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Publication Details

Quirit, I. (2021). Material Engagement Theory and Extensive Enactivism Within the 4E Cognitive Debate: A Phenomenological Approach to Material Agency and Application to Current Technology (Master of Philosophy (School of Philosophy and Theology)). University of Notre Dame Australia. <https://researchonline.nd.edu.au/theses/355>

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**Material Engagement Theory and Extensive Enactivism Within the 4E Cognitive
Debate: A Phenomenological Approach to Material Agency and Application to
Current Technology**

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Submitted in fulfilment of the requirements for the
Master of Philosophy (5129)



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Statement of Authorship

This research is the candidate's own work and contains no material which has been accepted for the award of any other degree or diploma in any university or other institution. To the best of my knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text.

Israel Qurit

Support for this research was provided via an Australian Government Research Training Program (RTP) Scholarship

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ABSTRACT

4E Cognition is a fairly new field of study within cognitive science, cognitive psychology, and cognitive philosophy. The various approaches to cognition namely embodied, embedded, extended and enacted cognition; provide multi-faceted approaches to cognition. A common claim of these approaches is that cognition may have various contributing factors such as the role of the brain, body and its environments. This challenges the traditional idea that cognition exists purely mentally within the confines of the brain and skull. However, even within the 4E Cognition family, some nuanced arguments are hotly debated, particularly among the proponents of Embedded Theories (EmT) and Extended Theories (ExT). The main area of dispute centres on the idea of what process(es) can be classified as ‘cognitive’. Both enterprises try to answer the pertinent question regarding what makes a cognitive state the process of a particularly cognitive kind. In other words, both theories try to answer *what* and *where* the mark of the cognitive is. EmT argues that a particular context, situation, or an environment where the body is located shapes one’s cognition. The environment, context, or situation constitutes the mark of the cognitive. However, although the body is deeply embedded with the surrounding environment, the processes that can be considered ‘cognitive’ remain within the domain of the neural system. ExT on the other hand, through the coupling principle, argues that if external resources have the same functionality with internal processes located inside the brain, then these external processes can be considered ‘cognitive’ processes. For ExT, cognition extends to external resources if and only if, extracranial resources have the same functionality as internal or neural processes inside the brain and the skull. Although, ExT and EmT vary to some degree on *what* constitutes the mark of cognition, they agree on *where* cognition predominantly resides – both agree that it is very much a “heady” affair! Still, both ExT and EmT are susceptible to the assumption that the only processes that can be classified as ‘cognitive’ processes are the internal or neural processes. However, this does not tell us how ‘cognition’ comes to be, nor does it answer the question of what makes a cognitive state the process of a particularly cognitive kind. My main aim in this thesis is to provide a possible theory, an alternative theory that can tease out the mark of the cognitive we need to settle the dispute between EmT and ExT. The first commitment we require from this theory is that it needs to renounce any knowledge claim assumption that ‘cognition’ has an *a priori* location inside the head. Therefore, this thesis will propose a theory that will not assume ‘cognition’ as mainly a “heady” affair, it will instead, start from the assumption that

‘cognition’ has no *a priori* location. Drawing from Lambros Malafouris’ framework of Material Engagement Theory (MET) seen through the lens of Extensive Enactivism (EE), I will argue that this is the theory required to tease out the mark of cognition. In addition, by giving special attention to the phenomenological perception of material things, which is that things matter and should be taken seriously since the default mode of our place in the world is ours *always*, and *already* involved in habitual engagement with things or technologies in the world. In that sense, our cognitive engagement with external things do not just scaffold or extend cognition, but rather, it is radically embodied and dynamically conflated – incorporating our brains, bodies, things, technologies, and environments. These conglomeration of contributing factors to our cognitive processes, I believe, form the mark of cognition.

CHAPTER I: INTRODUCTION

4E Cognition is a broad field, incorporating a number of theoretical approaches to cognition. The goal of 4E Cognition (4EC) is to challenge the traditional conception of cognition; namely that the processes by which representational data are transformed, manipulated, augmented and used to form motor abilities are effectively solely brain-based computational processes.¹ However, even within 4E Cognitive approaches, nuanced disagreements exist about the ontological conception of cognitive processes. For instance, the Embedded Theory (EmT) of cognition and the family of Extended Theory (ExT) of cognition disagree about the nature of cognition concerning what constitutes a cognitive process, and what is required for a state or process to be cognitive.² Resolving this issue is not an easy feat and it does not require a clear cut answer, instead, the research method employed in this thesis aims to come up with an alternative theory, which teases out the mark of the cognitive. This alternative theory must have a neutral assumption, rather than a neural assumption. I consider a neural assumption purely conjecture to some degree where cognition has *a priori* location inside the head, while a neutral assumption adopts a cognition that has no *a priori* location inside the head. This neutral starting point is critical in my extrapolation of the various sub-theories that will contribute to the emergent of the mark of the cognitive.

My thesis aims to start from the neutral assumption that cognition has no *a priori* location.³ The main contention of my research is to assess and examine, and ultimately incorporate Lambros Malafouris' Material Engagement Theory (MET),⁴ as seen through Extensive Enactivism (EE) and Tailer Ransom's phenomenological approach to Material Agency.⁵ As an overview, I argue that through habitual engagement, we constantly enmesh with the material (and technological) culture; this engagement plays more than a support or a scaffold to cognition – our engagement with things have always been

¹ Louise Barrett, "The Evolution of Cognition: A 4E Perspective," in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher, (United Kingdom: Oxford University Press, 2018), 721-733.

² Julian Kiverstein, "Extended Cognition," in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher (United Kingdom: Oxford University Press, 2018), 19-40.

³ For the purpose of this thesis and to avoid vagueness, I will intend to use what Lambros Malafouris refers to as the mind to have no "a priori location." That is to say, the knowledge claim that the thinking process has no intrinsic or innate place of origin. In other words, cognition is not inherently a brain-based system.

⁴ Lambros Malafouris, "Mind and Material Engagement," *Phenomenology and the Cognitive Sciences* 18, no. 1 (2019): 1-17.

⁵ Tailer G. Ransom, "Process, Habit, and Flow: a Phenomenological Approach to Material Agency," *Phenomenology and the Cognitive Sciences* 18, no. 1 (2019): 19-37.

constitutively intertwined with our cognitive processes that in effect transform how we understand ourselves and our place in the world. Therefore, by applying MET through the lens of EE and a phenomenological approach to material things, we can formulate a theory that clearly teases out the mark of the cognitive, and tentatively may resolve the issues within the EmT and ExT debate. These are the findings this thesis aims to accomplish.

Chapter II will briefly examine the historical background of the traditional notion of “cognition” as a cognitive process predominantly assumed to have *a priori* location in the brain and solely realised by neural processes. This chapter will also roughly discuss the emerging alternative views of cognition under the umbrella of “4E Cognition” (4EC), which stands for embodied, embedded, extended, and enacted. These are approaches that refuse to be shackled by Cartesian commitments of cognition, that is, seeing the mind as a nonphysical substratum separate from the physical bodies and the environment-cultural-technological resources where the body is situated and in constant engagement. Even though proponents of classical cognitivism more or less reject the Cartesian view of the mind, they adhere to the Cartesian idea that the mind, even though it is a nonphysical substratum, exists within the boundary of the brain. 4EC’s main agenda is to explore and question this traditional conception of cognition, and in return, offer various ways or alternative paradigms of modelling and explain cognitive processes other than the Cartesian framework of the mind. The main motivation of 4EC seems to be the conviction that the anthropogenic approach to cognition should not be seen as the yardstick of all cognition, thereby insisting that the wide variety of cognitive processes within biology should not be measured according to our anthropogenic view that cognition is primarily, if not solely, a brain-based model. A wide variety of literatures are starting to emerge within the biological studies, showing that some cognitive processes may in fact be very different from those in the traditional model of cognition. Organisms considered to have minimal cognition such as salticid spiders, whose brains are smaller than a mustard seed, are capable of complex movement, especially in their hunting tactics and deceptive mimicry.⁶ An *E. coli* bacterium seems to manifest some structural and dynamical activities in its interaction with their surrounding stimuli.⁷ Another organism are cephalopods, such as octopus, cuttlefish, and squids. Through evolution, these

⁶ Barrett, “The Evolution of Cognition,” 721.

⁷ Marc van Duijn, Fred Keijzer, and Daan Franken, “Principles of Minimal Cognition: Casting Cognition as Sensorimotor Coordination,” *Adaptive Behavior* 14, no. 2 (June 2006): 166.

cephalopods have developed navigational dexterity, and their cognitive processes appear to be distributed throughout their bodies rather than as a centralised cognitive neural system.

These emerging studies which examine the various cognitive spectrums in biology, certainly present a challenge for our unquestioned assumption that the mark of the cognitive which takes residence inside the head is necessarily representational. This chapter will establish the four strands of cognition namely embodied, embedded, extended, and enacted. These various approaches have nuanced differences and focuses on different aspects. Embodied cognition focuses more on the role of the “body” as autonomous, but its autonomy is dependent on its interaction with the external world. Embedded cognition emphasises on the role of the environment/culture where the body is deeply located. Extended theory, on the other hand, claims that cognitive processes are disseminated throughout the body and brain, and that it can extend to extracranial resources through the parity principle. Finally, enacted cognition sees the action as a constitutive component in the cognitive processes along with the body and the environment/culture. This of course, is a very brief description, but it will be substantially explicated further in the chapter.

At the heart of this chapter is the debate between EmT and ExT. The tension between these competing views maybe subtle, but ultimately, it comes down to what makes a process a cognitive process. In other words, it comes down to the competing ontological conceptions of the cognitive processes. Julian Kiverstein offered a solution to the debate by appealing to radical embodied cognitive science (RECS). Though RECS somewhat made a bold move in breaking from the representationalist model of cognition, it made a case in favour of ExT, arguing that cognition extends through the dynamical model of interaction between the agents and environments. However, without a clear break-away from the assumption that cognition has *a priori* location, it is not clear whether Kiverstein made a successful argument for his mark of the cognitive. Using a dynamical model to make an argument for ExT, though it may not necessarily commit to the representational or computational model of cognition, does not take away the suspicion that RECS somehow managed to smuggle some shadows of conservative commitments to the traditional assumption that cognition must first start in the agent’s brain, and through dynamical coupling with the environment, a successful account for ExT can be made.

Considering this apparent problem in Kiverstein's appeal to RECS' approach in an attempt to make a case for ExT, Chapter III will attempt to rectify RECS' account of cognition, but the process might cost RECS to reject its conviction completely to make a case for extended cognition. Otherwise, an alternative theory might be required, and this thesis will examine the viability of MET's account as a possible theory to tease out the mark of the cognitive and thus offer a possible solution to the ExT versus EmT debate. The assumption that cognition has no *a priori* location, neither entirely inside the brain of the agent nor entirely outside in the environment is central to MET's commitment. Cognition from MET's perspective takes a radical form, as it is an emergent property from a process where the material-environment-culture-body-brain actively conflate and meaningfully engage and participate in the cognitive process of the individual's sense making in the world. Viewing the cognitive process as emergent, explicate that the mark of the cognitive is situated in the middle-in-between space. The mark of cognition in MET's view does not exclusively belong to the agent or outside in the environment, rather, the mark of cognition belongs to its material engagement or as what Malafouris called this process of *thing-ing*. Malafouris coined the term *thing-ing* in order "to articulate and draw attention into the specific varieties of cognitive life instantiated in 'actual occasions'... of thinking (and feeling) *with, through* and *about* material things."⁸

Putting MET forward as a plausible alternative theory to settle the issue of the ontological conceptions of the cognitive process debated between ExT and EmT is not without difficulties. Chapter IV therefore addresses and answers these issues. For instance, arguments such as the cognitive bloat problem or the claim that MET's commitment is no different from that of RECS' commitment for endorsing extended cognition will be addressed accordingly. In addition, this chapter will also try to address the criticism on whether the role of material structures and resources should be considered constitutive to our cognising or whether we should just consider the material structures to be playing an artifactually-scaffolding process in cognition. The strategy employed to answer these pressing issues will be viewing MET through the lens of Extensive Enactivism (EE). This theory argues that cognitive activity should be considered an always and already entangled deeply intertwined process between these components (brain-body-action-world-involving structures and resources). Therefore, seeing MET through EE will necessarily reject any commitments to inner representations or non-derived

⁸ Lambros Malafouris, "Creative Thinging: The Feeling of and for Clay," *Pragmatics and Cognition* 22, no. 1 (2014): 142.

representational content of cognition. Using MET's approach seen through the lens of EE, we will end up formulating an alternative theory that will tease out the mark of the cognitive while at the same time rejecting any shadows of representationalism or smuggling a commitment to endorse extended approach to cognition.

Finally, in this chapter, the practical implication or application of MET's sub concepts namely *metaplasticity* and *thing-ing* to our current technological devices will also be examined. In particular, it will examine how our *thing-ing with* and *through* our devices make us adapt, make sense, gather information, and navigate our socio-cultural and technological environments in which we are deeply embedded in; and as a result, our engagement with our technologies shapes the way we think. By proving that this is actually the case, I will attempt to incorporate archaeological and anthropological evidence that will show the evolution of our early hominid ancestors' minds – an evidence that will lead both anthropologists and archaeologists to predict that our ancestors' minds may in fact have co-evolved with their primitive tools/technologies and material artefacts. From this evidence, we can therefore deduce that our engagements with our technological devices such as computers, smart-phones, tablets, and GPS devices play more than just a causally scaffolded process, and that perhaps, our cognitive activities may actually have always been extensive. If this is the case, then we should really be saying that our technological devices are constitutive parts of our cognitive processes. In this sense, we think in conjunction with our technologies rather than assuming that these material artefacts are mere tools to scaffold our cognition. If this sounds outrageous and radical, it is because it is! In order to completely break from the grips of the Cartesian way of viewing the mind that haunts cognitive science, cognitive psychology, and cognitive philosophy for centuries; in order to make progress in this particular field of studies, it is therefore necessary to thoroughly break away from this Cartesian model of the mind. It is the aim of this thesis to show that an alternative theory for the mark of the cognitive is needed, and as I will argue, MET viewed through the lens of EE might be the theory we need to settle the competing ontological conceptions of cognitive processes debated between ExT and EmT.

CHAPTER II: WHAT IS “COGNITION” AND 4E COGNITION?

This chapter will contend that even within the 4E Cognition (4EC) umbrella, there is no homogeneous approach to define cognition, particularly on the tenets and commitments to establish the mark of cognition. Before assessing the contemporary theoretical status of 4EC, especially the ongoing debate surrounding the competing conceptions of what can count as a mark of the cognitive, it is important to clarify what the word “cognition” means. To define this term is quite controversial for it is the subject of contention between adherents to the classical cognitivism and the proponents of 4EC. A problem in defining cognition seems to fall into the assumption that cognition is inherently modelled from a representational and computational classification. The ramification of modelling cognition in this way restricts cognition to a process that only concerns the manipulation of representational mental structures, and proponents of this view generally argue that this process is best realised by the brain processes. However, for the past couple of decades, adherents to classical cognitivism have come under pressure. This is due to the fact that proponents of 4EC have argued that cognitive phenomena studied by modern cognitive science such as spatial navigation, perception, action, and understanding people’s emotions, are in some sense dependent on the biological, physiological, and the active and embodied interaction of the agent with the environment.⁹ In other words, 4EC emphasises the significant role of the various extracranial factors in the cognitive process. The sense of ‘cognition’ I will be exploring here is the type of cognition that 4EC endorses.

For now, we can examine the foundation of the traditional definition of ‘cognition’. Perhaps, the most influential definition is from Ulric Neisser (1967), whereby he identified the term “cognition” as “all the processes by which the sensory input is transformed, reduced, elaborated, stored, recovered, and used.”¹⁰ Furthermore, such cognitive processes involve functions such as “*sensation, perception, imagery, retention, recall, problem-solving, and thinking.*”¹¹ This definition seems to explicitly embrace the assumption that these aspects of cognitive processes reside solely in the brain, as Neisser himself declared, stating, “For my part, I do not doubt that human behavior and

⁹ Albert Newen, Leon De Bruin, and Shaun Gallagher, “4E Cognition: *Historical Roots, Key Concepts and Central Issues,*” in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher, (United Kingdom: Oxford University Press, 2018), 5.

¹⁰ Ulric Neisser, *Cognitive Psychology* (New York: Appleton-Century-Crofts, 1967), 4.

¹¹ Neisser, *Cognitive Psychology*, 4.

consciousness depend entirely on the activity of the brain, in interaction with other physical systems.”¹²

Branquinho claims that “contemporary cognitivism takes it to be axiomatic that ‘the mind represents and computes.’”¹³ In a similar vein, Ken Aizawa contends that “if cognition is a cause of behavior, one can better appreciate why it might be something realized in the brain alone.”¹⁴ To view cognition in this way not only assumes that mental processes are strictly neural but also endorses an I-conception of the mind whereby cognition is methodologically and metaphysically tied up with individualism, intellectualism, and internalism.¹⁵ This is what Pamela Lyon calls the *anthropogenic* approach to cognition, the starting point of which is derived from the human case, that is, introspective experience or the science of the human brain rather than facts of biology.¹⁶

However, the anthropogenic approach to cognition assumes “to a greater or lesser extent, that human psychological attributes are hallmarks of cognition.”¹⁷ From this standpoint, any attempt to define cognition would likely be a predisposition towards the anthropogenic view or the I-conception of the mind, rather than asking unbiasedly what can be counted as a cognitive process. Mark Rowlands has pointed out that there is little consensus as to what can make something a cognitive process.¹⁸ He asserts that often, the class of processes that we regard as cognitive is defined by ostension, that is, processes such as perceiving, remembering, thinking, reasoning and our understanding of language. The only upshot is that underneath of all these ostensions is the vague idea that these are, indeed, “cognitive processes.” We consider them to be “cognitive processes” since they allow us to accomplish certain cognitive tasks, such as perceiving the world, remembering

¹² Neisser, *Cognitive Psychology*, 5.

¹³ João Branquinho ed., *The Foundations of Cognitive Science* (U.S.A: Oxford University Press, 2001), xv, quoted in Daniel D. Hutto and Erik Myin, *Evolving Enactivism: Basic Minds Meet Content* (Cambridge: The MIT Press, 2017), 3.

¹⁴ Ken Aizawa, “What Is This Cognition That Is Supposed to Be Embodied?” *Philosophical Psychology* 28, no. 6 (August 2015): 756.

¹⁵ Hutto and Myin, *Evolving Enactivism*, 4. The label “internalism” can connote variety of different views such as epistemic internalism or ethical internalism. However, the kind of internalism which Hutto and Myin is at issue with here classify that the nature of an individual’s mental states depends entirely on fixed or intrinsic physical properties of the individual; namely the computational brain processes alone rather than external processes such as the social, cultural or physical environment.

¹⁶ Pamela Lyon, “The Biogenic Approach to Cognition,” *Cognitive Processing* 7, no. 1 (2006): 12

¹⁷ Lyon, “The Biogenic Approach to Cognition,” 12.

¹⁸ Mark Rowlands, *Externalism: Putting Mind and World Back Together Again* (London: Routledge, 2003), 157, accessed March 3, 2020, ProQuest Ebook Central.

the various information we have perceived, and employing such information through reasoning.¹⁹

The definition of cognition, as articulated by Neisser, Aizawa, and others, have somewhat been inherited from or influenced by Cartesian dualism. Dualism was conceptualised by the seventh-century French philosopher, scientist, mathematician, and sometime mercenary, René Descartes.²⁰ For Descartes, the mind is a nonphysical substratum or substance. It must be noted that Descartes' conception of 'substratum' is not what is normally considered as 'the stuff from which a thing is made.'²¹ On the contrary, it is what the medieval philosophers referred to as a 'thing' or 'object'.²² Therefore, for Descartes, the mind exists as a nonphysical thing or object. To prove that this mind exists, Descartes mused in the third meditation in his book, *Meditations on First Philosophy*,

Ego sum res cogitans, id est dubitans, affirmans, negans, pauca intelligens, multa ignorans, volens, nolens, imaginans etiam et sentiens.

or,

I am a thinking (conscious) thing, that is, a being who doubts, affirms, denies, knows a few objects, and is ignorant of many.²³

This rather short passage implies that Descartes has discovered a foundation on which to claim that he is, indeed, a conscious or thinking thing. In other words, whether what he perceives is true or false, real or an illusion, right or wrong does not matter because even if these perceptions are wrong, he is still *aware* that they are wrong. This awareness reveals his own existence, and if he exists, then he must also be conscious. When Descartes claims that the mind is a nonphysical thing or object, his view is that the mind does not have spatial extension, in the sense that it does not take up physical room. This is what makes the mind nonphysical; nevertheless, the mind is an object, in the sense that it has a spatial location inside a functioning brain. Although Descartes never explicitly conveys the precise location of the mind, he seems to favour the assumption that the mind

¹⁹ Rowlands, *Externalism*, 157.

²⁰ Mark Rowlands, *The New Science of the Mind: From Extended Mind to Embodied Phenomenology* (Cambridge, Mass: MIT Press, 2010), 10.

²¹ Rowlands, *The New Science of the Mind*, 10.

²² Rowlands, *The New Science of the Mind*, 10.

²³ Gabby McCarthy, *Introduction to Metaphysics* (United Kingdom: ED-Tech Press, 2018), 45.

is located somewhere in the vicinity of the brain's pineal gland.²⁴ This is how Cartesian dualism came to be, from his assertion that the mind is a nonphysical substratum separate from the physical bodies.

This Cartesian framework of the mind has unquestionably influenced cognitive science. To elaborate, the idea that the mind or mental processes are somehow identical to or exclusively dependent on neural functions is fashioned in the image of the Cartesian framework of the mind. There are two aspects to the Cartesian conception of the mind: first, the claim that the mind is a nonphysical thing (though many cognitive scientists deny this assumption), and second, the idea that the mind is something that exists inside the brain. Although classical cognitive science denies this first aspect, it has nevertheless aligned mental processes as identical to or dependent on neural functions. Therefore, proponents of classical cognitivism reject Descartes' idea that the mind is nonphysical; however, they adhere to the second defining idea of the Cartesian conception, that the mind is a substratum, thing, or object, something that exists *inside* the head.²⁵ Therefore, to avoid any confusion, this thesis will refer concepts and theories such as anthropogenic theory, folk psychological theory, classical or traditional cognitivism, and representational and computational concepts as approaches to studying the concept of the mind fashioned partly in the image of the Cartesian framework of the mind.

Deciding to define cognition either in an anthropogenic way or folk psychological approach seems problematic since it implies that other organisms capable of flexibility in navigating their surroundings but not necessarily exhibiting anthropogenic capabilities are being undermined. Many of these organisms have either small brains or no nervous systems entirely. Organisms such as salticid spiders, have brains smaller than a mustard or poppy seed, but nevertheless, are capable of complexity and flexibility in chasing their prey, especially in their hunting tactics. They have developed the ability to engage the prey in deceptive mimicry, that is, diversions to distract them while the spiders reposition themselves by taking a longer and complicated detour in order to capture their prey effectively.²⁶ Another example are bacteria, which lack a nervous system altogether. Nevertheless, according to Van Duijn et al. (2006) an *E. coli* bacterium seems to manifest some structural and dynamical complexities with its interaction with environment,

²⁴ Rowlands, *The New Science of the Mind*, 11.

²⁵ Rowlands, *The New Science of the Mind*, 12.

²⁶ Barrett, "The Evolution of Cognition," 721.

especially in its capability in “traversing gradients of attractant or repellent chemicals in its environment.”²⁷ This particular behaviour might even be described as decision-making, that is, to run or tumble, which mirrors what the traditional cognitivist would define cognition as perception, memory, and action.²⁸

Another cognitive research subject that has captivated the minds of scientists for years dates back around 330 BCE, when Aristotle first became fascinated by the intelligent behaviour of cephalopods, namely octopus, cuttlefish, and squids, which the scientific community widely considers to be the most cognitively advanced group in the phylum Mollusca of invertebrates.²⁹ Particularly in the case of common cuttlefish (*Sepia officinalis*) and octopus (*Octopus vulgaris*), studies³⁰ show that their evolution occurred due to the pressure of competing in the demanding world of teleost fishes. For this, they developed a wide range of skills and learning, especially their navigational dexterity. Their generalist behaviour is thought to constitute an embodied cognition since cognitive control is literally distributed throughout their body. For instance, their multifaceted camouflage behaviour is substantially executed by the peripheral nervous system located outside the central brain. According to Binyamin Hochner, there are about half a billion neurons in the entire nervous system in *Octopus vulgaris* – 50 million reside in the central brain and 60 million reside in each optic lobe alongside the central brain; the remaining 320 million neurons are located in the arms, about 40 million neurons in each arm.³¹ This intriguing anatomy of the coleoid nervous system definitely challenges the centralised view of cognition, that cognition is primarily located inside the head and skull.

Therefore, approaching cognition from the bottom-up perspective in the biogenic approach would be a good starting point for our investigation of cognition in general. As Lyon favourably pointed out:

Because cognition is naturally a biological function, the empirical strength and relative conceptual clarity of its principles would seem to make the biogenic approach the logical choice for

²⁷ van Duijn et al., “Principles of Minimal Cognition,” 166.

²⁸ van Duijn et al., “Principles of Minimal Cognition,” 166.

²⁹ Alexandra K. Schnell and Nicola S. Clayton, “Cephalopod Cognition,” *Current Biology* 29, no. 15 (2019): R726.

³⁰ The studies referred here are that of Jennifer Mather and Michael Kuba (2013), Alexander Schnell and Nicola Clayton (2019), Joseph J. Vitti (2013), and Darmaillacq et. al. (2014).

³¹ Ken Cheng, “Cognition Beyond Representation: Varieties of Situated Cognition in Animals,” *Comparative Cognition & Behavior Reviews* 13, (2018): 3–4.

attempting a general theory of cognition that generates testable empirical generalizations.³²

To assume cognition as predominantly located in the individual's brain or see it in an anthropogenic perspective is to grab the horse by its tail. Contrary to the ongoing and thriving literature in the area of dynamic and world involving cognition, particularly using the bottom-up approach, defining cognition as a brain-based capacity would discriminate against the wide scale of cognitive processes within biology. Bearing in mind that as we ourselves are a product of biological evolution, investigating cognition from a biogenic starting point will be logical and unbiased.

As argued by Pamela Lyon and Fred Keijzer, adopting a biogenic approach to a general understanding of cognition presents a promising and most productive direction in terms of tracing back the properties and principles of what anthropogenic theorists would ultimately define cognition to be. The rationality behind their adoption of a biogenic approach to cognition is because, cognition as we know it – serves a biological function; and since human beings are both cognitive and biological organisms, therefore understanding cognition from a biogenic lens gives a fundamental understanding of the substantial contribution of cognition to the survival, wellbeing and reproduction of the human animal.³³ As Keijzer interestingly pointed out, the complex role in the dynamical sensorimotor behaviour such that of a hydromedusan jellyfish called *Aglantha digitale* can be a strong case study to bring about behavioural functionality.³⁴ The functional movement of this creature is accomplished by the contraction of muscle patterns arranged across its transparent bell, thus “making the bell itself contract, pushing water outside through the opening and so providing a kind of jet propulsion.”³⁵ Though this dynamical sensorimotor behaviour of feeding and escaping when touched may appear as fundamentally simple motility in comparison to complex human cognition, nevertheless, *Aglantha digitale* exhibits a varying complexity of organisation and response to the external environment compared to those organisms on the cellular level.³⁶

³² Lyon, “The Biogenic Approach to Cognition,” 26.

³³ Pamela Lyon and Fred Keijzer, “The Human Stain: Why Cognitivism Can’t Tell Us What Cognition Is & What It Does,” in *The Mind, The Body and The World: Psychology After Cognitivism?* eds. Brendan Wallace, Alastair Ross, John Davies, and Tony Anderson (Exeter, UK: Imprint Academic, 2007), 141.

³⁴ Fred Keijzer, “Differentiating Animality from Agency Towards a Foundation for Cognition,” *Proceedings of CogSci/ICCS*, (2006): 1596, University of Groningen/UMCG research database.

³⁵ Keijzer, “Differentiating Animality from Agency Towards a Foundation for Cognition,” 1596.

³⁶ Keijzer, “Differentiating Animality from Agency Towards a Foundation for Cognition,” 1596.

Another heterogeneous approach to cognitive processes is the Environmental Complexity Thesis (ECT) advanced by Peter Godfrey-Smith. According to this thesis, cognition can be viewed as an assemblage of various capacities, which, if properly amalgamated, can serve as a coordinated function between the organisms' actions and the environmental offerings or resources.³⁷ These collections of capacities including a very broad sense, capacities for perception, the internalisation or representation of the world,³⁸ memory, learning, decision-making in dealing with environmental complexities, and the production of behaviour.³⁹ ECT favoured the idea that an organism's information processing and behavioural strategy do not always entail the involvement of the nervous system. Some organisms' defence mechanisms, or when confronted with threats, use a flexible strategy; that is, it uses environmental cues for their adaptive response to complex environmental conditions. For instance, the colonial marine invertebrate animals, called "bryozoans or sea moss", can detect the presence of predatory sea slugs by making use of the water-borne chemical cue. Bryozoans' sensitivity to environmental cues effectively controls their behaviour by producing spines to reduce predation.⁴⁰ These marine invertebrate animals use environmental cues to motivate complex behaviour in response to complex environmental conditions.

Many of the studies⁴¹ in the biogenic approach to cognition or minimal cognition state that cognition should not be seen as a prerogative only belonging to the handful of "bourgeoisie" or "elite" type of organisms,⁴² as if anthropogenic attributes are the hallmarks of cognition. On the contrary, the studies recommend cognition should be seen as a biological development which "indicates that there exists a vast cognitive spectrum that fills the gap between the mindful and the mindless."⁴³

The Rise of 4E Cognition (4EC)

³⁷ Peter Godfrey-Smith, "Environmental Complexity and the Evolution of Cognition," in *The Evolution of Intelligence*, eds. R. J. Sternberg and J. C. Kaufman (Mahwah: Lawrence Erlbaum, 2002): 5, <http://www.its.caltech.edu/~theory/Godfrey-Smith.pdf>.

³⁸ Godfrey-Smith conceived of "cognition" in a broad and undemanding definition. It does not necessarily mean; cognition comes from a single evolutionary restricted pathway. That is, there are variety of ways to process information and behaviour responses, a central nervous system maybe one of them, but certainly not the only way.

³⁹ Godfrey-Smith, "Environmental Complexity and the Evolution of Cognition," 5.

⁴⁰ Godfrey-Smith, "Environmental Complexity and the Evolution of Cognition," 16.

⁴¹ The studies referred here are that of van Duijn et al. (2006), Lyon (2006), and Reid et. al. (2016).

⁴² van Duijn et al., "Principles of Minimal Cognition," 167.

⁴³ van Duijn et al., "Principles of Minimal Cognition," 167.

It has been shown in the preceding pages that there is no consensus or single universally accepted answer to the question of what cognition is. The predominant assumption among adherents to cognitivism is the axiomatic definition of cognition as a mental process whereby external inputs are represented and computed, and this is best viewed as predominantly a brain-based process that sees cognition from a traditional perspective of the mind. Of course, one way of viewing cognition is approaching it from the top-down or folk psychological attributes and making it a yardstick by which cognitive capacities of other organisms are to be measured.

The main difficulty with this kind of approach is that it operates on the big assumption that human psychological attributes set the measuring standard for cognition. It has been shown that defining cognition as a brain-based capacity would discriminate against the wide scale of cognitive processes within biology. That is why determining when or why a creature can be considered cognitive or investigating what determines the cognitive process is not as clear-cut or easy as it sounds.⁴⁴

The main form of defence taken by traditional cognitivists is when they equate brains with cognition, that is, the larger the brain, for instance, in species such as humans and apes, the more complex and intelligent cognitive capabilities an organism tends to perform. As van Duijn et al. have pointed out, linking the brain and cognition would seem to be the logical move and intuitively true.⁴⁵ However, this is only true so long as brain function cannot be performed by other organisms that lack a nervous system such as bacteria and slime mould (*Physarum polycephalum*), among others. Experimental studies show that this is not the case within the phylogenetic tree as demonstrated by a growing number of authors such as van Duijn et al. (2006) who investigated the complex behaviour of *Escherichia coli* bacterium, Lyon (2006) who argued the importance of looking at cognition from a biogenic approach, and Reid et al. (2016)⁴⁶ who looked at the decision-making behaviour of an amoeboid organism when faced with problem-solving stimulus. Many of these studies intriguingly challenge the belief that the nervous system is equal, if not required, for complex and intelligent behaviour, as the organisms studied can function cognitively even though they do not have a nervous system.

⁴⁴ Barrett, "The Evolution of Cognition," 720.

⁴⁵ van Duijn et al., "Principles of Minimal Cognition," 163.

⁴⁶ Chris R. Reid et al., "Decision-Making without a Brain: How an Amoeboid Organism Solves the Two-Armed Bandit," *Journal of the Royal Society, Interface* 13, no. 119 (2016): 1-8.

Investigating cognition from the starting point of biology or from the bottom-up approach opens up cognition wider and makes it more inclusive to all cognitive forms within and across all biological genus. As a result, it allows us to appreciate cognition in many different forms in terms of the organisms' information processing, problem solving, and decision-making tactics in response to external stimulus.⁴⁷ Additionally, the biogenic approach to cognition lays out a promising argument that human brain function is somehow analogous to the function of these biological organisms without a nervous system, rather than the other way around.

The rise of 4EC is therefore becoming persuasive in its approaches to cognition because it houses various paradigms and offers alternative approaches other than the traditional cognitivist view. This relatively new field of research on cognition includes for embodied, embedded, enactive, and extended approaches.⁴⁸ As Richard Menary once said, for the last 10 or 15 years of cognitive research, different ways of modelling and approaching cognition are thriving, and “homogeneity there is not.”⁴⁹ These approaches under the umbrella of 4E Cognition explore various ways of modelling and explaining cognitive processes, rejecting the familiar and traditional concept of cognition as a brain-based, representational, computational, and anthropogenic model. In saying this however, there are nuances even between the 4E frameworks. Menary asked whether by combining them together under one umbrella there is a possibility to miss out the subtle differences and often genuine incongruities between them.⁵⁰ For instance, some extended theorists argue that although cognition extends to the world, nevertheless, construction and manipulation of informational content from the world are still necessary in some cognitive cases. On the other hand, some enactivists are radical in their rejection of orthodox cognitivism and argue that mental representations are unnecessary in cognitive explanations.⁵¹ Another incongruity is between the two camps of embodied and embedded frameworks. As Andy Clark has suggested, a possible tension between these two strands centres down to the role of the body, such that the embodied camp assigns the body special significance in producing cognition while the embedded camp treats the body as nothing but an “equal-

⁴⁷ Reid et al., “Decision-Making without a Brain,” 7.

⁴⁸ It has to be noted that this list of approaches does not include ecological, distributed, situated, and encloded models of cognition.

⁴⁹ Richard Menary, “Introduction to the special issue on 4E cognition,” *Phenomenology and the Cognitive Sciences* 9, no.4 (2010): 459.

⁵⁰ Menary, “Introduction to the special issue on 4E cognition,” 459.

⁵¹ Menary, “Introduction to the special issue on 4E cognition,” 460.

partners dance between brain, body and world.”⁵² It is in the balance of these dynamic interactions between the brain, body, and environment that the mind or cognition emerges.⁵³

This dissertation, will not discuss every issue and disagreement between the different camps in 4EC. To say the contrary, these differences, in fact, mark the rich and abundant 4E literatures, offering us different explanatory methods to account for cognition and in challenging the traditional paradigm of cognitivism. As Menary perceptively commented, that we are in a position of abundance rather than disarray and the growing 4E literature provides us new ways to think about the mind.⁵⁴

In particular, this thesis will focus on the specific issue that the embedded and extended theories have been debating. That issue centres around the idea of cognitive process(es), that is, what makes a process or state a cognitive process or state. To answer this question, it is therefore vital to come up with a theory that can tease out the mark of the cognitive. Before delving into this area of contention, it is important to clarify the sense in which 4EC talks about/of embedded, embodied, extended, and enacted cognition.

Embodied Cognition (EmboC)

Over the past 20 years, the theory of embodiment has created an enriching discussion and debate within the philosophy of cognitive science. The disagreement centres on what it means to say that cognition is embodied and how embodiment generates cognition.⁵⁵ Embodiment theory goes back 20 years ago when Francisco Varela, Evan Thompson, and Eleanor Rosch published *The Embodied Mind* (1991). The book was thought to be provocative since it argued against the traditional cognitivist view of the mind and asserted that cognition must be understood in terms of the sense-making activities of living organisms, in which cognitive systems are conceptualised as autonomous systems when coupled with the external environment in a way that “brings forth” or constructs

⁵² Andy Clark, “Pressing the Flesh: A Tension in the Study of the Embodied, Embedded Mind?” *Philosophy and Phenomenological Research* 76, no. 1 (2008): 56-57.

⁵³ An informative introduction to this disagreement is discussed by Julian Kiverstein and Andy Clark (2009) on their paper “Introduction: Mind Embodied, Embedded, Enacted: One Church or Many?” Another paper discusses disagreements within 4E Cognition is by Richard Menary (2010) “Introduction to the Special Issue on 4E Cognition.”

⁵⁴ Menary, “Introduction to the special issue on 4E cognition,” 460 – 461.

⁵⁵ Julian Kiverstein, “The Meaning of Embodiment,” *Topics in Cognitive Science* 4, no. 4 (2012): 740.

skilful or meaningful activities that can sustain the agent's own viability.⁵⁶ It is worth reflecting that the idea of embodiment theory actually has roots in the phenomenological accounts of Edmund Husserl (1913, 1931), Maurice Merleau-Ponty (1945), and to some extent Jean-Paul Sartre (1943). These earlier phenomenological accounts are consistent with the new embodied cognitive science popularised by Varela, Thomson, and Rosch in *The Embodied Mind*. It can be said that the embodiment theory advances forward the phenomenological accounts in new directions.⁵⁷ That is to say, rather than understanding how physicality opens up the experience of the self, the outside world and others, instead it “aims to specify the *mechanisms* that explain just how cognition is grounded in, and deeply constrained by, the bodily nature of cognitive agency.”⁵⁸

The concept of the “body” in the embodiment thesis cannot be construed as a body defined by functionalist accounts as one that operates in terms of inputs and outputs. On the contrary, the body is construed to be self-individuating, hence autonomous, but its self-individuation is adaptive in the sense that it sustains its autonomy through interactions with the world.⁵⁹ Therefore, cognition in this particular view is understood to be sense-making, only possible because of the presence of the body and its adaptive regularities with the world. In this sense, the body, as adaptively autonomous with the world, and cognition, as the agent's sense-making activities, are seen to be constitutive rather than playing a causal role.⁶⁰

A more moderate embodied position is that of Andy Clark who argued that rather than making a revolutionary claim to reject the central role of the brain in cognition, “might it not be more fruitful to think of brains as controllers for embodied activity?”⁶¹ Clark held a conciliatory view of embodied cognition that emphasised the role of the body and the environment without necessarily breaking away from the conservative cognitivist. As Clark maintained, “minds may be essentially embodied and embedded and *still* depend crucially on brains which compute and represent.”⁶² For Clark, the brain decides whether

⁵⁶ Kiverstein, “The Meaning of Embodiment,” 741 – 742.

⁵⁷ Robert A. Wilson and Lucia Foglia, “Embodied Cognition: 2.6 Phenomenology,” in *Stanford Encyclopedia of Philosophy* (Stanford University, Spring 2017), Edward N. Zalta (ed.), <https://plato.stanford.edu/archives/spr2017/entries/embodied-cognition/>.

⁵⁸ Wilson and Foglia, “Embodied Cognition: 2.6 Phenomenology.”

⁵⁹ Ezequiel Di Paolo and Evan Thompson, “The Enactive Approach,” in *The Routledge Handbook of Embodied Cognition*, ed. Lawrence Shapiro (New York: Routledge Press, 2014), 76.

⁶⁰ Di Paolo and Thompson, “The Enactive Approach,” 76.

⁶¹ Andy Clark, *Being There: Putting Brain, Body, and World Together Again* (Cambridge, MA: MIT Press, 1997), xii.

⁶² Clark, *Being There*, 143.

a certain cognitive task can be done purely within the head or whether it must incorporate bodily manipulations of extracranial artefacts as a strategy for efficient achievement of certain task.⁶³ In other words, cognition can extend if the brain decides to do so for the purpose of efficiency.

Another perspective of embodied cognition is Shaun Gallagher's notion of body schema which he defined as "a system of sensory-motor capacities that function without awareness or the necessity of perceptual monitoring."⁶⁴ In other words, body schema⁶⁵ is a non-conscious action, its functioning is prenoetic and tends to remain "behind the scene," and this schematic adjustments of the body shape one's perception even though one is unable to perceive their body making the schematic adjustments.⁶⁶ This account of embodied cognition is dependent on our understanding of body schema and how it shapes perception because once we know how this happens we will likely know how body schema shapes cognition.⁶⁷ Overall, embodied cognition is based on the premise that the body contributes to the cognitive processes and the brain and the body have co-evolved together, bringing forth meaningful activities. The main area of contention among the proponents of embodied cognition seems to be whether the body is at par with the brain or should the brain be considered as superordinate and the body its subordinate.

Embedded Cognition (EmbeC)

As we have seen, embodied cognition focuses mainly on the body's role or contribution to the cognitive process. However, embedded cognition is seen to focus on the role of the environment or where the body is embedded and situated. Often, both embodied and embedded cognition are seen to be in tandem with one another since the body is or has always been constantly embedded in a particular environment; therefore, the way humans perceive, act, and think is always determined by the kinds of bodies they have and interactions they perform within a particular context, situation, or environment.⁶⁸ In other

⁶³ Kiverstein, "The Meaning of Embodiment," 742.

⁶⁴ Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Oxford University Press, 2005), 24.

⁶⁵ Body schema should not be confused with body image. In *How the Body Shapes the Mind*, Gallagher provides a distinction between body schema and body image. A body image is seen to be a system of perceptions that involves attitudes, and beliefs pertaining to one's own body (p.24). In other words, body image involves conscious actions while body schema involves non-conscious actions.

⁶⁶ Gallagher, *How the Body Shapes the Mind*, 141.

⁶⁷ Gallagher, *How the Body Shapes the Mind*, 137.

⁶⁸ Erik Myin and Jan Van Eemeren, "Embodied and Embedded Cognition," in *The Sage Handbook of Theoretical Psychology, Thousand Oaks: Sage*, eds. Stam H, Hooren H, de Jong H (In Press).

words, embedded cognition questions how a situated context or particular environment shapes one's cognition.

Among the first thinkers who examined the role of environment in shaping one's cognitive processes is the American psychologist James J. Gibson. Gibson argued that the psychological processes could only be understood in terms of the organisms' dynamic coupling with their environment.⁶⁹ According to Gibson, perceptual system is not a one way transmission, but rather, it is a circular or dynamical transmission, wherein the brain and the eyes are parts of the perceptual system and together, the "eye-head-brain-body system registers the invariants in the structure of ambient light."⁷⁰ This means the eye-head-brain-body system, together with its perception of the environment in a dynamical transmission, experience the surrounding environment directly rather than through sets of information calculated or represented and delivered to the brain for processing. Later on, Lucy Suchman and Edward Hutchins took this concept up a notch, contending that though the structure of the environment shape one's cognition, the role of the socio-cultural environment should also be examined. As Hutchins wittily commented on Gibson's ecological approach to psychology, "he examined the structure of the environment (*but, alas, not the cultural environment*)."⁷¹ Further, Suchman began with her twofold basic premises stating that first, cognitive phenomena have a fundamental relationship to our socio-cultural environment, that is, an environment of a collaboratively organised world of artefacts and actions. Second, the significance of these material artefacts, actions, and the methods or plans by which their significance is conveyed, in return, have a fundamental relationship to their particular, concrete circumstances.⁷² This means, particular actions will depend necessarily on the ways the material and social circumstances influenced such actions. Suchman mainly examined how plans for actions are founded in social circumstances rather than the other way around.

Extended Cognition (ExC)

⁶⁹ Edwin Hutchins, "Cognitive Ecology," *Topics in Cognitive Science* 2, no. 4 (2010): 707.

⁷⁰ James J. Gibson, *The Ecological Approach to Visual Perception* (New York: Taylor and Francis Group, 1986), 61.

⁷¹ Hutchins, *Cognitive Ecology*, 708, (emphasis added).

⁷² Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 2nd ed. (Cambridge, UK: Cambridge University Press, 2007), 70.

This hypothesis claims that thinking is disseminated beyond the body or brain and skull. That is, cognition incorporates extracranial resources and processes from the environment if these same processes are similar to the processes located inside the brain. Of all the theories under the 4EC umbrella, extended cognition is perhaps the theory that has best received different amendments or developments. Within ExC, three different waves or ways of approaching ExC have been developed since its genesis, each of which endorses different perspectives or commitments.⁷³

The first wave of ExC is committed to the notion of what Andy Clark and David Chalmers called the parity principle,⁷⁴ which is formulated as:

If, as we confront some task, a part of the world functions as a process which, *were it done in the head*, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process. Cognitive processes ain't (all) in the head!⁷⁵

The principle means that if extracranial resources have the same or equivalent functionality to of intracranial processes located inside the brain, by parity of causal and functional roles, the extracranial processes and resources should be considered part of the cognitive processes. Therefore, through the parity principle, cognition is seen to extend beyond the body. A simple example would be a to-do list stored in the mobile phone. When we go through our day, whether at home or workplace, we can remember all the things we have to do using our short-term memory. Alternatively, we can check our mobile phones for the list of things or set an alarm on our mobile devices as a reminder what we need to do throughout the day. In this way, it saves us from recalling the things to do from our memory. According to the parity principle, we should count both processes, whether storing the to-do list in the short-term memory or storing them on our mobile devices, as the same cognitive process of remembering.

The second wave of ExC focuses on different sets of commitments. It focuses on complementarity and integration of the different processes between internal and external processes, since these differences “both *predicts* and *requires*”⁷⁶ the array of ways in

⁷³ Michael D. Kirchhoff and Julian Kiverstein, *Extended Consciousness and Predictive Processing: A Third Wave View*, 1st ed. (Milton: Routledge Ltd, 2019), 8.

⁷⁴ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 10.

⁷⁵ Andy Clark and David Chalmers, “The Extended Mind,” *Analysis* 58, no. 1 (1998): 8.

⁷⁶ Rowlands, *The New Science of the Mind*, 89.

which external structures can enhance internal modes of processing. For instance, in the to-do list example, we may vaguely remember the things we have to do throughout the day, but by storing specific information on our mobile devices, say, for a project we have to do at work, it allows us to achieve this particular cognitive task which may not be accomplished by way of internal processes alone. The complementarity principle of the second wave results in a hybrid cognitive process, bringing together the heterogeneous scaffolding of props and artefacts to complement the internal or biological states and processes of the brain. In this sense, extended cognitive systems are biological, technological, as well as cultural.⁷⁷

The third wave of ExC was first anticipated by John Sutton, who proposed that if there is to be a distinct third wave of extended mind, cognitive processes will be reciprocal, dynamic, and ongoing, dissolving “individuals into peculiar loci of coordination and coalescence among multiple structured media.”⁷⁸ The third wave is founded in several key tenets. First, it rejects any fixed properties which say some cognitive processes only belong to internal and occasionally includes external elements.⁷⁹ This means the internal cognitive functions undergo transformation when an individual is continuing to participate in cultural norms and practices. Likewise, external cognitive functions continuously undergo transformation through the individual’s meshing of embodied actions, material artefacts, and cultural norms and usage.⁸⁰ Second, the third wave is committed to the idea that the mind has no sharp boundaries, it is open-ended and flexible. The agent is seen to be a “loci of coordination and coalescence among multiple structured media.”⁸¹ In other words, the boundaries that separates the individual from the socio-cultural environment are blurred; if the boundary is not rejected completely, it leaves boundary as an open issue to be settled by considering each case of cognitive process individually. Third, the third wave is committed to coordination and distribution of cognitive roles. That is, the interactions among the components, both individual and material or cultural, are non-linear and from these dynamic interactions comes order and structure which maintains the system to function as a whole.⁸² Finally, the third wave is committed to the diachronic constitution of cultural practices over a period of time. This

⁷⁷ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 11.

⁷⁸ John Sutton, “Exograms and Interdisciplinarity: History, the Extended Mind, and the Civilizing Process,” in *The Extended Mind*, ed. Richard Menary (Cambridge, MA: MIT Press, 2010), 213.

⁷⁹ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 16.

⁸⁰ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 17-18.

⁸¹ Sutton, “Exograms and Interdisciplinarity,” 213.

⁸² Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 18-19.

implies our coupled interactions with material artefacts are embedded in the wider web of cultural practices developed over periods of time, which then influence how we perform cognitive tasks in the here and now.⁸³ It shows that individuals can never be conceived of in isolation from the cultural practices, and cultural norms and practices of the area where the individual is situated are active in their influence over cognitive tasks.

Enacted Cognition (EnC)

The enactive approach to cognition is arguably the most complex of the 4EC, because it entails that cognition is both embodied and embedded. This means cognition is realised not just by the brain alone, but rather, by the whole organism and its dynamic interactions with the environment.⁸⁴ Whether enactivism entails cognition to be extended is a matter of argument, but the synthesis of both EmbeC and EmboC implies enactivism to incorporate complementarity framework within cognitive science, phenomenology, and biology. It is also a developing framework since it acknowledges its own incompleteness and much of the challenges still need to be addressed.⁸⁵

Historically, “enactivism” has its root in the seminal work of Varela, Thompson, and Rosch in their published book titled *The Embodied Mind* (1991). According to them:

We propose as a name the term *enactive* to emphasize the growing conviction that cognition is not the representation of a pre-given world by a pre-given mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs.⁸⁶

At the heart of enactivism is the commitment that “(1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided.”⁸⁷ In other words, if EmboC starts with the premise that the body is at par with the brain in its contribution to cognition and EmbeC sees the vital role of the environment where the body is situated, enactivism on

⁸³ Kirchoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 23.

⁸⁴ Giovanna Colombetti, “Enacting Affectivity,” in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher (United Kingdom: Oxford University Press, 2018), 571 – 572.

⁸⁵ Colombetti, “Enacting Affectivity,” 572.

⁸⁶ Francisco J. Varela, Evan Thompson, and Eleanor Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, Mass: MIT Press, 1991), 9.

⁸⁷ Varela, Thompson, and Rosch, *The Embodied Mind*, 173.

the other hand claims that the action is the constitutive component in the cognitive processes in addition to the body and the environment.

Three strands of enactivism have emerged since the influential work of Varela et al. was published. The first strand is sensorimotor enactivism which focuses on explaining the intentional and phenomenal features of perceptual experience. Perception in this view is not to be construed as a construction of an inner model of informational processes which are ultimately lost in sensory transduction, but rather, as an active engagement or exploration of the environment.⁸⁸

The second strand is autopoietic enactivism influenced by the theory of autopoiesis developed by Humberto Maturana and Francisco Varela in their 1972 work titled *Autopoiesis and Cognition: The Realization of the Living*. They argued that cognition is realised in a living system by virtue of its self-maintaining and self-identifying nature. It is, therefore, a closed system. However, current proponents of enactivism have modified this notion, if not distanced themselves from the original formulation of autopoiesis,⁸⁹ contending that if a system is totally closed or totally open, the organism will not survive in these extreme cases. Thus, according to Ezequiel Di Paolo, an adaptive autopoietic system is needed. This will be one where agents or organisms are able to distinguish and regulate the flows of matter and energy that maintain their self-production and self-distinction in terms of their relationship with the environment. The organisms will hence avoid flows that might contribute against their survivability.⁹⁰ In the same vein, Evan Thompson maintained that an autopoietic system is a circular network upon which its “constituent molecular processes both produce and embody that network.”⁹¹ This implies that the autonomy or self-identity of an organism is regulated in its dynamic relationship with the environment since the organism itself is in and of the world. Therefore, the boundary of an organism cannot be reduced to its material constitution as the organism’s material composition is constantly changing. For instance, 99% of the atoms in our body are replaced every year. According to Thompson, in this constant dynamic but regulated

⁸⁸ Dave Ward, David Silverman, and Mario Villalobos, “Introduction: The Varieties of Enactivism,” *Topoi* 36, no. 3 (2017): 370.

⁸⁹ Colombetti, “Enacting Affectivity,” 572 – 573.

⁹⁰ Ezequiel A. Di Paolo, “The Enactive Conception of Life,” in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher (United Kingdom: Oxford University Press, 2018), 85.

⁹¹ Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA: Harvard University Press, 2007), 75.

flux, constancy can be found, which contributes to the organism's self-production and identity.⁹²

The third strand is a “radicalised” version of enactivism advocated by Daniel Hutto and Erik Myin (2013). Hutto and Myin argued that both sensorimotor and autopoiesis enactivism are not radical enough. They claimed that the language that both sensorimotor and autopoiesis enactivism use is confusing. Further, it indicates some commitments to representationalist language if not being tacitly committed to representationalist thinking. For example, the claim that Varela et al. made that “organisms ‘enact’ or ‘bring forth’ their worlds – that enaction enables a world to ‘show up’ for individuals”⁹³ is problematic. Hutto and Myin’s concern is words like “cognition,” “interpretation,” “sense-making,” “understanding,” “emoting,” and even the terms “significance” and “relevance” in describing a simple organism’s activity are misplaced and misleading, precisely because these imply placing mental processes into simple living systems. What Hutto and Myin argued as an alternative instead is presenting simple living organism with basic minds. Minds in this basic sense are capable of intentionally-directed responding that may not necessarily qualify as mentality. In other words, certain organisms with basic minds not only respond to their environments that bear their interest, but also seemed to respond phenomenally despite these activities lacking content, mentality, and being wholly non-representational.⁹⁴

Thus far, this chapter has done has unpacked the various commitments of the traditional representationalist perspective of cognition and how these commitments are being challenged, arguing that the traditional approach to cognition may not be the yardstick or hallmark of cognition as has been unquestionably assumed for a long time. This is because the traditional approach does not accommodate the wide variety of cognitive processes within the biological spectrum. The rise of 4EC, namely embodied, embedded, extended, and enacted cognitions has been explored. Though their characterisations are not exhaustive, they give us an overview of various paradigms from cognitive science, biology, psychology, philosophy and phenomenology. These perspectives offer alternative approaches other than the traditional cognitivist view. In saying this however,

⁹² Thompson, *Mind in Life*, 150 – 151.

⁹³ Daniel D. Hutto and Erik Myin, *Radicalizing Enactivism: Basic Minds without Content* (Cambridge, MA: MIT Press, 2013), 5

⁹⁴ Hutto and Myin, *Radicalizing Enactivism*, 35-36.

even within the umbrella of 4EC, we find there is no homogeneity, especially in their conceptions of cognition and processes or commitments involved in explicating how cognition should be axiomatically embraced.

In the next section of this chapter, I will focus on a particular debate between the embedded and extended theories of cognition, of which the main issue concerns the mark of the cognitive.

Embedded Theory (EmT) versus Extended Theory (ExT)

Julian Kiverstein has subtly laid out a particular tension that exists between EmT and ExT, according to Kiverstein, comes down to “competing ontological conceptions of cognitive processes.”⁹⁵ This indicates both camps disagree on what makes a process or state cognitive. Thus, the main issue of the debate fundamentally concerns what can count as a mark of cognition. The question of whether thinking is merely an inner mental process which takes place inside an individual’s head is being challenged. Both EmT and ExT challenge this traditional idea, asking whether thinking can “sometimes constitutively depend upon an agent’s coupled interactions with structures and resources found in the environment”.⁹⁶

Kiverstein sets to lay out the central theoretical commitments of both EmT and ExT. The proponents of EmT argue that cognitive processes heavily rely on bodily interactions with the surrounding environment. Nevertheless, EmT remains committed to the idea that these bodily engagements with environment are wholly realised by neural systems and mechanisms located inside the person’s head.⁹⁷ At the heart of EmT’s argument are mental processes such as thinking, reasoning, remembering, and perceiving, which presumably take place within the individual’s brain and yet depend causally on the environmental structures and resources within which the agent is deeply embedded.⁹⁸

Conversely, ExT argues that external structures and resources work together with inner cognitive processes inside the individual’s head. Coupling the environment and one’s

⁹⁵ Kiverstein, “Extended Cognition,” 19.

⁹⁶ Kiverstein, “Extended Cognition,” 20.

⁹⁷ Kiverstein, “Extended Cognition,” 19.

⁹⁸ Kiverstein, “Extended Cognition,” 21.

own internal thinking processes forms a dynamic system, and as an effect, the two are mutually and continuously in a causal relation and influence with each other. Therefore, at the heart of ExT's argument, external structures and resources are constitutive parts of a cognitive process, rather than causally dependent. However nuanced the differences, both EmT and ExT agree with the *explanation* of how internal processes give rise to cognitive behaviour due to their external interactions with environmentally located structures and resources in the world.⁹⁹ This shows that while EmT and ExT may differ in their emphasis of what process teases out the mark of the cognitive, both camps nevertheless remain more or less committed to the representational version of cognition, whereby the internal processes or brain-based model of cognition is seen to be the yardstick for the mark of the cognitive.

ExT is mainly defended by the proponents of the extended functionalism theory (ExFT) who claim that bodily interaction with external environmental structures and resources is one of the ways in which computational processes, constituting cognitive processes, can be implemented. ExFT proponents appeal to the parity principle, which states if a certain cognitive process, normally thought to take place inside a person's head, takes place externally, such an external process should be considered cognitive.¹⁰⁰ This clearly indicates that ExFT remains committed to the computational and representational version of cognition, presupposing that a mark of cognition is modelled from the brain-based system and this similar model can extend externally through the parity principle. However, the main problem of the parity principle is it already presupposes that "we must have some pre-existing philosophical theory of what makes a state or process count as a state or process of a particular cognitive kind".¹⁰¹ Thus, it does not answer the pertinent questions of what makes a cognitive state the process of a particularly cognitive kind, since it assumes that such particular cognitive processes exist in the head. From this implication, it follows that in order to settle the debate on the mark of cognition, a theory that does not rely upon or have any commitments, implied or otherwise, to classical representationalism is needed.

Kiverstein further posits that since neither empirical nor common sense functionalism provides the mark of the cognitive to settle the debate between EmT and ExT, it is crucial

⁹⁹ Kiverstein, "Extended Cognition," 23-24.

¹⁰⁰ Kiverstein, "Extended Cognition," 24-25.

¹⁰¹ Kiverstein, "Extended Cognition," 26.

to draw upon the radical embodied cognitive science (RECS) hypothesis. This is justified as the RECS theory does not imply a commitment to representationalist approach to cognition.¹⁰² This radical option is inspired by Anthony Chemero's definition of RECS as the:

scientific study of perception, cognition, and action as necessarily embodied phenomenon, using explanatory tools that do not posit mental representations. It is cognitive science without mental gymnastics.¹⁰³

Chemero's RECS can be traced back from its historical roots in Darwinism, Jamesian functionalism which rejects representationalism fully, and Gibsonian ecological psychology.¹⁰⁴ Particularly, Chemero's RECS uses the dynamical model approach like that of Gibson's theory of ecological psychology, whereby the thinker dynamically interacts with the world directly and therefore does not need to form representations of the world. It is this dynamic relationship between the thinker and world that inspires radical embodied cognitive science.¹⁰⁵ As Gibson himself argued, his theory of perception "is *not* supposed to occur in the brain but to arise in the retino-neuro-muscular system as an activity of the whole system".¹⁰⁶ This is in direct contrast to the theory that focuses only on computational or mental representations.

At the heart of the RECS argument is the mutual manipulability between the agent and environment, their interdependent systems "together forming a 'moving, growing, never finished process.'"¹⁰⁷ Both the agent and environment exert a continuous interaction of mutual causal influence so that both systems cannot be modelled as separate systems, but as a single extended cognitive system.¹⁰⁸ Kiverstein argued this dynamic mutuality between the agent and environment grounds the mark of the cognitive to settle the ExT and EmT debate, whilst contending this cognitive mark is required to make a successful

¹⁰² Kiverstein, "Extended Cognition," 31-32.

¹⁰³ Anthony Chemero, *Radical Embodied Cognitive Science* (Cambridge, MA: MIT Press, 2009), 29.

¹⁰⁴ Anthony Chemero, "Radical Embodied Cognitive Science," *Review of General Psychology* 17, no.2 (2013): 147.

¹⁰⁵ Chemero, "Radical Embodied Cognitive Science," 148.

¹⁰⁶ Alva Noë and Evan Thompson, eds., *Vision and Mind: Selected Readings in the Philosophy of Perception* (Cambridge: Massachusetts, MIT Press, 2002), 79.

¹⁰⁷ Kiverstein, "Extended Cognition," 32.

¹⁰⁸ Kiverstein, "Extended Cognition," 35.

case for extended cognition without necessarily being committed to the representational model of cognition.¹⁰⁹

However, Kiverstein's appeal to RECS is vulnerable to Ken Aizawa's criticism that RECS' continuous reciprocal causal (CRC) relations with the environmental structures and resources presuppose that a mark of cognition already exists in the agent. This effectively makes it a *source* of cognition. Cognition extends, for example, when an agent couples with a notebook through continuous reciprocal causation.¹¹⁰ Aizawa's criticism is critical to the concept of *coupling* within the RECS approach, criticising that appealing to the idea of coupling requires the assumption that such a mark of cognition must be satisfied in the agent alone for a successful coupling with the environment. This, however, defeats the purpose of appealing to RECS in the first place to search for a theory which can tease out the mark of the cognitive. Aizawa believed that there is an apparent tension or gap between CRC and RECS' appeal to a dynamical system. He pointed out that in the case of Otto and his notebook,¹¹¹ the notebook forms a unitary system through CRC according to the dynamical model. However, Aizawa's concern is "why couldn't Otto's brain be a component with cognitive processes?"¹¹² Therefore, based on this tension or gap, proponents of RECS should therefore abandon the CRC commitment.

Owing to this apparent difficulty, an alternative or rectified theory is required. For this reason, I intend to argue that appealing to Lambros Malafouris' material engagement theory (MET)¹¹³ seen through the lens of extensive enactivism are the components needed in order to tease out the mark of the cognitive. Additionally, examining our habitual engagement with the material culture reveals how our bodies are constitutively intertwined with material things, thereby transforming how we understand ourselves and our place in the world. Chapter III will unpack this alternative theory in more detail, examining how the MET approach might close the apparent gaps or tensions that Aizawa criticised.

¹⁰⁹ Kiverstein, "Extended Cognition," 37.

¹¹⁰ Ken Aizawa, "Critical Note: So, What Again is 4E Cognition?," in *The Oxford Handbook of 4E Cognition*, edited by Albert Newen, Leon De Bruin and Shaun Gallagher (United Kingdom: Oxford University Press, 2018), 121.

¹¹¹ Aizawa is referring to Inga and Otto's thought experiment written by Andy Clark and David Chalmers in their article "The Extended Mind," *Analysis* 58, no.1 (1998): 7-19.

¹¹² Aizawa, "Critical Note," 121-122.

¹¹³ Malafouris, "Mind and Material Engagement," 1-17.

CHAPTER III: MATERIAL ENGAGEMENT THEORY AND COGNITION

This chapter will contend that by appealing to the material engagement theory (MET) hypothesised by Lambros Malafouris, the mark of the cognitive can be teased out. Before discussing this theory needed for the mark of the cognitive, it will be clarified what is meant when it is said that *that* process(es) constitutes the mark of the cognitive. Mark Rowlands attempted to answer this question, arguing that if the four inter-related conditions are fulfilled, such a process teases out the mark of the cognitive.

Rowlands' thought-provoking book titled *The New Science of the Mind*¹¹⁴ provides an insightful basis for the mark of cognition. The main purpose of the book is to show the readers why Cartesian cognitive science, the science that presupposes that mental states and cognitive processes have a priori location or a place of origin, must be rejected. Since these cognitive processes are believed to be located in the brain, that is, they are exclusively realised by neural mechanisms in the brain, it does not accommodate any extracranial processes or consider external resources as constitutive parts of the cognitive process.¹¹⁵ Rowlands believes that when processes outside the brain fulfil the initial conditions that form the basis for the mark of cognition, these external processes are constitutive parts of the cognitive processing of the subject. According to Rowlands, processes outside the brain not only play a causal role but also a constitutive role in our cognising process. However, to determine that these external processes are indeed real parts of our cognising process, a mark of the cognitive is required.¹¹⁶

Rowlands' mark of the cognitive comprises four akin conditions that, if sufficiently fulfilled, qualify processes to be of the cognitive kind, whether internal or external.¹¹⁷

Quoting Rowlands at length:

when we examine cognitive-scientific practice, what we find is an implicit mark or criterion of the cognitive that looks like this: A process *P* is a cognitive process if: 1. *P* involves *information processing* – the manipulation and transformation of information-bearing structures. 2. This information processing has the *proper function of making available* either to the subject or to subsequent processing operations information that was, prior to this

¹¹⁴ Rowlands, *The New Science of the Mind*.

¹¹⁵ Victor Loughlin, "Mark Rowlands, the New Science of the Mind: From Extended Mind to Embodied Phenomenology," *Phenomenology and the Cognitive Sciences*, no. 12 (2013): 891.

¹¹⁶ Loughlin, "Mark Rowlands, the New Science of the Mind," 891.

¹¹⁷ Loughlin, "Mark Rowlands, the New Science of the Mind," 893.

processing, unavailable. 3. This information is made available by way of the production, in the subject of *P*, of a *representational state*. 4. *P* is a process that *belongs* to the *subject* of that *representational state*.¹¹⁸

One can infer that these four conditions are conservative and Rowlands clarifies that as a matter of strategy, his criterion of the mark of the cognitive “has conservative origins – origins that even the most dyed-in-the-wool defender of tradition would have to accept – but radical consequences.”¹¹⁹ In other words, Rowlands wants to make a case that it is coherent to argue for the embodied mind and the extended or amalgamated mind, as he calls it, by appealing to conservative commitments. For him, there is no apparent contradiction when one incorporates conservative cognitivism with one’s amalgamated mind.

Further, in David Marr’s theory of vision, visual perceptions are the transformations and manipulations of information in the retinal image. According to Marr’s theory, visual perception begins with the formation of an informationally impoverished retinal image. There are three operations within this process; first, the transformation of this retinal image into the raw primal sketch takes place. Second, the transformation of the raw primal sketch into a full primal sketch occurs. The third operation is the transformation of the full primal sketch into a 2.5Dimensional (2.5D) sketch, which is the culmination of the whole perceptual processing. At each stage of the operation, an information-bearing structure is transformed into another, and so on (fulfilling condition 1) and in every transformation, new information is available for processing (fulfilling condition 2). Finally, the culmination of this perceptual process is the 2.5D sketch.¹²⁰ The items that carry new information-bearing structures in each successive stage of processing are the basic representational states; however, this representational state is derivative from or within the processing stream itself rather than outside the process. This makes it nonderived representational content (thus fulfilling condition 3).¹²¹

Conditions one to three, if sufficiently fulfilled, are supposedly the “paradigmatic internalist approach to cognitive-scientific practice”¹²² according to Rowlands and the

¹¹⁸ Rowlands, *The New Science of the Mind*, 110 – 111.

¹¹⁹ Rowlands, *The New Science of the Mind*, 114.

¹²⁰ Rowlands, *The New Science of the Mind*, 120 – 121.

¹²¹ Rowlands, *The New Science of the Mind*, 122.

¹²² Rowlands, *The New Science of the Mind*, 122.

same conditions can be extracted from this internalist model to make a case for extended models of cognition. To do this, Rowlands refers to Gibson's work on the direct theory of perception, except that Rowlands creatively reinterprets Gibson's work devoid of any hostility towards the notion of representations or concept of representation generally. Therefore, the hybrid Gibsonian account that Rowlands comes up with is that condition (1) involves the manipulation of the optic array, that is, the transformation of one optic array into another can also be seen as a transformation of one information-bearing structure into another. Condition (2) involves making available, either to the organism or subsequent processing operation, the invariant information that was not previously available. Condition (3) sees the manipulation and transformation of one optic array into another as the manipulation and transformation of intracranial information-bearing structures, which culminated in processes of a representational state, indicating that the visual perception of the world is such-and-such.¹²³ Taking these three conditions together and mirroring them from the internalist model of cognition, Rowlands strategically comes up with the process that teases out the mark of the cognitive.

Perhaps the most important condition among these is condition (4) since, according to Rowlands, both theses (the embodied and the extended mind) "are straightforward implications of our *ownership* of cognitive processes, when this is properly understood."¹²⁴ Rowlands' fourth condition, where conditions one to three must belong to a *subject*, is designed to counter the cognitive bloat objection. Cognitive bloat is the objection against the proponents of non-Cartesian approaches of the mind. According to this objection, if mental states and cognitive processes are partly realised or can extend outside the brain and skull, there could be potentially no limit to what can be counted as part of cognition or the human mind.¹²⁵ The force of Rowlands' four conditions for the mark of the cognitive certainly make a strong case for both embodied and extended cognition, that is, Rowlands successfully argues why the classical internalist view of cognition should not be the only focus of cognitive scientists' research programmes; extracranial process(es) can also be a constituent part of cognition if certain conditions are fulfilled.

¹²³ Rowlands, *The New Science of the Mind*, 122 – 124.

¹²⁴ Rowlands, *The New Science of the Mind*, 150. (Please note that it is italicised in the original).

¹²⁵ Loughlin, "Mark Rowlands, the New Science of the Mind," 895.

In saying this, however, Rowlands' four conditions for his mark of the cognitive still fall short, in the sense that they still presuppose that a mark of cognition is modelled on the traditionalist or brain-based conception of the mind. That is, by formulating the four conditions crafted from conservative and internalist commitments and contending that these same conditions can be mirrored or extracted by extracranial processes, the extracted extracranial processes are constitutive parts of the cognitive process. Thus, cognition extends outside the head, though it is owned primarily by the cogniser. Its traditionalist commitment comes from the assumption that the mark of cognition inherently involves the manipulations and transformations of information-bearing structures and the need for representations. Though Rowlands is vague in his specification whether his model of representations is inherently a cerebral affair or purely systemic, as is emergent, one thing is quite clear in his presentation of the four conditions, that is, he has taken it to be axiomatic that representations are necessary for cognition. As I have already discussed in the early chapter, it cannot be presupposed that cognition proposed by the cognitive scientists is taken to be axiomatic for the main reason that not all cognitions within the study of natural biology necessarily involve representations or manipulations of information-bearing structures (at least not on a minimal level of the cognitive process).

For example, according to Barbara Webb's work on cricket phonotaxis, the navigational behaviour of crickets in nature may not necessarily be engaged in the manipulation of information-bearing structures and representational processes. Female crickets navigate their male counterparts purely by listening to the acoustic signals of male songs and as the female crickets continuously listen to this signal, they adjust their path accordingly at the same time as they approach. According to this study, the male cricket's song has a particular characteristic tone and rhythm that specifically matches the unique makeup of the female's auditory system, which, in return, is capable of responding to the male's species-specific signals. Female crickets' behavioural orientation towards the males' acoustic signals is an immediate result of the physical path of the males' particular tone and rhythm, directly received by the sensory system in the female crickets. In other words, the capacity of these organisms to successfully locate their mating counterpart is dependent on their ongoing interactive process of engagement with the environment. Therefore, in doing so, these organisms navigate or exploit the special features of their environment (in this instance, locating the songs of male crickets' acoustic signals). In this picture of minimal cognition perform by the crickets, beautiful synchronous

cooperation between these species exists, and their navigational activity exploiting their environmental features involves nothing more than a sequence of dynamic and synchronous embodied interactions without the need of representations.¹²⁶

The mechanisms of cricket phonotaxis could be considered a complex state of affairs involving varying components between the cricket's interneural, bodily, and environmental dynamics and continuous interactions. As Louise Barrett discusses in her book *Beyond the Brain: How Body and Environment Shape Animal and Human Minds*, studies show that a female cricket has two ears or eardrums located on each front leg, which are connected with each other by a tracheal tube. In addition to the two eardrums, crickets also have additional auditory spiracles located on each side of the top of their body which are also connected to the eardrums via a tracheal tube.¹²⁷ In cricket's anatomy, sound vibrations are picked up both directly and indirectly. That is, sound waves can travel directly from the sound source and through the spiracles and trachea.¹²⁸ This is an intriguing part of the cricket's auditory functions; that is, depending on where the sound is coming from, the female cricket's auditory spiracles and eardrums receive the soundwaves at varying phases since the external ear will receive sound waves faster than the internal auditory spiracles. While the other part of the eardrum and the auditory spiracle, which are not directly receiving the sound source, will detect the sound vibrations further away, and therefore, they will arrive at the eardrum in the same phase (since the external ear would be further away from the sound source).¹²⁹ Depending on the dynamic functionality of the female cricket's ears and auditory spiracles positions, it will affect its environmental navigation or behavioural movement. Barrett describes that each eardrum is connected by approximately fifty neurons to the rest of the cricket's nervous system, and these are even further converged on a smaller number of interneurons. The pairing of interneurons is crucial since it will be this particular pair of interneurons closer to the sound source (which receives a higher oscillation) that will reach a certain threshold faster and therefore, will have a more rapid firing compared to the pair of interneurons further away from the sound source.¹³⁰ Based on neurophysiological studies, whichever interneurons that fire intensely, can potentially

¹²⁶ Hutto and Myin, *Radicalizing Enactivism*, 42 – 43.

¹²⁷ Louise Barrett, *Beyond the Brain: How Body and Environment Shape Animal and Human Minds* (Princeton, NJ: Princeton University Press, 2011), 50.

¹²⁸ Barrett, *Beyond the Brain*, 50.

¹²⁹ Barrett, *Beyond the Brain*, 50.

¹³⁰ Barrett, *Beyond the Brain*, 50.

affect a female cricket's phonotaxis behaviour. It means female cricket is likely to route itself toward a male that produces a higher amplitude by simply steering towards the direction of the interneurons that fire first after each chirp. This particular interneural reactive in a female cricket's phonotaxis behaviour towards a conspecific male's song may have been an innate or adaptive tactic (responding at the beginning of each chirp) instead of "analysing the whole pattern of the syllables and chirps."¹³¹

However, one can argue that the reason why a female cricket is drawn towards a stronger oscillation of chirps by a male cricket is that a male cricket's song contains locational information. This information is then consumed and manipulated by a simple interneural process that triggers phonotaxis behaviour in a female cricket. In other words, the male song is considered to be a representational vehicle containing information about its location. Therefore, one cannot always rule out the possibility of the representational content involving process in cricket's phonotaxis. This may have been the case, and more arguments in support of cricket's representational process may need to be further substantiated, but obviously, providing a substantial argument is beyond the scope of the present chapter of this thesis. However, for the sake of argument, one could also argue that a female cricket's phonotaxis may have involved intentionality without the representational mental content. In their paper, *The Primacy of Skilled Intentionality*, Julian Kiverstein and Erik Rietveld have argued for the possibility of intentionality without necessarily involving mental representational contents. Kiverstein and Rietveld put forward the concept of skilled intentionality. According to this concept:

*Skilled intentionality is the individual's selective openness and responsiveness to affordances – the possibilities for action the environment offers to animals in a form of life because of the skills and abilities available within this form of life. More succinctly: "affordances are relations between aspects of a material environment and abilities available in a form of life."*¹³²

In their characterisation of skilled intentionality, Kiverstein and Rietveld outlined the following two features. Firstly, it is the selective responsiveness of an individual animal to the landscape of affordances in the environment that answers its needs and concerns. Secondly, the openness of an individual animal to the field of affordances, whereby the

¹³¹ Barrett, *Beyond the Brain*, 50 – 51.

¹³² Julian Kiverstein and Erik Rietveld, "The Primacy of Skilled Intentionality: on Hutto & Satne's the Natural Origins of Content," *Philosophia* 43, no. 3 (2015): 704.

individual animal is understood to have a varying degree of readiness to act on a multiplicity of affordances based on its skills and abilities.¹³³ In relation to the female cricket's phonotaxis, skilled intentionality can be viewed in a way that a phonotactic process can only be activated by a very specific environmental trigger; and based on the multiplicity of affordances, the selective response of a female cricket will depend on the immediate relevance or significance for its concerns and needs. For example, when a female cricket responds to a male song, its behaviour towards the source of the song is motivated by that environmental cue (the male song). However, if a more significant concern arises (for instance, a detection of a bat predatory eating insects), a female cricket's steering behaviour towards the location of a male song would have to be interrupted. As a result, the female cricket may have to stop, modify its direction, or hide underneath stones or logs in order to survive. This specific behaviour, I would suspect, would be a common or habitual occurrence in the phonotactic process of female cricket. For the simple reason, when an individual animal repeatedly exercises its skills (in this case, the female cricket's sensitivity to predatory soundwaves and the necessary strategies to avoid predators), it will bring the individual animal to the point of being exquisitely sensitive to the demands of the situation and the affordances from the environment it offers. The female cricket's intentionality to respond to the demands of its situation could be motivated by repeated practice or habitually exercised skills in answer to the demands of its situation; taking this immediate corrective action in order to gain a better and improved grip on the situation,¹³⁴ may not necessarily involve a mental representational process. This behaviour may simply be a result of a dynamic process in the life form of a female cricket's phonotaxis.

I agree with Rowlands in his attempt to make a case to defend the non-Cartesian theory of the mind. The only disagreement I have with him concerns his starting point to ground his mark of the cognitive, that is, his hasty assumption that cognition necessarily involves the manipulation of information-bearing structures and, therefore, the representational process. In his attempt to strategically smuggle a non-Cartesian model of cognition into the cognitive scientists' arena in the hope that the proponents of traditional cognition will be sympathetic, one of the consequences that Rowlands must adhere to, unfortunately, is to remain dedicated to the traditional and internalist commitments of cognition. This

¹³³ Kiverstein and Rietveld, "The Primacy of Skilled Intentionality," 710.

¹³⁴ Kiverstein and Rietveld, "The Primacy of Skilled Intentionality," 705.

implies the assumption that the representational model of cognition is inherently necessary to come up with the mark of the cognitive.

Material Engagement Theory

Unlike Rowlands' four conditions for his mark of cognition, MET does not seek to start from the research programme championed by the cognitive scientists. Rather, it focuses on the research programme championed by cognitive archaeologists and philosophical anthropologists with subsequent implications in the field of phenomenology. My proposed theory to tease out the mark of cognition starts from the assumption that cognition or the mind¹³⁵ has no *a priori* location. This implies that cognition does not start inside the head and is then projected to the world nor does it start from the world and go to the head for representational processing. Instead, it has no *a priori* location. By starting from this assumption, I contend that we can best venture *when* and *how* cognition emerges. If we can somehow articulate the coming together of the various factors that make up cognition, we obtain a theory that can tease out the mark of cognition. As stated at the beginning of this chapter, the mark of the cognitive will be teased out and this is best articulated by referring to MET. In his article "Mind and Material Engagement", Malafouris asks the following questions:

What then if, trying to answer the fundamental questions about the nature of human intelligence, we start from the assumption that the mind has no *a priori* location or place of origin? What if, adopting a point of view well supported in cognitive archaeology and anthropology, we assume that the stuff of mind do not exist only inside the head but can be found also, if not primarily, inside the world?¹³⁶

Malafouris asks us to be critical in our assumption that cognition is a brain-bound system and one-way causation; mental activity comes first and environment second. As we have previously argued, this narrow view of causal cognition that thinking is exclusively situated inside the skin and skull might not be the case after all. At least, it is not the case that all cognition is inherently a brain-based system or necessarily involves the

¹³⁵ For the purpose of this thesis and to avoid confusion, the term "cognition" will be considered synonymous with the term "mind".

¹³⁶ Malafouris, "Mind and Material Engagement," 4.

manipulation and transformation of information-bearing structures for representation. Further, this is certainly not the case in some organisms with basic cognition.

According to Ben Jeffares, this “simple causal arrow from cognition to behaviour is false”.¹³⁷ If we start from the vantage point that the mind has no *a priori* location or normative place of origin, we discard any assumptions that the mind is a brain-bound system. Without this bold assumption, we can examine that environmental, sociocultural and material artefacts may have co-evolved with minds. As Jeffares contends, various approaches to cognition acknowledge that it is not just something that happens *in here*, internally in our brain (within the boundaries of the brain and skull) about the world *out there*, around us.¹³⁸ This suggests that cognition does not simply shape our behaviours, which in turn shape our material culture; our environmental structures and material resources may shape our cognition in return.¹³⁹

Line Making

In MET, Malafouris gives an example of line making that is illustrative of the mark of the cognitive. According to it, the cognitive process has no *a priori* location. As Malafouris states:

Let’s begin with a simple task. Take pen and paper. Draw a line. The sketch of any form will do. Just leave a trace. Make a mark. What constitutes an adequate description of, and how do we account for the process by which skills, hands, instruments and materials intersect to create a trail of ink on the paper’s surface?¹⁴⁰

Malafouris considers three common ways to describe this simple line-making process. First, to think of line making as an *action*, since it shows an active drawing of the line. Second, to think of line making as an *object*, since a line has been drawn on a material object – a paper. Third, to think of the line as a *sign*, since it indicates an index hand moving or a creative gesture. These three common ways of describing the line making process, ontologically, are inseparable because each component supports, constraints,

¹³⁷ Ben Jeffares, “The Co-Evolution of Tools and Minds: Cognition and Material Culture in the Hominin Lineage,” *Phenomenology and the Cognitive Sciences* 9, no. 4 (2010): 504.

¹³⁸ Jeffares, “The Co-Evolution of Tools and Minds,” 504.

¹³⁹ Jeffares, “The Co-Evolution of Tools and Minds,” 504.

¹⁴⁰ Malafouris, “Mind and Material Engagement,” 1.

causes and complements the other. The three components conflate, making the line making process possible. Thus, to grasp their unity is to attend the *cognitive life* of the line.¹⁴¹ Moreover, the “attentiveness to the cognitive life of the line will allow us to see sentience in the trail of ink”.¹⁴²

For Malafouris, the line we draw on paper resulting from the three conflated components exists somewhere in the middle space, neither entirely mental (internal) nor material (external).¹⁴³ In other words, the cognitive life of the line is dependent on the line making process, that is, the conflation of action, object and sign. This enactive process of conflation should not be construed as separate from the cognitive life of the line, but rather, as a constitutive part of the cognitive life of the line itself. This means there are no pre-formed ideas or mental representations of the line inside one’s head that makes line making possible.

The concept of nonderived representational content that traditional cognitivists have taken as their dogma could well be a by-product of looking at the world of experiences from the inside. This is what the anthropologist Tim Ingold referred to as the logic of inversion. For Ingold, people tend to be divided according to their differences, when, in fact, they are joined by their differences and not divided by them. The reason we view ourselves as individuals different from each other is that we are positioned differently in the world, within this unbounded and all-embracing matrix of relations. Therefore, in this sense, differences cannot be equated with diversity as diversity is construed to be the measure of differences rendered in the discourse of similarity.¹⁴⁴ Furthermore, there is a persistent tendency in modern thought to reconstruct the matrix in which people are positioned, with and from which they identify their sense of identity and belonging, into an internal and representational cognitive affair owned by them. Here, the term “owned” is used as Rowlands would refer to this as the sense of *ownership*, the fourth condition of his mark of the cognitive. The manifestation of behaviour results from this internal and representational schema of experiences and is nothing but a pure outward expression of this internal affair.¹⁴⁵ The reconfiguration of this matrix is what Ingold calls *inversion*,

¹⁴¹ Malafouris, “Mind and Material Engagement,” 2.

¹⁴² Malafouris, “Mind and Material Engagement,” 2.

¹⁴³ Malafouris, “Mind and Material Engagement,” 4.

¹⁴⁴ Tim Ingold, “The Man in the Machine and the Self-Builder,” *Interdisciplinary Science Reviews: History and Human Nature* 35, no. 3-4 (2010): 354 – 355.

¹⁴⁵ Ingold, “The Man in the Machine and the Self-Builder,” 354.

through which human beings that are originally open to the world they inhabit now become “closed in upon themselves, sealed by an outer boundary or shell that protects their inner constitution from the traffic of interactions with their surroundings.”¹⁴⁶

It seems to me that all these divisions between the internal and external, physical and metaphysical and the apparent gap between the mental and material may, in fact, be caused by the representational logic of inversion. The concept of dynamic conflation of different components (action, object and sign) for line making seems reasonable. This process of the enacted gathering of various components embedded within the matrix of relations – relations that hold the action, object and sign together – is an inseparable process that makes line making possible. This process evidences the mark of the cognitive, that is, the conflated gathering of various components that make line making possible that are necessary to settle the ExT and EmT debate. Furthermore, this process exists neither in the mind, as traditional cognitivists affirm, nor outside the mind, as materialists would see it. Rather, the mark of the cognitive exists somewhere in the middle-in-between space where the brain-body-material cultures conflate, producing a single process of cognition. It is within the conflated matrix of relations of the various components that the mark of the cognitive emerges, rather than the conception of cognition purely as a brain-bound system.

Situating “Cognition” in the Middle-In-Between Space

Malafouris’ example of the line making process is one of the basic examples of the mark of the cognitive process. This approach of cognition, as situated in the middle, in-between space whereby various components of the brain, body and material culture conflate, is the creative process at the heart of human evolution, right from the earliest lithic ecologies to the latest digital ontologies.¹⁴⁷ For instance, during the lithic age when early hominins began to make stone tools for hunting or navigation, their stone tool-making process should not be interpreted as a by-product of thinking, but rather, seen as a way of thinking or process that is at the heart of thinking itself. Just like line making, the process by which early hominins made stone tools not only shows the external signs of their skills, memories, and intentions, but we also observe “how the affordances of stone make

¹⁴⁶ Ingold, “The Man in the Machine and the Self-Builder,” 355.

¹⁴⁷ Malafouris, “Mind and Material Engagement,” 3.

possible for human bodies to learn and to remember skills, to sense causality, or to enact intentions.”¹⁴⁸ In other words, stone tool making is a process where the material-brain-body conflate and actively and meaningfully participate in the cognitive process of thinking. In short, it can be construed that the stone tool-making process is thinking in action.

Perhaps a more mundane example to also show that intentions are primarily action-oriented is if an individual says they intend to go to a Kiss concert, there are various things *they must do* if it is to be said that they, indeed, intend to go to a Kiss concert. If someone genuinely intends to attend the concert, they must first obtain a concert ticket. It may involve searching for the best internet site to buy the ticket; they may drive their car or hire a cab to reach the concert arena. If they are an avid fan, they may even buy a Kiss costume and so on. As noted by Graham Button et al., someone that does all these various preparations before going to the concert and is eventually there at the concert arena “does not merely provide us with *evidence from which the existence of his intention can be inferred*: rather, doing all these things *qualifies* the person as possessing the intention.”¹⁴⁹ In other words, intentionality, in this sense, depends on the relationships between the person’s ensuing activities (such as the things *they must do* to go to the Kiss concert) in the situations in which these prior preparations are produced.

How about those cases in which it appears that the sincere affirmation of thought is tantamount to the sincere affirmation of a mental image or representation? For instance, suppose someone asks me to think of the number “four” and I think of the number “four” purely in an abstract formulation of the word without vocalising it, or I simply conjure the number “4” purely in my head while sitting comfortably in my chair, drinking my favourite whiskey. Proponents of the traditional representationalist view would see this as a cognitive quality that uniquely transpires within the confines of my brain. Surely, this sort of cognitive event does not involve the enacted process or any activities outside my brain. However, according to Jeff Coulter, we must count the context in which the order to think of the number “4” was given because that was the context in which “the order to think of the number ‘4’ that gave meaning to the image or subvocal saying.”¹⁵⁰ As David Rubinstein aptly puts it,

¹⁴⁸ Malafouris, “Mind and Material Engagement,” 3.

¹⁴⁹ Graham Button et al., *Computers, Minds, and Conduct* (Cambridge, UK; Polity Press, 1995), 35.

¹⁵⁰ Jeff Coulter, “The Brain as Agent,” *Human Studies* 2, no. 1 (1979): 345.

If an individual was directed to think of a sociologist and a picture of Emile Durkheim came to his mind, what would make this a case of ‘thinking of a sociologist’? Not the picture alone. For we could ask the individual to think of a French professor and again he might picture Emile Durkheim. The same picture might represent any one of a number of different thoughts and its meaning a sociologist, a French professor, a Dreyfusard, or an erect mammal could not be determined by the mental picture alone. The *context*, in this case the order given, would determine its meaning.¹⁵¹

Of course, the contexts in which thoughts occur are deeply grounded in our ordinary experiences. Therefore, to account for the thoughts, intentions and thinking of persons and things, they cannot be construed as prescientific conjectures or unscientific fictions that are awaiting development in the neurosciences for their correction or even replacement. On the contrary, these cognitive faculties “are ruled by practical logic and have firm places in the flux of our lives together.”¹⁵² In short, thoughts and intentions cannot be divorced from our ordinary activities as they occur in instances when we observe, recognise or associate people and things that lead these cognitive faculties to emerge. Thus, thoughts and intentions, in this sense, are enacted activities in our mundane lives. They are emergent properties from a process where the material-brain-body actively conflate and meaningfully participate in the cognitive process of our thinking, intentions and thoughts.

To return to the previous example of line making, the characteristic of MET mainly lies in closely examining various elements such as the lines, forms and material traces left or made in the course of their becoming. This dynamic ensemble flows and configures matter and energy that sentient creatures use to manipulate and organise themselves to relate with their surrounding environment and each other; it is referred to as *mind-stuff*.¹⁵³ As Malafouris illustrates,

What we call mind is a ‘process’ constituted by the continuous recycling and re-organisation of mind-stuff, i.e., a cognitive becoming. Thinking, like form-making, exists in a state of

¹⁵¹ David Rubinstein, “The Concept of Action in the Social Sciences,” *Journal for the Theory of Social Behaviour* 7, no. 2 (1977): 223 – 224.

¹⁵² Coulter, “The Brain as Agent,” 346.

¹⁵³ Malafouris, “Mind and Material Engagement,” 5.

perpetual movement. Minds never stop minding. Minds always become.¹⁵⁴

Malafouris indicates that the mind has no ontological existence separate from the stuff that constitutes it. If a mind is a “process”, that is, the dynamic conglomerations of brain, body and culture, it is implied that the mind is plastic. Contextually, the mind’s plasticity is the process of the continuous manipulation of environmental structures and resources¹⁵⁵ and vice versa; through this continual process, thinking or the mind emerges. This process of continuous recycling and re-organisation of mind-stuff is a clear indication of the mark of the cognitive. According to Malafouris, “we have a plastic mind, inextricably intertwined with the plasticity of culture. I call that special feature of human becoming metaplasticity.”¹⁵⁶ This concept of metaplasticity can be interpreted as a dynamic relationship between brains, bodies and the material culture, constantly interacting towards human becoming. This process can be found neither inside the head nor outside it, but somewhere in the middle-in-between the mental and material. This middle-in-between space is where the continuous and perpetual flux of movement for the recycling and re-organising of mind-stuff occurs and moves towards its human becoming.

So far, we have extrapolated the various characteristics of MET, namely, the line making process, mind-stuff and the concept of metaplasticity. The underlying commitment of these features is the assumption that the mind has no *a priori* location or place of origin. With all these concepts on the table, we can now discuss and answer Aizawa’s concern regarding RECS’ concept of continuous reciprocal causation (CRC) in Chapter II. To reiterate, Aizawa’s concern is “why couldn’t Otto’s brain be a component with cognitive processes?”¹⁵⁷ If this is indeed a real concern, RECS’ commitment to the idea of dynamical systems and CRC faces a problem, that is, there seems to be a tension or gap between these ideas that RECS is committed to. On the one hand, dynamical systems treat both the agents and environments as two separate and functioning systems. On the other, through the process of the dynamical system, these two functioning systems (that is, agents and environments) are coupled in a nonlinear direction as “they form a unified,

¹⁵⁴ Malafouris, “Mind and Material Engagement,” 5.

¹⁵⁵ It has to be noted that the reference to the manipulability of environmental structures and resources does not necessarily mean a manipulation for representational states or internal contents. Rather, the manipulation is construed to be an enactive process or engagement *with* and *through* material structures and resources that mark the mental. In other words, through our active and meaningful engagement with the material ecology, we participate in the process of what we call the “mind.”

¹⁵⁶ Malafouris, “Mind and Material Engagement,” 5.

¹⁵⁷ Aizawa, “Critical Note,” 121-122.

nondecomposable system, which is to say that they form a system whose behavior cannot be modelled, even approximately, as a set of separate parts.”¹⁵⁸ Further, RECS is committed to CRC for cognition to extend. As Kiverstein himself argues, the dynamic coupling between the agents and environments, that is, their continuous reciprocal causation is “best modeled as a single extended cognitive system.”¹⁵⁹ Thus, the alleged tension is in the idea of coupling or CRC commitment; if rightly coupled, cognition extends. Aizawa contends that RECS’ CRC relations with the environmental structures presuppose that a mark of cognition already exists in the agent, making it a source of cognition, such that when an agent couples with an object in the right way, cognition extends through continuous reciprocal causation.¹⁶⁰ This criticism may be reasonable, such that when we examine the idea of extension, intuition informs us that something is being extended. If something is being extended, *that* something, say cognition, must have a place of origin from which to extend. Therefore, Aizawa’s concern about why Otto’s brain should be considered as a sufficient component for a cognitive process persuasively holds weight.

In response, Kiverstein can argue that Aizawa’s criticism towards RECS’ commitment to CRC relations is misplaced. This is because the latter mistakenly refers to the source of cognition as situated in the agent alone. However, the agency responsible for cognition is not just a single part, for example, the individual’s brain, but rather the diverse conflation of the brain, body and material culture or what Malafouris calls mind-stuff. As Malafouris argues, “no single part of this dynamical system is responsible for central processing. What is often described or seen as central processing is in fact an attribution of agency.”¹⁶¹ If this is the line of argument that Kiverstein is ready to take, any talk or commitment to the extension of or extended cognition must be abandoned. It would then imply that Kiverstein must start from the assumption that cognition has no *a priori* location so that nothing whatsoever must be extended. In this view of the cognitive process, cognition is situated somewhere in the middle-in-between space.

Therefore, Kiverstein’s use of RECS and its commitment to CRC and dynamical systems between the agents and environments on which he attempts to situate the mark of the

¹⁵⁸ Chemero, *Radical Embodied Cognitive Science*, 31.

¹⁵⁹ Kiverstein, “Extended Cognition,” 35.

¹⁶⁰ Aizawa, “Critical Note,” 121.

¹⁶¹ Malafouris, “Mind and Material Engagement,” 6.

cognitive to settle the ExT and EmT debate does not hold. This is because it lacks the characterisation that these movements or gatherings of mind-stuff (or as Kiverstein calls it, the dynamical system of coupling between the agent and environment) start from the assumption that cognition has no *a priori* location. Perhaps, Kiverstein's attempt to tease out the mark of the cognitive lacks the ontological status of "things" and the active role of the material culture within and with which we find ourselves mutually interacting. By delving deeper into the conceptions of the line making process, mind-stuff and metaplasticity that have been persuasively presented by Malafouris' MET and by starting from the assumption that cognition has no place of origin, we avoid falling into the trap of using our theoretical commitments to make a case for extended cognition. MET eludes Aizawa's criticism because in MET's perspective, the centrality of Otto's brain

does not lie in its ability to constitute mentality by internalising and representing the world; rather, it lies in the ability of the brain to connect, to attend, to attune and relate to the world using its extraordinary plasticity and sensitivity. In other words, brain operations are inseparable from the rest of the body and its surrounding relevant environment.¹⁶²

If cognition has no *a priori* location, we can tear down the opulent assumption that the brain is the executive pilot of the whole cognitive process. In this dynamical system whereby the material culture-brain-body conflate, forming the continuous recycling and re-organisation of mind-stuff towards human becoming, no single part of the components is considered responsible for the centrality of the entire process. Rather, all components in this dynamical model are responsible for the whole process, the brain alone does not need to carry the responsibility. It follows that the active role of the material culture in our form-making process and ongoing activity with the material culture towards human becoming constitutes the requisite process to tease out the mark of the cognitive. Therefore, MET is the hypothesis needed to settle the ExT and EmT debate.

The Mark of Cognition as *Thing-ing*

The last section of Chapter III will assess the heart of MET's approach within the concept of *thing-ing*. Malafouris defines thing-ing as the "ontological gathering, the coming together of specific mind-stuff".¹⁶³ To prove that it is the mark of the cognitive, I intend

¹⁶² Malafouris, "Mind and Material Engagement," 6.

¹⁶³ Malafouris, "Mind and Material Engagement," 7.

to use Malafouris' conception of thing-ing to illustrate that many of our cognitive tasks are best described as thing-ing. According to Malafouris, "our ways of think-ing are better described as modes of *thing-ing*".¹⁶⁴ Our conventional idea of thinking is usually understood as something we do *about* things in the absence of things. However, thing-ing is a kind of thinking we do primarily *with* and *through* things. For MET, *with-ness* and *through-ness* take precedence over *about-ness*.¹⁶⁵ Moreover, thing-ing "signif[ies] flow: the ongoing movement and transformation of mind-stuff... *thinging* should be seen itself as an *act of consciousness*."¹⁶⁶ The analytical value of thing-ing does not depend on making a differentiation between what things are as entities or static and de-contextualised objects, material structures and tools. Rather, thing-ing refers primarily to how things come to be, that is, "how things come to possess ontological specificity or multiplicity in the course of their situated life histories."¹⁶⁷ In other words, the primary phenomenological ingredients of thing-ing are the enactive and ecological approaches to the creative process between the entanglement of humans and things, or the ontological *synechism* (sourced from the Greek word *synechēs*, meaning continuous) enmeshing of form and matter or its *hylonoetic* (sourced from the Greek words *hyle* or matter and *nous* or mind) process – the constitutive intertwining of mind and matter towards human becoming.¹⁶⁸

Before giving an illustrative example of thing-ing, it is important to mention that this concept is rooted in Martin Heidegger's famous essay titled "Das Ding" (The Thing) published in 1975, in which Heidegger examines the ontological power of thing(s). Heidegger articulates that "the vessel's thingness does not lie at all in the material of which it consists, but in the void that it holds."¹⁶⁹ According to Malafouris, Heidegger's articulation of "thing-ness" is not so much about producing the various primary and secondary material or phenomenal qualities of the thing, but more "about penetrating the ontological power of this vessel to 'gather' space and time."¹⁷⁰ Heidegger's introduces the term "thing-ing" to refer to the concept of "gathering" as the tying or unifying together of the vessel's ontological constituents that make up not only the totality of the form-

¹⁶⁴ Malafouris, "Mind and Material Engagement," 7.

¹⁶⁵ Malafouris, "Mind and Material Engagement," 7.

¹⁶⁶ Malafouris, "Mind and Material Engagement," 7.

¹⁶⁷ Malafouris, "Creative Thinging," 143.

¹⁶⁸ Malafouris, "Creative Thinging," 142.

¹⁶⁹ Martin Heidegger, "The Thing," in *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: Harper & Row, 1975), 169.

¹⁷⁰ Nathan Jones and Sam Skinner, eds., *Torque #1: Mind, Language, Technology* (Brescia: Link Editions, 2014), 11.

making process that composes the particular thing but also the material conditions and relations that sustain the “vessel’s social, cognitive, and emotional life (actual and possible).”¹⁷¹

To best illustrate the concept of thing-ing, consider the craft of pottery making. When we normally think of pottery making, we think of the clay pot or ceramic vase, the potter that artistically and skilfully forms the vase by hand and the wheel on which the vase is mounted. The important question to ask in this example is, where does the thinking of the potter end and the moulding or forming of the vase begin? To answer this question, let us examine the process of making itself. It is well known that pots have distinctive lines that run around them. These are a part of the design in pottery making. In this process, many of us would say that the potter must imagine where they need to put the line, visualise the design of the line and determine whether it will be a straight, wavy or abstract line. The potter must also consider whether the line has to be painted, engraved or raised. These are situated projections or anticipations that combine aesthetic and functional considerations.¹⁷²

In this example of pottery making, we can ask how to account for the cognitive life of this line. In other words, where and how should we distinguish the mark of cognition in pottery making? The traditional, classical or representational cognitivism perspectives would view the mark of cognition as something the potter already possesses, that is, the starting point of cognition is always in the potter’s head. Therefore, the cognitive life of the line, so to speak, begins off-line as a mental image or representation formed in the potter’s brain before its actual execution on the exterior wall of the clay pot. The mental image of the line exists before the act of making the line and this same mental image is the cause of the “sequence of motor commands and the proprioceptive, tactile, and visual events as well as the perceptual and kinesthetic experiences that the actual process of marking entails.”¹⁷³ This imaginary line partially carries some relevant but generic information about lines, such as their possible width, size, colour or texture, or the skills and relevant tools needed to produce the line. Nevertheless, it relates or anticipates the formation of the actual line on the clay pot executed by the potter’s actions and

¹⁷¹ Jones and Skinner, *Torque #1*, 11.

¹⁷² Lambros Malafouris, “Thinking as ‘Thinging’: Psychology With Things,” *Current Directions in Psychological Science: A Journal of the American Psychological Society* 29, no. 1 (February 2020): 3.

¹⁷³ Malafouris, “Thinking as ‘Thinging,’” 3.

movements.¹⁷⁴ In short, the engine that causes the making of the line on the clay pot happens inside the potter's brain. This would also mean that the mark of the cognitive is something that is already in the potter's head or everything that constitutes the mark of cognition happens within the boundary of the potter's head and skull.

This simple and straightforward representational narrative of cognition may sound compelling and convincing; nonetheless, in all these mental representations, a serious problem emerges. There is a gap between thinking and forming. As Malafouris expresses, the underlying assumption of the cognitivist view of cognition is the implicit (if not explicit) separation between forming and thinking. The forming process follows or obeys the potter's thinking. In this illustration, therefore, thinking is a kind of gymnastic that happens inside the potter's head, while the actual forming process is a kind of activity that happens within the world.¹⁷⁵ It seems to me that due to this gap or separation, the adherents of traditional cognitivism are confronted with the old problem of explaining how a mental image or representation produces the making of the line on the surface of the clay pot.

Concerning the debate between EmT and ExT, proponents of EmT would argue that thinking and reasoning in the potter are causally dependent on the environmental structures and resources within which the potter is embedded, even though the thinking process is wholly realised by neural systems and mechanisms located inside the potter's head. On the other hand, ExT's proponents would argue that an external process can sometimes be considered a real cognitive process through the parity principle. This principle is committed to an extended functionalist view of cognition, which is to say that if extracranial resources have the same or equivalent functionality to that of intracranial processes located inside the brain, the extracranial processes and resources should be considered part of the cognitive processes by the parity of causal and functional roles. Therefore, based on ExT's view, the potter's formation process of line making on the surface of the clay pot can be seen as a real cognitive process since it mirrors the mental image of a line pre-formed in the potter's head.

As already pointed out in Chapter II, both EmT and ExT proponents may differ in their emphasis on what process teases out the mark of cognition, in this case, pottery making.

¹⁷⁴ Malafouris, "Thinking as 'Thinging'," 3.

¹⁷⁵ Malafouris, "Thinking as 'Thinging'," 3.

Nevertheless, both camps remain more or less committed to the representational version of cognition, in which the internal processes or brain-based model of cognition is considered the yardstick for the mark of the cognitive. Still, the pressing explanatory problem of the gap between the mental and physical or biological and non-biological is not avoided. This is due to the sole reason that the mind or mark of cognition has a priori location; it is best situated inside an individual's brain. This is hypothesised and assumed, to a greater or lesser extent, by the proponents of classical and traditional cognitivism, ExT and EmT of cognition.

What about RECS' view of our pottery making example? How would RECS fare on the pressing problem of the separation between the forming and thinking? As examined earlier in the debate between EmT and ExT, RECS is committed to the mutual manipulability between the agent and environment, their interdependent systems "together forming a 'moving, growing, never finished process.'"¹⁷⁶ Both the agent and environment exert a continuous interaction of mutual causal influence so that both systems cannot be modelled as separate systems, but must be regarded as a single extended cognitive system.¹⁷⁷ Therefore, in RECS' view, both the potter and the line forming on the clay pot are in a continuous process of interaction; this continuous, mutual, causal influence is modelled as a single extended cognitive system to ground the mark of the cognitive. Thus, RECS' approach can be seen as a non-representational model of cognition.

RECS' view can be easily adopted by MET except for the commitment to the extended cognitive system. If RECS' commitment with ExT is not to be construed as an "extension" in a sense that mirrors the functionality of the brain-based model of cognition as demonstrated by the parity principle, MET and RECS can be taken together to make a case in conjunction for the mark of the cognitive through the continuous process of interaction between the potter and the forming of the line on the clay's surface. MET offers something unique and simply unassuming, that is, it "proposes that forming and thinking are inseparable."¹⁷⁸ It does not assume that the mark of cognition is already a pre-cooked set of ingredients and procedures and the process of putting those ingredients together is nothing but following the innate cooking procedures and formulas that already

¹⁷⁶ Kiverstein, "Extended Cognition," 32.

¹⁷⁷ Kiverstein, "Extended Cognition," 35.

¹⁷⁸ Malafouris, "Thinking as 'Thinging'," 6.

exist in the agent's head. Rather, MET discards the assumption that cognition is necessarily a brain-bound system to assess the exchange between the potter and the formation of the line on the clay.

The mental image of forming the line inside the potter's head is best described as "imagination", empirically speaking. To elaborate, imagination as immanent in the actual creative line-making process on the clay pot. Any master potter must start from the basic observation or study of pottery making, and this observation is profoundly embodied, situated and gathered from a variety of material structures and resources that bridge the boundaries between the potter's brain and body. This observational process of consolidating material resources within the embodied and situated activity can be easily misconstrued and, instead, placed as a "mental" process in the conventional internalist sense of memory and imagination, thus divorcing these two elements from actual observation. However, careful observation in the creative process of pottery making reveals a diversified mixture of bodily skills, affordances, techniques, material resources and tools that falsifies the apparent problem of the gap or usual analytical separations between the subject and object, mind and matter, nature and culture, mental and physical, biological and non-biological and so on.¹⁷⁹ The inseparability of forming and thinking is at the heart of thing-ing; specifically, the forming of the line on the clay pot is not the product of externalisation (that is, an external projection of an internal process). On the contrary, material form is deeply interwoven into the mental form. Therefore, in MET's view, the potter's projections and anticipations inhabit the clay *with* and *through* the process of pottery making.¹⁸⁰ As Malafouris articulates,

Forms do not travel from mind to matter. Form making is more of a gift exchange than an imposition. Forms are mundane gifts that mind exchanges with matter, often without the need of linguistic inscription. The mind is not imposed or opposed to matter. Rather, mind and matter, "insights" and "outsights" ... merge together in the situated activities that carry forward the process of creative thinging.¹⁸¹

Therefore, the coming together and dynamical ongoing movement and transformation of mind-stuff, that is, the gathering of various components of the potter's brain-body-clay

¹⁷⁹ Malafouris, "Thinking as 'Thinging'," 6.

¹⁸⁰ Malafouris, "Thinking as 'Thinging'," 6.

¹⁸¹ Malafouris, "Thinking as 'Thinging'," 6.

within the process of pottery making is arguably situated in the middle-in-between space. It is neither entirely mental nor material. The ontological gathering of this heterogeneous mixture of components in the middle-in-between space is named as the concept of thing-ing by Malafouris. In thing-ing, the bridging or “gift exchange” between mind and matter, *with* and *through* the situated activity of pottery making that carries forward creative becoming or the emerging of an aesthetically stunning piece of pottery, is the mark of the cognitive we need. Thus, MET teases out the mark of cognition, and in the process, eliminates or avoids the so-called gap or separation problem between forming and thinking. MET is not representational nor does it adhere to smuggling any kind of representational commitments into the EmT and ExT debate. Unlike RECS, MET is explicit in its rejection of the idea that the mark of cognition or mind has a priori location. If my interpretation of MET is accurate, incorporating the MET approach within the ExT and EmT debate can clearly tease out the mark of the cognitive.

CHAPTER IV: PHENOMENOLOGY AND MATERIAL ENGAGEMENT THEORY

Towards the end of Chapter III, the theory of *thing-ing* was discussed, examining the ontological value of material things when gathered together in conjunction with an individual's brain and body. For Malafouris, individuality and materiality cannot be separated; in the Malafourisian sense, thing-ing can also be referred to, if not implied as, the agential role of material things in terms of their engagement with the individual's brain and body. However, a nagging problem for MET is to answer the cognitive bloat problem. If MET claims that material things take on agential roles, the theory is vulnerable to the problem known as the cognitive bloat. The second possible problem for MET is whether this concept may, after all, be committed to, endorse or make a case for extended cognition. Therefore, this chapter will attempt to answer these problems by contending that the cognitive bloat does not hold any weight against MET and that if MET is interpreted or slightly modified from an extensive enactivism (EE) perspective, there is no implication of a commitment to or endorsement of extended cognition. These alleged problems will simply collapse. This chapter will also assess the phenomenological approach to MET, particularly in examining its concrete applicability to current technologies.

Agential Role of Material Things

Before discussing the cognitive bloat problem, let us first examine the issue of contention for MET. In his book *How Things Shape the Mind: A Theory of Material Engagement* (HTSM), Malafouris expresses, “*If there is such a thing as human agency, then there is material agency; there is no way human and material agency can be disentangled.*”¹⁸² As discussed in Chapter III, thing-ing is a kind of thinking we do *with* and *through* things, and through the ongoing ecological approach and enactive process between humans and material culture, that is, the constitutive entanglement and enmeshing of various mind-stuff that makes creative human becoming possible. In other words, properties such as thinking and intentionality are not exclusively owned by a human agent, as thing-ing explicitly argues that cognitive processes such as thinking and intentionality do not have a priori location. Rather, they are properties of material engagement, the dynamical

¹⁸² Lambros Malafouris, *How Things Shape the Mind: A theory of Material Engagement* (Cambridge: MIT Press, 2013), 119, <https://ebookcentral.proquest.com/lib/unda/detail.action?docID=3339639#>.

intertwining of humans and material culture, wherein this ongoing process is situated in the middle-in-between space,¹⁸³ neither entirely inside the person's head nor entirely outside. As Malafouris claims, "while agency and intentionality may not be properties of things, they are not properties of humans either; they are the properties of material engagement."¹⁸⁴

It seems to me that MET is a double edged sword that once embraced, also compels us to commit to the other side of its theoretical commitment. As much as MET challenges the anthropocentric view of cognition, that is, cognition is primarily a cerebral affair with a priori location, it also invites us to challenge the anthropocentric view of agency. Although agency, according to Malafouris, is a much-contested concept among philosophers, anthropologists, archaeologists and sociologists, their contentions on the subject are housed within the theoretical margins of a narrow anthropocentric view of agency. Further, though their disagreements are nuanced, they are based on a general agreement about a single indisputable and unquestionable fact that agency, in the real sense of the word (or agents proper), is a property exclusive to humans.¹⁸⁵ As Rowlands would argue, cognitive processes, whether viewed through the internalist lens or amalgamated lens, are strictly owned by the subject or cogniser. According to Rowlands, "cognitive processes – whether neural, embodied, or extended – belong to me when they disclose the world to me."¹⁸⁶ Hence, the most important condition of Rowlands' mark of the cognitive is the fourth condition since the agent proper takes ownership of the cognitive process. Nevertheless, this is precisely the deeply entrenched anthropocentric approach of agency that Malafouris intends to challenge.¹⁸⁷

Malafouris cites various examples to argue for the agential role of material things. Borrowing from Latour's actor-network theory (ANT) and his speed-bump and hotel key examples, Malafouris contends that the speed-bump conveys both a sign and moral

¹⁸³ This hyphenated phrase "middle-in-between space" is my initiative. It is to highlight the idea that cognitive processes such as thinking and intentionality do not exclusively belong to humans nor material culture; rather it belongs to the engagement process between humans and material culture. In this sense, thinking and intentionality exist "in between" since it is an emergent property caused by the engagements between humans and material culture.

¹⁸⁴ Malafouris, *How Things Shape the Mind*, 119.

¹⁸⁵ Malafouris, *How Things Shape the Mind*, 122.

¹⁸⁶ Rowlands, *The New Science of the Mind*, 216.

¹⁸⁷ Malafouris, *How Things Shape the Mind*, 122.

agent.¹⁸⁸ It embodies a very different and somewhat “selfish”¹⁸⁹ morality because of its stubborn material shape, said as, “[p]ass over me at a speed that will allow your back and your car’s suspension not to suffer any damage”.¹⁹⁰ Latour’s ANT is defined as “semiotics of materiality that is symmetrical with respect to human and non-human agents”.¹⁹¹ According to Malafouris,

ANT proposes that all entities participating in those networks should be treated analytically as of equal importance. In other words, for ANT what we call actors or agents are essentially products or effects of networks. That means that no primacy of the human actor – individual or collective – over the non-human actor can be accepted on *a priori* grounds.¹⁹²

Thus, in what sense does the speed-bump convey not only a sign but also a moral agent? From ANT’s perspective, the speed-bump is an entity participating within a network. In this instance, the network may consist of road regulations such as driving practices, the context in which the speed-bump is situated and any other relevant signages. Situated within this network of road rules, the effects of the speed-bump on the car and driver are active and it is no longer a passive sign. It “does more than simply remind drivers to slow down”.¹⁹³

Latour’s example of hotel keys provides another ANT proposition. In this instance, the hotel keys are accompanied by a large, annoying and cumbersome weight. This “weight” embodies the “hotel manager’s initial intention or statement: ‘Please leave your room key at the front desk before you go out’”.¹⁹⁴ The agential role of the keys with a large cumbersome weight attached acts as a nagging reminder to the guests that they must leave their keys at the reception before leaving the hotel. Their heaviness and large shape make the keys burdensome to the guest, thus acting as a reminder (by way of a heavy material object) for the guests to leave them at the reception. Situated within the network of the

¹⁸⁸ Malafouris, *How Things Shape the Mind*, 124.

¹⁸⁹ To clarify, the term “selfish” refers to a non-negotiable enactive material sign. Meaning, Malafouris illustrates that the speed-bump example portrays more than a passive sign to slow down, but rather, it expresses a forceful reminder to people that it is necessary to slow down if they don’t want their car’s suspension to suffer any damage.

¹⁹⁰ Malafouris, *How Things Shape the Mind*, 124.

¹⁹¹ Malafouris, *How Things Shape the Mind*, 123.

¹⁹² Malafouris, *How Things Shape the Mind*, 123.

¹⁹³ Malafouris, *How Things Shape the Mind*, 124.

¹⁹⁴ Malafouris, *How Things Shape the Mind*, 126.

hotel's regulations and manager's intention, the keys serve as more than a simple sign for the guests. Rather, they actively remind them about the hotel's policy. Influenced by Latour's ANT, Malafouris argues,

Agency as an emergent property cannot be reduced to any of the human or the nonhuman components of action. It can only be characterised according to that component that, at a given moment, has the upper hand in the ongoing phenomenological struggle.¹⁹⁵

Malafouris conveys that agency has no *a priori* essence according to which there exists a universal property. Agency cannot be attributed to a single component alone, whether human or non-human, within the network of activity. Rather, it is characterised as a process through which both the aforementioned components are constitutively related to the ongoing phenomenological becoming. In this sense, the most important question to ask is not "what is agency". Rather, the pertinent questions to ask are *when* and *how* agency is constituted and manifested in the world.¹⁹⁶ Therefore, agency in a Malafourisian sense is "the relational and emergent product of material engagement. It is not something given but something to become realized."¹⁹⁷ Concerning the above examples, the sense of agency of both the speed-bump and hotel keys should not be seen as a fixed property that belongs to their materiality (this would be a bizarre idea) or as their material usages extend human capability. Attributing material agency in these terms would be a misinterpretation of material agency in the Malafourisian sense; the agential roles of the speed-bump and hotel keys are dependent on their ongoing relational activities situated within a network of relevant environmental structures or their context. Therefore, one should not characterise material agency divorced from its networks of contextual activities, because agency is the very by-product of material engagement between persons and things.

The Cognitive Bloat Problem

The cognitive bloat objection, in essence, is a slippery slope argument and is usually raised against the extended cognition advances made by Clark and Chalmers' discussion

¹⁹⁵ Malafouris, *How Things Shape the Mind*, 147.

¹⁹⁶ Malafouris, *How Things Shape the Mind*, 147.

¹⁹⁷ Malafouris, *How Things Shape the Mind*, 148.

of Otto's notebook.¹⁹⁸ In their thought experiment, Otto is a person who suffers from Alzheimer's disease and therefore keeps a notebook with him wherein he writes down various facts that will remind him of his day-to-day schedule and relevant places, in particular, information on the Museum of Modern Art, located on the 53rd Street. According to Clark and Chalmers, because of Otto's condition, information about the museum in Otto's notebook will constitute a subset of his belief because they have a functionality that is sufficiently and relevantly similar to the role played by beliefs in his unimpaired friend, Inga.¹⁹⁹ The cognitive bloat objection uses this example as its starting point, objecting that if Clark and Chalmers are willing to allow that the information in Otto's notebook is his beliefs, why stop there? Why not also allow the same concession to claim that Otto's telephone directory, road map directory or even computer and internet play a very similar role or functionality as Otto's notebook since he is so reliant on these things?²⁰⁰

This same objection will apply to any theories of cognition that allow for a cognitive state or process to be extended. That is, if we allow the conception of cognition to be too permissive, we are forced to include cognitive categories of all kinds of structures and processes that may not be cognitive at all. Concerning MET, the criticism is that by arguing for the material agency of the speed-bump and hotel keys, it is ambiguous whether these materials should be considered cognitive agents in themselves. This is due to the fact that speed-bump and hotel keys do not have the same agency as human individuals do. This claim is predicated on a general agreement that agency, in the real sense of the term, is exclusively a human property.²⁰¹ If so, then the concept of material agency would lead to an improbable hypothesis. That is to say, Malafouris extends the conceptions of the mind or agency too hastily. In the Malafourisian sense of agency, Otto's notebook would be considered an agent, as well as his computer or the internet. It would mean that agency is in action everywhere, including cyberspace. Where do we draw the boundary? Therefore, Rowlands argues in response to the cognitive bloat objection that cognitive processes, whether viewed through the internalist lens or amalgamated lens, are strictly owned by the subject or cogniser.²⁰² By arguing that cognitive process must belong to a subject, it undercuts the cognitive bloat problem,

¹⁹⁸ Clark and Chalmers, "The Extended Mind," 12.

¹⁹⁹ Rowlands, *The New Science of the Mind*, 93.

²⁰⁰ Rowlands, *The New Science of the Mind*, 93.

²⁰¹ Malafouris, *How Things Shape the Mind*, 122.

²⁰² Rowlands, *The New Science of the Mind*, 216.

because the fourth condition requires that a cognitive process must play a role in causally revealing the world to a subject. This is crucial for Rowlands since “if there is no subject to which the world is disclosed, there is no cognition.”²⁰³ Therefore, Rowlands’ fourth condition for his mark of the cognitive is to contend that cognitive states are exclusively owned by the agent or cogniser alone.

In defence of MET, one may attempt to answer the cognitive bloat problem by stating that this slippery slope argument is only applicable if the cognitive theory starts from the assumption that cognitive processes have a priori residence in the brain. The irony of this objection is it poses that cognitive processes cannot be extended since they lead to an improbable conclusion. That is, any cognitive theories that support the idea of extended cognition will ultimately be forced to admit all sorts of structures and processes that may not necessarily be considered as cognitive processes.²⁰⁴ However, this objection amounts to question-begging since it forces us to have a cognitive theory that already assumes cognitive processes must be owned by a cogniser or an agent proper to avoid the bloat. If the mark of cognition and agency are not assumed to have a priori location, MET cannot be accused of cognitive bloating, since this problem is only applicable in cognitive theories that assume cognition and agency have a fixed location and reside primarily in a subject.

Additionally, another problem of Rowlands’ notion of ownership is that it does not seem to apply in some other cognitive engagements. For example, when a lawyer is engaged in defence, the main artefact that they will be in engagement with is the legal *code*, written in a law book. One could argue that no agent owns the normative *legal code* found in the law book. The agency of the law book in MET’s perspective will be an emergent property. It will belong neither to the lawyer nor the social norms; rather, its agency will emerge from within a network of activity when the lawyer is engaged with the law book in the right manner under the contextual background of legal practice. If I have interpreted Malafouris’ intended meaning for MET accurately, the boundary of the cognitive process and material agency will be within a contextual network of activities between humans and non-humans.

²⁰³ Rowlands, *The New Science of the Mind*, 217.

²⁰⁴ Rowlands, *The New Science of the Mind*, 86.

The speed-bump example, similar to the law book, is very much situated within a network of road regulations such as driving practices and other relevant signages of road rules. Likewise, the annoying hotel keys are very much situated within the network of the hotel's regulations and hotel policies; they embody the manager's intentions. The speed-bump, hotel keys and law book examples do not merely play a passive role. These things play an active²⁰⁵ role within the network of engagements between humans and non-humans. Their agency is an emergent property within the contextual network of activities they are situated in and engaged with. Therefore, MET's boundary will be within the network of relationships between humans and non-humans – a network wherein the relevant context of engagement produces a productive phenomenological struggle²⁰⁶ or human becoming²⁰⁷, and anything outside this network is arbitrary²⁰⁸. Latour captures this idea of network boundary perfectly, stating,

If we display a socio-technical network – defining trajectories by actants' association and substitution, defining actants by all the trajectories in which they enter, by following translations and, finally, by varying the observer's point of view – we have no need to look for any additional causes. The explanation emerges once the description is saturated... There is no need to go searching for mysterious or global causes outside networks. If something is missing it is because the description is not complete. Period.²⁰⁹

Furthermore, Carl Knappett comments in support of this idea that “agency comes to be distributed across a network, inhering in the associations and relationships between entities, rather than in the entities themselves.”²¹⁰ In this sense, the agency and network

²⁰⁵ “Active” in the sense that these artifacts play more than passive reminders, but they forcefully assert in people to engage because of its material shapes and designs.

²⁰⁶ The phenomenological “struggle” refers here is the ongoing engagement or dynamic exchange between humans and material structures. It refers to whoever/whatever influences the most. That is to say, sometimes material things can become extension of humans but other times humans can become extension of material things. If we look at the speed-bump example, the shape and material structure of a speed-bump can influence drivers to slow down in a forceful manner. Within a network of the road safety regulations and driving practices, the speed-bump has the upper hand (so to speak) in its engagement with humans.

²⁰⁷ Human “becoming” refers to our understanding or making sense of the world. Through our constant engagement with the material culture, material things shape our understanding and our place in the world; and vice versa.

²⁰⁸ Within the context of engagement, let us say, in the hotel keys example. The hotel keys accompanied by a large and heavy piece of metal, embodies a nagging reminder to the guests that they must leave their keys at the reception before leaving the hotel. This reminder only works within the network of the hotel's policy and the manager's intentions – outside of this policy the key with the heavy metal attached to it would simply be arbitrary.

²⁰⁹ Bruno Latour, “Technology is Society made Durable,” *The Sociological Review* 38, no.1 (1990): 129-130.

²¹⁰ Carl Knappett, “Photographs, Skeuomorphs and Marionettes: Some Thoughts on Mind, Agency and Object,” *Journal of Material Culture* 7, no. 1 (2002): 100.

are mutually interrelated and constitutive. That is, both actants, humans and non-humans, cannot act without a network, and likewise, a network consists of actants. Within the boundary of the contextual network where humans and non-humans are engaged, both the mark of cognition and the mark of agency emerge as properties of material engagement. Therefore, from this standpoint, the so-called cognitive bloat problem proves to be question-begging and since MET does not hold any assumption that cognition and agency have a priori location and/or essence, this slippery slope objection does not hold any weight against MET.

One last question a critic may object against the idea of an agency being defined as an emergent property from the process of material engagement between humans and non-humans (such as things, artefacts, and objects); one could ask: what difference would it make if we removed the artefact or the network? Would our agency be diminished without the network of engagements? To examine this question, it is necessary to start with our assumption that we are individuals situated in an interdependent relationship with things, objects, artefacts, rules, regulations, and particular contexts of culture or multiculturalism. As argued above, the interdependent enmeshing of relations between humans and non-humans and their ongoing engagement activities constitutes an emergent property of agency through material engagement. According to this argument, humans and non-humans are inextricably linked; that is, it is impossible to isolate a particular “artefact” from its sociocultural context of relations or networks. To take the speed-bump example, how and in what sense could this be considered as an active participant or ‘actant’ (in Latour’s designation) independent from the various relations that contribute to its construction? Is the speed-bump merely made up of concrete/metal materials or whatever it is made from? Is the speed-bump a mere device created by various people and engineers who designed ‘it’? Is it even possible to disentangle the “speed-bump” from its contextual concept of road rules and regulations, moral implications (such as not to endanger students or pedestrians), the protection of one’s car suspension to avoid accidents, and the spatial locations where the speed-bump is situated? Our sense of “agency” (the assumption that human subjective agents are self-evidently distinct from the material world and its engagements) has always been a mere assumption, specifically a western conception of “agency”, which is tainted by a Cartesian dualist view of reality. However, for the last two decades, research on the idea of the decentralised agency has gained popularity and momentum across the social sciences. Latour’s Actor-Network Theory (ANT) has been particularly influential in shifting its focus from a narrow anthropocentric

view of agency to a conceptualisation of agency as variously distributed relations of networks with respect to the dynamic enmeshing between human and non-human interactions. The participating actants within a particular network of contextual engagements (between humans and non-human artefacts) are treated analytically to have equal importance. Therefore, for ANT, the concept of “agency” is a by-product or an effect of networks of dynamic engagements.²¹¹ Returning to the question: “Would our agency be diminished without the network of engagements?” – from ANT’s perspective, it would. In his book, *Pandora’s Hope: Essays on the Reality of Science Studies*, Bruno Latour tries to answer the ethical question of whether guns kill people or *people* kill people; not guns.²¹² Latour clearly laid out the failure of both materialist and sociological accounts of agency; according to Latour:

What does the gun add to the shooting? In the materialist account, *everything*: an innocent citizen becomes a criminal by virtue of the gun in her hand. The gun enables, of course, but also instructs, directs, even pulls the trigger... Each artifact has its script, its potential to take hold of passersby and force them to play a role in its story. By contrast, the sociological version... renders the gun a *neutral* carrier of will that *adds nothing* to the action, playing the role of a passive conductor, through which good and evil are equally able to flow.²¹³

For Latour, the agency does not entirely belong to the materialist nor to the sociologist, and this is where both accounts fail to recognise²¹⁴ that agency “resides in the blind spot in which society and matter exchange properties.”²¹⁵ From ANT’s account, moral or ethical accountability can neither be attributed to the isolated gun nor the isolated individual person as the sole responsible for the act of killing. Therefore, the responsibility lies somewhere on the “blind spot”, that is, in the way these two actants (the guns and the individual person) come together to construct a new hybrid agent – the gunman – situated within a socio-technical network of interactions that supports and makes possible such action. In this sense, actions involve a coalescence of both human and non-human elements distributed equally within its contextual network.²¹⁶ To remove

²¹¹ Carl Knappett and Lambros Malafouris, “Material and Nonhuman Agency: An Introduction,” in *Material Agency: Towards a Non-Anthropocentric Approach*, 1st ed. eds. Carl Knappett and Lambros Malafouris (New York, NY: Springer Science+Business Media, LLC, 2008), xi.

²¹² Bruno Latour, *Pandora’s Hope: Essays on the Reality of Science Studies* (Cambridge, Massachusetts London, England: Harvard University Press, 1999), 176.

²¹³ Latour, *Pandora’s Hope*, 177.

²¹⁴ Knappett and Malafouris, “Material and Nonhuman Agency,” xi.

²¹⁵ Latour, *Pandora’s Hope*, 190.

²¹⁶ Knappett and Malafouris, “Material and Nonhuman Agency,” xi – xii.

one of the elements that produce the “gunman” would not only make sense, but it would also attribute the moral responsibility to either the gun held by a person or the person holding a gun, but never to a “gunman.” For ANT, no distinctions are given in isolation between human and non-human actants – agency in this view lies in the “blind spot” where both elements come together within a particular socio-technical network.²¹⁷ Agency would diminish if human actants are taken out from the network or from its engagements with non-human artefacts. Likewise, the agency is equally diminished if non-human actants are isolated from their human engagements. Agency is sustained only when a particular action involves a coalescence of both human and non-human elements embedded within a socio-technical network.

Is Material Agency an Artefactually-Scaffolding Process?

Perhaps some critics may object by arguing that material agency does not affect our will significantly or meaningfully to constitute a strong sense of agency. According to Georg Theiner and Chris Drain, the speed-bump does not effectively constitute a strong sense of agency; it does not strongly affect our will that engages us to act as moral agents. Conversely, the “speed bump turns the actions of many selfish individuals into a ‘scaffolded’ display of collective altruism”.²¹⁸ Similarly, the heavy keys do not meaningfully affect our will to comply with the hotel’s policy; instead, they act as a reminder. Both examples are artefactually-scaffolded displays of compliance that do not act or interact with us as a strong sense of agency; they remind us of our resistance, rather than constituting our action to be morally responsible.²¹⁹ For Theiner and Drain, Malafouris’ examples mainly function as artefactually scaffolding, guiding the activity to its intended end without indicating that the material things themselves to play strong agential roles. If material things do not have a strong sense of agency, they do not have a strong mark of cognitive life either. This affects the mark of the cognitive we have been trying to tease out.

²¹⁷ Knappett and Malafouris, “Material and Nonhuman Agency,” xii.

²¹⁸ Georg Theiner and Chris Drain, “What’s the *Matter* With Cognition? A ‘Vygotskian’ Perspective on Material Engagement Theory,” *Phenomenology and the Cognitive Sciences* 16, no. 5 (2017): 855.

²¹⁹ Ransom, “Process, Habit, and Flow,” 28.

To respond to Theiner and Drain's objection, I will draw on Taler Ransom's phenomenological approach to material agency. Ransom contends, "we should consider the role of *habit* according to Merleau-Ponty (2012) and how it relates to Malafouris' (2016a, b) description of embodying action and enactive significance (2013)."²²⁰

Embodiment, in this sense, refers to how we are *situated* in the world, wherein the body comes to take up various relations or connections with the world and therefore develops different ways of navigating or living through ecological²²¹ situations from which it develops ways of *embody-ing* actions. Thus, the embodiment cannot be conceived in isolation from the world it inhabits.²²² A simple everyday example of our habitual engagement with the world is the careful positioning of our things on our desks or in office rooms. I have a very particular working routine – my desk must face a certain direction. I like to work with an open window through which the sun shines in my room. I like to place my computer in a certain position and prefer to have two computer screens to work with. I cannot start working without having a cup of coffee first thing in the morning. In a way, my office room is my niche where the various relations and network of connections between myself and my habitual engagement with the things around me are tightly intertwined. In my habitual working environment, this is where I write my thesis, do my research and send emails to colleagues. If someone tries to disrupt or disarrange the things around me, it will also affect how I navigate my work. It will put me out of position, so to speak.

Malafouris designates agency as a property of material engagement rather than one that belongs only to humans or things.²²³ Therefore, my sense of agency is an emergent property of my ongoing and habitual engagement with the various things around me, and since things are constitutive to my sense of agency and vice versa, the disruption of my habitual flow of engagement with the things around my desk or inside my office will also disrupt my sense of agency. Therefore, if someone deliberately makes a mess of the things inside my office, it will be considered disrespectful of my agency because it will be very hard to function in my working environment when things are not in their usual or habitual

²²⁰ Ransom, "Process, Habit, and Flow," 31. I have adopted this approach (Merleau-Ponty's idea of *habit*) because the idea of *habit* resides neither in the body nor in the brain alone. "Habit" is an emergent property, it is realised in the relation between the engagements of the body and the world.

²²¹ The term "ecological" refers to the entire spectrum of human interactions with the material world.

²²² Ransom, "Process, Habit, and Flow," 32.

²²³ Malafouris, *How Things Shape the Mind*, 119.

flow. Besides, the reason we feel as though our agency primarily belongs to us is because of our habitual engagement with the things around us. The danger of our habitual engagement with things, of course, is we tend to downplay the constitutive role that material things play in our mundane activities.

Likewise, to treat the speed-bump and hotel key examples as materially-scaffolded agencies “seems to miss the ways in which the habitual structure of the body finds itself transactively situated in the flow of being in the world”.²²⁴ For Ransom, the default mode of being in the world always involves our habitualised engagement wherein material things fluidly mesh together with our mundane and pedestrian activities.²²⁵ In other words, we feel as though we are the executive captains of our sense of agency because our habitual flow engages with the world. As we engage with the habitual flow of things, the conflated network of relations, both human and non-human, and the coalition of forces that shape our intentions and actions are almost non-recognisable. Thus, we feel like isolated agents and the material things only scaffold or support our sense of agency.

Nevertheless, in practice, we are interdependent with the material culture, that is, the various networks²²⁶ we habitually engage with. The problem seems to be in our perception of agency; we have habitually perceived agency to belong exclusively by us. However, as I have argued in the previous discussion of material agency, this anthropocentric view of agency must be rectified since it undermines the socio-technical network, associations and relationships between humans and non-humans as well as the niche wherein we habitually engage with the material culture. This view pushes them in the background and we mistakenly conceive ourselves as the centre of the Cartesian universe, separating ourselves as mental entities. Somehow, have deceived ourselves in thinking that we are independent of the realm of materiality and its practice. This anthropocentric view is the biggest sin of an assumption that has been committed so far. Therefore, in my view, Theiner and Drain’s conception of material culture as artefactual scaffolding is too weak to counter Malafouris’ material agency. It misunderstands agency as an emergent property from our habitual process of already being in a network of

²²⁴ Ransom, “Process, Habit, and Flow,” 33.

²²⁵ Ransom, “Process, Habit, and Flow,” 33.

²²⁶ Crudely define, “networks” involve coalescence of actions, processes, systemic regulations, social and cultural structures where humans and nonhuman agents shared or interact.

continuous relationships with material culture, a culture that is very much situated in the world.

Is MET Committed to Extended Cognition?

This section will examine another criticism against MET, that is, whether or not there is any commitment to the extended mind hypothesis in MET. According to Theiner and Drain, Malafouris' theory of "distributed cognition", as discussed in HTSM, is ambiguous in denouncing any commitment to the *coupling* idea according to the extended mind theory. Their criticism is as follows:

without further justification, the 'distributed cognition' approach need not underwrite the ontologically more extravagant 'extended mind' thesis... and we are not convinced that Malafouris presents any decisive argument to that effect.²²⁷

Theiner and Drain also noted that although Malafouris aligns his idea of the hypothesis of the constitutive intertwining (HCI)²²⁸ with the complementary view of the second wave argument for ExC, there is a tension between the proponents of ExC arguing for a "locational externalism" of cognition and Malafouris' repeated assertion that from MET's point of view, cognition has no location.²²⁹ Says Malafouris, "[c]ognition is not a 'within' property; it is a 'between' property".²³⁰ This tension makes Malafouris' MET vulnerable to criticism since it seems that he still endorses extended cognition, which we are trying to avoid.

I agree with Theiner and Drain's criticism of Malafouris' alleged endorsement of the complementary view of the second wave argument of ExC. This is because it is difficult to divorce ExC from its commitment to the "locational externalism" view of cognition while simultaneously endorsing the "anti-localisation" of cognition.²³¹ However, in defence of Malafouris' endorsement of ExC, it needs to be clarified that his endorsement of the "parity principle" or "coupling" should not be referred to as the advocacy of such a simplistic isomorphic view of the parity principle, a view that "if 'exograms' (e.g.,

²²⁷ Theiner and Drain, "What's the *Matter* With Cognition?," 849-850.

²²⁸ In *How Things Shape the Mind*, Malafouris defines HCI as a hypothesis whereby the material culture is seen fundamentally as a co-extensive and consubstantial with the mind (p. 77).

²²⁹ Theiner and Drain, "What's the *Matter* With Cognition?," 851.

²³⁰ Malafouris, *How Things Shape the Mind*, 85.

²³¹ ExC in its first formulation involves a "coupling" concept. This concept implies a locational view of cognition. Meaning, though cognition takes place in the head; nevertheless, it can extend outside the head and skull. This seems to clash with the idea that cognition has no place of origin in the head, since cognition is an emergent property between human and nonhuman engagements of which MET endorses.

Linear B tablets) *act* as ‘engrams’ do, then ‘exograms’ count as part of memory.”²³² As Malafouris himself says, “such a simplistic isomorphic reading of the parity principle is far from what I advocate.”²³³ The HCI of cognition and material culture mainly approach the “parity principle” from the lens of MET.

HCI argues that if we accept that the mind evolves and exists in a tightly entangled activity as a fundamental means of our engagement with the world, then material culture is potentially co-extensive and consubstantial with the mind. This hypothesis views the mind and things as more than causally linked; rather, they are constitutively interdependent – the mind cannot exist without things and vice versa – in terms of their ontological significance. Therefore, the “parity principle”, as viewed by MET, more than implies the “functional isomorphy”²³⁴ between “outer” and “inner” cognitive elements. Rather, it implies a constitutive intertwining of brains, bodies, and things – tightly entangled in their engagement activity with the world and specific cultural and environmental settings. In this reading, the parity principle does not presuppose a prior identity of the mind such that when external resources play or mirror what is a mentally or neural-based system, cognition extends. Instead, the parity principle seen within the context of MET reads as a measure wherein the brain-body-material culture have “equal opportunity” or “symmetrical” importance and contribution. It views cognition or the mind in a “non-anthropocentric” manner.²³⁵ It is this reading of the parity principle that Malafouris’ HCI advocates.

Perhaps another interpretation of Malafouris’ endorsement for ExC is that Malafouris’ HCI aligns with the third wave of ExC.²³⁶ As explained in Chapter II, ExC has had three different waves of development since its genesis that have each endorsed different perspectives or commitments. In particular, the third wave, as first anticipated by John Sutton, seems to be the approach that Malafouris leans towards in his endorsement of ExC. In this third wave, the cognitive process is seen to be reciprocal, dynamic and

²³² Malafouris, *How Things Shape the Mind*, 76.

²³³ Malafouris, *How Things Shape the Mind*, 76.

²³⁴ “Functional isomorphy” means, a causal and functional reading of ExC.

²³⁵ Malafouris, *How Things Shape the Mind*, 77.

²³⁶ In this sense, HCI can be accommodated within the third wave of ExC. Since the first, second and third wave of ExC have different conceptual commitments, HCI may not necessarily fit within the first and the second wave (revisions) of ExC.

ongoing, dissolving “individuals into peculiar loci of coordination and coalescence among multiple structured media.”²³⁷

As exemplified by the theory of thing-ing and material agency, MET’s commitments are very much in line with the key tenets of the third wave. First, it rejects any fixed properties that consider cognition to exclusively belong to internal elements, with the occasional inclusion of external elements.²³⁸ Second, the third wave, like MET, is committed to the idea that the mind has no sharp boundaries and is open-ended and flexible, engaging continuously in contextual associations and relationships within its network. Third, the third wave is committed to the coordination and distribution of cognitive roles. This implies that the interactions between humans and non-humans are non-linear and from these dynamic interactions, order and structure emerges, which maintains the system to function as a whole.²³⁹ Finally, the third wave is committed to the diachronic constitution of cultural practices over a period. This implies our coupled interactions with material artefacts are embedded in the wider web of cultural practices developed over time, which then influence how we perform cognitive tasks in the here and now.²⁴⁰ Resembling the actor-network theory that Malafouris advances, that is, their interrelated interdependence of engagements, it shows that individuals (humans and non-humans) can never be conceived of in isolation from the cultural practices and norms of the area or context wherein these individuals are situated; these factors are active in their influence over cognitive tasks.

However, to further advance Malafouris’ MET, it can be argued that MET may not necessarily need to commit or endorse ExC. It seems to me that the third wave completely divorces its commitments from the first wave that Clark and Chalmers originally hypothesised. Malafouris can still retain the idea of HCI without its endorsement of the “parity principle” in ExC by shifting its focus to EE cognition, as articulated by Hutto et al.²⁴¹ EE regards the thinking of minds as naturally extensive, meaning, “the idea that

²³⁷ Sutton, “Exograms and Interdisciplinarity,” 213.

²³⁸ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 16.

²³⁹ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 18-19.

²⁴⁰ Kirchhoff and Kiverstein, *Extended Consciousness and Predictive Processing*, 23.

²⁴¹ Daniel D. Hutto, Michael D. Kirchhoff, and Erik Myin, “Extensive Enactivism: Why Keep it All In?,” *Frontiers in Human Neuroscience* 8, no. 706 (2014): 1-11.

cognitive activity always already entangles embodiment, action and world-involving resources and does not restrict itself only to what is inside the individual organism.”²⁴²

EE does not in any sense deny inner or mental phenomena (though EE is clear in its rejection of inner representations, specifically non-derived representations). Rather, it highlights the default starting point that cognitive activity is always and tightly interrelated and entangled with the body, action and material resources. From this perspective, EE refuses to play into the Cartesian dichotomy of inner and outer phenomena; instead, it orients us such that the relations between inner and outer phenomena are tightly entangled.²⁴³ This non-reductive way of viewing the relationship between inner and outer phenomena is supported by the writings of Ludwig Wittgenstein. Anna Boncompagni argues in her article “Enactivism and the ‘Explanatory Trap’: A Wittgensteinian Perspective” that making such a dichotomy of the inner and outer realms as if they are reducible and can be theoretically explained separately is problematic. Boncompagni explicates her contention by quoting various points made by Wittgenstein in *Philosophical Investigations*, as follows:

Suppose everyone had a box with something in it: we call it a “beetle”. No one can look into anyone else’s box, and everyone says he knows what a beetle is only by looking at *his* beetle. – Here it would be quite possible for everyone to have something different in his box. One might even imagine such a thing constantly changing. – But suppose the word “beetle” had a use in these people’s language? – If so it would not be used as the name of a thing. The thing in the box has no place in the language-game at all; not even as a *something*: for the box might even be empty.

[I]f we construe the grammar of the expression of sensation on the model of ‘object and designation’ the object drops out of consideration as irrelevant.

I can know what someone else is thinking, not what I am thinking. It is correct to say “I know what you are thinking”, and wrong to say “I know what I am thinking.”

²⁴² Hutto et al., “Extensive Enactivism,” 10. Here, I am arguing for a shift of commitment. Rather than MET endorsing for the third-wave of ExC, it will instead endorse Extensive Enactivism (EE).

²⁴³ It is important to note here that I am arguing for a notion of cognition as an emergent property. This is a quasi-immaterial property. In the sense that, the ontological nature of cognition is partly phenomenological. Meaning, “cognition” is neither belonging to the “inner” or the Cartesian conception of mentality; nor it wholly belongs to the “outside” or material world. Instead, it is in the entangled activities of humans and non-humans that “cognition” emerged.

(A whole cloud of philosophy condensed into a drop of grammar.)
And hence also ‘obeying a rule’ is a practice. And to *think* one is obeying a rule is not to obey a rule.

Hence it is not possible to obey a rule ‘privately’: otherwise thinking one was obeying a rule would be the same thing as obeying it.²⁴⁴

Boncompagni provides three points to argue that if Wittgenstein’s conceptions of sensations, emotions and thoughts, are considered in isolation as if it is essentially a private affair or it only belongs to a separate ontological world – the inner world, then it will be problematic. First, for Wittgenstein, it does not make any sense to isolate sensations, emotions and thoughts by placing these objects into the private mental compartment in a subject. If this is the case, no names can be meaningfully designated to such objects as they will be inaccessible in the language game. The consequences are devastating because by considering such objects as private, these objects drop out of the game. Second, if we consider these objects to have a separate ontological existence in the mental realm, the possibility to have an epistemological relationship with them does not make sense. We may claim that we have feelings, or experiences or thoughts, but it is not correct to claim that we know these objects. Third, in the language game, the meaning of words cannot be designated through private, ostensive definitions because meanings are inescapably a public realm. The criteria for determining meanings must be public for a rule to be deemed as such (for example, the rule that constitutes the meaning of words). In this sense, no private rules will be possible and it will follow that no private languages are possible either. The fact that it *is* a language, then, requires that it cannot be private, it must be public.²⁴⁵

Boncompagni’s interpretation of Wittgenstein’s remarks supports the idea that cognition is always world involving; the “inner processes stand in need of outward criteria.”²⁴⁶ Wittgenstein’s emphasis on the outer criteria is supposed to remind us that the inner and outer realms are not reducible or separable because they are closely related. According to Hutto et al., in their explication of sensations, emotions, thoughts or any talk about the

²⁴⁴ Ludwig Wittgenstein, *Philosophical Investigations* (Oxford: Blackwell, 2001), 189, quoted in Anna Boncompagni, “Enactive and the ‘Explanatory Trap’. A Wittgensteinian Perspective,” *Methodes*, no. 2 (2013): 40.

²⁴⁵ Anna Boncompagni, “Enactive and the ‘Explanatory Trap’. A Wittgensteinian Perspective,” *Methodes*, no. 2 (2013): 40 – 41.

²⁴⁶ Ludwig Wittgenstein, *Preliminary Studies for the Philosophical Investigations: Generally Known as the Blue and Brown Books* (Oxford: Blackwell, 1958), 50.

mind, Wittgenstein and the phenomenological investigations reveal that while people do conceive of cognition and perception as kinds of public activity, their spatial and temporal boundaries are messy, rough-edged and extensive. Therefore, it is best to conceive of minds as naturally extensive, that is, the idea that cognitive activity is best seen as always and already entangled with embodying, action-oriented and world-involving resources.²⁴⁷ This idea supports that EE advances cannot be associated or accused to be committed to or endorse ExC.

Thus, if MET is seen from the EE perspective, it is divorced from any prior commitment to or endorsement of ExC and avoids Theiner and Drain's criticism. Most importantly, the HCI process of this already entangled brain-body-action and material culture, conceived by Malafouris as an "anti-locationalised" cognitive process, is preserved. This is since it refers to its constitutive intertwining aspects as *already* and *always* entangled ensembles of the brain-body-action-world-involving resources of cognitive activity and *not* of ExC, specifically on its "parity principle".

Metaplasticity in Technology

If we accept the EE proposition that our cognitive activity is always and already entangled with this constitutive intertwining process of brain-body-action-world-involving structures and resources, the question arises in what way can EE be empirically demonstrated. In other words, can we find any evidence to support the assertion that our cognitive activity has always been a process that is intertwined with other humans, non-human animals, and objects? This part of Chapter IV integrates the concept of MET in its application with technology. In particular, I contend that by looking at some evidence of the evolution of tools or material artefacts, and the way our tools and material artefacts have shaped our minds or cognitive activities in return, we should be able to demonstrate that our current technology plays more than a causally scaffolded role in our navigation of the world.

From the evolutionary perspective, I adhere to Ben Jeffares' hypothesis that our minds co-evolved with material artefacts.²⁴⁸ Jeffares' hypothesis well complements the EE theory proposed by Hutto et al. regarding thinking about minds as naturally extensive.

²⁴⁷ Hutto et al., "Extensive Enactivism," 10.

²⁴⁸ Jeffares, "The Co-Evolution of Tools and Minds," 504.

This implies “the idea that cognitive activity always already entangles embodiment, action and world-involving resources and does not restrict itself only to what is inside the individual organism”.²⁴⁹ Cognitive archaeology offers strong evidence to support that our species is always and already entangled with non-human resources in navigating the world. The most important find was perhaps the discovery of the fossil specimen OH7 (Olduvai Hominid No. 7). In his 1964 paper in *Nature*, a British weekly scientific journal, Louis Leakey, a paleoanthropologist, extensively studied the fossil. He named OH7 a new hominid species, *Homo habilis*, and it was perhaps the earliest species designated as *Homo* or man. Leakey’s additional designation of the specimen as *Habilis* was based on the presumed relationship with stone tools. *H. habilis* was seen to be a “tool man” since in Leakey’s view, tools, quite literally, make the *man*. However, Leakey’s assertion that tools make the man may not quite fit the bill since today, several documented finds from different species, such as the specialised tools of the New Caledonian crows and occasional tool use in animals such as otters, prove that tool use may not be limited or unique to the humans.²⁵⁰

Nevertheless, Leakey paying significant attention to the existence of tools in the lifeways of the early *Homo* species proves something remarkable. It proves that the relationship between hominins and their tools was quite different from the relationship between other non-*Homo* species and their tool use. *H. habilis* were not the first *Homo* species that used tools; it has been discovered beyond a doubt that *H. habilis*’ ancestors were tool-users. The difference is that the tools used by those ancestors were disposable and probably indistinguishable from other natural or raw materials occurring at that time. On the other hand, *H. habilis* may have been the first to have tools that lasted and further, the first to use the tools more than once. In short, this was the first hominid that had an adaptive relationship with tools. It is this relationship that distinguishes them from other non-*Homo* species and their early tool-user ancestors. The relationship signifies a crucial shift from the temporary and disposable tool-using hominids to the permanent and reusable tool-using hominids.²⁵¹

The earliest tools used by the early *Homo* species from about 1.5 – 1.8 million years ago were called the Oldowan tools. These tools were rocks with flakes struck off from them

²⁴⁹ Hutto et al., “Extensive Enactivism,” 10.

²⁵⁰ Jeffares, “The Co-Evolution of Tools and Minds,” 508.

²⁵¹ Jeffares, “The Co-Evolution of Tools and Minds,” 509.

so either the cores or the flakes could have been used as the tool. The flakes were probably used to de-flesh carcasses while the cores were for smashing long bones to extract marrow. After this period a distinctive Acheulean hand axe emerged distinct from the Oldowan tools. Acheulean hand axes composed of an intentionally trimmed large flake. These tools played important roles for the early Homo species, particularly the Erectines, in their hunting activities. It allows them to obtain carcasses that other predators could not access. These tools became necessary for hunting strategies in a way that tools of chimpanzees were not. According to Jeffares, at this point in the evolutionary history of humans, tools became increasingly important in the hominids' survival. That is to say, their tools became part of their way of life.²⁵²

As noted, tools undoubtedly co-evolved with the early hominins, especially as their surrounding environments shifted and changed, and since the navigation of their complex environment required complex tools and complex foraging practices and strategies. This archaeological evidence supports the claims of EE proponents that human cognitive activities have always been extensive. If our primitive tools and technologies co-evolved with us, it follows that they constitute part of our cognitive activity. Besides, our co-evolution alongside primitive technologies proves that we have a plastic mind. As briefly discussed in Chapter III, MET's concept of metaplasticity according to which "we have a plastic mind, inextricably intertwined with the plasticity of culture",²⁵³ implies that culture is never static as long as every individual continues to engage with material culture. In his article "Metaplasticity and the Primacy of Material Engagement",²⁵⁴ Malafouris discusses the idea of metaplasticity by considering the thought experiment of the blind man's stick, originally posited by Maurice Merleau-Ponty.²⁵⁵ Merleau-Ponty asks us to imagine a blind man navigating the surrounding environment with the use of the stick and points out,

The blind man's cane has ceased to be an object for him, it is no longer perceived for itself; rather, the cane's furthest point is transformed into a sensitive zone, it increases the scope and the radius of the act of touching and has become analogous to a gaze... The position of objects is given immediately by the scope

²⁵² Jeffares, "The Co-Evolution of Tools and Minds," 509.

²⁵³ Malafouris, "Mind and Material Engagement," 5.

²⁵⁴ Lambros Malafouris, "Metaplasticity and the Primacy of Material Engagement," *Time and Mind* 8, no. 4 (2015): 357.

²⁵⁵ Maurice Merleau-Ponty, *Phenomenology of Perception*, Translated by Donald A. Landes (London and New York, Routledge: Taylor & Francis Group, 2012, 2014), 144.

of the gesture that reaches them and in which, beyond the potential extension of the arm, the radius of action of the cane is included.²⁵⁶

Using this insight, Malafouris argues that the stick becomes deeply entangled with the blind man's activity. This transforms the stick from the mere substitution of vision for touch into an enactive cognitive prosthesis.²⁵⁷ Properties of both the blind person and stick become deeply intertwined and entangled to the point where they change the landscape of affordances.²⁵⁸ For Malafouris, through the analogy of utilising sticks in such a manner, "the human species, much like the blind man in our example, feels, discovers and enacts the way forward".²⁵⁹ The blind man's engagement with the stick provides not only a substitution of vision but also, through its active engagement, the stick itself has its life. Since it no longer exists in isolation or as a mere extension, it has dynamic constitutive effects on the blind man's sense-making of the world.

Of course, Merleau-Ponty's blind man example points to the dynamic and constitutive role of the primitive technologies with which our ancestors navigated and made sense of their changing world. Considering this, how can we apply Malafouris' theories of metaplasticity and thing-ing to our constant interactions with and usages of current technologies such as computers, smart-phones, tablets and global positioning system (GPS) navigation devices? As already discussed in Chapter III, the concept of thing-ing is the kind of thinking we do primarily *with* and *through* things.²⁶⁰ Similar to our early hominid ancestors, it is apparent that we are and have always already been thinking using our technological devices, navigating our surrounding environment through our navigational devices and solidifying our thoughts through the use of computer devices by typing, tapping or swiping. Additionally, we use these devices not only to organise different facets of our lives through applications such as automated calendar entries but also employ verbal cues to enable virtual operating assistance systems to further enable and benefit our day to day lives. Finally, we interact with our social culture and enable relationships via texting through social media applications such as WhatsApp, Instagram, Facebook, Twitter, Zoom or email.

²⁵⁶ Merleau-Ponty, *Phenomenology of Perception*, 144.

²⁵⁷ Malafouris, "Metaplasticity," 357.

²⁵⁸ Malafouris, "Metaplasticity," 357.

²⁵⁹ Malafouris, "Metaplasticity," 359.

²⁶⁰ Malafouris, "Mind and Material Engagement," 7.

In our engagement *with* and *through* technology, the main components of interaction are our fingers or voice recognition for texting, tapping, swiping or voice interaction. This, in a way, is our thing-ing, since we adapt, make sense of, gather and navigate information within the socio-cultural environment in which we are situated. Engaging with technologies shapes our minds in return. Our techno-cultural environment can be said to be co-evolutive with our constant thing-ing *with* and *through* environmental structures and resources. As opined by Malafouris, this is due to the “extraordinary plasticity of the human mind and its reciprocal openness to creative evolution by way of making and material engagement is a distinctive niche constructing features of our species”.²⁶¹

Thus, our current technologies and ongoing technological improvement is the result of our EE. It is the result of our perpetual and habitual thing-ing with and through our material culture. What this chapter argues is as far as MET states that the mark of cognition has no a priori location, neither does the mark of agency. If cognition exists somewhere in the middle-in-between space where the brain-body-and-material culture conflate, so does the concept of agency. Agency in the Malafourisian sense has no a priori essence wherein there exists a universal property. Similar to the mark of cognition, agency cannot be attributed to a single component alone, whether human or non-human. Rather, agency is an emergent property that is characterised as a process in which both the aforementioned components are constitutively related to the ongoing phenomenological process of becoming.

Crucial to the argument is that MET, if seen through the lens of EE, argues persuasively that the mark of cognition has *already* and *always* been entangled in the ensemble of the brain-body-action-world-involving resources. Thus, it denounces any shade of representational commitments as the proponents of traditional cognitivism attempt to contend. The concepts of thing-ing and material agency seen through EE provide several components. First, we have co-evolved with the things around us. That is, our cognitive activity has already and always included world-involving resources. Second, our extensive engagement with world-involving resources has been a continuous process that started from our early hominid tool-using ancestors; these ancestors have always used tools extensively in their foraging activities. Their flow of ongoing movement to navigate

²⁶¹ Malafouris, “Metaplasticity,” 359.

their world cannot be separated from the tools that co-evolved with them. Thirdly, this unending ontological gathering of mind-stuff, a combination of human and non-human activities, cannot be construed only to have a linear direction. Fourth, if our cognitive activity is non-linear, it must be viewed as dynamical. This indicates that when humans engage with material artefacts, the material artefacts engage with humans in return. These components are, of course, the tenets that MET is committed to. They neither have a priori location or essence because they are the emergent properties of human and material engagement. Therefore, if MET is seen through the lens of EE, we end up with a theory that teases out the mark of the cognitive. Thus, an alternative theory that is required to plausibly settle the debate between EmT and ExT is presented.

CHAPTER V: CONCLUSION

So where does this thesis leave us? What is the purpose of all these articulations, that is, rectifying MET through the lens of EE? At the risk of being repetitive here, I would like to briefly summarise. As I have argued, by introducing MET as an alternative view within the EmT and ExT debate, we can tease out the mark of cognition. Chapter II has briefly examined the classical definition of “cognition” as cognitive processes predominantly, if not solely, assumed to be processes confined within the boundary of the brain or neural processes. However, this thesis has also roughly established the alternative views under the banner “4E Cognition” namely embodied, embedded, extended, and enacted. These are approaches that explore and question the familiar and traditional conception of cognition, and instead offer various ways to model and explain cognitive processes, other than the traditional method of approaching cognition as a brain-based process.

Special attention was given to the subtle tension that exists between EmT and ExT, which comes down to what makes a process a cognitive process. Though RECS provide a compelling solution to the debate, the concept of coupling within RECS approach proves to be problematic and vulnerable to criticism. Therefore, it is necessary to provide an alternative theory that might possibly assuage the “competing ontological conceptions of cognitive processes”²⁶², which does not necessarily commit to the coupling idea. Central to this thesis is the contention that MET is the viable theory which could possibly settle the tension in the EmT and ExT debate, since its commitment uncompromisingly holds the assumption that cognition has no *a priori* location. Given this assumption, Chapter III has contended that cognition may in fact be an emergent property, which emerges from a process where the material-environmental-cultural-brain-body actively conflates and meaningfully engages and participates in the cognitive process of our sense making in the world, thus, situating the mark of cognition in the middle-in-between space. The mark of cognition in this view is neither entirely mental nor material, for its property belongs to *thing-ing* or its material engagement – that is, MET’s mark of the cognitive is an emergent property belonging to the “ontological gathering, the coming together of specific mind-stuff.”²⁶³

²⁶² Kiverstein, “Extended Cognition,” 19.

²⁶³ Malafouris, “Mind and Material Engagement,” 7.

This contention is of course not without any difficulties. Chapter IV has addressed and answered these issues. Complications such as the cognitive bloat problem, the question whether MET is committed to or endorsing for the case of extended cognition, and whether the role of material structures and resources should be considered an artefactually-scaffolding process rather than constitutive to our cognising, have been resolved. For this alternative conception to be forceful, it is imperative that MET has to be seen through the lens of Extensive Enactivism (EE), a theory that postulates cognitive activity as always and an already entangled and deeply intertwined process between brain-body-action-world-involving structures and resources, thus necessarily rejecting any commitments to inner representations or non-derived representations. Therefore, seeing MET through EE, we end up formulating an alternative theory that teases out the mark of cognition, while at the same time, denounces any commitment to an extended approach to cognition.

In addition, this thesis has also examined the practical application of Malafouris' concepts of *metaplasticity* and *thing-ing* to our current technological devices and how our *thing-ing with* and *through* our devices makes us adapt, make sense, gather information, and navigate through the socio-cultural and technological environments we are in. In the process, our engagement with our technologies shapes our minds in return. This is not merely an empty claim, as it has been argued from an archaeological and anthropological evidence which shows the evolution of our early hominid ancestors' minds, and the evidence leads that they may have in fact co-evolved with their tools and material artefacts. From this evidence, we have deduced that our use of technological devices such as computers, smart-phones, tablets and GPS devices, that is, our engagement with them, plays more than a causally scaffolded process, but our cognitive activities are and have always been extensive. In other words, our technological devices are constitutive parts of our cognitive processes.

Potential Limitations

There is a potential limitation of MET if applied to immaterial components of technology. Robert Clowes introduces us to the potential limitation in MET's applicability to the virtual reality called the internet.²⁶⁴ According to Clowes, our continued interactions with

²⁶⁴ Robert W. Clowes, "Immaterial Engagement: Human Agency and the Cognitive Ecology of the Internet," *Phenomenology and the Cognitive Sciences* 18, no.1 (2019): 259 – 279.

our gadgetries are “connected up to the cloud of data services and applications mediated by the wireless internet”;²⁶⁵ these internet data services are what Clowes calls cloud technology or ‘Cloud-Tech.’²⁶⁶ As examined in previous chapters, MET’s concept is primarily a framework, focussed on human engagement with the material culture, and on how material things shape our minds in return.²⁶⁷

However, the nature of Cloud-tech might be difficult for MET to theoretically grasp since:

Cloud-tech is not just composed of a multiplicity of cloud-connected devices, the software apps they instantiate and the distant databases servers to which they and we are tethered, but also of personalised services instantiated in informational relations and accessed through the (sometimes skilful) interaction with multiple virtual interfaces. All of this can make the technology appear rather immaterial, or at least separate from our normal understanding of material culture. This sets up the problem for MET (and indeed any materialist framework) of trying to theoretically “grasp” this new stuff of cognition.²⁶⁸

I agree with Clowes’ observation that with the immaterial component of the internet, we find a new type of cognition in which MET may be theoretically realised; it is indeed a potential limitation. However, as I see it, this limitation should not be construed as a theoretical deficiency, rather it shows us that a potential area of future research might be worth exploring. As we argued in response to the cognitive bloat problem in Chapter IV, MET’s boundary will be within the network of relationships between humans and non-humans – we referred to this network as the relevant context in which the engagements between humans and non-humans produce a productive phenomenological existence or human becoming, and everything outside this network would be deemed arbitrary. Perhaps, some meaningful questions to ask for future research would be the following: How exactly does Cloud-tech or virtual reality affect our phenomenological existence? What is the nature of virtual reality, and how does cognition emerge from our engagements with them? They indeed pose a potential limitation, but along with it, a potential route for future research that might be worth venturing.

²⁶⁵ Clowes, “Immaterial Engagement,” 260.

²⁶⁶ Clowes, “Immaterial Engagement,” 260.

²⁶⁷ Clowes, “Immaterial Engagement,” 261.

²⁶⁸ Clowes, “Immaterial Engagement,” 261.

Another limitation is when human interaction with technology becomes redundant. Luciano Floridi states that technology is a thing, functioning in-between human and natural objects, processes, or phenomena he calls *natural affordances*.²⁶⁹

Floridi contends that there are three orders of technologies. The first order occurs when humans engage with technology in-between with natural affordances²⁷⁰; for instance, the wood-splitting axe functions between the individual (user) and wood (affordance).²⁷¹ The second order occurs when humans no longer relate to natural affordances but to other technologies; here affordances are also other technologies.²⁷² For instance, a simple screwdriver is a technology between an individual and screw (another piece of technology).²⁷³ The third and final order occurs when humans are no longer within the loop of engagement. Technologies become the users themselves, engaging with other technologies as affordances through other in-between technologies. Floridi calls this third order a technology-technology-technology scheme, whereby, humans as users are no longer in the loop or not significantly present at all. Rather, the human user becomes highly reliant passive beneficiary or mere consumer.²⁷⁴ For example, an artificially intelligent agent, such as a robot or fully autonomous AI, uses a computer to send an email to another computer on our behalf. Our engagement with technology is no longer an active interaction; we are just passive beneficiaries or mere consumers.

Therefore, MET's approach in this third order schema may not be applicable, since the heart of MET's approach as proposed by Malafouris is our very engagement – our *thing-ing with* and *through* technological devices so that we are able to make sense of our place in the world. What Floridi refers to as the technology-technology-technology scheme would be considered outside MET's boundary. That is, the third order schema is outside the network of relevant context of engagements between humans and non-humans. In this

²⁶⁹ Luciano Floridi, "Technology's In-Betweenness," *Philosophy and Technology* 26, no. 2 (2013): 111.

²⁷⁰ It is important to note that Floridi's concept of affordances is different from the description that Gibson referred to as affordances. In *The Theory of Affordances: The Ecological Approach to Visual Perception* (1979), Gibson states that "The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill" (p. 127). In other words, Gibsonian affordances are offerings in the environment which are meaningful to animals since it provides opportunities for particular kinds of behaviour. Therefore, this should not be confused with what Floridi means as *natural affordances*, which may refer to material objects, processes, or even phenomena.

²⁷¹ Floridi, "Technology's In-Betweenness," 111.

²⁷² Floridi, "Technology's In-Betweenness," 112.

²⁷³ Floridi, "Technology's In-Betweenness," 112.

²⁷⁴ Floridi, "Technology's In-Betweenness," 113.

sense, it would not be regarded as constituents with cognitive processes since anything outside this network would be deemed arbitrary. If humans are outside this loop of engagements or no longer engage with technologies, then MET's approach is limited in this sense. However, what is interesting to explore is if we would count the cognitive abilities of artificially intelligent agents, such as robots or fully autonomous AI's in their engagements with other technologies as cognitive processes *per se*. Perhaps, this is yet another area for further future research.

Potential Significance

The potential significance of MET's approach as viewed through the lens of EE and placing it at the heart of the ongoing debate between EmT versus ExT is valuable. This alternative theory is important because it offers a unique contribution to the ongoing flourishing literature on the mark of the cognitive. This thesis has examined the concept of RECS that Kiverstein persuasively attempted to use as an alternative theory to settle the competing ontological issues of cognitive processes debated between EmT and ExT. However, the finding of this research has established that RECS may in fact have lacked the components needed to tease out the mark of the cognitive. Specifically, Kiverstein's appeal to RECS is vulnerable to Aizawa's criticism, which argues that RECS' continuous reciprocal causal (CRC) relations with the material culture seem to presuppose that a mark of cognition already exists in the agent, making it a 'source' of cognition. Admittedly, CRC appears to convey an assumption that there are two systems and when they are coupled, they form a single dynamic system of cognition; it is in this sense that cognition extends though without necessarily being committed to the representational approach to cognition.

A close examination of RECS' commitment to extended cognition (though only favouring the mutual complementarity version of *coupling* idea in extended cognition) reveals that this still lacks a component needed to make a successful case for the mark of the cognitive. Hence, drawing on MET's various components of *thing-ing*, *metaplasticity*, *mind-stuff*, and *material agency* is important to tease out the mark of the cognitive. The most significant feature of all is MET's commitment that cognition has no *a priori* location, since it is an emergent property emerging from the engagements between

humans and non-humans, situating cognition in the middle-in-between space – within the networks of relevant contexts of activities.

Though MET is committed to the second wave of ExC, which is the complementary view of mutual manipulability between the individual and material culture, it should not be misunderstood that its focus is to extend cognition in a simplistic isomorphic reading of the parity principle. Rather, Malafouris has modified the reading of parity principle as an “equal opportunity” or “symmetrical” importance in terms of their (humans and non-humans) contribution to the cognitive process. However, this thesis has advanced Malafouris’ theory of MET by positing that MET may not necessarily need to endorse ExC, and therefore it avoids the allegation that MET endorses the parity principle. By shifting its focus to EE, as articulated by Hutto et al., if MET is seen through EE, then we shift its focus on the idea that “cognitive activity always already entangles embodiment, action and world-involving resources and does not restrict itself only to what is inside the individual organism”.²⁷⁵ This manoeuvre is a significant contribution since it divorces any commitment to extended cognition and the idea of *coupling*; instead, it first looks at the *always* and *already* entangled dynamic complementarity between components rather than seeing each part in isolation. If the cognitive activity is seen from this vantage point, there is no such idea of *coupling* to extend cognition.

The consequences in amending MET in this slight form are significant. That is, it does not just highlight the major role of the world of things in the cognitive processes, it also bridges the mind and material objects in its relations as co-evolutive and extensive. However, focusing on the major role of objects and material artefacts within the 4E cognition does not necessarily mean that there is something especial about humans’ engagement with materiality. The rationality behind it is because this is not even something new in the fundamental evolutionary perspective. For instance, many researchers on non-human animals such as the salticid spiders, New Caledonian crows and otters, have proved to be engaging extensively with material objects to navigate their surroundings, and putting significant attention to the existence of things in the lifeways of these species. Even the early Homo species have been engaging extensively with material artefacts. What is significant however, is the relationships we humans have developed as we engage with these objects through time. We discovered that in our

²⁷⁵ Hutto et al., “Extensive Enactivism,” 10.

material engagements, thinking, imagination, memory, and intentionality have emerged. In short, cognition emerged in the process of creative *thinging*. It is in the dynamic intertwining of various components of objects-brain-body-action-environment within the relevant context of engagement that cognition comes to be, eliminating any separation or rigid division between forming and thinking, mind and matter, mental and physical, or the ontological worlds of inner and outer.

Therefore, I would like to end on this note, by disclaiming that this thesis is not in any way a novel formulation to solve the debate between EmT and ExT. However, my proposed thesis as it stands has made a significant contribution to the mark of cognition debate, and by introducing MET within the idea of Extensive Enactivism, I believe that I have provided an additional arsenal to Malafouris' theory of Material Engagement Theory. Taking these together, I believe that this thesis has argued persuasively in teasing out the mark of the cognitive required to settle the ExT and EmT debate. Furthermore, I hope that the attempt to integrate MET and EE within the heart of the competing ontological conceptions of cognitive processes will at least encourage further explorations of the relationship between MET and EE, and how this might contribute to the ongoing debate within the 4E cognition.

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