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MAKING SENSE OF (AUTOPOIETIC) ENACTIVE EMBODIMENT: A GENTLE APPRAISAL

1. Introduction

With the advent of the cognitive revolution in the 1950s the intuitive idea that cognition is exclusively a brain process gained considerable scientific plausibility and credence. The last three decades, however, have seen various researchers challenge this idea and argue that cognition is not just "embrained", but also *embodied* and *embedded*. As a consequence the notion of *embodiment* has come to acquire special significance. So much so that some have argued that we are currently witnessing a "corporeal turn" (Sheets-Johnstone 2009) akin to the linguistic turn that took place in philosophy in the first half of the last century.

Embodiment or embodied cognition is a thesis which can be summarized as follows: cognition cannot be understood by studying the brain alone, we also need to appeal to the whole body (see Calvo and Gomila, 2008). As many theorists have recognized, this thesis is as ambiguous as it is important. Naturally, what one makes of the thesis will depend on one's understanding of its two key concepts, the *body* and *cognition*. It should then come as no surprise to find that currently there is no one unified embodied approach but rather a number of loosely connected and partially overlapping, partially incompatible,

perspectives. Hence, what was once more uniformly called "embodied cognitive science", now goes by the name of 4E – *embodied, embedded, enactive, extended* – approaches to cognition (Menary 2010; Vörös, Froese, and Riegler 2016).

Within the 4E community *enactivism* (Varela et al. 1991) has unquestionably been at the forefront of this corporeal turn. Over the last few decades a particular strand of enactivism, so-called "autopoietic enactivism" (AE) (Hutto and Myin 2013), has been developing a very unique account of the body, which it argues can and should serve as the basis for a unified non-cognitivist cognitive science (Di Paolo and Thompson 2014). This is because, unlike cognitivists and other non-cognitivists accounts of embodiment, AE foregrounds the role of the body in the emergence of *meaning*.

The main aim of this paper is twofold; to introduce AE's account of the body and then take a close critical look at it. In the first section of the paper I present a schematic overview of what I term the "mechanistic" approach to embodiment in order to provide a general background for the discussion of the rest of the paper. Section two then introduces AE's account of the body while the following sections take a critical look at it. These sections introduce two difficulties for the AE account: (i) that it could be regarded as anthropocentric and anthropomorphic, and (ii) that it is too abstract, synchronic, and does not pay sufficient attention to the historical, sociocultural dimension of embodiment. The paper concludes by drawing liberally from recent work in the anthropology and sociology of the body (Mol 2002; Mol and Law 2004) in order to both support this reading of AE and as a possible means of improving it.

2. Embodiment in Cognitivist and Non-Cognitivist Cognitive Science

For much of the early part of the so-called "cognitive revolution" the body played a minor explanatory role within cognitive science. The central tenets of this revolution, which are still dominant in current theorizing about cognition, were *computationalism*, *functionalism*, and *representationalism*, all of which, in one sense or another, contributed to the obfuscation of the body. From the perspective of computational cognitivism cognition amounts to nothing more than computational processes *in* the head (Chemero 2009).

These internal computational operations, defined over symbolic representations, are argued to be *implementation neutral* and thus not tied to a particular substrate. It was this functionalist tenet of traditional cognitivism that relegated the body to a merely accidental and ultimately non-essential property of cognition. Cognition was thus "embodied", but only insofar as it was *physically instantiated* in a manner capable of supporting the requirements of a particular cognitive (computational) architecture. However, by the late 1980s and early 1990s, a number of theorists within cognitive science and closely related fields began challenging the central tenets of computational cognitivism. It is within this context of dissatisfaction that an alternative approach to cognition began to take shape.

Inspired in large part by both phenomenology and pragmatism (Dreyfus 1992; Wheeler 2005) a move towards a more embodied understanding of cognition began to slowly emerge. This embodied view gradually coalesced into what has been termed "Embodied Cognitive Science" or "4E" (embodied, embedded, enactive and extended) approaches to cognition. In contrast to computationalism, 4E approaches shift the focus from passive and disengaged inner brain processes to the *active engagement of embodied agents*. As a consequence the body went from being an accidental property to a crucial requirement for cognition.

However, while it is now generally accepted that cognition is in some sense embodied, it remains unclear what exactly this entails (Anderson 2003; Di Paolo and Thompson 2014; Wilson 2002; Wilson and Golonka 2013). It certainly does not help that such concepts as body, embodiment, and embodied cognition are commonly used interchangeably within cognitive science (cf. Wilson 2002). This can make it difficult to accurately disentangle these notions and clarify their respective meanings, similarities, and differences. It should then come as no surprise to see researchers come up with varying numbers of meanings related to the concept of embodiment.

To add to this confusion, the two central concepts – *body* and *cognition* – are not only interpreted in a number of different ways but are often conflated (Di Paolo and Thompson 2014). This is clearly evident from the number of conflicting ways the concept of embodiment has been used over the years by different theorists. These range from the fairly "conservative" views of

embodiment, such as those that regard the body as a part of a computational circuit (Clark 2008) or as providing a format for neural mental representations (Goldman 2012), to the more "radical" views that see sensorimotor know-how (O'Regan and Noë 2001) or bodily-life regulations (Di Paolo and Thompson 2014) as a constitutive element of perception and cognition. Furthermore, evidence of the conflation of the concepts can be seen in the fact that a great majority of these accounts in actual fact do not have an account of the body.

These issues notwithstanding, it is however possible to roughly identify two broad approaches to embodiment loosely clustered around a *conservative* and *radical* nexus. Following Sharkey and Ziemke (2001) I will call conservative approaches *mechanistic*, and radical approaches *phenomenal* accounts of embodiment respectively (see also Kiverstein (2012) for a similar broad taxonomy of embodiment).

3. The Mechanistic Approach

Mechanistic approaches to embodiment are varied, complex, and often straddle the line between a total rejection of internal computations and symbolic representations (Chemero 2009; Pfeifer and Scheier 1999) and a mere re-tweaking of these traditional cognitivist concepts (Clark 2008; Harnad 1990; Wheeler 2005). These approaches are nonetheless united by the fact that they are all informed/constrained, either implicitly or explicitly, by functionalism. That is, functionalism provides the theoretical foundation for how embodiment and the body are understood.

It is here that we see that computationalism and functionalism can exist perfectly without each other. Like traditional cognitivist approaches the central concern of the mechanistic approach is with the implementation of cognitive processes. But unlike traditional approaches the mechanistic approach does not regard these processes as solely encased in the head nor the product of a centralized controller but as processes that cut across brain, body, and world. Nonetheless, whether cognition is understood in terms of computational processes which are realized by brain, body, and world or non-computational processes involving an hierarchical set of behavioral routines and reflexes, embodiment amounts to nothing more than the *substrate* upon which these processes are realized.

As a consequence, just like in traditional cognitivist accounts, the living body itself plays a very minimal explanatory role. Mechanistic accounts are thus by and large mostly interested in promoting a particular account of *cognition* rather than attempting to understand embodiment or the body as such. This is succinctly expressed by Wilson and Golonka (2013) definition of embodiment as "the surprisingly radical hypothesis that the brain is not the sole cognitive resource we have available to us to solve problems" (2013: 1).

This is also evident in Chemero's influential "radical embodied cognition thesis". Chemero defines radical embodied cognitive science as the "scientific study of perception, cognition, and action as necessarily embodied phenomenon, using explanatory tools that do not posit mental representations" (2009: 29). The main impetus for this approach is clearly to reject traditional computational representationalism and replace it with dynamic systems theory and ecological psychology, respectively, not to provide an account of embodiment or the body. The nod to "embodied phenomenon" functions merely to emphasis that cognition is not exclusively a brain process. But the body as a historical, living, gendered, sociocultural entity remains underdeveloped, under-theorized, and utterly neglected.

This account of embodiment is not too dissimilar to the one defended by Andy Clark (2008).[1] According to Clark, "the body, insofar as it is cognitively significant, turns out to be itself defined by a certain complex functional role" (Clark 2008: 56). Clark insists that the body is special, "[b]ut we should understand its specialness through the familiar lens of our best information processing models of mind and cognition" (ibid.: 58). While brains must be embodied and embedded, they nonetheless, according to Clark, are computational and representational devices. Accordingly, an embodied cognitive science needs to recognize that the brain simply does not care where the computational processes take place, sometimes they are in the head while at other times they recruit external artefacts and bodily structures. What is at stake here then is not embodiment or the body but *how best to understand and explain cognition*. For Chemero we must abandon representational

1 Note that the point being made here is that Chemero and Clark's account of *embodiment* are similar, not their account of *cognition*.

computationalism, while for Clark we must merely re-tweak our traditional understanding of these notions.

To sum up, mechanistic approaches to embodiment are (a) grounded on functionalism and (b) concerned with developing non-traditional accounts of cognition rather than providing accounts of embodiment or the body. In the next section we will present the AE alternative to this approach.

4. Embodiment in Enactive Cognitive Science

AE has over the past few decades developed and promoted an account of embodiment that is distinctively different from the more conservative mechanistic 4E approach presented above. Its distinctive feature is its concern with the phenomena of *meaning*, understood in terms of *signification,* something it argues has been neglected by both traditional cognitivists and mechanistic accounts. To distinguish this account from the mechanistic approach I will call it the *phenomenal* approach to embodiment.

Central to AE and indeed most varieties of enactivism is the view that cognition is, at various levels of complexity, an embodied sensorimotor coupling between living organism and environment. However, there are several fundamental differences between AE and other 4E approaches, two of which are particularly important in this context: according to AE cognitive systems are (i) constituted through adaptive biological autonomy and, as a consequence, (ii) are sense-making agents whose engagements with the world are inherently meaningful for the agent itself (Colombetti 2014; Di Paolo 2005; Thompson 2004, 2007). These two key ideas provide the foundations for the AE conception of the body.

Like other 4E approaches to embodied cognition AE's conception of the body and embodiment is intimately tied to its understanding of cognition more generally. However, unlike these approaches, AE also provides an actual account of the body. So what exactly is the body for AE? As Kiverstein (2012) observes, for AE the body can ultimately be understood as "the source of meaning" (2012: 5). To get a feel for this idea it will be helpful to consider one of AE's central criticisms against cognitivist and mechanistic accounts.

AE theorists argue that a central problem for computational cognitivism is

that its posited symbolic representations mean nothing to the system to which they belong, but they only mean something to an outside observer of the system. Meaning is *ascribed* to the system *from the outside* and is thus *not intrinsic* to it. Moreover, the same applies equally to systems operating on non-computational/non-representational principles, such as a robot picking up empty cans. In both cases the systems are doing something which has been enforced by a designer *from the outside* (Nasuto and Bishop 2013). For this reason these systems have no *intrinsic goals* and subsequently no intrinsic criteria for success or failure hence no value and signification.[2] In order to understand the emergence of intrinsic meaning one needs to begin with an appropriate account of the body. This is because, in the words of Di Paolo et al. "the body is the ultimate *source* of significance" (2010: 42). According to AE, body and mind emerge from the inherently precarious, dynamically active, and meaningfully normative processes of adaptively autonomous living systems. From this perspective the body is not a passive vehicle for the brain and its purported computational architect, but rather a self-constituting and self-organizing animate dynamic complex system deeply immersed in a meaningful world (Colombetti 2014; Di Paolo 2005; Di Paolo and Thompson 2014; Kyselo and Di Paolo 2015; Thompson 2007, Varela et al. 1991). Therefore, in order to understand how the body becomes the source of signification, we must first understand what "adaptive autonomy" is.

According to AE, living systems are a special sub-class of self-organizing dynamic systems, which are autonomous, or operationally closed, and adaptive. Autonomy is the property of a system that enables it to be self-organizing and self-constituting in order to maintain its identity as an individual entity. This self-individuating identity is argued to be a "dynamic network of precarious processes where each process is enabled by other processes in the network and also contributes to enable other processes in the network" (Kyselo and Di Paolo 2015: 529). In order to preserve its identity an autonomous system must be able to regulate its behavior in relation to perturbations from the environment.

2 As Kiverstein (2012: 6) points out, the issue here has a superficial similarity to the symbol-grounding problem, but is ultimately more fundamental, since it also applies to non-representational systems.

It must act in such a manner as to support self-constitution whilst at the same time attempting to avoid that which may threaten its integrity. This capacity is called adaptive behavior or *adaptivity* (Di Paolo 2005; Thompson 2007).

As Di Paolo (2005) argues, given their inherent fragility, autonomous systems continuously maintain themselves under "precarious conditions". As the system is under constant threat from the environment it must affirm its existence through interactive processes. Adaptivity thus not only enables self-monitoring and self-regulating in relation to its own conditions of viability but also allows for various degrees of concern and signification to emerge for the system itself. It is this "concern" for self-preservation and self-interest which leads to *normativity* and allows adaptively autonomous systems to develop a *unique teleological point of view* on the world, from which environmental properties and interactions are evaluated, pursued, and acquire meaning and value (Barandiaran, Di Paolo, and Rohde 2009). These interactive processes are what AE theorists call the system's "sense-making" activities (Thompson 2007: 152).

We must note at this point, as this will be crucially important in the next section, that for AE cognition is the direct result of the system's sense-making activities as it "enacts" or "brings forth" its own world of meaning and significance. These sense-making processes are further argued to be goal-directed and the product of an intrinsic teleology that, as we just saw, springs from the system's autonomous adaptive organization. As alluded to above the most general purpose of such systems is the striving to maintain systemic integrity and stability while more specific purposes are the result of structural and environmental differences (Colombetti 2014).

From the AE perspective, then, the body is understood to be a self-individuating entity that generates and maintains itself through constant engagement with the world. As Kyselo and Di Paolo point out, "the body can be associated with the living organism as a whole and to its appropriation of non-organic structures and processes as they are integrated into the autonomous self-sustaining network that makes up its identity. It is a self-individuating, dynamic and precarious unity of organic and non-organic processes that contribute to the conservation of life" (2015: 530).

However, as Evan Thompson suggests, the body is also a "special kind of autonomous system, one whose sense-making brings forth, enacts, or constitutes a phenomenal world" (Thompson 2007: 237). The body is thus not only a self-individuating/self-maintaining biological mechanism but is also "intimately tied to that of interiority and subjective experience, so that the living organism is not only considered from a mechanistic perspective, i.e. as an entity in the world but also always understood as a centre of subjectivity" (Kyselo and Di Paolo 2015: 530). Lived experiences, hence meaning and signification, are thus grounded in but are not reducible to the self-regulating processes of the living body.

This presents what we might call a *dyadic picture* of the body[3] comprised of an *objective* biological body and the *subjective* phenomenological body. The AE framework thus allows for both a first and third-person *perspective* on the body. The living body is both an object and a subject that can be explained from these two distinct yet tightly interconnected perspectives: from an organizational/biological perspective the body is an objective living system, and from a subjective perspective the body is an experiential subject. The body is not simply an "objective" body, a *Körper,* but as the phenomenological tradition points out, it is also at the same time a *living experiential* body, or a *Leib.*

Furthermore, adaptive autonomy provides a framework within which to understand and explain the emergence of the living subjective body from the objective biological body. It explains, in other words, how the objective body becomes the source of meaning. As Kyselo and Di Paolo argue, it is by virtue of being constituted as a precarious autonomous network of constructive

3 Lest I be accused of deliberate provocation, I will refrain from referring to AE's endorsement of a subject/object dichotomy, and instead, simply call it AE's *dyadic picture of the body.* Nonetheless, it is worth bearing in mind that AE is concerned with acknowledging the "subjective experiences" of living subjects, which should enrich and perhaps complement theoretical perspectives that are only concerned with the objective properties of the body. Bruno Latour (2004), correctly in my opinion, argues that in persisting with this distinction we are simply reproducing yet another dichotomy not unlike the entrenched set of dichotomies pervasive throughout intellectual history: subject-object, mind-body, mind-world, perception-reality. See the following sections for further discussion on this issue.

processes that the body emerges as a natural sense-maker with intrinsic self-generated norms, which enable its meaningful engagement with the world (ibid: 530). Or, to put in a manner that will be further clarified below, for AE *embodiment equals sense-making.*

AE sees in this approach a promising way of accounting not only for embodiment but also for some fundamental difficulties brought about by cognitivism, which according to AE, 4E approaches have thus far been unable to adequately answer. According to AE, it is only if 4E approaches adopt its notion of autonomy that it can provide a genuine alternative to traditional cognitivism (Di Paolo and Thompson 2014).

To sum up this section, the AE approach to embodiment starts by acknowledging the fundamental importance of meaning and develops a scientifically informed account which can fruitfully account for it. The body is conceived as an autonomous network of precarious self-individuating/self-creating processes which are in constant adaptive interaction with the world. These adaptive interactions, AE argues, not only allow the system to maintain itself in the face of constant threats but in so doing endows it with a point of view. This allows AE to conceive of the body in dyadic terms as something which can be explained both from objective and subjective perspectives.

After this brief exposition of AE's account of the body we will in the next section turn our attention to critically evaluating it.

5. Taking a Critical Look at AE's Account of the Body

In this section I will critically evaluate AE's account of the body. My intention here is not to undermine this account, but rather to tease out certain conceptual ambiguities and tacit theoretical commitments and incongruences that, understood in particular ways, could undermine the broader AE framework. Thus the rather modest aim here is to highlight that this account of the body remains critically underdeveloped and so in need of further elaboration.

6. From Body to Embodiment

Let us begin by recapping what the body is and what cognition is for AE. The body refers to the "living organism as a whole and to its appropriations of non-organic structures and processes as they are integrated into the *autonomous self-sustaining network*" (Kyselo and Di Paolo 2015: 531 *emphasis added*), while cognition is the *active sense-making of the organism*. For AE the body is an adaptive autonomous system and embodied cognition is the system's situated sense-making abilities. As we saw above, certain organizational features allow for the system's direct engagements with its environment to be intrinsically teleological and meaningful for the system.

The question that now presents itself is: what exactly is it that connects particular organizational properties, mechanisms if you will, to subjectivity, meaning, and value? Or, to put it slightly differently, what is it about the body that allows it to be the source of meaning? This question is made possible because, as we noted above, AE's conceptual framework leads to a dyadic conception of the body, where the body is both an autonomous network and a sense-making subject.

It is by drawing from the existential bio-philosopher Hans Jonas that AE connects the dots between *the body* and *embodiment*.[4] According to Jonas (1966) scientific biology is incapable of accounting for the inner subjectivity of living organisms because it is only concerned with "biological facts" (Jonas 1966: ix). But in adopting this stance it falls into a self-contradictory position, which ultimately results in the negation of not only the subjectivity of other living organisms but of human beings too. However, Jonas argues that if we take Darwin's theory of evolution seriously and at the same time simply acknowledge our own undeniable inner subjectivity, it would be incorrect to deny that subjectivity is a natural property of all living organisms. But how exactly does this particular insight relate to embodiment?

4 For the purpose of this section I will maintain the dyadic distinction implicit in the AE account and will refer to the autonomous system as "the body" and the enactment of the sense-making subject as its "embodiment".

To answer this question we first need to understand how this insight is deployed by AE. For AE, Jonas's critical insight can be usefully deployed to argue for a *strong* continuity between life and mind (SLMC). That is, cognition should not be seen as a property of human beings alone but of living creatures in general, thus forming a continuity between the processes of living and those of cognition (Thompson 2007: 128). Moreover, this continuity is not merely an organizational/structural one, but a subjective (experiential) phenomenal one as well. It is within the context of SLMC that the idea of the body as the source of meaning acquires its true significance. For, according to Jonas, we are justified in regarding other living organisms as goal-directed phenomenological subjects because we ourselves are such subjects. We are not mere passive mechanical objects, but embodied beings that strive and struggle to stay in existence.

According to Weber and Varela (2002), who were the first to explicitly suggest that autonomous systems can productively be linked to Jonas's phenomenological approach to biology,

> "it is actually by experience of *our* teleology – our wish to exist further on as a subject, not our imputation of purposes on objects – that teleology becomes a real rather than an intellectual principle […]. In observing other creatures struggling to continue their existence – starting from simple bacteria that actively swim away from a chemical repellent – we can, by *our own evidence,* understand teleology as the governing force of the realm of the living. (Weber and Varela 2002: 110, *emphasis added*)"

Similarly Evan Thompson tells us that "to make the link from matter to life and mind, from physics to biology, one needs concepts like organism and autopoiesis, but such concepts are available only to an embodied mind with firsthand experience of its own living body" (Thompson 2004: 90). As Jonas points out, if we were disembodied intellects, embodied subjectivity would make no sense, and for this reason the concepts of organism and body would not have any grounding. Thus it is that life can only be known by life (Jonas 1966).

According to AE we are thus justified in regarding the body as the source of meaning because *we ourselves are embodied beings* whose existence is a continual meaningful striving and this, in turn, enables us to recognize other living organisms as equally phenomenal embodied beings in their own right. It is not, as the previous section suggests, by virtue of the body's structural/functional properties. Drawing on some recent work in enactivism, which has raised the issue of anthropocentrism and anthropomorphism within the AE approach to cognition, I will, in the next section, explore whether these arguments could also apply to its account of embodiment.

7. Anthropocentric and Anthropomorphic Embodiment

The aim of this subsection is to try and establish whether AE's account of embodiment could be accused of anthropocentrism and anthropomorphism. Recent work within enactivism (De Jesus 2016a, 2016b, 2016c; Ward and Villalobos 2016) has argued that AE's conception of cognition is implicitly anthropocentric and anthropomorphic, and here I would like to explore if this could also apply to embodiment.

The general argument is that by drawing from the phenomenology of Hans Jonas to justify a SLMC, AE inadvertently prioritizes human experience, and as a consequence, negates the distinctive, nonhuman experiences and cognition of other living organisms. The experiences of other organisms are said to be negated by AE because it casts the idea of life-mind continuity in anthropocentrically phenomenological terms, which leads to a tacit anthropomorphic conception of other living organisms. The finer details of the arguments need not concern us here,[5] since all we are interested in is in establishing whether its main points could also apply to AE's account of embodiment. I think they could, and the reasons to support this stance shall be enumerated in the following.

5 For a more in-depth argument regarding the inherent anthropocentrism and anthropomorphism within the AE framework see De Jesus (2016a). See also Ward and Villalobos (2016) for a similar, but subtly different, critique.

The central reason becomes evident once we recognize that AE, like other 4E approaches, also conflates embodiment with cognition, which in turn leaves its account of embodiment wide open to the criticism of anthropocentrism and anthropomorphism. Recall that, for AE, the body is a sense-maker, meaning that *embodiment is sense-making* and s*ense-making is cognition* by another name. As we saw above, embodiment equals sense-making and sense-making equals cognition. Thus, regardless of one's views on the validity of the argument, the point is that if the criticisms apply to AE's account of cognition they will equally apply to its account of embodiment. Therefore, if cognition is anthropocentric and anthropomorphic, then so is embodiment.

But we need to tread carefully at this point, and bear in mind the dyadic nature of the AE body. Because "the body" is first conceived in *mechanistic* terms, as a self-organizing, self-individuating complex dynamic network, it steers clear from anthropocentrism and anthropomorphism. However, when the focus is shifted from an objective body towards a phenomenal one, from the body as autonomous adaptive system to the *body as sense-making system,* it then arguably lapses into anthropocentrism and anthropomorphism.

In this instance anthropocentrism and anthropomorphism stems, it could be argued, from AE's reliance on what Ward and Villalobos (2016) have aptly dubbed a "Jonasian inference" (2016: 228). Recall that the objective body of another is understood (inferred) to also be a subjective sense-making body *only because of my direct access* to *my own embodied experiences*. That is, I take my own embodied experience as grounds for (a) granting embodied experiences to other living organisms, and (b) for the ability to understand and make sense of those experiences. The problem, however, is that AE proposes SLMC, but provides no adequate justification for it other than Jonas's take on the matter. As a consequence, AE simply runs the risk of tacitly casting all forms of organic embodiment in human-specific terms. Thus, *embodiment* cannot help but be *human embodiment*. It is my embodied experience that serves as the benchmark (anthropocentrism) and template (anthropomorphism) for the embodiment of other living organisms.

But, if *human* embodiment is all we are interested in, are accusations of anthropomorphism not misplaced? Yes and no. The problem is that AE places SLMC at the core of its framework and is therefore not only concerned with

human embodiment alone. Indeed, its framework centers on accounting for mind *in life* (i.e., for mind *in all living beings*). At the same time, one could argue that, insofar as human embodiment is concerned, the AE approach currently provides the best possible account. A researcher could simply leave out the life-mind continuity aspect of AE and merely concentrate on human embodiment. So let us put aside these particular concerns and turn our attention to how the AE account fairs in accounting for human embodiment.

8. An Abstract Body is no Body at all

Can the AE account adequately explain human embodiment? I believe that, as it is currently developed, the AE account faces some significant difficulties in explaining human embodiment. The main difficulty is that this account could be regarded as (a) too abstract and universalist, and (b) ahistorical and asocial. This means that the AE body could be understood as a singular, ahistorical, asocial phenomenon which fails to shed light on, or even recognize, the concrete embodied realities of human beings. In this and the following section it will be argued that these difficulties emerge from two interrelated and mutual supporting issues: (i) the *equation of embodiment with sense-making*, and (ii) the active *endorsement of a dyadic account of the body*. Let us explore (i) first.

We have already seen in the previous section that equating embodiment to sense-making has left the AE account open to accusations of anthropomorphism and anthropocentrism. Here, I want to highlight a further consequence of these equations, namely that it leads to the unnecessary abstraction and universalization of embodiment.

In order to illustrate the abstract and universalist nature of AE embodiment, we merely need to ask *what type of embodiment* is involved in (human) embodied cognition. For AE, embodiment is the consequence of a sense-making subject who acts and experiences the world in an intrinsically meaningful manner. The AE account is developed and structured precisely in order to account for this. However, on closer inspection, it is far from clear *who* or *what* this sense-making subject actually is. The "subject" itself remains grossly under-developed, under-explored, and generally under-thematized. It is a subject that appears as an abstract entity, without a history, ethnicity, gender, social status, and much more besides. All "subjects" seemingly have

the same body, act in similar ways across different "environments", and generally appear to share an untold number of common bodily characteristics.

This might, at first glance at least, strike many as something of an exaggeration. But to see that this is not the case one simply needs to bear in mind that the notion of sense-making is applied across the phylogenetic scale without further qualification. Sense-making is thus said to apply equally to a single-celled bacterium, just as it does to a toddler, a disabled middle-class white male, and the Queen. Moreover, because embodiment – sense-making – is so closely tied to the here-and-now (synchronic) *subjective meaning* generated by the underspecified, under-thematized subject, the AE account seems to imply that subjective firsthand embodied experiences themselves, can serve as the basis for our more general understanding of embodiment.[6]

However, our firsthand experiences as embodied beings *cannot* serve as the only grounds to account for embodiment in general. It would be problematic, to say the least, to regard *my* subjective experience as an embodied adult with *my* particular ethnicity, historical background, medical history, social standing, and so on as the *only* grounds for understanding and explaining the idiosyncratic embodiment of others. How can *my* experience of my own embodiment – my sense-making – serve as the grounds for understanding the embodiment of a 18th century French woman, for example? What this suggests is that sense-making on its own, by being synchronic and too subject-centered, will struggle to adequately account for the rich particularities of concrete embodiment such as ethnicity, gender, historical background, medical history, sexuality, social standing, etc.

This is partly because sense-making, the "bringing forth" of a world, can only occur within the broader background of sociocultural norms and practices, otherwise it simply collapses into an abstract, synchronic, single-sided construction disconnected from those very practices that enable it. AE might be correct in claiming that the body is in essence a sense-maker, but the sense made here must clearly be understood in the larger context of the enactment of cultural practices. Ultimately, sense-making must be anchored on something *beyond the body and its immediate experience*. Indeed, as Cowley

6 As we saw above, AE relies on a Jonasian inference, which involves a generalization from my own embodied experience to the embodied experience of other living organisms.

and Gahrn-Anderson (2015) point out, "the impact of cultural life cannot be understood synchronically, or, in short, by appeal to sense-making" (2015: 55). This issue will be further explored in the next section. Before doing so, however, we must first take a closer look at this notion of *my subjective embodied experiences,* routinely used by AE theorists. On closer inspection two issues becomes apparent from the outset. The first is that the locution "my subjective embodied experiences" is, despite what AE generally suggests, rather ambiguous, highly abstract, and trades excessively in a homogenized and simplistic conception of what these experiences involve. The second issue is that the AE account strongly suggests, or could be read as strongly suggesting, that these lived experiences are intrinsic, immediate, directly given, and self-evident, which would place them directly outside culture and history. This is certainly a reading that AE would do well to avoid.

Lived experience itself, or rather our own subjective understanding of these experiences, including affective experiences, are not intrinsic universal givens. As Latour (2004) observes, not even our own phenomenological experience of our bodies can be regarded as immediate, directly given or self-evident, or independent of history, cultural practices, and specific technologies. Rather, even embodied experiences are already inherently saturated by a host of complex historical, technological, and sociocultural practices. This is not to deny personally lived experiences, but rather to highlight that these experiences are themselves enabled by a larger sociocultural nexus and context-specific circumstances and not pure, uninterpreted givens. AE's account of embodiment seemingly glosses over these issues.

Let us pause here to take stock. We have argued thus far that AE's account of embodiment, in being structured towards the synchronic, subjective, and intentional side of embodiment, has led to an overly abstract and universalist conception of embodiment. We traced the root of this issue to AE's equation of embodiment to sense-making and then highlighted further reasons for why sense-making on its own cannot fully account for embodiment. These considerations suggest that the AE account threatens to collapse the notion of embodiment into a singular homogenized abstraction which not only obscures the inherent idiosyncratic complexity of what it is to be an embodied being but also fails to account for the inherent *historicity* and *sociality* of embodiment (cf. Cummins and De Jesus 2016; De Jesus 2016b). In

the next section we will explore the issue of history and sociality further by drawing more closely from work in anthropology and the sociology of the body.

9. From Sense-Making to Enactment

In this final section I want to explore, as proposed above, in what way AE's dyadic conception of the body is problematic. Recall that AE conceives of the body in dyadic terms and actively endorses the perspectival implications of such a view. However, as Mol points out, this sort of "perspectivalism" is tacitly grounded on a problematic epistemic position that implies that there is a single entity "out there", a static universal "essence" or reality, which is being observed and is unaffected by history, context, or those who study it (Mol 2002: 10-12). In this view scientists and theoreticians become *observers* constructing various knowledges of the object itself by virtue of the perspective they take. Perspectivalism thus embraces what we might call *epistemic multiplicity*. It is interested in acquiring knowledge of objects from different perspectives but consequently leaves the object itself untouched.

The metaphysical commitments and implications of AE are varied, complex, and still very much open to debate (see Vörös, Froese and Riegler 2016). Nonetheless, as we saw above with regards to embodiment, AE clearly does endorse some form of perspectivalism. Recall that from the perspective of the scientist the body was understood as a complex dynamic self-organizing/self-creating system, while from the phenomenological perspective the body (embodiment) was understood as a teleological agent with a meaningful point of view on its world. Presented in this manner, AE is concerned with *knowledge* of the body, rather than with *the body itself*. The *ontological status* of the body is seemingly passed over for the sake of its perspectival epistemic constructions. Insofar as this is the case, the body remains a sole static ontological entity, researched, contemplated, and studied from multiple perspectives by several researchers.

This will certainly seem like a questionable implication. After all, AE has always explicitly argued against the idea of a pre-given world out there ready to

be encountered by an agent (Varela et al. 1991).[7] It is not the aim of this paper to explore this potential tension further, but rather to tease out an altogether different implication of perspectivalism for AE's account of the body. More specifically, what I want to show here is that, even though AE clearly takes history and sociality seriously, it nonetheless, by virtue of its commitment to a dyadic conception of the body, ends up regarding them as secondary.[8] My suggestion will be that, in order to foreground the *intrinsic* (to embodiment) nature of culture, sociality, and history, AE needs to abandon its dyadic conception of the body. I will now draw from recent work on the sociology and anthropology of the body to help illustrate this point.

The Dutch anthropologist Annemarie Mol (2002) rejects epistemic perspectivalism and in its place presents an alternative *ontological* proposal for understanding embodiment. This ontological proposal requires a shift of focus from knowledge of the body to the *practices of embodiment*. According to Mol, this shift of focus will enable us to recognize that there is no singular body but rather *multiple bodies*, the "body multiple" as she calls it, which are sets of multiple relations brought into being through diachronic complex practices of self-production. For Mol, the living body – embodiment – is an unfinished process of *becoming* and as such is always a *uniquely enacted process*, continuously shaped and reshaped, made and remade, within a diachronic, context-specific, sociocultural practical nexus. The body is thus

7 It seems clear that there is an underlying tension here between the metaphysical "middle path" between realism and idealism for which AE is well-known and the perspectivalism identified within its account of the body. Clearly, the AE notion of "bringing forth a world", the creation of a path in walking, seem to suggest ontological rather than epistemic multiplicity. I will, however, leave the question of how these divergent aspects of the account relate for future work, and merely highlight that there are several other aspects of the AE paradigm which openly endorse some sort of perspectivalism. For example, Thompson (2007: 50) argues that "autonomy" and "heteronomy" are "heuristic notions", and hence *perspectives* which scientists can take on target phenomena, while neurophenomenology proposes that there should be a "constant back-and-forth exchange between lived experience and scientific endeavour" (Vörös, Froese, and Riegler 2016: 192).

8 This is perhaps also not helped by the fact that within the AE literature there is a tendency to argue for an *asymmetry* between subject and world, between insides and outsides and as a consequence endow insides with *ontological priority* over outsides (see Di Paolo 2005; Thompson 2007).

conceived as *ontologically* rather than *epistemically* multiple. But what exactly does this mean?

The general idea is that, rather than seeing the body, the-body-we-*have*, as an entity to be observed from different perspectives, we should regard it as the-body-we-*do,* as enacted and so brought into being by virtue of being enmeshed in a historical, context-specific, and sociocultural practical nexus. According to Mol:

> "If the practices are foregrounded there is no longer a single passive object in the middle, waiting to be seen from the point of view of seemingly endless series of perspectives. Instead, objects come into being—and disappear—with the practices in which they are manipulated. And since the object of manipulation tends to differ from one practice to another, reality multiplies. The body, the patient, the disease, the doctor, the technician, the technology: all of these are more than one. More than singular. (Mol 2002: 4)"

To illustrate and clarify this further, consider the example of hypoglycemia, a condition often associated with diabetes and abnormally low blood sugar levels (Mol and Law 2004). It might be tempting to see hypoglycemia as a condition of the objective body related to hormonal effects of insulin, for example, or perhaps as a condition, again of the objective body, but related to dietary intake and lack of physical exercise. This would be the most common understanding of hypoglycemia and one that aligns perfectly with biomedical understandings of diabetes. Here, the body is the object and target of medical knowledge and practices. Hypoglycemia is seen to be "contained" within this objective singular body and is regarded as a consequence of blood sugar levels dropping below 3.5 mmol/l.

Mol and Law approach this condition, however, not by asking *"what"* hypoglycemia *is*, but by asking *how* it is *done*, how is it performed or enacted. In the view of Mol and Law, "we also do (our) bodies. In practice we enact them" (2004: 45). Drawing on their ethnographical work, Mol and Law proceed by showing the various ways – *the modes of enactment* – in which hypoglycemia is done. These modes of enactment vary from the pricking of a

finger, through drawing of one's blood, to self-monitoring by being sensitive to changes in one's body. In contrast to perspectivalism, these various practices are not merely different epistemic ways of getting at a singular static entity; rather, they all constitute an *ontologically different* entity that is given the label "hypoglycemia". The focus is no longer on the many ways an entity can be known, but rather on the many ways it is *enacted*.

This analysis highlights two important points for our current discussion: (i) specific modes of enactment stand or fall only by virtue of the active presence of other agents, medical devices, context-specific practices, modes of self-monitoring, and so forth. This means that organisms do not only enact practices but are themselves enacted by them. Further (ii) by virtue of the many ways that hypoglycemia is enacted in diverse settings, various medical practices and settings enact *different versions* of this "entity". Mol and Law are at pains to stress that, while they record blood samples, sugar levels, and accounts of lifestyles, these do not refer to any one specific stable "entity".

Hypoglycemia is not divided into objective or subjective layers, it is not taken to be some static entity within biological bodies nor a particular set of embodied phenomenal experiences of a subjective body. Rather, it involves both as it is enacted through the practice of measuring blood sugar levels, the devices and technologies that enable it, the staff who take the readings and documentation, and so forth. The point is that only in the multiple interrelation of these entities that a specific hypoglycemic body emerges. As this case of hypoglycemia illustrates, particular bodies are "brought into being" and the production and enactment of these bodies is intimately connected to the sociocultural practices, techniques, and artefacts that make different bodies possible.

To conclude our discussion, we can now see that sense-making is clearly distinct from enactment. The essential difference, as we have seen, is that the notion of enactment is an *ontological* concept, while sense-making and hence embodiment, according to our analysis above, turns out to be an *epistemic* concept. The body and embodiment turn out to be specific epistemic perspectives taken by the AE theorists on "the body". As such, history and sociality are epistemic "layers" added to an unexplored ontological core. In contrast, the notion of enactment as introduced here shifts the focus

from knowledge of the body to the concrete practical nexus which enables various versions of the body to emerge. It also takes history and sociality to be intrinsic to the emergence of these multiple versions of embodiment (Mol 2002). Moreover, we have also seen that these versions of the body are neither physical or social, nor subjective or objective, but all of these *at the same time*. Finally, enactment enables us to collapse both the dyadic picture of the body and nature/culture distinction, seemingly upheld by the AE account.

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