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Material Engagement Theory and its philosophical ties to pragmatism

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Abstract

Material Engagement Theory (MET) is currently driving a conceptual change in the archaeology of mind. Drawing upon the dictates of enactivism and active externalism, it specifically calls for a radical reconceptualization of mind and material culture. Unpersuaded by the common assumption that cognition is brain-bound, Malafouris argues in favour of a process ontology that situates thinking in action. In granting ontological primacy to material engagement, MET seeks to illuminate the emergence of human ways of thinking through the practical effects of the material world. Considering that this is a characteristic example of a pragmatic take on cognition, this contemporary theoretical platform appears to share a lot with pragmatism. As of late, scholars working at the intersection of philosophy, semiotics, and cognitive science have made important steps towards the rapprochement between pragmatism and externalism. Looking to contribute to this growing corpus of work, the present paper focuses on MET's relation to the pragmatism of Peirce, Dewey, and Mead. Having elsewhere recognized the overlap and complementarity between Malafouris' and Peirce's theories in particular, I developed a pragmatic and enactive theory of cognitive semiotics that is suitably geared to trace the nature, emergence, and evolution of material signs. Therefore, besides noting some obvious historical connections, I hereby aim to establish (at least part of) the theoretical backdrop upon which this composite theory is supposed to function, while also exploring new potential avenues. Given that this cognitive semiotic framework can be seen as a pragmatic extension of Malafouris' enactivist approach to archaeology, the current paper delves into MET's theoretical underpinnings, seeking to complement its working hypotheses and concepts with philosophical notions and ideas advanced long ago. This synthesis ultimately concludes with a call for the reconceptualization of 'representation' as a heuristic concept.

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1 Introduction

At the turn of the millennium, Colin Renfrew (2001) challenged the theoretical dispositions of cognitive archaeology by proposing that material culture actually substantiates its meaning. Having recognized the need for detachment from the age-old idea that artefacts are imbued with predefined meaning, Renfrew (2004) and Lambros Malafouris (2004) paved the foundations for a paradigm shift by developing the *Material Engagement Theory (MET)*. Influenced by recent advances in cognitive science and the philosophy of mind, Malafouris (2013) has since made a strong case against the commonplace tendency to associate the mind with a brain-bound apparatus that processes symbolic representations, before externalizing them through premeditat-ed behaviour into passive material substrates. From the vantage point of his interdis-ciplinary platform, cognition is not to be found trapped within the brain, because the cognitive processes involved in many 'real-life' tasks are brought forth through the relational engagement of brains, bodies, and things. According to Malafouris (2004, p.58, emphasis in original), it is in fact possible "*to think through things, in action, without the need of mental representation.*" For MET's proponents then, the world is not an external realm that transmits information to an internal processor, but an emergent product of the organism's coupling with the environment.

Seeking to reorient the theoretical dispositions of cognitive archaeology, MET draws upon enactivism, a theory of cognition that is currently gaining momentum in philos-ophy and the cognitive sciences (Iliopoulos and Malafouris 2014). Varela and his colleagues (Varela et al. 1991, p.9) advanced the term *enactive* in order "to emphasize the growing conviction that cognition is not the representation of a pregiven world by a pregiven mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs." According to the theory of enactivism, emotional, perceptual, and conceptual meaning is brought forth through a relational process of interaction between neuronal, bodily, and environmental elements (De Jaegher and Di Paolo 2007; Colombetti and Thompson 2008; Thompson and Stapleton 2009; Parthemore 2013; Krueger 2014). Two themes that are particularly common in enactivist literature are: sensorimotor contingency and autopoiesis. The former idea attributes perceptual experience to the implicit knowledge of how the sensations felt are affected by (personal or other) movements (O'Regan and Noë 2001; Noë 2004); whereas the latter describes the organismal mind as an autonomous system with set (albeit flexible) boundaries, whose intrinsic teleology helps self-construction at times of external perturbations (Varela et al. 1991; Di Paolo 2005; Thompson 2007; Di Paolo and Iizuka 2008). In light of these theoretical advances, MET suggests that the minds of our ancestors are not to be found within the confines of their long-gone brains, but embodied and embedded in their enacted worlds, traces of which now comprise the archaeological record. In fact, MET goes a step further than embodiment and embeddedness. Influenced by the *extended mind theory* first advanced by Clark and Chalmers (1998), it maintains that cognition can actually be extended into the outer realm. However, while MET recognizes the importance writ large of the mind's extended functional organization, it departs from the theory of the extended mind in also seeking to highlight the constitutive role of its physical substrate (Malafouris 2018; Malafouris and Renfrew 2010). From the perspective of its advocates, the material constitution of a cognitive process actually shapes the very form it comes to assume.

Granted its slight departure from the orthodox interpretation of the externalist doctrine, the theory of material engagement introduces this radical way of thinking to the archaeology of mind, in order to overcome the problematic effects of the internally-located mind as it is traditionally conceived. As Malafouris (2013, p.244) succinctly puts it towards the end of his monograph on *How Things Shape the Mind*:

The functional anatomy of the human mind (which includes the whole organism, that is, brain/CNS and body) is a dynamic bio-cultural construct subject to continuous ontogenetic and phylogenetic transformation by behaviourally important and socially embedded experiences. These experiences are mediated and sometimes constituted by the use of material objects and artifacts (e.g., the blind man's stick) which for that reason should be seen as continuous, integral, and active parts of the human cognitive architecture.

In order to paint this image of human cognition, Malafouris (2013) puts forth a tripartite set of working hypotheses:

- According to the *hypothesis of extended mind*, the human mind is constitutively entwined with material culture.
- According to the *hypothesis of enactive signification*, our active engagement with material signs brings forth both form and meaning.
- And according to the *hypothesis of material agency*, the ability to bring about changes in the world is the emergent product of situated activity.

In addition to these postulations, Malafouris (2014, 2015, 2016c) adheres to a number of working definitions:

- The idea of *thinging*, which refers to the capacity of humans to feel/think through and about things (ergo the wordplay on *thinking*).
- The notion of *Creative thinging*, which refers to the creative force that drives the mindful engagement of humans with the material world.
- And the concept of *metaplasticity*, which refers to the variability and plasticity of the integration between plastic brains and things.

The aim of the current paper rests at linking and complementing these theoretical constructs with ideas drawn from *pragmatism*, a philosophical tenet that can be arguably seen as an antecedent of the revisionist schools of thought currently gaining traction in the philosophy of mind and the cognitive sciences. As Gallagher (2017, p.48) points out, the enactivist school of thought traces its roots to theoretical biology and phenomenology, while the extended mind theory stems from philosophy of mind, computational models, and cognitive science more generally – yet both generally fail to acknowledge pragmatism as an even earlier precursor. Fortunately though, a small but increasing number of scholars has recently started demonstrating how the theories of Charles Sanders Peirce, William James, John Dewey, and George Herbert Mead have much in common with the contemporary notions of embodied, embedded, enacted, and extended cognition (for links between the 4Es and pragmatism see Menary 2007; Johnson 2008, 2017; Gallagher 2009, 2014, 2017; Fusaroli and Paolucci 2011; Paolucci 2011; Solymosi 2013; Atã and Queiroz 2014; Fabbrichesi 2016; Madzia

and Jung 2016; Di Paolo et al. 2017). Looking to add to this growing corpus of literature that ties the 4Es to their philosophical predecessors, this paper seeks to demonstrate how the theory of material engagement, an evolutionary epistemology grounded on externalism, can be complemented with pragmatism, in order to offer cognitive archaeology a theoretical grounding that can shed new light on the co-development of mind and culture.

I have already taken a step towards this direction by recently integrating Peirce's and Malafouris' work, for the purpose of tracing the nature, emergence, and evolution of material signs (Iliopoulos 2016a, b). The theoretical compatibility between Malafouris' take on enactive cognition and Peirce's pragmatic semiotics allows for the development of an interdisciplinary theory of cognitive semiotics that can account for the origins of symbolic and aesthetic artefacts, not by distinguishing between ideas and ideals, but by arguing for their inextricable entwinement. Bringing together analytical tools developed by temporally-distant but theoretically-proximate theorists, enables the formation of a multi-faceted framework that helps address many of the issues encountered by those seeking to appreciate the meaning-making interactions past humans must have engaged in. Epigrammatically, this analytical toolkit can provide a clear definition of material signification, and establish strict criteria for human forms of the sign function. It can also recognize the often overlooked iconic and indexical forms of relevance between the sign and what it stands for, as well as differentiate between various kinds of iconic and indexical signification. It can finally illuminate the cognitive mechanism driving the emergence of material signification, as well as the process of semiotic scaffolding behind the development of symbolic narratives. Keeping in mind that this is but a working version of a framework open to attunement and modification, the present paper seeks to delve deeper in the philosophical compatibility and complementarity between MET and pragmatism, so as to build the theoretical context within which the analytical tools brought together are taken to function. While the work of Peirce is admittedly explored to a greater degree than that of other pragmatists (because his semiotic theory has been integral in the formation of the aforementioned composite), the theories of Dewey and Mead are also considered in this paper, in an attempt to identify other relevant ideas that could be put to the service of cognitive archaeology. All in all then, rather than examining the overlap between MET and pragmatism for historical purposes alone, I hereby undertake a task that is also supposed to have a practical side to it. With these historical and epistemic goals in mind, let us go over a brief outline of the structure to be followed.

The first order of business is to link MET's emphasis of the world's practical effects on the human mind with the core idea of pragmatism – that is, the importance of human practice (Section 2). The same section also provides a brief sketch of Peirce's semiotic model of cognition, on the basis that it can be arguably used to describe the development of thinking during processes of material engagement. The following section suggests that the development of practical sensibilities and dispositions, which MET invokes when explaining cultural knowledge and innovation, can be described as a process of forming habits and beliefs, in Peirce's sense of the terms (Section 3).

After setting the necessary foundations for the main part of the rapprochement, I turn to MET's three core hypotheses: Firstly, the hypothesis of extended mind is associated with Dewey's sensori-motor account of perception, and Peirce's synechism – that is, the

tendency to regard everything, including mind and matter, as continuous (Section 4). Next, the hypothesis of enactive signification is re-evaluated through the prism of Göran Sonesson's take on Peircean semiotics, since his contemporary framework helps us account for both the participatory and the significative dimensions of material signs (Section 5). Moreover, his distinctions between different types of iconic and indexical signification help us appreciate how early humans could have familiarized themselves with physically grounded signs that in turn scaffolded the emergence of symbols. Having accounted for the process of semiotic scaffolding, I subsequently turn to the hypothesis of material agency, which I complement with Mead's manipulatory area in order to account for the context within which contact experience and agency take place (Section 6).

Following the examination of MET's core hypotheses, attention is paid to the three concepts mentioned above: Starting with the notion of *thing*, I explore how thinking through things connects to the concept of transaction put forth by Dewey and Arthur F. Bentley (Section 7), before considering the creative variant of *thing*, linking it in particular with Peirce's icon-based account of abductive inferences (Section 8). I then examine the concept of metaplasticity, so as to locate the various ways plastic brains and things can be integrated in – what Dewey calls – organism-environment situations (Section 9).

Finally, I conclude the present attempt to connect MET with pragmatism by proposing that 'representation' should be reconceptualized along the lines of Peirce's triadic model of semiosis (Section 10). With this plan in mind, we can now proceed with the intended rapprochement.

2 Material engagement and Peirce's pragmatic theory

Coming from the direction of archaeology, the theory of material engagement naturally assumes an object- or artefact-oriented perspective. In Malafouris' (2013, p.35) own words: "MET seeks to provide an integrated archaeological perspective concerned with the interactions through time between cognition and material culture and with the consequences of these interactions for understanding the making of present and past ways of thinking." Having recognized that the situated cognition paradigm did not manage to adequately acknowledge materiality's causal efficacy and constitutive participation in cognitive systems, the theory of material engagement essentially sets out to identify the effects and consequences that things have on human ways of thinking during interactive processes of material engagement. As suggested by Malafouris (2013, p.139), "pragmatic effect (and thus agency) is not a matter of private thought and imagination but a matter of actual practice and being-in-the world." On first glance then, MET seems to align with pragmatism, a mode of reasoning that grounds the meaning of abstract mental concepts to concrete experience. Generally speaking, the philosophical attitude behind pragmatism seeks to illuminate the relation between the ideational and the material by placing human practice at the forefront of philosophical inquiry (Gallagher 2017). Peirce, in particular, had described the relation between concepts and facts (of which material objects are a part) by sketching his famous doctrine of phenomenological categories, which links mental rules called Thirds with brute facts called Seconds (and actual existents with qualitative possibilities called

Firsts; see CP 1.24–1.26).[1] As he famously proposed, general laws are only fulfilled through their embodiment in actual things or events (themselves manifesting a range of possible qualities), because their mode of being consists solely of the fact that future instantiations will take on a determinate general character. As far as MET is concerned then, Peirce's pragmatic approach appears to be a promising way for linking the regularity involved in the general thoughts brought forth through particular instances of material engagement with the actual objects or artefacts themselves.

In distancing itself from the common assumption that thinking takes place through the syntactic arrangement of symbolic representations, MET must rely on a model of cognition wherein new thoughts emerge though a dynamical engagement between the human mind and the material world. Unlike de Saussure's (2011 [1916]) structural linguistics, Peirce's semiotics are particularly helpful in this regard, since they help us appreciate how meaning is generated through an irreducible process that is grounded on actual (or seemingly true) connections between signs, which are not necessarily purely arbitrary (thus also taking into account links based on likeness and contiguity). The triadic form of his semiotic logic is best illustrated through his own words:

> A sign, or *representamen,* is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object.* It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the *ground* of the representamen. (CP 2.228, emphases in original)

Besides providing a clear account of the sign's workings, this passage gives us the opportunity to note an important point: the sign itself (i.e., the representamen), the thing for which the sign stands (i.e., its object), and the idea to which it gives rise (its interpretant), are distinct, yet co-dependent constituents of semiosis. It is also important to note that, in this tripartite model of signification, the meaning of the sign is not to be found in the sign's object, but in the relation between the sign and its object (i.e., the ground; also see CP 1.339).The distinction between the object and the ground is a crucial one because it helps us recognize that what is cognised is a thematic aspect of what preceded it (whether a physical thing or a previous thought). The sign we directly perceive is relevant to its semiotic object only in a particular respect or capacity, which (as would be expected) cannot provide us with a spherical image of the whole object, an object which could have generated a number of other interpretants, thus leading ensuing thoughts along different (but unrealized in each case) paths. Seeking to differentiate the signification-inducing object that yields a certain interpretant from the one corresponding to numerous potential interpretants, Peirce (CP 8.183) called the former *immediate*, while reserving the term *dynamical* for the latter. Although it may be the immediate object instigating the growth of a semiotic act, it is the dynamical object that is eventually cognised, for that is what the sign professes to mediate, even if partially so (Romanini 2014). Accordingly, while meaning first appears as an

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[1] Adhering to scholarly tradition, I cite Peirce's (1931–1935) work as CP (followed by volume and paragraph number in *The Collected Papers of Charles Sanders Peirce*).

immediate interpretant, it is then grasped as a broader, dynamical interpretant, which might ultimately turn into a *final* or *normal* interpretant (CP 8.314, 8.343). As I see it, these terms could prove especially helpful when trying to elucidate the emergence of thoughts during acts of material engagement, because they can be used to describe how partial aspects of the real world (garnered through sensorimotor engagement) develop into general concepts (such as those involved in material signification).

Of course though, the emergence of cultural ideas through material engagement is a semiogenetic process that involves becoming attuned to the world in particular ways. These proclivities are the focal point of the section that follows.

3 Sensibilities/dispositions and Peirce's take on belief-habit

Seeing how cultural knowledge and innovation are "infused and diffused into settings of practical activity," Malafouris (2013, p.116, my emphases) suggests that "they are constituted by experience within these settings through the development of specific *sensibilities* and *dispositions*, leading people to orient and think about themselves within their environment in specific and often unexpected ways." In other words, both norms and novelties are the result of specific dispositions that Peirce called *habits*. As he defined them, habits are motivated dispositions to act in a certain way under certain circumstances (CP 5.480). For instance, upon encountering a rosary within the context of Irish (Gaelic)-speaking communities at the Aran island, one would be inclined to recite a Catholic prayer by habitually following the beads' sequential and ordinal arrangement (Lele 2006). In order to better grasp the habitual character of material culture, it would be worth introducing, at this point, Peirce's concept of *belief*. As he defined it, a belief is essentially a deliberate or self-controlled habit (CP 5.480). To appreciate the development of belief-habits through an example close to archaeology, consider the following:

> …the primitive man must have been sometimes asked by his son whether the sun that rose in the morning was the same as the one that set the previous evening; and he may have replied, "I do not know, my boy; but I think that if I could put my brand on the evening sun, I should be able to see it on the morning sun again; and I once knew an old man who could look at the sun though he could hardly see anything else; and he told me that he had once seen a peculiarly shaped spot on the sun; and that it was to be recognized quite unmistakably for several days." (ibid.)

As this passage tells us, rules and laws, such as the one about it being the same sun that shines every day, are grasped through the formation of habits. In fact, they become meaningful "by virtue of imparting a quality to reactions in the future" (CP 1.343), as in the conclusion that the same sun will be seen shining tomorrow.

While this inference may seem unlikely to change any time soon, not all belief-habits are as enduring – far from it, actually. As had been pointed out by Peirce (CP 3.161): "At the same time that this process of inference, or the spontaneous development of belief, is continually going on within us, fresh peripheral excitations are also continually creating new belief-habits." It should come to no surprise that habits and

beliefs are far from permanent, seeing how real-world events are often unexpected. As Peirce (CP 1.324) put it: "We are continually bumping up against hard fact. We expected one thing, or passively took it for granted, and had the image of it in our minds, but experience forces that idea into the background, and compels us to think quite differently." This is why our daily encounters with people and things require that we are open to habit-change. Peirce (CP 5.476) described this as "a modification of a person's tendencies toward action, resulting from previous experiences or from previous exertions of his will or acts, or from a complexus of both kinds of cause." In a world comprised of continuously changing facts, we have no choice but to habitualise new circumstances and thus change our thinking accordingly. Crossland (2013), for instance, illustrates how Sotho Tswana communities experienced dynamic changes in their daily practices because of the architectural (and semiotic) changes motivated by British missionaries who sought to reproduce the spatial patterning of British homes, towns, and villages. As she demonstrates, the architecture brought by the missionaries forced the Tswana to make adjustments in their previous habits of action and thought, by exposing them to new layouts.

In order grant some merit to matter for its role in shaping new mental habits, let us now turn to MET's fundamental axioms, starting with the first of the three hypotheses.

4 The hypothesis of extended mind, Dewey's sensori-motor account of perception, and Peirce's synechism

Called the *hypothesis of the extended mind*, MET's first hypothesis raises an important point about the constitutive entwinement of cognition and material culture: "If we accept that the mind evolves and exists in the *relational domain* as our most fundamental means of *engaging* with the world, then material culture is *potentially co-extensive and consubstantial with mind*" (Malafouris 2013, p.77, emphases in original). In other words, if we are to recognize the continuity between matter and mind, it is important that we appreciate how experience cannot only be incited, but also constitutively shaped by the use of material objects and artefacts. To this end, we must take into account the *Blind Man's Stick (BMS) hypothesis* – a theoretical exercise that will help us re-evaluate the borders commonly drawn between brains, bodies, and things (Malafouris 2008b). Bateson (1973, p.318) asks us to "consider a blind man with a stick. Where does the blind man's self begin? At the tip of the stick? At the handle of the stick? Or at some point halfway up the stick?"

In addressing this classical phenomenological example, Malafouris (2008b, pp.404–405) suggests that we focus on two major questions: i) "What does the stick do for the blind?" and ii) "Does the biological boundary of the skin apply in the case of the blind?" In response to the first question, he argues that the stick enables the blind to see by effecting a cognitive reorganization of the cortex in which cortical areas normally associated with vision are repurposed to accommodate tactile processing. As for the second question, it appears that a skin-delineated boundary is unproductive, since the stick is incorporated through practice by the blind to such a degree that it becomes transparent. Given that tactile sensation is somehow projected at the point of contact

between the tip of the stick and the outside world, it would seem reasonable to accept that the stick is as important for the perceptual system of the blind as their neural components. After all, the removal of the stick would deprive their visual cortex from stimulation, and them from an enhanced sensory experience. Apparently then, the stick does more than enacting visual experiences – it also plays a constitutive role in perception. To this extent, the theory of material engagement seeks to take material culture seriously by "being systematically concerned with figuring out the causal efficacy of things in the *enactment* and *constitution* of human cognition" (Malafouris 2013, p.8, emphases in original). In order to study the evolution of the human mind, MET therefore draws upon an enactive sensorimotor contingency theory (O'Regan and Noë 2001) which has two main implications (Malafouris 2007, p.295, 2013, p.203):

For one, it allows us to treat perception as a form of skilful interactive engagement – that is, as a form of action rather than a form of 'internal' representation. The outside world does not have to be represented inside the brain, because it functions as its own 'external' representation. Human perception thus depends on mastering different ways of probing the environment, as in the case of using a stick for the purpose of seeing. This essentially entails amassing practical knowledge about the sensory consequences of different behaviours. While it has not been long since this notion has been supported by empirical evidence (O'Regan and Noë 2001), the idea that perception cannot be reduced to the passive sensation of external stimuli is not new. As Gallagher (2017, pp.48–51) points out, the importance of sensorimotor contingency and response-depended stimulation had already been recognized by pragmatists. In a paper on the reflex arc, Dewey (1896, p.358) characteristically reported: "Upon analysis, we find that we begin not with a sensory stimulus, but with a sensori-motor coordination, the optical-ocular, and that in a certain sense it is the movement which is primary, and the sensation which is secondary, the movement of body, head and eye muscles determining the quality of what is experienced." Clearly then, Dewey's sensori-motor take on perception is much in line with MET's attempt to replace the sense-datum theory of perception with an approach that grants the actual engagement between humans and things with ontological primacy in the emergence of the mind.

This brings us to the second implication of adopting an enactive sensorimotor account: if perception is a mode of probing (rather than representing) the outside world, then we can conceptualise artefacts as continuous prosthetic parts of this probing mechanism, and therefore as cultural extensions of the human brain (Malafouris 2007, p.295, 2013, p.203). The transparency with which external tools can be integrated into the human cognitive system is what led Clark and Chalmers (1998) to the formulation of the *parity principle*. As they famously put it: "If, as we confront some task, a part of the world functions as a process which, *were it to go on 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" (ibid., p.8, emphases in original). Again though, this idea is not new, since Peirce (CP 4.551) had insightfully proposed much earlier that "[t]hought is not necessarily connected with a brain." In an attempt to illustrate how thinking is actively shaped by the physical characteristics of exosomatic entities, he calls the reader to consider the following telling example:

A psychologist cuts out a lobe of my brain (*nihil animale me alienum puto*)[2] and then, when I find I cannot express myself, he says, "You see your faculty of language was localized in that lobe." No doubt it was; and so, if he had filched my inkstand, I should not have been able to continue my discussion until I had got another. Yea, the very thoughts would not come to me. So my faculty of discussion is equally localized in my inkstand. (CP 7.366)

Even though Peirce would have retained his reasoning faculties without his inkstand, certain kinds of thought can only be induced through pen and paper, as some writers will definitely attest to. Apparently, thinking actively involves the participation of more than cortical areas. Unfortunately though, the idea that material culture is constitutive to previously unavailable forms of cognition never became widely accepted, which is why more than a century later Malafouris (2013, p.229, emphasis in original) calls attention to the fact that "*[t]he mind is more than a brain.*"

According to both scholars, cognition escapes the confines of the skull and inundates the outside world because mind and matter are not disconnected entities. From a Peircean point of view, "we ought to suppose a continuity between the characters of mind and matter" (CP 6.277). So what does this exactly mean? That thinking can be constituted in part by material objects, such as the blind man's stick or Peirce's inkstand, is an understandable position, even if somewhat radical for most. The idea however that matter entails some kind of mind is a harder pill to swallow. Considering though that meaning is produced through habits, it would not be unreasonable to see matter as "nothing but mind that had such indurated habits as to cause it to act with a peculiarly high degree of mechanical regularity, or routine" (ibid.). It would perhaps be fair to say that "the reaction between mind and matter would be of no essentially different kind from the action between parts of mind that are in continuous union, and would thus come directly under the great law of mental association" (ibid.). In a way then, it should not be unreasonable to suggest that "what we call matter is not completely dead, but is merely mind hidebound with habits" (CP 6.158). Attributing however a quality associated with sentient beings to inorganic substances is understandably expected to meet some resistance, especially if misconstrued as placing matter at the crux of Peirce's take on reality. In order to protect his metaphysical perspective from such a misinterpretation, Peirce (CP 6.277) had therefore stated the following:

This hypothesis might be called materialistic, since it attributes to mind one of the recognized properties of matter, extension, and attributes to all matter a certain excessively low degree of feeling, together with a certain power of taking habits. But it differs essentially from materialism, in that, instead of supposing mind to be governed by blind mechanical law, it supposes the one original law to be the recognized law of mind, the law of association, of which the laws of matter are regarded as mere special results.

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[2] A play on the saying *nihil humani a me alienum puto*, which translates to *nothing human is alien to me*.

Having thusly dismissed the ontological demarcation between mind and matter, Peirce (CP 7.565, emphasis in original) "proposed to make *synechism* mean the tendency to regard everything as continuous." The ontological position that "all is fluid and every point directly partakes the being of every other" (CP 5.258n2) is clearly reverberated in the Blind Man's Stick hypothesis, for according to Malafouris (2013, p.244, emphasis in original), "the ontological unity of the blind man and the stick offers a powerful metaphor that enables us to conceptualize minds and things as *synechēs* (continuous)." In replacing the common misconception that cognition is confined within the braincase with the notion that thinking is the emergent product of intra- and extra-somatic coalitions, Peirce and Malafouris effectively converged on the idea that the mind has no physical location per se (Menary 2007, p.125; Malafouris 2013, p.85; Aydin 2015). According to this locationally-neutral account of cognition, "we ought to say that we are in thought, and not that thoughts are in us" (CP 5.289, note 1), for "the mind does not inhabit the body, it is rather the body that inhabits the mind" (Malafouris 2008c, p.115).

The idea that the mind is not something an isolated brain is privy to is, in fact, nicely illustrated in the case of material signification. To get a sense of how material signs come to be enactively discovered through material engagement and semiotic interpretation, we must now turn to the second of MET's working hypotheses.

5 The hypothesis of enactive signification and Sonesson's iconic and indexical sign function

Malafouris (2013, p.99) defines "enactive signification as a process of embodied "conceptual integration" responsible for the co-substantial symbiosis and simultaneous emergence of the signifier and the signified that brings forth the material sign." Avoiding the widely held assumption that wants the concept signified to have preceded the creation of the signifier, MET proposes that both form and meaning emerge simultaneously through an engagement-driven mechanism. Influenced by Hutchins' (2005) 'materialist' take on the conceptual blending theory by Fauconnier and Turner (2002), Malafouris (2013, chapter 5) suggests that once corresponding qualities between material and mental spaces have been mapped, their integrative projection into a novel hybrid space yields what is essentially known as the material sign. From this enactivist point of view: "Material signs do not represent; they enact. They do not stand for reality; they bring forth reality" (Malafouris 2013, p.118). In order to illustrate these claims by means of a case study, Malafouris (2007, 2013) has delved into a semiotic exploration of Upper Palaeolithic cave paintings, which are generally accepted as uncontested evidence of a representational ability and, by extension, a symbolic capacity.

From the vantage point of MET though, maintaining that Upper Palaeolithic humans would have understood cave paintings in the same way that we do should not be taken for granted, because they might have been uninitiated to the function of representational media. Malafouris (2007, p.292) argues that "it is one thing to say that the people of the Upper Palaeolithic were creating representations – they certainly appear as representations to the modern observer – it is another to say that the Palaeolithic people were aware or knew they were making representations in some arbitrary symbolic sense."

According to MET's take on enactive discovery, it was only after reflexively engaging with these material signs that Palaeolithic humans were eventually able to grasp their representational and symbolic relation to what they depict. Based on this enactive logic, the rhinos painted on the walls of Chauvet Cave qualified as 'external' representations only once they had been enactively conceived to stand for actual rhinos. Although humans inhabiting other places and (probably earlier) times would have discovered material signification through different means (both bodily and artefactual), those inhabiting Upper Palaeolithic caves would have likely come to discover the practice of 'external' representation through the very act of painting itself. Based on the logic of enactive discovery, MET thus poses that what we are quick to consider an 'external' representation should be taken as the ending, rather than the starting point of an archaeological investigation.

While placing the emergence and evolution of material signification upon enactivist foundations is without a doubt a theoretical suggestion of great value, maintaining that drawings as clearly iconic as the rhinoceroses on the panel of the horses at Chauvet would have come to function as symbols (whenever it was that their representational function became established) may be in need of some reconsideration. In order to illuminate the reasoning behind this claim, a terminological clarification is in order: In the context of MET, icons and indices are "motivated" in that they operate through some form of actual relevance, whether via resemblance or contiguity; whereas symbols are "arbitrary" in that the signifier operates by means of convention (Malafouris 2007, p.293; 2013, p.96). As Malafouris (2007, p. 293) sees it, the symbolic artefact "is taken to embody a sort of visual code or language and thus invites reading." In short, MET associates 'symbolism' with the 'representational' status of material signs. While icons and indices certainly play a crucial role in the eventual arrival of symbolism and representation, they are not themselves treated as representational or in need of interpretation on the basis that they can be straightforwardly perceived. Yet as I have elsewhere suggested (Iliopoulos 2016a, b), restricting icons and indices strictly to the perception of qualitative and existential relations, while reserving the representational sense of signification for symbols alone, might not be the most appropriate course of action when studying habit-involving material signs, such as prehistoric cave paintings and early body ornaments. As I see it, it is important to recognize that primarily iconic and indexical signs can also incorporate 'symbolic' elements, such as mediation and generality.

Admittedly departing a bit from Peircean orthodoxy is a position according to which icons and indices can also be guided by conventional rules (and, by contrast, one wherein symbols are defined as conventional signs connected to their objects through *purely* arbitrary means). To be more specific, Sonesson's (2012) take on Peircean semiotics manages to combine the principle of participation with the principle of significative equivalency when describing iconic and indexical signs, because they are conceived as being comprised of iconic/indexical relevance (i.e., the semiotic ground) *and* the sign function. Simply put, the relation of relevance falls under the auspices of perception, since similarity, contiguity, and/or factorality (i.e., the relationship between part and whole) between two things can be actually 'seen' as a real-world relation. For instance, the similarity between the painted rhinoceroses and the real animals is not difficult to glean, even by a pictorially untrained eye. As we have seen though, taking the former to stand for the latter in a representational sort of way is a

cognitive capacity that involves a different kind of meaning. Having recognized that Peirce's notion of the sign does not really help us differentiate between perceptual and truly significative meaning, Sonesson (2012) proposes that a narrower, but in no way incompatible definition of the sign function be adopted. To this end, he introduces a pair of terms used to describe the sign's parts: he refers to the thing functioning as the Peircean sign or representamen as the sign's *expression*, while calling the thing functioning as the Peircean object (along with its respective interpretant of course) the sign's *content*. Applying these terms to our example, we could say that the painted animals would have eventually come to function as the sign's expression, while the real animals would have provided its content.

So what are the criteria that need to be fulfilled in order for the relation between two things to be considered truly significative? For one, the expression and the content must be doubly differentiated, in that: i) they must not go over into each other in time and/or space (the painted and the real animals clearly do not); and ii) they must be perceived to be of a different nature (the painted and the real animals certainly are). In addition, the parts of the sign must be in a doubly asymmetrical relation, in that: i) the expression must be perceived more directly than the content (i.e., the painted animals must be taken to stand for the real animals, not the reverse); and ii) the content must be more in focus than the expression, because it is the real animals that are more important than the painted ones. At this point, the two things constituting the semiotic relation are subjectively differentiated, in that the painted animals are directly given and nonthematic, whereas the real animals are only indirectly present and thematic. Evidently then, Upper Palaeolithic cave paintings would have come to operate as iconic *signs* (in the strict sense of the term), which would have consisted of more than an actual relevance open to perception, when their interpretation would have relied on differentiation and asymmetry between the sign's parts.

Recognizing the distinction between iconic/indexical relevance and the sign function serves more than the purposes of analytical precision. Acknowledging that icons and indices are truly significative general mediations of particular similarities, contiguities, and/or factoralities is important because it helps us account for the transition from the perception of an actual relevance to the conception of a typical idea. To understand how early humans might have discovered that objects and actions can be interpreted as standing for something else in some respect, it would be helpful to recognize that iconic and indexical signs have more than a single way of manifesting themselves. In order to appreciate the various ways that physically grounded signs can function, we must turn again to Sonesson's approach to Peircean semiotics, and more specifically to his distinctions between different iconic and indexical types.

Starting with the former, it is important to note that, while the iconic grounds of some signs are readily perceived, others require prior familiarity with their sign function in order to be discerned (Sonesson 2010, 2013). The panel of the horses is a characteristic example of what Sonesson calls a *primary* icon, because the easily discerned similarity (i.e., the iconic relevance) between the painted figures and the real animals would have been the main reason that the depictions came to be identified as iconic signs. On the other hand, had a Venus figurine been a representation of a mother goddess (Russell 1998), it would have functioned as a *secondary* icon, since prior knowledge of its significative function in some particular system of interpretation

would have been necessary in order to be able to perceive its similarity with the form of a particular mother goddess.

As for indexical signs, it is important to recognize that, while in some indices the indexical relevance precedes the formation of the sign function, in others the ground is established at the very moment that the sign is given (Sonesson 1989a, b). The use of prehistoric tools as markers of social identity (Chase 1991; Rossano 2010) is a clear example of what Sonesson calls an *abductive* index, because the contiguity between a particular kind of tool and a specific group of people would have pre-existed to its conception as significative. For this type of indexical signification to describe a state of affairs, exposure to a known regularity is a necessary prerequisite. Yet not all indices rely on amassing cultural knowledge; the meaning of some is spontaneously generated. A classic example of a *performative* index is the pointing finger, where the ground between the finger and what it points to is created at the very moment that the sign is formed. To create such states of affairs, these indexical signs must depend on posited (rather than known) regularity. Interestingly, the two types of indexical signification are not mutually exclusive (Sonesson 1989a, p.53; 1989b, p.64). As the case of early body ornaments helps illustrate, shell beads would have come to be established as material signs for a trait of their wearer (e.g., wealth), both by referencing it to others as abductive indices, and by conferring it on the person as performative indices (Iliopoulos 2016a).

Evidently then, material signs have various ways of becoming meaningful: some icons can be straightforwardly grasped, while others require knowledge of a significative convention; and some indices describe states of affairs, while others create them, with some even doing both at the same time. Familiarization with these various modes of meaning-making would have given humans ample opportunity to think about thinking, eventually helping them realize that objects and actions can reveal (seemingly) true facts about people and things. Having arrived at a meta-representational understanding of material semiosis, humans would have been a step closer to grasping the core idea behind symbolism (in the aforementioned sense) – that is, the idea that humans and things can be associated with something else through a purely arbitrary connection. As I have argued elsewhere (Iliopoulos 2016b, p.119), the eventual cohabitation of various physically grounded meanings in the same sign-vehicle must have scaffolded the development of entirely arbitrary concepts. For instance, the accumulation of more tangible meanings such as 'value' and 'wealth' in bead-decorated individuals would have provided the foundations for the emergence of novel properties in the blended space, such as the more abstract concept of 'status' (Iliopoulos 2016a, p.266). There is nothing in this arbitrary concept and in the beadworks that explains the sign relation that produced the relevance between them, and yet its development need not have been the result of a preconceived and deliberate invention; it could have simply been an enactive discovery made possible through the semiotic scaffolding provided by iconic and indexical signs. It thus becomes apparent that, acknowledging the capacity of icons and indices to stand for something else in a representational sort of way makes accounting for the development of symbolic connections less of a leap.

Hoping to have thusly brought the motivated and the arbitrary elements of material signification somewhat closer to one another, it is now time to turn to the third and final of MET's working hypotheses.

6 The hypothesis of material agency and Mead's manipulatory area

The *hypothesis of material agency* is a hypothesis "which explores agency not as a human property but as the emergent product of situated activity asking not "What is an agent?" but "When is an agent?"" (Malafouris 2013, p.51). Rather than accepting agency as the result of prior intention, Malafouris associates the ability to bring about changes in the world with *intention-in-action*. As he explains: "In the case of "prior intention" no such correlation [between intentionality and agency] can be made before this intention becomes realized in the world—that is, before it meets its relevant condition of satisfaction" (Malafouris 2013, p.139). In order for this condition to be met, a pertinent affordance must be presented (Gibson 1979). Case in point: whether one's intent to drink something can be agentively manifested relies on whether any interaction with a specific object affords drinking. For the proponents of MET then, intentionality and affordance are not respectively exclusive to humans and things; they are instead constitutively entwined products of situated material engagement.[3] In order to identify the ontology with the upper hand at any given moment during the struggle of humans and things toward a "maximum grip", MET specifically calls us to concentrate on the dynamics of action and practice (Malafouris 2013, p.147), reminiscing once again the core idea behind pragmatism.

Besides describing agency in practical terms, its enactivist dispositions converge with pragmatism in another important way: the reachable peripersonal space within which material agency emerges can be seen as – what Mead (1938) termed – the *manipulatory area*. As Gallagher (2017, p.51) points out, Mead's (1938, p.103) treatment of perception as "the readiness to grasp" what is seen, is much in line with the enactivist idea that explains thinking by evoking our sensorimotor engagement with an affording world. According to – what Lewis (1981) called – Mead's *contact theory* of reality, organisms grasp the objects occupying their manipulatory area in order to gain contact experience. As he had notably argued, the haptic experience of permitting objects allows humans to evaluate percepts by confirming or denying whether the visual, aural, and/or olfactory sensations formed while they were still at a distance conform to prior memory images of contact experience. In fact, through their unique propensity for affirming the meanings of things through manipulation, humans are effectively able to evaluate and appreciate a wide array of perceptual objects, not just physical, but scientific and aesthetic ones as well.

In order to better understand how these different forms of material culture can be actively engaged with, it is imperative that we delve deeper into the issue of how humans think through and about things – a task undertaken in what follows.

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[3] MET does not, of course, claim that the humans and the things participating in this dynamical interaction share the same ontological status. It should go without saying that, unlike things, humans possess a "sense" or an "experience" of agency (Malafouris 2013, p.215). Malafouris therefore suggests that the differentiating factor between human agency and agency proper is consciousness rather than causality (ibid.). It is worth noting here that MET's differentiation between agency and the experience of agency bears striking similarity to Peirce's (CP 7.364–7.367) distinction between mind and consciousness (i.e., the experience of mind).

7 *Thinging* and Dewey & Bentley's transactional logic

Keeping in mind that this neologism admittedly lacks the analytical precision and closure of other concepts (albeit not inadvertently so; Malafouris 2014, p.143), *thinging* is considered by MET as an attempt to conceptualize things as processual and relational, rather than static and decontextualised entities. From MET's enactivist point of view, things are not simply passive entities represented in the brain for computational purposes; they are instead active participants in a dialectic engagement with humans, which makes them the things they are right then and there (Malafouris 2016b). Whether be it in manufacture, use, or even disposal, things allow humans to experience their very essence during, or better yet through these acts of *hylonoetic*[4] integration (Malafouris 2016a). On the one hand, humans approach an interaction with skilled bodies shaped through prolonged periods of culture-specific training (which of course changes over time); on the other, things enable particular ways of thinking through and about them (while simultaneously constraining others). In order to illuminate the specificity and multiplicity of things over the course of their situated life histories, MET proposes shifting our perspective from one that treats them as beings occupying a snapshot of lived and evolutionary time, to one that traces their becoming across time and space. In Malafouris' (2014, p.143, emphasis in original) own words: "The notion of *thinging* seeks to encapsulate the major phenomenological ingredients of the latter process, shifting our attention away from the sphere of isolated and fixed categories (objects, artefacts, etc.) to the sphere of the fluid and relational *transactions* between people and things."

From a philosophical point of view, it could be argued that MET alludes to a transactional whole that cannot be reduced to the sum of its individual components – a position very much in the spirit of *transactionalism*. Famously defended by Dewey and Bentley (1946, 1949), its anti-Cartesian and process-oriented dispositions are captured well in the following excerpt:

> What we call "transaction"…is…in technical expression, neither to be understood as if it "existed" apart from any observation, nor as if it were a manner of observing "existing in a man's head" in presumed independence of what was observed. The "transaction," as an object among and along with other objects, is to be understood as unfractured observation—complete as it stands, at this era of the world's history, with respect to the observer, the observing, and the observed, and affected by whatever merits or defects it may prove to have when it is judged, as it surely will be in later times, by later manners. (Dewey and Bentley 1946, p.506)

This passage highlights a couple of important points that reflect MET's view on *thinging*: first, that a transaction is not an external exchange, which happens to be passively observed and internalised, but an irreducible engagement that involves the whole organism-environment system; and second, that transactions unfold primarily at an embodied and non-discursive level, before being reflexively evaluated.

In this light, when examining the creative variant of *thinging* in the section that follows, I start by showing the primacy of non-discursive intelligence (i.e., creative

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[4] The term *hylonoetic* comes from the Greek words *hyle* (matter) and *nous* (mind).

thinking *through* things), upon which creativity in the inferential sense of the term then develops (i.e., creative thinking *about* things).

8 Creative *thinging* and Peirce's abductive inferences

Malafouris (2014, p.144, emphases in original) uses "the term Creative *thinging* to designate *a long-term commitment to the discovery of new varieties of material forms, so far as it is possible in a given historical situation, through a saturated, situated engagement of thinking and feeling with things and form-generating materials.*" As he points out, humans are particularly adept at discovering new varieties of materials to think through and about. Yet this discovery is not one left to chance, since humans are able to find new material forms via their unique propensity for making. In his famous monograph on *Creative Evolution*, Bergson (1998 [1911], p.139, emphasis in original) highlighted the fact that "*intelligence, considered in what seems to be its original feature, is the faculty of manufacturing artificial objects, especially tools to make tools, and of indefinitely varying the manufacture.*" Influenced by the Bergsonian idea that humans think by means of manufacture, MET's emphasis on a creative kind of thinking through things seeks to elucidate the fact that the novel meanings humans come to entertain involve more than mere observation of the world as it is presented to us.

According to Malafouris (2014, p.144): "The feature that particularly marks Creative *thinging* can be found by noting the peculiar combination of enactive discovery (world-involving and world-revealing bringing forth) and making that lies at its heart. Humans usually either discover or create. The differentiating feature of Creative *thinging* is that we discover by creating." From the vantage point of MET, the form and meaning of an artefact are not so much formed before the actual engagement, as much as emerging through it. Creative material engagement is guided by a logic of improvisation, thus doing away with the nebulousness of prodigious invention. Rather than relying on a preconceived image, humans bring it forth right then and there, because each and every change they make along the way forces them to recalibrate their bearings and adjust subsequent actions. This is, for instance, the case with pottery making, where new material forms are actually discovered through the potter's senso-rimotor attunement to the clay's affordances, which are ongoingly manipulated through the coordination of visuo-haptic feedback and behaviour (Malafouris 2008a, 2014).[5]

Of course, the important role that eyes and hands play in creative thinking had also been highlighted by Peirce (Viola 2016). As he claimed in his *Sketch of a New Philosophy*: "It is not a historical fact that the best thinking has been done by words, or aural images. It has been performed by means of visual images and muscular imagination" (Peirce 2010, p.19). Unpersuaded by the idea that reflection primarily takes place through words, Peirce had invoked what he called *diagrammatic, or schematic, reasoning.* As he aptly recognized: "We form in the imagination some sort of diagrammatic, that is, iconic, representation of the facts, as skeletonized as possible. The impression of the present writer is that with ordinary persons this is always a visual image, or mixed visual and muscular; but this is an opinion not founded on any systematic examination" (CP 2.778). Despite the lack of empirical evidence at the

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[5] Malafouris (2014 p.149) calls this multimodal variety of creative awareness *feeling of* and *for clay.*

time, Peirce sought and managed to explain the iconic production of thoughts by invoking inferences, especially abductive ones.[6] Viola (2016) examines in detail how novel hypotheses, formed in order to explain observed facts, are actually founded on the exploration and manipulation of our environments (what was called above, Creative *thinging*). As he explains:

> This inferential mechanism has an eminently practical nature, and runs in great part in a tacit way. Far from needing explicit beliefs to be formulated in the mind, it mainly hinges on the role of habits, which are the practical, embodied, and sometimes pre-conscious equivalent of the major premise of a syllogism, "if A then B". (That is, habits link a set of stimuli, or observations, to a set of "practical reactions".) (ibid., p.256).

From Peirce's point of view, the 'feeling' experienced about how something came to be is actually rooted in one's perceptual awareness of the world. Peirce (CP 5.181) specifically noted "that abductive inference shades into perceptual judgment without any sharp line of demarcation between them; or, in other words, our first premisses, the perceptual judgments, are to be regarded as an extreme case of abductive inferences, from which they differ in being absolutely beyond criticism."

Strictly speaking though, the non-discursive inferences Peirce sought to describe do not rely on abduction alone, since deduction and induction also play a role in these complex processes (Tiercelin 2005; Viola 2016). In fact, the arrival of a possible explanation for a particular observation by means of abduction marks only the beginning of a broader inferential process, which is followed by the deduction of the practical effects of the hypothesis, thus paving the way for further inductions, whose experimental examination can either confirm or correct the initial habit. Or, as Peirce (CP 6.146) put it:

> By induction, a number of sensations followed by one reaction become united under one general idea followed by the same reaction; while, by the hypothetic [i.e., abductive] process, a number of reactions called for by one occasion get united in a general idea which is called out by the same occasion. By deduction, the habit fulfils its function of calling out certain reactions on certain occasions.

Given the broadness of inferential thinking, as well as the subconscious and experiential roots of abduction, the anti-intuitionist stance held by Peirce has been recently introduced to the externalist school of thought gaining traction in the cognitive sciences (Fusaroli and Paolucci 2011; Paolucci 2011; Viola 2016). It seems that the creative moment mistakenly attributed to intuition is better seen as the conscious realizing of perceptually grounded inferences, much like the ones emerging from acts of creative material engagement.

In order to better appreciate where novel content may be lurking, we need to return to semiotics, as icons appear to play a fundamental role in the creative nature of abductions (Atã and Queiroz 2014; Viola 2016). To be more specific, the hypothesis

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[6] Abduction is a highly fallible kind of inference, which involves speculating how an observed fact could have come about.

formed during an abductive act can be seen as an icon of what has been perceived. According to the traditional definition of the icon, this means that the thing perceived and the hypothesis formed share certain qualities. This however does not explain the creative power of abduction, which is simply reduced to reverberating something already there. To account for the introduction of novel content through abductive inferences, we must embrace a broader conceptualization of the iconic sign, one wherein new truths can be discovered, "[f]or a great distinguishing property of the icon is that by the direct observation of it other truths concerning its object can be discovered than those which suffice to determine its construction" (CP 2.279). The idea, according to which the manipulation of icons allows us to perceive properties of the object that are not noticeably apparent through the filtering done by the sign, has in point of fact gained much traction in the literature on Peirce's diagrammatic logic that has been published over the past decade or so (e.g., see Stjernfelt 2007; Paolucci 2017; Pietarinen and Belluci 2017).

To put – what Stjernfelt calls – the *operational* definition of icons to the test, let us consider the case of the triangle, as has already been done by others before us (e.g., Viola 2016, p.259; Pietarinen and Belluci 2017, p.185). It should go without saying that the easiest way to draw a triangle is by intersecting three straight lines in a way that creates a closed planar space. By observing it directly, we realise that it also has three angles, and that their sum equals 180°. Apparently then, while its construction relied on a particular set of instructions about the geometrical diagram, more can be revealed upon close examination. Given that, by definition, the qualities of two things iconically related inhere in them independently,[7] it is easy to see that, besides sharing qualities with things demonstrably there, icons may also share qualities with things whose existence has yet to be demonstrated (or even things that have yet to come into existence). This is, for instance, the case with the discovery of possible such truths through algebraic formulae. While often seen as purely arbitrary, they actually share many qualities with what they stand for, which is why Peirce (CP 2.279) argued that "the iconic character is the prevailing one."

Interestingly, the creative likenesses of icons are not restricted to the realm of logical reasoning explored by mathematicians and philosophers; they can also be encountered in artistic practices not unlike pottery-making. As recognized by Peirce (CP 2.281): "Another example of the use of a likeness is the design an artist draws of a statue, pictorial composition, architectural elevation, or piece of decoration, by the contemplation of which he can ascertain whether what he proposes will be beautiful and satisfactory." It seems then that iconic signs provide ample opportunity for the creation of both discursive and non-discursive inferences. To this extent, the innovativeness of scientists and artists alike could be said to lie mostly in perceptual awareness and abduction.

That said, creativity also depends on the exceptional ability of humans to integrate themselves with the material world in a multitude of ways. In order to appreciate the plasticity of these creative coalitions, let us now turn to the last of MET's concepts under examination.

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[7] According to Peirce (CP 2.247): "An *Icon* is a sign which refers to the Object that it denotes merely by virtue of characters of its own, and which it possesses, just the same, whether any such Object actually exists or not."

9 Metaplasticity and Dewey's notion of situation

Prompted by the idea that the defining feature of humans is the alterability that is natural to their cognitive architecture, Malafouris (2009, 2010a, b, 2013, 2015, 2016c) suggests that the concept of *metaplasticity* can be used to describe the remarkable flexibility with which plastic brains and malleable objects come together at the interface provided by the human body. Seeing how neural and cultural elements can be integrated in a number of different ways, it is also worth noting here the postphenomenological concept of *multistability* (for MET's relation to postphenomenology see Ihde and Malafouris 2018). According to Ihde (2002, pp.106–107, 2009, pp.14–16), the same material structure can follow various stable trajectories, thus leading to very different phenomena. For an example of how different semiotic and cognitive ontologies can be brought forth through the same structures, take the case of prehistoric shell beads: while they could have served ornamental purposes when worn as beadworks, they could have also held a numerical function when used as parts of abaci (Garofoli and Iliopoulos 2017). It should thus be fair to say that the path treaded by material culture relies on its physical form as much as it relies on the various ways in which it is incorporated into human practice. Given the importance of context in the excitation and shaping of unique cognitive processes, it might be helpful then to consider the unfolding of situations from the vantage point of pragmatism.

As demonstrated by Gallagher (2017, pp.54–57), Dewey's notion of *situation* is an idea closely aligned with enactivist thinking. Contrary to its use in modern parlance, the term does not refer, in this case, to isolated facts that an organism finds itself facing. In Dewey's (2008, p.72, emphasis in original) own words: "What is designated by the word "situation" is *not* a single object or event or set of objects and events. For we never experience or form judgements about objects and events in isolation, but only in connection with a contextual whole called a "situation"." As he saw it, this contextual whole involves both organism and environment, but not detached from one another. It should not be difficult to see that an organism cannot exist outside of its environment, and correspondingly an environment cannot be defined but in relation to an organism. This happens to be the case for organisms dwelling in physical, as well as social environments. In both cases, a situation emerges when the integration of an organism and its environment gets disrupted, thus stimulating the co-relational system to rely on a coordinated coupling in order to maintain and propagate itself even further. Having recognized the self-organizational direction of situations, Gallagher (2017, p.55) identifies a link to the enactivist idea of autopoiesis: Much like the biological variant of enactivism defended by Varela, Dewey described the resolution of impeding tension through the organization of interacting facts in systems (a process which is not necessarily consciously premeditated). Seen along these lines, humans could be argued to (un)consciously address external perturbations through different kinds of embodied integration with material culture, thus harnessing the benefits of what MET calls their metaplasticity.

10 Conclusion

So where does this theoretical exercise leave us? What is the point of all these connections between MET and pragmatism? At the risk of being repetitive, I concede

yet again that this paper is in a way another piece of evidence for the relatively recent claim that pragmatism can be seen as a philosophical antecedent of the enactivist wave of thinking currently spreading in the cognitive sciences, including cognitive archaeology. Yet, besides adding to the accentuation of this interesting historical similarity, the current paper serves another, more fundamental purpose. It specifically attempts to set some of the theoretical context required for the analytical tools of MET-inspired cognitive semiotics. As mentioned in the introduction, I have elsewhere integrated Malafouris' take on enactive cognition and signification with Peirce's pragmatic semiotics, so as to yield a multifaceted framework that can trace the nature, emergence, and evolution of material signs. What I strived to do here is to provide at least some of the background for this pragmatic and enactive theory of cognitive semiotics by highlighting the overlap and complementarity between the philosophical influences of this composite. As we saw, Malafouris (2013) grounds his evolutionary epistemology on the ontological primacy of material engagement. In the same vein, Peirce had seen metaphysical reality as evolutionary, rather than static and substantival (Hausman 2012). Yet, as it became clear in this paper, the theory of material engagement is also linked in other ways to pragmatism – Peircean, Deweyan, and Meadian, alike. If it were to be distilled though, the core of this rapprochement would probably lie in the fact that both, MET (Gosden and Malafouris 2015) and pragmatism (Rescher 2000, pp. 46–47; Hausman 2012), adhere to a process philosophy that shifts our focus from being to becoming.

That said, a small (but easily removable) thorn remains on the issue of representation: MET rejects the notion of 'internal' representations, reserving the term for the 'external' world. Isolated brains are evidently unable to represent the world for the purposes of most real-life cognitive tasks, unlike artefacts, which are indeed capable of standing for something else in a representational sort of way. While the general message of this externalist stance certainly finds me in agreement, a couple of objections may be worth raising: (i) the internal/external divide is maintained on the issue of representations, despite MET's commitment to the idea that the mind has no location; and (ii) external representations are described in the rather 'static' terms of the signifier-signified relation, despite the material sign being conceived as a hylonoetic entity that 'brings forth' meaning. To evade the first of these issues, we must simply adhere to MET's theoretical commitment on the location of the mind. Granted that Malafouris assumes a locationally-neutral approach to the mind, we ought to treat representations consistently, regardless of whether it was a physical or mental object that instigated the thought process. As for the second issue, we must replace the dyadic understanding of the signifier and the signified with concepts that allow us to appreciate the environment's ability to mediate physically and semiotically grounded meaning. The terms sign-object-interpretant might be useful in this regard, seeing how the triadic sign is able to bring forth a thematic aspect of the world through mediation. It is probably best then that we adopt a Peircean take on representations, by essentially treating them as mediated interpretations that are neither internal nor external (see Paolucci 2011; Aydin 2015). As I see it, a representational account of reasoning does not have to be at odds with MET's core beliefs, so long as representations are not seen as arbitrary symbols arranged by a brain-bound homunculus, but as mediated interpretations driven by the generative force of semiotic objects and the hermeneutic nature of an extended mind. Admittedly, this proposal entails a radical reconceptualization of what it is that we

mean when referring to representations. Difficult as this may be, we can at least try moving towards a conception that is arguably worth retaining for epistemic purposes. After all, reconceptualizing familiar but misapprehended notions such as cognition, signification, agency, and creativity, is a cause MET has been extensively fighting for since its inception.

On this note, I would like to close by recognizing that certainly more remains to be done towards this end. Partly due to space limits, and partly due to time restrictions, the connections made above, between pragmatism and enactivism, are admittedly few and far between. Nevertheless, I hope that the rapprochement attempted in this paper will at least encourage further exploration of the commonality and complementarity between these chronologically-distant, but philosophically-proximate schools of thought.

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