precisely because of this intertwining that research in the sciences of mind has a value for understanding "consciousness." Rather than implicitly reifying dualism, thinking about bodily subjectivity through flesh reduces the worry about dualism to an artifact of a framework for thinking about the relationship between body and world that is fundamentally problematic. The work that I have developed throughout this project extends Merleau-Ponty's framework of flesh that makes possible the chiasmic intertwining of sensing and sensible.

It is worth noting, as a point of self-criticism, that some of the project I develop could be accused of failing to exorcise the Cartesian spirit that still haunts the discussion of embodiment because I have not fully adopted Merleau-Ponty's language of flesh and have continued to use subjectivity and consciousness in descriptions of our bodily being in the world. I cannot fully rebut the point except to note that by nature of the critical project, some common language needs to be adopted in order to understand how the revisions apply to enactivism. I have nevertheless attempted to express these revisions through the conceptual framework of flesh. There is a much stronger point to be made, however, along the lines of Dennett (1988), that the notion of consciousness (in Dennett's discussion 'qualia') is so incoherent in the variability of its use that it is no longer useful. Merleau-Ponty makes a stronger claim that not only is it used in a variety of ways that make it incoherent, but its use in general serves to preserve a framework for thinking about our bodily being in the world that undermines the very project we undertake in attempting to use it. In part, I hope the incorporation of Merleau-Ponty's framework of

flesh that I have developed can serve as a point of departure from these problematic ways of thinking about our being in the world and can offer a productive way of moving beyond these "philosophies of consciousness."

It is should be clear, then, that the criticism of a cognitivist understanding of consciousness and cognition, which reduces subjectivity to function, does not commit one to dualism. Rather, the criticism of cognitivism is precisely an attempt to *avoid* dualism by showing that to reduce subjectivity to functional properties is not only to explain it away but also to entirely leave it out of the cognitivist framework itself. By leaving subjectivity out of the framework, it persists as disembodied and immaterial. The way out of this dualism is the conceptual framework of flesh according to which sensing and sensible are chiasmically intertwined. Indeed, that behaviour can be understood as a sign for consciousness or cognition is precisely because of this intertwining that I have developed in the preceding chapters. The project I develop is thus an exploration of this intertwining as it relates to the enactive approach. The co-constitutive relationship between subjectivity as flesh and structural flexibility can be understood as a way of understanding *how* the intertwining between sensing and sensible is manifest in the body.

The nature of the relationship between sensing and sensible becomes particularly interesting in contexts when there is no behavioural indication of their intertwining, which is to say, in contexts in which there is no overt behavioural indication of an individual's sensibility. These contexts emerge in a variety of ways through what has been called disorders of consciousness. The existence of individuals with locked-in syndrome, for example, present a problem for embodied accounts. (Kyselo and Di Paolo 2015) Locked-in syndrome involves the global paralysis of the patient which amounts to almost no voluntary muscle movement and no ability to verbally communicate. (Laureys et al. 2005) There are varying degrees of locked-in syndrome relative to the amount of voluntary muscle control that is preserved, for example, but what makes it so interesting to embodied accounts is that these individuals are fully conscious with cognition widely unaffected. (van León-Carrión et al. 2002; Schnakers et al. 2008) Given the constitutive

role of the body in embodied accounts in general, it becomes difficult to see how such individuals are cognitively engaged and experiencing the world. (Anderson 2003)

Kyselo and Di Paolo (2015) rightly argue that the role that the body plays can be interpreted differently according to different kinds of embodied accounts, and that locked-in syndrome is arguably less problematic if we understand embodiment through the enactive framework. The enactive body, they argue, is conceived as grounding cognitive identity and meaning generation through an ongoing precarious process of self-construction. (Kyselo and Di Paolo 2015, 539) What this means is that "[t]hese ongoing processes are not restricted to neuro-muscular activity and can also include covert bodily action." (Kyselo and Di Paolo 2015, 539) While the discussion of behaviour throughout this project has largely been concerned with overt, world-oriented behaviour, it is clear that an element of agency applies to our mental life as well; there is an agency to thought as well as an affectivity in terms of the effort or discomfort, or ease and pleasure, involved in certain cognitive activities even when no embodied behaviour can be observed. Adopting this interpretation of the enactive body also allays concerns about a revival of behaviourism (especially relative to the discussion in the previous several paragraphs). While overt world-oriented behaviour plays an importantly role in the articulation of the enactive body, this is not meant to preclude any role for covert internal states. Indeed, the importance of lived experience to the enactive framework tells against concerns of behaviourism. However, there is certainly room for further work on exploring the connections between covert behaviour and phenomenology through the enactive framework.

"Mental" agency and affect are particularly important in a variety of other cases where individuals do not display overt behaviour and cannot communicate conventionally. In these clinical contexts, attributing consciousness increasingly depends on unconventional methods and technologies for assessing consciousness because of the limitations, due to injury, of conventional methods for assessing and attributing consciousness, such as self-report. These contexts create a unique challenge because, overtly, the behaviour of such individuals would indicate a lack of consciousness. One such context emerges for

individuals who are diagnosed as being in the vegetative state due to a lack of responsiveness to environment and an apparent lack of self-awareness. An individual may enter a vegetative state when coming out of a coma following serious brain injury, which involves "a normal sleep-wake cycle, opening their eyes when awake and making roving eye movements." (Shea and Bayne 2010, 460) Such individuals can recover fully from the vegetative state or remain in it persistently. The challenge that emerges is that some individuals appear to be in the vegetative state but are actually minimally conscious. (Owen et al. 2006) This poses a serious difficulty for diagnoses in these contexts given that such individuals display no overt behavioural indication of consciousness.

Given that consciousness is often characterized as fundamentally divorced from behaviour (Nagel 1974; Block 1980; Chalmers 1996) there has been difficulty with testing and applying theories of consciousness, but especially in clinical contexts where serious brain injury inhibits "normal" behavioural markers of consciousness. As such, consciousness is often attributed to, or found absent from, an individual based on methods like reportability (Papineau 2002; Naccache 2006; Owen et al. 2006, 2007; Monti et al. 2009), which can often be unreliable. (Cf. Dretske 2006; Shea and Bayne 2010) Reportability is ultimately a behavioural condition whereby the individual communicates that they are, in fact, conscious. Self-reports of one's states do not necessarily need to be verbally communicated and so reliable methods of report can be established even in some contexts in which injury makes communication difficult. For example, eye movements or blinking can be used as a form of communication in some cases of locked-in syndrome. (Kyselo and Di Paolo 2015). However, the case is more difficult with individuals that appear to be in the vegetative state, and is compounded by the high rate of misdiagnosis. (Naci et al. 2016) More unorthodox methods of report have been used to attempt to infer the presence of minimally conscious states, if they exist, using imaging techniques. (Owen et al. 2007) Because these techniques are not the ordinary means through which individuals communicate it is difficult to ground a strong inference about whether or not such individuals are in fact conscious. Normally, one can rely on an individual's self-report of their own conscious states through conventional

language-based communication, but such means are not available in serious disorders of consciousness because of the lack of voluntary control over one's muscles that is characteristic of the vegetative state and other disorders of consciousness.

As I have argued, the co-constitutive relationship between subjectivity and behavioural flexibility strongly suggests that certain kinds of behaviour are indicative of minimally subjective states. Indeed, we similarly lack the ability to rely on self-reports of non-human animals about their conscious states, but the account I develop strongly suggests that they are indeed conscious as indicated by the presence of certain kinds of behavioural flexibility. Of course, in the case of non-human animals, we can rely on overt behaviour as an indication of the presence of a minimal presence of self to self that would roughly correspond to "consciousness" as it's used in this discussion. But in light of the discussion of Kyselo and Di Paolo (2015) above, this model for thinking about the relationship between consciousness and cognition can potentially offer different methods for attributing consciousness in individuals with impaired abilities to report on their conscious states or to display other common behavioural capacities associated with consciousness. The structural flexibility of cognition could be interpreted as allowing for the attribution of consciousness to individuals based on behavioural flexibility, which would involve not just the presence of a behaviour or a successful report, but an element of adaptation of behaviour to context. Because the account I propose emphasises the *flexibility* of behaviour rather than specific kinds of behaviour, it would be especially valuable in the clinical contexts discussed above in which disorders of consciousness make diagnoses difficult due to impairments of communication or behaviour.

We can develop the beginnings of a model of what this might look like by building from the point made by Kyselo and Di Paolo (2015), that covert agency is also critical to the enactive approach. Indeed, the relationship between overt and covert behaviour has already been discussed in a roundabout way in Chapter 5. Damasio (2010) has argued that the structure of the efference copy model of agency can be co-opted by an "as-if" body loop that allows the individual to imagine performing a given action as a form of pre-planning without actually needing to perform that action. The advantages of such a

system are obvious, but the implications are particularly significant for the present discussion. The expression of agency would be possible without the corresponding action being performed. If individuals that would otherwise be classified as occupying a vegetative state can initiate covert actions in a similar manner, then it is also possible that the covert behaviour of such individuals could also be executed in a flexible way. Imaging techniques used by Owen et al. (2006), for example, involve the purported willful modulation of (measured) brain activity according to detailed instructions given by the researchers. These, or similar methods, could be exploited in conjunction with the account of enactive subjectivity as flesh that I develop. More complex questions, or scenarios, could be presented that rely on an element of creativity on the part of the patient, through changing or adaptive sequences of 'yes' and 'no' responses that build of off imaging techniques already used, for example. (Owen et al 2006) Or, more to the point of the discussion in previous chapters, a repeating series of questions could be asked with the periodic instruction to answer the questions falsely. This would demonstrate an ability to behave differently in similar contexts, though only once a baseline of response to the questions asked had been established. Such a scenario might be able to demonstrate a behavioural flexibility that shows an ability to behave differently in similar contexts, and could be indicative of (at least) a minimal consciousness. While this suggestion is only preliminary, it should be clear that the account of embodied subjectivity as co-constitutively intertwined with cognition could have important clinical applications.

Understanding the massive integration of our different ways of being in the world can thus open up different methods for investigating our unique manners of embodiment. Because of the massive integration and the co-constitutive intertwining of each aspect of our being in and toward the world ("consciousness," cognition, affectivity, motricity) we can make inferences about one aspect of our being based on the others (e.g. through their presence or absence). Of course, these inferences will only be as strong as the relations established between the different aspects of our embodiment. In Chapter 5, I developed a case for the co-constitutive intertwining of the sensing body and structural flexibility (as a minimal form of cognition) and the role that motricity (the agentive body) and

affectivity (the affective body) play in this picture. More work needs to be done to strengthen the account I develop, but it offers new paths of research with potentially significant implications. Importantly, the suggestion I am making about the role that this framework can play in clinical contexts is not a reduction of "consciousness" to behaviour in the manner I have just criticized. Rather, as just discussed, these behaviours can allow us to make inferences about the sensing body, but only once the relationship the sensing body and cognition is understood as co-constitutively intertwined.

6.2 The Openness of Subjectivity as Flesh[24]

The co-constitutive intertwining of cognition and subjectivity as flesh provides an openness and flexibility to the subjective dimensions of the body and allows for a deepened understanding of the sensing body as fundamentally social, as briefly discussed at the end of Chapter 5. It is through the openness and flexibility of cognitive processes which enrich the sensing body that we can understand the embodied subject as socially constrained and developed. Subjectivity is not constituted solely by an active subject engaging with the world, but is instituted through the biological development of the physiological capacities necessary for sentience and structural flexibility and out of one's embodied history of inhabiting a world that is comprised by natural and social significance. The world with which we, as humans, interact is not just the natural world that we exploit in an effort to fight against the precariousness of our materiality. Through language and reflective thought, and the novel structures that these ways of being afford, we can understand the world of the individual as extending into social, political, cultural and historical dimensions as well. This is to say that our embodied subjectivity is fundamentally social. This understanding of subjectivity is characterized in terms of an openness that allows for subjectivity to develop over time, not just in a physiological

[24] The discussion in this section is indebted to personal communication with Kimberly Dority, who has done work on whiteness as a habit of perception, and is inspired by her presentation "Exploring Whiteness as a Habit of Perception" at the 40th Annual Meeting of the International Merleau-Ponty Circle (Worcester, MA, October 2015). The section is at least partly an effort to facilitate a bridge between the kinds of feminist phenomenology that she and others develop and the account of the enactive body I have articulated.

sense, but through the subject's engagement with the world she inhabits. This openness can be understood as involving a plasticity of the structures that institute subjectivity. However, the ability to change and develop is not a matter of an absolute openness, since the subject always brings her history to her style of being of the world. Rather, the plasticity of the structures that institute subjectivity enable a passive receptivity to the world and in response these structures can be organized and modified. Openness is grounded in plasticity, and as such, rather than wholly immutable, subjectivity as instituted (i.e. as flesh) is capable of change.

As I argued in Chapter 5, the plasticity of subjectivity is crucial to understanding the nature of our social bodies. As my discussion of inhibited intentionality has demonstrated, one's pre-reflective sensibility, even if felt in a bodily manner via our agentive and affective bodily awareness, is structured and constrained by the social dimensions of our embodiment. The social world that our body inhabits exists at a plurality of levels, and one's embodied social identity within that world can be characterized in relation to the socially constructed groups one belongs to, including but not limited to, race, gender and class. One's social identity cannot be reduced to the membership within a single group. Rather, social identity is developed through one's participation across a variety of social groups. (Crenshaw 1989, 1991) In this way, one's social body is the site of an intersectional identity existing at various social levels all at once, and which collectively structure and organize our inhabiting of the world. In light of the discussion at the end of Chapter 5, we can understand that one's identity is structured and constrained by certain norms relative to the social context in which one finds oneself. For example, given the continued existence of white privilege in our current geographical and historical context (Ontario in 2016), being white right now in Ontario might afford certain ways of being in the world to white individuals in certain contexts (e.g. the academy). (Ahmed 2006; Smith 2010) These affordances, however, may be "cancelled out" if one's identity intersects with other underprivileged identities such as being a woman or being poor. Norms apply differently to different intersectional identities and are instituted at different social levels relative to the individuals participating in those groups. Importantly, one's intersectional identity is not the product

of an additive function given that one's participation within any group is constrained and co-constituted by membership within other groups as well.

These social norms are often problematic in that they enact social hierarchies that are oppressive. In Chapter 5, I showed how these oppressive norms can, if we have certain kinds of bodies and identities, inhibit the way in which we move into the world. The sensing body is thus shaped and constrained through these social norms. Not only does this inhibiting affect how or where one can move into the world, it also affects how one's subjectivity, as an experience of self, is felt: movement involves more effort and is met by resistance to make us feel weaker. The natural extension of this way of thinking of embodied subjectivity is to understand the inverse relationship as well, where one's intentionality is not inhibited but enabled through the institutionalized privileging of certain bodies over others, and more importantly, how it can be undone. I cannot give such a complex topic the space it deservers in relation to the present project, but it is worth drawing out a few points here.

The ability of white men (speaking generally) to move into the world in certain ways was, and is, at the expense of individuals with different intersectional identities. (Ahmed 2006) Our goal is and should be to dismantle those hierarchies. This involves changing subjectivity at the individual level, and at the pre-reflective level. Whiteness, for example, can be understood as manifest in the body as a form of privilege that affords certain ways of being in the world by providing a background for social action through the habitual body. (Ahmed 2006) Understanding whiteness as a habit that pre-reflectively guides one's intentionality and orientation in the world implies the possibility for the undoing of the habit, of "kicking a bad habit." The very premise that these problematic ways of being can and should be changed requires an understanding of subjectivity as flexible and open in the ways the account that I develop articulates. The relationship between cognition and subjectivity as co-constitutively intertwined shows how these bodily structures can be influenced by cognitively mediated social norms to manifest a style of being in the world that both expresses and sustains those norms, as well as the problematic hierarchies they correspond to. This is certainly not to say that the body is

the only possible site of social change (political systems can attempt to institute new norms through legislation and social activities that attempt to restructure society in certain ways so that it no longer perpetuates problematic norms, for example), but rather indicates that change also needs to happen at the level of the individual.

The privileged way of being in the world that white masculinity affords comes as an *uninhibited* intentionality, which is an intentionality that is enabled precisely through its imposition upon the space of individuals with different intersectional identities. In order to rectify the imposition of an uninhibited intentionality, a critical self-reflexivity needs to be introduced through a moment of hesitation, which

> allows an interval wherein vision can become self-critical—questioning the structures of habituation and socialization that it takes for granted and yet cannot see. Hesitation can be expanded into an effort of openness and responsivity toward an affective field which is unrecognized by the objectifying gaze. (Al-Saji 2014, 153)

This hesitation would require a greater decoupling of body from world in experience that would create an interval in which the social structures that constrain one's intentionality and perception can be dismantled or reorganized and in which new institutions can be developed. The change that is effected in the habitual body is facilitated through the abilities that cognition affords, once again, given that it is through a *decoupling* of body from world (or sensing body from action). This decoupling allows for an interval to form where an act of *reflection* can occur in which the white male body witnesses his body (as an object and) as an uninhibited intentionality that takes up space in the world by imposing on and restricting the space of others. Through a privileged individuals' recognition of their own uninhibited intentionality as an imposition, they can begin to restructure their habitual body by learning new, better ways of being in the world and being with others. As such, by understanding the relationship between cognition and the sensing body as co-constitutively intertwining we can not only see how social norms and hierarchies are constitutive of our subjectivity, but also how they can be undone and dismantled in order to strive toward a way of being in the world through which true chiasmic intersubjective relationships can be instituted. As the discussion of the chiasm

in Chapter 2 indicates, chiasmic intersubjective relationships would involve an exchange in equal proportions, where one's taking is in proportion to their giving. This involves recognizing the other as a sensing body with its own projects and lived experience and not a mere sensible thing. Again, the richness and depth of the feminist phenomenology already dealing with this complex topic warrants a much more extensive treatment, and I do not intend to offer an overly hasty solution to the problem of whiteness as an uninhibited intentionality that imposes on others. Rather I show how an extension of the account of enactive subjectivity as flesh developed here can be further developed, with further care and work, to be productive in this context as well.

6.3 Obligations to Non-Human Life

In some sense, the changes to the account of cognition that come about from the modified account of continuity do involve a degree of semantics, given that the debate is centered precisely around how we are to understand the concept of cognition and to whom it applies. In that sense, there is indeed a semantic element of the debate given that part of what's going on is conceptual analysis. The interest in what cognition is comes at least partly because we want to know what is and is not cognitive. It also helps to frame questions and motivate answers surrounding the evolution of cognition. Arguing that cognition is less about a kind of information processing and more about the flexibility of the structures of behaviour an organism possesses makes some progress towards individuating what we might think of as cognitive behaviour in the real world. One can determine whether an organism is cognitive based on whether it can adapt to a situation by learning to behave differently in similar contexts in order to improve its performance in, and the outcome of, interaction. The enactive account of cognition set the bar fairly low by requiring only that an organism behave in accordance with the self-generated norm of self-preservation to be considered cognition. The revisions I develop build off of this condition but add a further condition that the system must be capable of adapting behaviour to interaction in light of previous interactions in similar contexts. This is to say, the system must be capable of modifying behaviour through a process of learning. This sets a higher bar than the enactive account, but it remains relatively low and would correspond to behaviours that many non-human species enact.

One important implication of this revision of enactive cognition, discussed in Chapter 5, is that it implies a co-constitutive relationship between cognition and subjectivity as the sensing body, however minimally cognition and subjectivity can be understood. As I have argued, anything capable of learning requires enough self-specifying and self-relative information about its body in interaction, which, in conjunction with world-oriented behaviour, could be considered a minimal form of subjectivity as a sensing body. This minimal subjectivity would emerge out of a decoupling of body from world that would create a dehiscence in interaction large enough for something like experience to manifest. This picture is relatively general in terms of identifying what species would possess the capacities necessary for this presence of self to self. It's unclear exactly at what point, both phylogenetically and ontogenetically, this interval in interaction would be created through which a sensing body can develop. But it is partly by design that the account I develop is general in application. Although I have suggested that something like a nervous system would be required for cognition (and sensibility), this is not meant to be a definitive condition. Rather, the presence of cognition (and sensibility) needs to be determined on a case-by-case basis and the account I have developed is intended to provide tools to help with that assessment.

If what I've argued about the relationship between structural flexibility and minimal subjectivity is true, we could infer that anything capable of the right kind of behavioural flexibility would very likely have some form of minimal subjectivity. To put the point in terms of Damasio's (2010) framework, the presence of structural flexibility would be indicative of a form of subjectivity robust enough for emotion and affect to be *felt* by the organism. Indeed, Damasio's own account expresses the pervasiveness of subjectivity given that the neural structures and organization that give rise to subjectivity on his account are relatively common and widespread. This has significant implications for the treatment of non-human animals, given that it would entail the ability to feel pain and to suffer in a great many species that we interact with. Panksepp and Biven (2012), whose work has been foundational in affective neuroscience, discuss the moral importance of this research in experimental contexts:

> the majority of neuroscientists and psychologists remain silent, agnostic, or in denial about the subcortical sources of mind. They use rewards and punishments to train—to reinforce—their animals, in abundant studies on learning. But many still seem to believe, as did our behaviourist forebears, that animals feel nothing—that the brain mechanisms of affective feelings do not contribute to the processes of learning and memory. Human research has long suggested otherwise. The evidence from animal research has long supported the opposite conclusion. But at present, the silence in cross-species brain science is deafening about the role of affective experiences in controlling animal behaviours. (Paknsepp and Biven 2012, 476)

While I have not placed this project within an ethical framework, it is clear that it cannot be divorced from ethical considerations. There is a very real concern about how animals are treated in experimental contexts if the account that I have developed, and the research it relies on, is correct. Indeed, ecological concerns also become more relevant within this context given the significant co-constitutive role I have argued, following Merleau-Ponty's later works especially, that the world plays in the development and institution of the sensing body and structural flexibility. As a social and scientific environment, the laboratory is unfamiliar to many humans, but it can easily be adapted to, given that it is part of a broader social and scientific context that many humans are embedded within. In the case of non-human animals, the laboratory is not part of their world unless we take "world" as extremely emaciated, to the extent that the social and natural environments of the animal play no role in instituting their particular manner of being in the world. The results obtained through animals forced to live in such contexts would, as Merleau-Ponty argues in SB, correspond to behaviours of a "sick organism." This is, of course, not to say that nothing valuable can be understood about cognition or subjectivity in such contexts, but is rather to assert that much more could be learned if ecology was a greater concern.

Another related implication can be extended out of the discussion in the preceding chapters. The phenomenogical consideration of enactive subjectivity as flesh revealed that not only is our body characterized by our inhabiting of the world, but the kind of body that we have influences the way in which we inhabit the world and the way in

which the world opens to us. This claim was supported throughout the discussion, especially with regard to the continuity between life and cognition, and the continuity between simpler and more complex forms of cognition. Differences in capacity are at least partly a result of differences in embodiment. But the continuity between life and mind, and between non-human and human minds is not accomplished merely through an additive function that builds new modules upon old ones. New cognitive capacities develop *out of* previous ones, and will likely involve a modulation of those previous capacities that involves reuse or adaptation. (Anderson 2010, 2014) The subcortical roots of affective awareness are shared by all mammals (Panksepp 1998), but the way in which my brain uses those structures to generate affective bodily awareness and influence perception is going to be different from how my dog's brain does it, for example. This is because there are novel structures and organizations present in my brain that are absent or less "developed" in my dog's. It would be wrong, though, to say that my dog does not feel pain or stress. But it is unlikely that the way that my dog's pain feels is the same as how my pain feels. We have different bodies and different ways of being in the world as a result, which would suggest something like a plurality of types of subjectivities or sensibilities corresponding to the massive structural differences that different kinds of bodies possess. An interesting question emerges from this situation: to what extent are the similarities between human and animal sensibility and cognition strong enough to justify the use of animals in experimental contexts that would cause harm or death? We can make inferences about the underlying structure and function of the human mind based on research done on non-human animals, but how strong are these inferences if we take seriously the idea that a difference of embodiment is a difference in subjectivity? This is certainly not a new question, but one that is implied by the framework developed, and that demands to be asked.

There is a further question about what kind of obligation we have to non-human species that are, at least according to the account I develop, not cognitive and do not possess anything like a sentient body. I have argued that even if such organisms are not cognitive, and so not sentient, that they nonetheless display a capacity for basic sense-making. Even this kind of sense-making would be sufficient for the emergence of normativity insofar as

there is a better or worse for the organism in relation to its environmental interaction relative to the norms of self-preservation its organization and dynamics sustain. (Christensen 2012) If normativity can be understood as developing out of the self-maintaining organization of all living systems in this way, then to what extent do we have a moral obligation to treat them in accordance with their self-generated norms? It might be argued that the presence of sentience, however minimal, is required on the part of the organisms in question in order to sustain a moral obligation toward them. This may be the case, but as living systems capable of making sense there is certainly a difference in normativity between simple organisms and quartz crystals. The question is important also because there is a case that can be made for interpreting much broader systems that have a much wider temporal extension, such as ecosystems, as autonomous systems capable of generating their own normativity. Whether the organization and dynamics of ecosystems can sustain basic sense-making remains to be seen and so it is also possible that there could be obligations owing to these kinds of systems as well. The kind of obligation that basic sense-making sustains is a valuable consideration that merits further treatment beyond the present discussion.

6.4 Conclusion and Summary

In Chapter 1, I introduced enactivism through Varela et al.'s (1991) claim that enactivism follows Merleau-Ponty's thought as a continuation of his work:

> We hold with Merleau-Ponty that Western scientific culture requires that we see our bodies both as physical structures and as lived, experiential structures—in short, as both "outer" and "inner," biological and phenomenological. These two sides of embodiment are obviously not opposed. Instead, we continuously circulate back and forth between them. (Varela et al. 1991, xv)

Varela et al. (1991) nonetheless see points of divergence from Merleau-Ponty's thought that, they argue, become necessary in light of contemporary research in the sciences of mind and biology, but also in light of phenomenological research since Merleau-Ponty. To a certain extent, the project I have developed in the preceding pages has been an exploration of what enactivism can learn, after twenty-five years, from a return to and re-

examination of Merleau-Ponty's philosophy. The later works of Merleau-Ponty have gone largely overlooked in the contemporary context, enactivism included, with a marked preference instead for PhP and SB. The return to Merleau-Ponty's philosophy that I have explored, then, has not brought us back to the same starting point where enactivism began. In drawing on Merleau-Ponty's philosophy I have relied heavily on his later works to shed light upon the insights of his earlier thought. I hope to have shown that Merleau-Ponty's later works offer a deepening of his earlier thought, especially in relation to embodied subjectivity, that is valuable within the context of contemporary research in the sciences of mind. As much as I view this project as an extension of Merleau-Ponty's work—including his later works—it is developed through the enactive framework. This is because I think that the enactive approach offers a significant contribution to contemporary research because it actively attempts to bridge the various aspects of our embodiment. While I have leveled criticisms against enactivism, they have been made to develop revisions to the approach in order to make it stronger, and more useful within the contemporary context. As I have shown, extending the enactive approach in light of Merleau-Ponty's later works affords new solutions to pressing issues and also opens enactivism to research that explores different dimensions of our bodily being in the world.

The revision to the enactive account of subjectivity that I began in Chapter 2 has involved incorporating Merleau-Ponty's conceptual framework of flesh in order to understand how the passive and active dimensions of our being in the world are chiasmically intertwined. Incorporating flesh was necessary to overcome the implicit dichotomy in enactive subjectivity that construed our embodied engagement with the world as one-sidedly active, and has the consequence of reifying dualism through the opposition of active constituting subject and passive constituted world. Enactive subjectivity as flesh overcomes these difficulties, but brings with it a new one, of understanding how body and world are discretely distinguishable. The solution to this problem, I have argued, comes through more carefully considering the relationship between subjectivity and cognition. The enactive account of cognition, as behaviour in relation to norms that the system enacts on the basis of its self-maintaining organization, however, was also

problematic in its generality, which had the (intended) consequence of making cognition continuous with life. At least part of this generality has come as a result of phenomenological considerations about sense-making, understood as the manner in which meaning is brought forth in the world in relation to the organism. As such, I begin my revision the enactive account of cognition in Chapter 3 by more closely examining sense-making as it's discussed in Merleau-Ponty's work, and reveal two distinct ways in which sense, as a kind of meaning, can be generated by organisms. The difference largely amounts to the flexibility of sense and its amenability to change as a result of experience. These two distinct kinds of sense-making motivate the discussion in Chapter 4 in which I argue that we ought to be at least a little bit more conservative in our application of cognition and so distinguish between two different kinds of behavioural flexibility as a way of distinguishing between what is and what is not cognitive.

I have argued that structural flexibility, which allows individuals to act differently in similar contexts as a result of experience, is the relevant kind of behavioural flexibility to cognition. As such, enactive cognition ought to be defined as the capacity to flexibly interact with the environment in accordance with self-generated norms that constrain interaction and institute sense, where flexibility is understood as structural rather than situational. Understanding enactive cognition in this way is not inconsistent with the continuity claim held by many enactivists, but it does entail that the continuity is not quite as deep, given that not all organisms would be capable of cognition on the account I develop. The revisions to enactive cognition have also provided the tools to solve the problem of breaking with the world that was discussed at the end of Chapter 2. As argued in Chapter 5, the decoupling from world that characterizes structural flexibility is necessary in order to differentiate body from world. This decoupling comes first as a distancing of stimulus from response, allowing the organism to plan its responses and select from alternative behaviours in interaction. This creates a temporal gap in interaction through which self-specifying and self-relative information (via interoception and proprioception, for example) can become accessible to the organism as feeling states that motivate behaviours one way or another. Importantly, this solution is only available if we follow Merleau-Ponty in recognizing the massive integration of all the different

modes of being in the world. As such, I argued that the sensing body, as a form of subjectivity, and cognition, as structural flexibility, are co-constitutively intertwined insofar as each is required for the institution of the other. At the human level, this picture is significantly more complicated. Given that part of the motivation behind revising enactive cognition was to provide an account that was not so general it lacked meaning and applicability at the human level, I showed how this co-constitutive intertwining of sensing body and structural flexibility was manifest in the human context, through a discussion of the relationship between agentive and affective bodily self-awareness. Not only does this discussion further elaborate the integration Merleau-Ponty spelled out in his discussion of the intentional arc in *Phenomenology of Perception*, but it also opens up a way of understanding the role of the social body in the experience of our embodiment according to the enactive framework that I have revised.

The project I have developed has thus been framed around three interrelated goals: (1) to extend Merleau-Ponty's project by incorporating his later works into the contemporary context; (2) to revise the enactive approach by developing the enactive account of subjectivity and of cognition in light of Merleau-Ponty's later works, as well as contemporary research in cognitive science and the philosophy of biology; and (3) most importantly, to provide a unified account of enactive subjectivity that provides a means to understand the relationship between our various ways of being in the world. It is especially the third goal that I take to be of the most value to enactivism with respect to its position as an alternative to the standard cognitivist approaches that are dominant in the sciences of mind. In developing these revisions to the enactive approach through the incorporation of Merleau-Ponty's later philosophy, I have made enactivism more viable by resolving some of the problems inherent in the framework. By providing a means to account for the integration between the different dimensions of our bodily being in the world, I hope to have also provided a unique advantage to the enactive approach.

Bibliography

Ahmed, A. (2006). *Queer Phenomenology: Orientations, Objects, Others*. Durham: Duke University Press.

Albus, J.S., Bekey, G.A., Holland, J.H., Kanwisher, N.G., Krichmar, J.L., Mishkin, M., Dharmendra, S.M., Raichle, M.E., Shepard, G.M., Tononi, G. (2007). A proposal for a decade of the mind initiative. *Science*, 317: 1321.

Al-Saji, A. (2010). Bodies and sensing: On the uses of Husserlian phenomenology for feminist theory. *Continental Philosophy Review*, 43(1): 13-37.

___. (2014). A phenomenology of hesitation: Interrupting racializing habits of seeing. In Emily Lee (ed.), *Living Alterities: Phenomenology, Embodiment, and Race*. Albany: SUNY Press, 133-172.

Alcoff, L. M. (2005). *Visible Identities: Race, Gender, and the Self*. Oxford: Oxford University Press.

Anderson, M. (2003). Embodied cognition: a field guide. *Artificial Intelligence*, 149(1), 91–130.

___. (2010). Neural reuse: A fundamental organizational principle of the brain. *Behavioural and Brain Sciences*, *33*(4): 245-266.

___. (2014). *After Phrenology: Neural Reuse and the Interactive Brain*. Cambridge: MIT Press.

Anderson, M., Richardson, M. and Chemero, A. (2012). Eroding the boundaries of cognition: Implications of embodiment. *Topics in Cognitive Science*, 4(4): 717-30.

Barandiaran, X., E. Di Paolo and M. Rohde. (2009). Defining agency. Individuality, normativity, asymmetry, and spatio-temporality in action. *Adaptive Behaviour*, 17(5): 367-386.

Barandiaran, X. and A. Moreno. (2008). Adaptivity: From metabolism to behaviour. *Adaptive Behaviour*, 16(5): 325-344.

Bargmann, C.I., and Marder, E. (2013). From the connectome to brain function. *Nature Methods*, 10: 483–490.

Barrett, L. (2006). Valence is a basic building block of emotional life. *Journal of Research in Personality*, 40: 35–55.

Barrett, L, and M. Bar. (2009). See it with feeling: Affective predictions during object perception. *Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences*, 364: 1325–1334.

Boisseau, R.P., D. Vogel and A. Dussutour. (2016). Habituation in non-neuronal organisms: evidence from slime moulds. *Proceedings of the Royal Society B*, 283(1829): DOI 10.1098/rspb.2016.0446.

Boly, M., C. Phillips, E. Balteau, C. Schnakers, C. Degueldre, G. Moonen, A. Luxen, P. Peigneux, M.E. Faymonville, P. Maquet, S. Laureys. (2008). Consciousness and cerebral baseline activity fluctuations. *Human Brain Mapping*, 29(7): 868-874.

Bower, M. and Gallagher, S. (2013). Bodily affectivity: Prenoetic elements in enactive perception. *Phenomenology and Mind*, 2: 108-131.

Brass, M. and Haggard, P. (2010). The hidden side of intentional action: the role of the anterior insular cortex. *Brain Structure and Function*, 214: 603–610

Burin, D., Livelli, A., Garbarini, F., Fossataro, C., Folegatti, A., Gindri, P., and L. Pia. (2015). Are movements necessary for the sense of body ownership? Evidence from the rubber hand illusion in pure hemiplegic patients. PLoS ONE, 10(3), e0117155. DOI 10.1371/journal.pone.0117155

Butler, J. (1988). Performative acts and gender constitution: An essay in phenomenology and feminist theory. *Theatre Journal*, 40(4): 519-531.

Cajal, S.R. (1995). *Histology of the Nervous System of Man and Vertebrates*. Oxford: Oxford University Press.

Carruthers, P. (1996). *Language, Thought and Consciousness.* Cambridge: Cambridge University Press.

Caspar, E.A., J.F. Christensen, A. Cleereman., P. Haggard. (2016). Coercion changes the sense of agency in the human brain. *Current Biology*, 26: 585-592.

Chalmers, D. (1996). *The Conscious Mind*. Oxford: Oxford University Press.

Christensen, W. D. (2004a). Self-directedness, integration and higher cognition. *Language Sciences*, 26(6): 661-692.

___. (2004b). Self-directedness: a process approach to cognition. *Axiomathes,* 14(1-3): 171-189.

___. (2010). The decoupled representation theory of the evolution of cognition—a critical assessment." *British Journal for the Philosophy of Science,* 61: 361-405.

___. (2012). Natural sources of normativity. *Studies in History and Philosophy of Biological and Biomedical Sciences,* 43(1): 104-112.

Christensen, W. D. and C. A. Hooker. (2000). Autonomy and the emergence of intelligence: Organised interactive construction. *Communication and Cognition – Artificial Intelligence,* 17(3-4): 133-157.

___. (2002). Self-directed agents. In J. MacIntosh (ed.), *Naturalism Evolution & Intentionality, Canadian Journal of Philosophy,* Special Supplementary Volume, 27: 19-52.

Clark, A. (1997). *Being There: Putting Brain, Body and World Together Again*. Cambridge: MIT Press.

Christoff, K., Cosmelli, D., Legrand, D., and E. Thompson. (2011). Specifying the self for cognitive neuroscience. *Trends in Cognitive Sciences,* 15(3): 104-112.

Critchley, H. D., Wiens, S., Rothstein, P., Öhman, A., Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience,* 7(2): 189-195.

Colombetti, G. (2010). Enaction, sense-making, and emotion. In J. Stewart, O. Gapenne & E Di Paolo (eds.), *Enaction: Toward a New Paradigm for Cognitive Science*. Cambridge: MIT Press, 145–164.

___. (2011). Varieties of pre-reflective self-awareness: Foreground and background bodily feelings in emotion experience. *Inquiry*, 54: 293–313.

___. (2014). *The Feeling Body: Affective Science Meets the Enactive Mind*. Cambridge: MIT Press.

Cosmelli, Diego & Thompson, Evan (2010). Embodiment or envatment? Reflections on the bodily basis of consciousness. In J. Stewart, O. Gapenne & E Di Paolo (Eds.), *Enaction: Towards a New Paradigm for Cognitive Science*. Cambridge: MIT Press, 361-386.

Craig, A. D. (2003). Interoception: the sense of the physical condition of the body. *Current Opinion in Neurobiology*, 13: 500-505.

___. (2009). How do you feel—now? The anterior insula and human awareness. *Nature Reviews Neuroscience*, 10(1): 59-70.

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: a black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *The University of Chicago Legal Forum* 140: 139-167.

___. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review* 43(6):1241-1299.

Csibra, G., and G. Gergely. (2009). Natural pedagogy. *Trends in Cognitive Sciences*, 13: 148–153.

Damasio, A. (1994). *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Penguin Books.

(1999). *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: Harcourt, Inc.

___. (2010). *Self Comes to Mind*. New York: Pantheon Books.

Damasio, A., Damasio, H., Tranel, D. (2013). Persistence of feeling and sentience after bilateral damage of the insula. *Cerebral Cortex*, 23(4): 833-46.

de Vignemont, F. (2011). A mosquito bite against the enactive approach to bodily experience. *Journal of Philosophy*, 108(4): 188-204.

Dennett, D. (1988). Quining qualia. In A. Marcel and E. Bisiach (eds.) *Consciousness in Modern Science*. Oxford: Oxford University Press.

___. (1996). *Kinds of Minds*. New York: Basics Books.

Di Paolo, E. (2005). Autopoiesis, adaptivity, teleology, agency. *Phenomenology and the Cognitive Sciences*, 4: 429-452.

___. (2009). Extended life. *Topoi*, 28: 9-21.

Di Paolo, E. and E. Thompson. (2014). The enactive approach. In L. Shapiro (ed.) *The Routledge Handbook of Embodied Cognition*. New York: Routledge Press, 68-78.

Dillon, M. (1988). *Merleau-Ponty's Ontology*. Bloomington: Indiana University Press.

Dretske, F. (2006). Perception without Awareness. In J. Hawthorne and T. Gendler (eds.), *Perceptual Experience*. Oxford: Oxford University Press, 147–80.

Ernandes, J., T. D'Amore, I. Russel and G. Stewart. (1992). Regulation of glucose and maltose transport in strains of Saccharomyces. *Journal of Industrial Microbiology*, 9: 127-130.

Evans, F. (2008). Chiasm and flesh. In R. Diprose and J. Reynods (eds.), *Merleau-Ponty: Key Concepts*, Stocksfield: Acumen Publishing Ltd, 184-193.

Ferrè, E.R., C. Ganos, K.P. Bhatia and P. Haggard. (2015). Feedforward somatosensory inhibition is normal in cervical dystonia. *Parkinsonism and Related Disorders*, 21: 266-270.

Fitch. W.T. (2010). *The Evolution of Language*. Cambridge: Cambridge University Press.

Fitch. W.T., B. de Boer, N. Mathur, A.A. Ghazanfar. (2016). Monkey vocal tracts are speech-ready. *Science Advances*, 2: DOI e1600723

Fletcher, P. and C. Frith. (2009). Perceiving is believing: A Bayesian approach to explaining the positive symptoms of schizophrenia. *Nature Reviews Neuroscience*, 10, 48-58.

Fodor, J. (1975). *The Language of Thought*. Cambridge: Harvard University Press.

___. (1981). *Representations*. Cambridge: MIT Press.

Foucault, M. (1977 [1975]). *Discipline and Punish.* A. Sheridan (trans.), New York: Vintage.

Freeman, W. (2000). Emotion is essential to all intentional behaviour. In M. D. Lewis and I. Granic (eds.), *Emotion, Development, and Self-Organization: Dynamic Systems Approaches to Emotional Development*. Cambridge: Cambridge University Press, 209–235.

Froese, T. and E. Di Paolo. (2011). The enactive approach: Theoretical sketches from cell to society. *Pragmatics and Cognition*, 19(1): 1-36.

Gancedo, J. M. (1998). Yeast carbon catabolite repression. *Microbiology and Molecular Biology Reviews*, 62(2): 334-61.

Ganos, C., A. Garrido, I. Navalpotro-Gómez, L. Ricciardi, D. Martino, M.J. Edwards, M. Tsakiris, P. Haggard and K.P. Bhatia. (2015). Premonitory urge to tic in Tourette's is asscoated with interoceptive awareness. *Movement Disorders*, 30(9): 1198-1202.

Gallagher, S. (1986). Lived body and environment. *Research in Phenomenology*, 16: 139-170.

___. (2005). *How the Body Shapes Shapes the Mind*. Oxford: Oxford University Press.

Gibson, James J. (1979). *The Ecological Approach to Visual Perception.* Houghton Mifflin.

Godfrey-Smith, P. (1996). *Complexity and the Function of Mind in Nature*. Cambridge: Cambridge University Press.

___. (2002). Environmental complexity and the evolution of cognition." In R. Sternberg and J. Kaufman (eds.), *The Evolution of Intelligence*. Mahwah: Lawrence Erlbaum, 233-249.

González-Franco, M., Pérez-Marcos, D., Spanlang, B. and M. Slater. (2010). The contribution of real-time mirror reflections of motor actions on virtual body ownership in an immersive virtual environment. *IEEE Virtual Reality Conference*, 111-114.

Greicius, M., B. Krasnow, A.L. Reiss, and V. Menon. (2003). Functional connectivity in the resting brain: A network analysis of the default mode hypothesis. *Proceedings of the National Academy of Sciences of the United States of America*, 100(1): 253-258.

Ham, T., Leff, A., de Boissezon, X., Joffe, A., & Sharp, D. (2013). "Cognitive Control and the Salience Network: An Investigation of Error Processing and Effective Connectivity." *The Journal of Neuroscience*, 33(16): 7091-7098

Harrison, B.J., Pujol, J., Ortiz, H., Fornito, A., Pantelis, C., Yücel, M. (2008). Modulation of brain resting-state networks by sad mood induction. *PLoS One*, 3(3): e1794.
Hass, L. (2008). *Merleau-Ponty's Philosophy.* Bloomington: Indiana University Press.

Hauser, M.D., N. Chomsky, and W.T. Fitch. (2002). The faculty of language: What is it, who has it, and how did it evolve? *Science*, 298(5598): 1569-79.

Hebb, D.O. (1949). *The Organization of Behaviour*. New York: Wiley & Sons.

Hume, D. (1993 [1777]). *An Enquiry Concerning Human Understanding*. Indianapolis: Hackett Publishing.

Hurley, S. (1998). *Consciousness in Action*. Cambridge: Harvard University Press.

Husserl, E. (1960 [1931]). *Cartesian Meditations: An Introduction to Phenomenology*. Dorian Cairns (trans.), The Hague: Martinus Nijhoff.

___. (1989 [1952]). *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, Second Book.* R. Rojcewicl. and A. Schuwer (trans.), Dordrecht: Kluwer Academic Publishers.

Jenkinson, J. (2016). Enactive subjectivity as flesh. *Phenomenology and the Cognitive Sciences*, DOI 10.1007/s11097-016-9488-5.

Kelly, M. (2015). The subject as time: Merleau-Ponty's transition from phenomenology to ontology. In D. Morris and K. Maclaren (eds.), *Time, Memory, Institution: Merleau-Ponty's New Ontology of Self.* Athens: Ohio University Press, 199-215.

Kilteni, K., Bergstrom, I., and M. Slater. (2013). Drumming in immersive virtual reality: The body shapes the way we play. *IEEE Transactions on Visualization and Computer Graphics*, 19(4): 597-605.

Kilteni, K., Normand, J-M., Sanchez-Vives, M., and M. Slater. (2012). Extending body-space in immersive virtual reality: a very long arm illusion. *PLoS One*, 7, e40867.

Klein, C.J., Olsson, L., Ronnow, B., Mikkelsen, J.D., Nielsen, J. (1997). Glucose and maltose metabolism in MIG1- disrupted and MAL-constitutive strains of saccharomyces cerevisiae. *Food Technology and Biotechnology*, 35: 287- 292.

Konishi, M., D.G. McLaren, H. Engen, and J. Smallwood. (2015). Shaped by the past: The default mode network supports cognition that is independent of immediate perceptual input. *PLoS ONE*, 10(6): DOI 10.1371/journal.pone.0132209.

Kyselo, M. and E. Di Paolo. (2015). Locked-in syndrome: a challenge for embodied cognitive science. *Phenomenology and the Cognitive Sciences*, 14(3): 517-542.

Landes, D. (2013). *Merleau-Ponty and the Paradoxes of Expression*. New York: Bloomsbury Publishing Plc.

Legrand, D. (2006). The Bodily Self: The sensori-motor roots of pre-reflexive self-consciousness. *Phenomenology and Cognitive Sciences*, (5): 89-118.

___. (2007a). Pre-reflective self-as-subject from experiential and empirical perspectives. *Consciousness and Cognition*, 16: 583-599.

___. (2007b). Pre-reflective self-consciousness: On being bodily in the world. *Janus Head, Special Issue: The Situated Body*, 9(1): 493-519.

___. (2010). Myself with no body? Body, bodily self-consciousness and self-consciousness. In D. Schmicking and S. Gallagher (eds.), *Handbook of Phenomenology and Cognitive Science*. Springer, 181-200.

___. (2012). Self-consciousness and world-consciousness. In D. Zahavi (ed.) *Oxford Handbook of Contemporary Phenomenology*. Oxford: Oxford University Press, 287-303.

Luo, L. W. Quan, J. Ren, M. Hendricks, M. Gershow, Y. Qin, J. Greenwood, E. Soucy, M. Klein, H.K. Smith-Parker, A.C. Calvo, D.A. Colón-Ramos, A. Samuel, and Y. Zhang. (2014). Dynamic encoding of perception, memory and movement in *C. elegans* chemotaxis circuit. *Neuron*, 82(5): 1115-1128.

Lycan, W. (1996). *Consciousness and Experience*. Cambridge: MIT University Press.

Marratto, S. (2015). "This power to which we are vowed": Subjectivity and expression in Merleau-Ponty. In D. Morris and K. Maclaren (eds.), *Time, Memory, Institution: Merleau-Ponty's New Ontology of Self*, Athens: Ohio University Press, 160-179.

Merleau-Ponty, Maurice. (1963 [1942]). *The Structure of Behavior*, A.L. Fisher (trans.), Boston: Beacon Press.

___. (1964 [1960]). The child's relations with others. W. Cobb (trans.). In J. Edie (ed.), *The Primacy of Perception: And Other Essays on Phenomenological Psychology, the Philosophy of Art, History and Politics*, Evanston: Northwestern University Press, 96-155.

___. (1964 [1961]). Eye and mind. C. Dallery (trans.) In J. Edie (ed.), *The Primacy of Perception: And Other Essays on Phenomenological Psychology, the Philosophy of Art, History and Politics*, Evanston: Northwestern University Press, 159-190.

___. (1968 [1964]). *The Visible and the Invisible.* A. Lingis (trans.), C. Lefort (ed.), Evanston: Northwestern University Press.

___. (2003). *Nature: Course Notes from the Collège de France.* R. Vallier (trans.), Evanston: Northwestern University Press.

___. (2010). *Institution and Passivity: Course Notes from the Collège de France* (1945—1955). L. Lawlor and H. Massey (trans.), D. Darmaillacq, C. Lefort and S. Ménasé (eds.), Evanston, Northwestern University Press.

___. (2012 [1945]). *The Phenomenology of Perception*. D. Landes (trans.), New York: Routledge.

Maclaren, K. (2014). Touching matters: Embodiments of intimacy. *Emotion, Space and Society*, 13: 95-201.

Mandrigin, A. and E. Thompson. (2015). Own-body perception. In M. Matthen (ed.), *The Oxford Handbook of the Philosophy of Perception*. Oxford: Oxford University Press, 515-529.

Marr. D. (1983). *Vision: A computational Investigation into the Human Representation and Processing of Visual Information*. New York: W. H. Freeman and Company.

Menon. V. & Uddin, L. Q. (2010). "Saliency, switching, attention and control: a network model of insula function." *Brain Structure and Function*, 214(5-6): 655-667.

Metzinger, T. (2003). *Being No-One*. Cambridge: MIT University Press.

Monti, M. M., Coleman, M. R. and Owen, A. M. (2009). fMRI and the vegetative state: Solving the behavioural dilemma? *Annals of the New York Academy of Sciences Series 2008: Disorders of Consciousness*, 1157: 81–9.

Morris, D. (2006). Ecstatic body, ecstatic nature: Perception as breaking with the world. *Chiasmi International*, 8: 201-216.

___. (2010). The enigma of reversibility and the genesis of sense in Merleau-Ponty. *Continental Philosophy Review*, 43(2): 141-165.

Naccache, L. (2006): Is She Conscious? *Science*, 313: 1395–6.

Naci, L., L. Sinai, and A. Owen. (2015). Detecting and interpreting conscious experiences in behaviourally non-responsive patients. *Neuroimage*. DOI: 10.1016/j.neuroimage.2015.11.059

Naci. L., M. Graham, A. Owen, C. Weijer. (2016). Covert narrative capacity: Mental life in patients thought to lack consciousness. *Annals of Clinical and Translational Neurology*. DOI: 10.1002/acn3.376

Nagel, T. (1974). What is it like to be a bat? *The Philosophical Review*, 83(4): 435-450.

Needleman, R. (1991). Control of maltase synthesis in yeast. *Molecular Microbiology*, 5: 2079- 2084.

Niziolek, C., Nagarajan, S., and J. Houde. (2013). What does motor efference copy represent? Evidence from speech production. *Journal of Neuroscience*, 33(41): 16110-16116.

Noë, A. (2004). *Action in Perception*. Cambridge: MIT University Press.

Normand, J-M., Giannopoulos, E., Spanlang, B. and M. Slater. (2011). Multisensory stimulation can induce an illusion of larger belly size in immersive virtual reality. *PLoS One*, 6: DOI: e16128.

O'Regan, J. and A. Noë. (2001). A sensorimotor account of vision and visual consciousness. *Behavioural and Brain Sciences*, 24: 939-1031.

Ostergaard, S., Olsson, L. and Nielsen, J. (2000). Metabolic engineering of saccharomyces cerevisiae. Microbiology and Molecular Biology Reviews, 64(1): 34-50.

Otterstedt, K., Larsson, C., Bill., R. M., Ståhlberg, A. Boles, E., Hohmann, S., Gustafsson, L. (2004). Switching the mode of metabolism in the yeast Saccharomyces cerevisiae. *EMBO Report*, 5(5): 532-537.

Owen, A. M., Coleman, M. R., Boly, M., Davis, M. H., Laureys, S. and Pickard, J. D. (2006). Detecting awareness in the vegetative state. *Science*, 313: 1402.

___. (2007). Using functional magnetic resonance imaging to detect covert awareness in the vegetative state. *Archives of Neurology*, 64: 1098–102.

Oyama, S. (2000). *Ontogeny of Information*. Durham: Duke University Press.

Palaniyappan, L. & Liddle, P. F. (2012). "Does the salience network play a cardinal role in psychosis? An emerging hypothesis of insular dysfunction." *Journal of Psychiatry and Neuroscience*, 37(1): 17-27.

Panksepp, J. (1998). *Affective Neuroscience*. Oxford: Oxford University Press.

Panksepp, J. and L. Biven. (2012). *The Archaeology of Mind*. New York: W.W. Norton and Company, Inc.

Papineau, D. (2002). *Thinking about Consciousness*. Oxford: Oxford University Press.

Pavlov, I. (1902 [1897]). *The Work of the Digestive Glands*. London: Griffin.

Pessoa, L. (2008). On the relationship between emotion and cognition. *Nature Reviews Neuroscience*, 9: 148–158.

___. (2010). Emotion and cognition and the amygdala: From "what is it?" to "what's to be done?" *Neuropsychologia*, 48: 3416–3429.

___. (2013). *The Cognitive-Emotional Brain*. Cambridge: MIT University Press.

Pourtois, G, A. Schettino and P. Vuilleumier. (2013). Brain mechanisms for emotional influences on perception and attention: What is magic and what is not. *Biological Psychology*, 92: 492–512.

Pylyshyn, Z. (1984). *Computation and Cognition: Toward a Foundation for Cognitive Science*. Cambridge: MIT Press.

Pynn, L. and J. De Sousa. (2013). The function of efference copy signals: Implications for symptoms of schizophrenia. *Vision Research*, 76(14): 124-133.

Rosenthal, D. (2005). *Consciousness and Mind*. Oxford: Oxford University Press.

Sanchez-Vives, M. V., and Slater, M. (2005). From presence to consciousness through virtual reality. *Nature Reviews Neuroscience*, 6: 332-339.

Sartre, J.-P. (1978 [1943]). *Being and Nothingness: An Essay on Phenomenological Ontology*. H. E. Barnes (trans.), New York: Pocket Books.

Schnakers, C., S. Majerus, S. Goldman, M. Boly, P. Van Eackhout, S. Ga, F. Pellas, V. Bartsch, P. Peigneux, G. Moonen, and S. Laureys (2008). Cognitive function in the locked-in syndrome. *Journal of Neurology*, 255: 323–330.

Seth, A., Suzuki, K. and H. Critchley. (2012). An interoceptive predictive coding model of conscious presence. *Fronteirs in Psychology*, DOI: 10.3389/fpsyg.2011.00395

Shapiro, L. (2011). *Embodied Cognition*. New York: Routledge.

Shea, N. and T. Bayne. (2010). The vegetative state and the science of consciousness. *British Journal for the Philosophy of Science*, 61(3): 459-484.

Shoemaker, S. (1968). Self-reference and self-awareness. *Journal of Philosophy*, 65(19): 555-567.

Slater, M., Spanlang, B., Sanchez-Vives, M., and O. Blanke. (2010). First person experience of body transfer in virtual reality. *PLoS One*, DOI: e10564.

Smith, M. (2010). Gender, whiteness, and "other Others" in the academy. In S Razack, M. Smith and S. Thobani (eds.), *States of Race: Critical Race Feminism for the 21st Century*. Toronto: Between Lines.

Snow, J., C. Pettypiece, T. McAdam, A. McLean, P. Stroman, M. Goodale and J. Culham. (2011). Bringing the real world into the fMRI scanner: Repetition effects for pictures versus real objects. *Scientific Reports*, 1(130): 1-10.

Spreng, R.N., W.D. Stevens, J. Chamberlain, A.W. Gilmore and D.L. Schacter. (2010). Default mode network activity, coupled with the frontoparietal control network, supports goal-directed cognition. *Neuroimage*, 53: 303-317.

Sterelny, K. (2003). *Thought in a Hostile World*. Oxford: Blackwell.

Sullivan, J.A. (2014). Is the next frontier in neuroscience a decade of the mind? In Charles Wolfe (ed.), *Brain Theory*. London: Palgrave Martin, 45-67.

Tebbich, S., K. Sterelny and I. Teschke. (2010). The tale of the finch: adaptive radiation and behavioural flexibility. *Philosophical Transactions of the Royal Society B*, 365: 1099-1109.

Thompson, E. (2007). *Mind in Life: Biology, Phenomenology, and the Science of Mind*. Cambridge: Harvard University Press.

___. (2011a). Living ways of sense-making. *Philosophy Today*, SPEP Supplement, 114-123.

___. (2011b). Reply to commentaries. *Journal of Consciousness Studies*, 18(51-6): 176-223.

Thompson, E. and M. Stapleton. (2009). Making sense of sense-making: reflections on enactive and extended mind theories. *Topoi*, 28: 23-30.

van den Brink, J., Akeroyd, M., van der Hoeven, R., Pronk, J. T., de Winde, J. H., Daran-Lapujade, P. (2009). Energetic limits to metabolic flexibility: responses of saccharomyces cerevisiae to glucose-galactose transitions. *Microbiology*, 155, 1340-1350.

van León-Carrión, J., P. Eeckhout, and M.R. Dominguez-Morales. (2002). The locked-in syndrome: a syndrome looking for a therapy. *Brain Injury*, 16: 555–569.

Varela, F. (1996). Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies*, 3: 330-350.

Varela, F., E. Thompson, and E. Rosch (1991). *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge: MIT University Press.

Vogel, D. and A. Dussutour. (2016). Direct transfer of learned behaviour via cell fusion in non-neuronal organisms. *Proceedings of the Royal Society B*, 283(1845): DOI 10.1098/rspb.2016.2382.

Vuilleumier, P. and Y.M. Huang. (2009). Emotional attention: uncovering the mechanisms of affective biases in perception. *Current Directions in Psychological Science*, 18 (3): 148–152.

Ward, D. and M. Stapleton. (2012). Es are good. Cognition as enacted, embodied, embedded, affective and extended. In F. Paglieri (ed.), *Consciousness in Interaction: The role of the natural and social context in shaping consciousness*. Amsterdam: John Benjamins Publishing Company.

Weber, A. and F. Varela. (2002). Life after Kant: Natural purposes and the autopoietic foundations of biological individuality. *Phenomenology and the Cognitive Sciences*, 1: 97-125.

Weiss, G. (2015). The normal, the natural, and the normative: A Merleau-Pontian legacy to feminist theory, critical race theory, and disabilities studies. *Continental Philosophy Review*, 48(1): 77-93.

Wheeler, M. (2011). Mind in life or life in mind? making sense of deep continuity. *Journal of Consciousness Studies*, 18(5-6): 148-168.

White, C. and J. Zainasheff. (2010). *Yeast: The Practical Guide to Beer Fermentation*. Boulder: Brewers Publications.

Yee, N. and J. Bailenson. (2007). The Proteus Effect: the effect of transformed self-representation on behaviour. *Human Communication Research*, 33: 271-290.

Young, I. (2005). *On Female Body Experience: "Throwing Like a Girl" and Other Essays*. Oxford: Oxford University Press.

Yuan, Y. and A. Steed. (2010). Is the rubber hand illusion induced by immersive virtual reality? *IEEE Virtual Reality Conference*, 95-102.

Zahavi, D. (2002a). First-person thoughts and embodied self-awareness: Some reflections on the relation between recent analytical philosophy and phenomenology. *Phenomenology and the Cognitive Sciences*, 1(1): 7-26.

___. (2002b). Merleau-Ponty on Husserl: a reappraisal. In T. Toadvine and L. Embree (eds.), *Merleau-Ponty's Reading of Husserl*, Dordrecht: Kluwer Academic Publisher, 3-29.

___. (2003a). *Husserl's Phenomenology*. Stanford: Stanford University Press.

___. (2003b). Inner time-consciousness and pre-reflective self-awareness. In D. Welton (ed.), *The New Husserl: A Critical Reader*. Bloomington: Indiana University Press, 157-180.

___. (2005). *Subjectivity and Selfhood: Investigating the First-Person Perspective*. Cambridge: MIT Press.

Curriculum Vitae

John Jenkinson

Education

PhD Candidate, Philosophy, The University of Western Ontario 2011—2017 (Expected)
Master of Arts, Philosophy, The University of Western Ontario 2010
Honours Bachelor of Arts (with High Distinction), The University of Toronto 2009
Ontario Secondary School Diploma, Earl Haig Secondary School 2005

Awards and Honours

Social Sciences and Humanities Research Council Doctoral Scholarship 2014-2016
Ontario Graduate Scholarship (declined) 2014
Ontario Graduate Scholarship 2013
Ontario Graduate Scholarship 2012
Dean's Entrance Scholarship, The University of Western Ontario 2009
Regent's In-Course Scholarship, Victoria College at the University of Toronto 2006, 2008
Anne Marjorie Beer Scholarship, Victoria College at the University of Toronto 2007
Dean's List, University of Toronto 2006—2009

Area of Specialization

Philosophy of Cognitive Science, Phenomenology, Philosophy of Mind

Areas of Competence

Philosophy of Emotion, Philosophy of Perception, Philosophy of Biology, History of Philosophy (Early Modern)

Publications

Jenkinson, J. (2016). Enactive Subjectivity as Flesh. *Phenomenology and the Cognitive Sciences*.

___. (2010). Pain and Common Sense: How Dissociation Syndromes Motivate the Appearance/Reality Distinction. *Noesis* 12 (The University of Toronto's Undergraduate Journal of Philosophy): 41-58. (refereed)

Conference Presentations

"Enacting *Flesh*: Enactive Subjectivity and Merleau-Ponty's Ontology of the Flesh." The Twenty-First Century Body: Thinking Mearleau-Ponty In and Out of Time, Worcester Polytechnic Institute, Worccester, Massachusettes, USA (October 2015)

"Grounding Intelligence in the Body: The Role of the Bodily Self in the Evolution of Intelligence." Summer Institute on the Evolution and Function of Consciousness, Université du Québec à Montréal, Montreal, Quebec, Canada (July 2012)

"Autonomy and Selfhood: Incorporating a Bodily Self into Intelligent Systems." PhilMiLCog, The University of Western Ontario, London, Ontario, Canada (May 2010) (international, refereed)

Commentaries

Commentary on "How Should Embodied Mind Theorists Account for Interpersonal Kinesthetic Diversity" by Lauren Alpert. PhilMiLCog (UWO's Graduate Conference in the Philosophy of Mind, Language, and Cognitive Science), The University of Western Ontario, London, Ontario, Canada (May 2015)

Commentary on "Grounding Self-Knowledge in the Brain's Modal Systems" by Vincent Abruzzo. PhilMiLCog (UWO's Graduate Conference in the Philosophy of Mind, Language, and Cognitive Science), The University of Western Ontario, London, Ontario, Canada (May 2013)

Commentary on "A Case for Non-Perceptual Proprioceptive Awareness" by Lana Kuhle. PhilMiLCog (UWO's Graduate Conference in the Philosophy of Mind, Language, and Cognitive Science), The University of Western Ontario, London, Ontario, Canada (May 2012)

Commentary with Guillaume Beaulac on "Emotion, Phenomenology, and Perceptual Justification" by Jonathan Vance. PhilMiLCog (UWO's Graduate Conference in the Philosophy of Mind, Language, and Cognitive Science), The University of Western Ontario, London, Ontario, Canada (May 2012)

Guest Lectures

Guest Lecture on "Merleau-Ponty and Contemporary Cognitive Science" in Merleau-Ponty's *Phenomenology of Perception* (H. Fielding), The University of Western Ontario, London, Ontario, Canada (February 13, 2015)

Graduate Courses Completed	**Instructor**
Phil 9205: Philosophy of Perception	J. Nicholas
Phil 9250: Philosophy of Physics (audited)	C. Smeenk
Phil 9403: 21st Century Philosophy of Mind	C. Viger
Phil 9750: Philosophy of Biology	G. Barker
Phil 9404: Intentionality and the Theory of Ideas in Early Modern Philosophy	B. Hill
Phil 9600: Late 20th Century Analytic Philosophy	A. Botterell
Phil 9802: Philosophy of Emotion	L. Charland
Phil 9605: Concepts	A. Mendelovici
Phil 9606: Hume and Reid on Mental Representation	L. Falkenstein
Phil 9889: Environmental Philosophy	E. Desjardins
Phil 9401: Kant and the Philosophy of Mind	C. Dyck
Phil 9750: Survey of Philosophy of Biology	D. Henry
Phil 9608: Consciousness	C. Viger
Phil 9661: Representation (audited)	A. Mendelovici
Phil 9885: Philosophy of Neuroscience (audited)	J. Sullivan

Phil 9615: Merleau-Ponty's *Phenomenology of Perception* (audited) H. Fielding

Teaching Experience

Phil 2073: Death January 2015—May 2015
Position: Graduate Teaching Assistant
Responsibilities: Grading

Phil 2065: Evil September 2014—December 2014
Position: Graduate Teaching Assistant
Responsibilities: Grading

Phil 1020: Introduction to Philosophy September 2013—May 2014
Position: Graduate Teaching Assistant
Responsibilities: Tutorial Leader, Grading

Phil 1022: Advanced Introduction to Philosophy September 2012—May 2013
Position: Graduate Teaching Assistant
Responsibilities: Tutorial Leader, Grading

Phil 1200: Reasoning and Critical Thinking September 2011—May 2012
Position: Graduate Teaching Assistant
Responsibilities: Tutorial Leader, Grading

Phil 1305G: Questions of the Day January—May 2010
Position: Graduate Teaching Assistant
Responsibilities: Tutorial Leader, Grading

Phil 2500F: Introduction to the Theory of Knowledge September—December 2009
Position: Graduate Teaching Assistant
Responsibilities: Grading

Professional Associations

Rotman Institute of Philosophy, Resident Member 2011—Present

Grahn Lab (Brain and Mind Institute), Lab Associate 2012—2015

Organizer, PhilMiLCog Conference 2011—2015