

# 4E's Are Too Many Why Enactive World-Making Does not Need the Extended Mind Thesis

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**Abstract** 4E's cognition – embodied, embedded, enacted, extended – replaces the cognitivist notion of world-mirroring with an active process of world-making: cognition needs no mental representation and is distributed over body, brain and environment. In recent years, the remark that extended cognition is not enactive and that the embodied approach to cognition fails to provide a definition of body raise the question of whether a postcognitivist approach to experience needs 4E's. This contribution suggests that it does not. The enactive body as a moving sense-making-system informed by phenomenology and pragmatism and its role in the constitution of the distinctive quality of an experience are discussed.

**Keywords** Non-Duality. Varela. Sense-Making. Enactivism. Embodied Mind.

**Summary** 1 Introduction. – 2 The Enactive Mind. The Original Proposal and the Extended Mind Thesis. – 3 Extended Reconsidered. – 3.1 Maiese's Criticism. – 3.2 Why Otto's Notebook Can Be an Enactive Extension. 3.3 Appropriation as Enactive Extension. Artifacts Change the Possibilities of Actions. – 4 The Enactive Body in Sensorimotor Life. – 5 Conclusion.



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## 1 Introduction

What it means to reject the cognitivist, representationalist approach to human experience, why the computationalist approach to the mind is implausible and how the mind is seen within the so called 4E's cognition – embodied, embedded, enacted, extended – shows the recent criticism by Fuchs (2018) to neurophilosopher Thomas Metzinger. In his work *Ecology of the Brain*, Thomas Fuchs strongly criticizes Metzinger's notion of "Ego Tunnel". "We are mental self-models of information-processing bio-systems [...]. If we are not computed, we do not exist" remarks Metzinger (1999, 284) in his work with the title *Subjekt und Selbstmodell*. Metzinger's claim is a radical elaboration of the assumption that our experience is an illusion created by the brain. This is considered to be a world simulator. Accordingly, we experience the image of the reality the brain generates without recognizing it as an image. Conscious experience is hence like a tunnel: we look at a show projected in a dark room (Fuchs 2018, 4). From a non-cognitivist point of view, Fuchs strongly criticizes the assumption that the brain is capable of performing its computational tasks without any involvement of a human subject. He rejects such a brain-centred representationalist computationalist approach to the human being and suggests the view that all brain's functions are dependent on the human person's unity as a living organism interacting with the environment. In other words, only if we understand human experience and action as acts of a living being it will become possible to overcome the dualism of brain and mind, of mind and body, the so-called Cartesian dualism. Fuchs concludes that "human persons become at one with themselves not in a mental or neural inner world, but in their bodily and inter-bodily being-in-the-world and acting-in-the-world" (Fuchs 2018, 290). The reductionist understanding of the mind as a disembodied representational system within the skull is hence rejected.

Fuchs' view is grounded in the so-called 4E's cognition. In his criticism and conclusions, the mind is seen as

1. embodied in the living organism. The bodily realization of the cognitive capacities is constitutive of their achievement;
2. embedded in the environmental context the organism co-determines in interactions;
3. enacted or brought forth only by the active perception of the environment the organism co-determines in interaction. Cognition is perceptually guided action;
4. extended beyond the boundaries of the body. The objects of the environment can function as non-neural vehicles for cognitive processes.

The purpose of a 4E's cognitive system is to provide possibilities for embodied actions within the world. The example of Fuchs' criticism

to Metzinger's work will not be discussed further in this contribution. For the purpose of this work, it remains a useful example to illustrate what it means to see cognition and the human mind from the point of view of a 4E's approach. Fuchs does not question the necessity of all four E's to criticize and reject cognitivism and computationalism even if in the last few years a question mark was put on the compatibility of some of the E's of this approach to human cognition with one another. Maiese (2017) questions the compatibility between the enactive and the extended mind. The extended mind thesis proposes that some objects in the external environment can be part of a cognitive process and in that way function as extensions of the mind itself in the environment (Clark, Chalmers 1998). Maiese (2017) points out that theorists who embrace the claim that the mind is fully embodied and enactive cannot consistently also embrace the extended mind thesis because this blurs the distinction between organism and environment, while the enactive and embodied view emphasizes the differentiations between the two.

In the last years, some scholars cast doubt on how the notion of body is defined in embodiment. Manzotti and Chella (2018) remark that it is not clear what body means in the embodied approach to the mind. They criticize the fact that embodiment does not explain the features that should be present in an object to be qualified as a body, focusing only on the body of a subject as though it were something more than a moving physical object. Moreover, the two authors observe that enactivism does not provide any criteria to distinguish between real actions and simple movements unless by reference to subjects. Both criticisms are only partially well-founded. While there are strong grounds to believe that 4E's are too much in the E-approach to cognition - I will show that the extended mind thesis is not needed to overcome the mind-body dualism, which is the main aim of enactive cognitive science - it is not completely true that in the embodied and enactive approach the notion of body is not explained and that criteria to distinguish between actions and movement, which are relevant in order to investigate the subject's activity as an agent interacting with the environment, are missing. They are necessary to explain the enactive tenet according to which perception depends upon "the kinds of experience that come from having a body with various sensorimotor capacities that are themselves embedded in a more encompassing biological, psychological, and cultural context" (Varela, Thompson, Rosch 1991, 172-3). Despite the central role of the sensorimotor capacities of the body in the enactive approach, there is more to enactivism than sensorimotor skills. As Stapleton (2013) remarks, while sensorimotor research in philosophy of cognitive science has often come to be labelled as "enactive" - for example through Alva Noë's use of the term "enactivism" to describe his sensorimotor theory of consciousness - the particular focus of enac-

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tive cognitive science lies on the constitution of cognitive systems and the relation between their constitution and their interaction with the environment, which take into account but cannot be reduced to embodied action in perception. The concept of enaction extends beyond sensorimotor skills.

Against this background, the aim of this contribution is twofold. On the one hand, it supports the view that the extended mind thesis is not compatible with the enactive approach to cognition and it does not contribute to overcoming the Cartesian mind-body dualism enactivism criticizes. The extended mind thesis is believed to commit the Cartesian inside-outside fallacy (Aydin 2013). In this contribution, it will be argued that the role of the subject's embodied sense-making in the sensorimotor interaction with the environment provides strong evidence for questioning the compatibility of the extended mind thesis with the enactive mind and for supporting a 3E's approach.

On the other hand, this contribution shows that enactivism does provide both a definition of body I will refer to as the enactive body and a clear distinction between actions and movement, which is necessary to explain what it means that a subject is an agent that evaluates her sense-making processes in the interactions with the environment.

In order to highlight the incompatibility of the extended mind with the enactive mind, a different argument from Maiese's argument will be provided. Instead of focusing on the notion of the extension of the mind into the objects of the environment like Maiese does, the role of the embodied appropriation of the objects of the environment playing a role in embodied sense-making in interaction is considered. I will illustrate the process of appropriation, in which the objects mediating the interaction with the environment become phenomenologically transparent to the subject as the world is experienced through them (Gapenne, Declerk 2009; Lenay, Stewart 2012) and in this sense extend the possibilities of embodied cognition into the experience of active perception. With reference to this, the enactive body and its sensorimotor role in interactions and in the process of the appropriation of an object of the environment will be considered, putting into focus the difference between the role of movement and the role of action. I will argue that the process of appropriation the enactive body as a vehicle of sense-making is involved in makes the extended mind thesis and the functionalism it embraces superfluous in the 4E's cognition. I am not going to suggest that the enactive mind cannot extend like Maiese (2017) does. Rather, I am going to claim that it does extend through embodied sense-making in the process of appropriation of the tools of the environment in the sense that the mind unfolds through them (see also Aydin 2013). I will argue that this process makes the functionalism the extended mind thesis embraces superfluous in a non-cognitivist approach to cognition and experience.

## 2 The Enactive Mind. The Original Proposal and the Extended Mind Thesis

In their work with the title *Enacting Enaction. A Dialectic between Knowing and Being*, Vörös and Bitbol (2017) remark that in the last years within the field of “enactivism” the far-reaching dimensions of the original proposal of the enactive framework are often simply ignored. The original framework of enactivism is a “conceptual evocation” of “non-duality”. It focuses on the ongoing circulation between the flux of lived experience (being) and the search of reason for conceptual invariants (knowing):

What we take to be objective is what can be turned from individual accounts into a body of regulated knowledge. This body of knowledge is inescapably in part subjective since it depends on individual observation and experience, and partly objective, since it is constrained and regulated by the empirical, natural phenomena. (Varela, Shear 1999, 1)

The notion of enaction was introduced into cognitive science with the purpose of overcoming dichotomies (e.g. mind/body, self/other, self/world), the Cartesian and representationalist view of the human mind and the view of the passive subject perceiving a pre-given world.

The enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided. (Varela, Thompson, Rosch 1991, 173)

In their work *The Embodied Mind* (Varela, Thompson, Rosch 1991), the authors refer to Merleau-Ponty to reject the relegation of the subject of cognitivism to a passive role of obedience to the environment:

The organism cannot be compared to a keyboard on which the external stimuli of the world play and in which their proper form would be delineated for the simple reason that the organism contributes to the constitution of that form. (Varela Thompson, Rosch 1991, 173-4)

Perception is hence not simply embedded within the surrounding world. It also contributes to bringing it forth. Perception is embodied action. Without active perception there can be no cognition. In other words,

enaction is the idea that organisms create their own experience through their actions. Organisms are not passive receivers of in-

put from the environment, but are actors in the environment such that what they experience is shaped by how they act. (Hutchins 2010, 428)

How can the perceiver guide her actions in a local situation that changes as a result of the perceiver's activity? The reference point for understanding perception is no longer a perceiver-independent world but rather the sensorimotor structure of the perceiver, which determines how a perceiver can act and cognize. Cognition depends upon the kinds of experience that comes from having a body with various sensorimotor capacities. Action and perception are hence inseparable in the exploration of the environment. Määttänen (2015) explains this enactive relation between action and perception, following the pragmatist philosopher Peirce.

In action "our modification of other things is more prominent than their reaction on us" while in perception "their effect on us is overwhelmingly greater than our effect on them". Precisely because of this difference, action not only broadens the concept of experience but also changes its character. (Määttänen 2015, 21)

In other words, the enactive approach to cognition has the purpose to investigate how the sensorimotor coupling with the environment changes the possibilities of action in interaction. For example, a person who wears skis or snowboards acquires different possibilities for the perception of the environment. This coupling changes the possibilities of actions and hence of embodied cognition and experience of a subject as a skier. A subject - a so called sense-maker or agent - is involved in interactions with her environment in which the objects or events become meaningful for the subject in the process of actively relating to the world by her own exploratory activity and orientation toward a course of action that is adequate to the subject (Di Paolo, Buhrmann, Barandiaran 2017). An actively perceived slope becomes hence meaningful for a sense-maker wearing skis in relation to the opportunity for setting off down the ski run. The sense-maker establishes a perspective on the world and participates in the generation of meaning through her body, bodily mediated perception and action. She enacts a world. The investigation of the possibilities of the embodied and enactive mind embedded in a context of sensorimotor coupling is the main concern of the enactive approach. Sense-making - the enaction of a meaningful world in the interaction of an autonomous system with the environment - becomes a strongly embodied, embedded and enacted sociocultural process which is distributed in the complex socio-technical environment, as Lindblom (2015) remarks. In reading Lindblom's observations one is tempted to explain the mediational role of things, objects and tools in terms of

the extended mind thesis, too. What is it exactly? The extended mind thesis is the fourth E in the 4E's cognition. It proposes that some objects in the external environment can be part of a cognitive process and in that way function as extensions of the mind itself in the environment (Clark, Chalmers 1998). The extended mind thesis asks the question of where the mind stops and the rest of the world begins (Clark, Chalmers 1998; Gallagher 2017). Objects within the environment function as a part of the mind. The vehicles of a cognitive state extend beyond the skin and skull of a cognizing organism. For example, the use of a notebook to support memory is considered to be a cognitive process itself. As Clark and Chalmers put it, "the information in the notebook functions just like the information constituting an ordinary non-occurrent belief; it just happens that this information lies beyond the skin" (1998, 13).

In the following, I will illustrate Maiese's criticism (2017) to the extended mind in enactivism. While I support her view that the extended mind is not compatible with the enactive mind, I do not share her point of view on the reasons for this. I will explain why and develop the view that the enactive mind does extend through the appropriation of the tools that mediates the sense-maker's interaction with her environment. Sensorimotor coupling makes this possible. For this sort of embodied cognitive extension the extended mind thesis has indeed no power of explanation.

### **3 Extended Reconsidered**

#### **3.1 Maiese's Criticism**

In order to be able to be compatible with the enactive approach to the human mind, which includes the embodied and the embedded mind, the extended mind should contribute to overcoming the mind-body dualism, the main aim of enactivism. Does the extended mind thesis have explanatory power in this sense? In his contribution on the artifactual mind, Aydin (2013) remarks that the advocates of the extended mind thesis have not sufficiently succeeded in escaping the Cartesian inheritance. According to the author, Clark and Chalmers (1998) preserve an inner-outer dualism by ascribing to cognition an original starting point: cognition arises from an inside world of brain processes. The notion of extended indicates a movement from inside to outside. The content of brain processes is granted an original unextended status. This is parasitical on the idea that cognition can be localized in an isolated inside sphere we can access through introspection. Aydin (2013) refers to Zahavi's criticism to Clark's work and concludes that by upholding the idea of a separate inside brain world Clark does not overcome but rather modernizes the Cartesian

mind-set. These are sufficient reasons to consider the extended mind thesis not compatible with the enactivist anti-dualistic tenets. In her criticism, Maiese does not consider these aspects of the extended mind thesis. Rather, her starting point is the remark that the commitment to the distinction between the organism and the world is the main aim of the enactive approach to the mind. According to Maiese,

theorists who embrace EE (enactive embodied) cannot consistently also embrace EM (extended mind). This is because once one takes seriously the central tenets of enactivism, it becomes implausible to suppose that either life or affectivity can extend. (Maiese 2017, 346)

According to Maiese, the main tension between the enactive and the extended mind is that the subject as a sense-maker in enactivism is an operationally closed system, spatially situated, and intentionally directed toward the surrounding world. Such considerations indicate that enactivism relies on a clear differentiation between organism and environment. Maiese claims that the idea that a living organism can extend and incorporate non-organic elements of the environment blurs this distinction and is hence not compatible with enactivism. I would like to consider this point here as controversial. Actually, cognition and the mind in enactivism are always relational. They are a way to be in relation to the world (Thompson 2007). According to enactivism, mind and body are not distinct and separable. Cognition arises through the interaction between an acting organism with a body and its environment. The focus is on how brain, body and environment are related when cognition arises. Dynamic relations are the explanatory units of enactive cognition. As Di Paolo, Buhrmann, Barandiaran (2017, 116-17) point out, the system and its environment are coupled. This means that an autonomous system undergoing interactions with the environment remains viable according to the system's structure, which is condition for self-regulation. According to the enactivists, each sense-maker is a dynamical system, it is capable to modify the way its own processes and those of the environment relates. So blurring distinctions in the sense Maiese means would not allow relations to take place. In the following, I will contend that it is the distinction Maiese talks about that makes possible that the objects of the environment can count as extended parts of the enactive cognitive system only if they play a role in the embodied sense-making interactions with the environment. The process of appropriation - rather than the process of extension as described in the original extended mind approach by Clark and Chalmers (1998) - makes possible that the objects of the environment become part of the embodied sense-making interaction of the agent and that a tool of the environment becomes part of the em-

bodied enactive mind and changes the possibilities of the sense-maker's embodied action. In this sense, the enactive mind can extend or expand. Let's consider the example of the improvising saxophone player. In the act of playing, and through interaction with the saxophone, the musician and the saxophone can be understood as coupled, and the musical instrument can be seen as a mediating structure that has become part of the adaptive autonomous organization of a new, higher-order composite system constituted by the musician and her instrument. The saxophone changes the possibilities of action of the sense-maker-player who becomes in the sensorimotor coupling with the saxophone a saxophone player. The distinction between the sense-maker and the environment Maiese (2017) criticizes remains and becomes in this example the distinction between the new form of embodied cognitive system constituted by the saxophone + the sense-maker = the saxophone player and the environment. In this example cognition does extend enactively. Nevertheless, Maiese is right in acknowledging the lack of explanatory power of the extended mind thesis in enactivism. But not for the reasons she supports.

### 3.2 Why Otto's Notebook Can Be an Enactive Extension

As Gallagher (2017) remarks, in contrast to enactivism, the extended mind thesis embraces functionalism. Since mental states are identified by a functional role, they are said to be realized on multiple levels; in other words, they are able to be manifested in various systems, so long as the system performs the appropriate functions. For example, the use of a notebook to support memory is considered to be a cognitive process itself. Can this be considered to be enactive? The well-known example of Otto and his notebook helps give an answer. Otto, the Alzheimer's patient who uses a notebook as memory, interacts with his notebook to find information he can't remember otherwise. Otto must read it and write in it. This requires perception and action. Ward and Stapleton (2012) remark that if this means thinking of Otto's perception being directed upon information in the notebook, which then informs cognition, the extended mind thesis is not compatible with the enactive approach because it seems to support a discontinuity between action, perception and cognition. But if Otto's notebook - the external artefact - serves to structure Otto's cognition and his perception of the notebook moves to the background of his experience, which will be directed upon a range of situations and possibilities the shape of which is constrained by his skilful interactions with the notebook, the enactivists will consider the notebook as part of the cognitive system through which Otto's mind is directed upon the world. This process is called transparency in phenomenology. I will come back to transparency later on in this contribution.

While Ward and Stapleton (2012) highlight the fact that cognitive extension into the objects of the environment is possible for enactivists only when or if it is subordinated to transparency, Wheeler (2019) supports the view that the fact that technology in use disappears from the conscious apprehension of the user is a necessary condition for technology to provide us a case of extended mind. In his work, he does not consider the enactive approach to human experience in relation with extended cognition. Rather, he considers the difference between extended cognition and embedded cognition in the use of technological devices. Let's have a look at his example of the mobile phone. According to Wheeler, we have a case of embedded cognition if the mobile phone is a scaffold that enables you to fluidly and reliably access phone numbers that are not stored in your memory, then losing it might well be disruptive but your mental machinery would still be intact. It becomes a case of extended cognition if the mobile phone is a genuine constituent of your mental machinery and the material realizers of your cognitive states and processes. If you lose it you lose part of your cognition. In this second example it would be transparent to your consciousness. What Wheeler calls 'extended' is what is closer to what in the following I will characterize as enactive, although Wheeler seems to make extended cognitive processes dependent on the technological devices without considering how such devices change the possibilities of action and perception thanks to transparency. As I will show, this point makes the difference between the enactive and the extended mind.

In contrast to Wheeler, Slors (2020) highlights the role of functionalism in the extended mind thesis by Clark and Chalmers (1998). The idea that some of the cognitive work in our interactions with the world has to be performed by items external to our brains and bodies can be unpacked following the basic idea behind functionalism that functional role states and processes are multiply realizable: the same function can be physically realized in different ways. The example of Otto and Inga explains this. Inga wants to visit the MoMa in New York and remembers that it is on 11 West 53rd Street. Otto has early onset Alzheimer. Instead of relying on information storage in his head, he uses a notebook he always carries with him. When he wants to visit the MoMa he consults his notebook to find the address. The same functional process has in this example two different implementations, one involving brain processes only, the other involving an item in the external world as well. Implementation extension is the idea that the realization or implementation base of functional role states and processes that are characteristic of human cognition includes items outside the brains and bodies of persons. According to the author, implementation extension fits really well with artifact extension, since physical artifacts are easy to imagine to be causally coupled with brains and bodies in ways that extend the implemen-

tation base of functional processes. Auvray and Myin (2009) refer to the notebook and the function the notebook has in Otto's case as METs – Mind Enhancing Tools. These are devices that should not be understood as merely external stand-ins for already existing internal processes. As they provide novel forms of interaction with the environment that cannot be reduced to perception in one of the natural senses, they provide an extension of cognition that would not be possible without them. More precisely, METs can be interpreted in two different ways. According to a first interpretation, the role of METs is mainly to make it easier to perform in an externally supported way cognitive operations that are normally performed exclusively by relying on unenhanced resources. METs would then contribute to cognition in a quantitative rather than in a qualitative fashion. They would support cognitive functioning, not by making novel operations possible, but by facilitating the already available cognitive operations. According to this view, the use of external tools cannot genuinely transform cognition. This interpretation of METs flows from a conception of cognition according to which everything properly called 'mental' and by extension 'cognitive' is internal to the brain or to the body. This is exactly the inside-outside fallacy Aydin (2013) refers to when he remarks that the extended mind thesis preserves the Cartesian dualism I mentioned above.

A second interpretation of METs has been proposed according to which METs do transform cognition in a qualitative way. Novel tools not only facilitate established cognitive processes; they can also allow for the appearance of novel cognitive operations, which simply would have been impossible without them. For example, without the proper means and tools to write down, calculate, or draw diagrams, human cognitive abilities would not have evolved to their current state. This second interpretation is closer to the enactive approach to human mind and experience in the interaction with the environment and its tools. In the enactive approach cognition is a process that encompasses perception, action and bits of the world. Extending a cognitive process in this sense is not extending a realization base of a functional role (because there is no such thing according to enactivists), it is extending the part of the world we can engage with, as Slors (2020) remarks. Extending the impact of engagements can be achieved by involving specific artifacts in the interaction. In other words, it is increasing the impact that a cognitive engagement with the world has, for example on the further action possibilities offered by the environment to the acting organism. Against this background, we can say that the enactive mind is not extended by objects of the environment but unfolds through them. In the following I will show that the process of appropriation makes enactive extension possible and the extended mind thesis superfluous in a non-cognitivist approach to cognition.

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### 3.3 Appropriation as Enactive Extension. Artifacts Change the Possibilities of Actions

In enactive terms, technologically mediated interactions are actions mediated by a technical device that changes the agent's possibilities of action in the perception of the environment the agent enacts and interacts with (Lenay, Stewart 2012). Perception – and hence experience and cognition – comes into being thanks to the agent's sensorimotor coupling with the technologically mediated environment. Technologically mediated interactions require the agent's sensorimotor skills in order to perform the actions needed for perception and cognition. Gapenne and Declerck (2009) explain this in the field of sensory substitution devices they contributed to developing, working on the improvement of the Tactos platform. This is a perceptual supplementation technology which defines an environment for the haptic reading of shapes. How does it work? The subject moves a stylus on a graphic tablet, which controls the movement of a cursor in the digital space. This cursor represents the surface of a 'sensory captor' which can have various shapes. When the receptor field of this sensory surface crosses a black pixel in the digital space, it triggers the activation of a tactile stimulation by an electronic Braille cell. In this setup, the perception of an object as a whole requires an active exploration of the object. Gapenne and Declerck (2009) observe that the dynamics of the appropriation of an instrument involves two mechanisms: on the one hand the incorporation of the instrument as such, its integration into the body schema (the term pertains to motor control); on the other hand the re-organisation of the ambient world, which is perceived in reference to the possibilities for action the instrument makes possible. The disappearance of the instrument from the user's field of focal attention, and the user's feeling of an immersive non-mediated presence in the world are the result. "It is precisely when the world is envisaged in terms of the operations made possible by using the instrument that the latter is no longer perceived for itself", they write (Gapenne, Declerck 2009, 368). An easier example is the situation in which I use my glasses to see with. When I put my glasses on, I no longer see the glasses themselves. In the case of appropriating a new tool, the user has to deal with a renewal, constrained by the tool, of his exploratory mode with respect to that environment. In other words, the process of appropriation calls on the user to replay the whole process of constituting an experience of environmental events (see also Lenay, Stewart 2012).

The notion of transparency can be traced back both to Heidegger and to Merleau-Ponty. In *Being and Time*, Heidegger ([1927] 1962) argues that we ordinarily encounter entities as equipment, that is, as being for certain sorts of tasks (cooking, hair-care, text-editing, navigation, and so on). According to Heidegger, when we skilfully

manipulate equipment in a hitch-free manner, we have no conscious apprehension of the items of equipment in use as independent objects. Thus, to use Heidegger's most-quoted example, while engaged in trouble-free hammering, the skilled carpenter has no conscious recognition of the hammer, the nails, or the work-bench, in the way that one would if one stood back and thought about them. In other words, tools-in-use become phenomenologically transparent. All we experience is the ongoing task, e.g. the hammering. Merleau-Ponty, on the other side, observes that there is also a perceptual dimension to some cases of tool use. For example, a blind person using her cane in a skilled and hitch-free manner does not consciously apprehend the cane itself. On a first impression, it might seem that this is simply another case of transparency in action: the blind person uses the cane for finding her way around, and when she does so in an expert, smooth, and undisturbed fashion, the cane disappears from conscious apprehension. However, the cane is also a device that enables the blind person to access the world. We can say that in this sense cognition or embodied sense-making extends into the cane to widen the range of the possibilities of the exploration of the environment. Does the blind person with a cane in her hand become a new form of life in enactive terms? I tend to say yes. The appropriated cane changes the possibilities of embodied actions and hence of perception of the sense-maker like Otto's notebook when it disappears in the background of experience. A new form of cognition comes into being. Extending a cognitive process is extending the part of the world the blind person can engage with. Against this background, it seems to be plausible to support the view that transparency and the process of appropriation the enactive body is involved in make the extended mind thesis superfluous in 4E's cognition.

In the following section, the role of the enactive body in the sensorimotor interactions with the environment will be discussed.

#### 4 The Enactive Body in Sensorimotor Life

Understanding what the body in enactive cognitive science is becomes central in order to put into focus how it can bring forth cognition in active perception or perceptually guided actions. From the point of view of the enactivists, cognition does not need mental representations and is hence direct and embodied. As it was said above, this means that it depends upon the kinds of experience that comes from having a body with various sensorimotor capacities. So, what exactly is the enactive body? Despite the criticism by Manzotti and Chella (2018), Di Paolo and Thompson (2015) provide an answer. The enactive body is a self-individuating system, an adaptively autonomous and therefore sense-making system, a moving constitutively

sensorimotor system having access to the environment. Adaptivity and sense-making are the two central mechanisms that determine the enactive body. Adaptivity is the subject's capacity to regulate herself with respect to the boundaries of her own structure and identity in the mutual and continuous exchanges with the environment. Adaptive processes permit the meaningful distinction of events that do not put the subject's organism directly in any danger. Adaptation has the function to preserve the subject's biological structure and identity and corresponds to the subject's own particular way of realizing and regulating autopoiesis, the organizational logic of living systems, according to which their ongoing processes of material exchanges with the world relate to each other in such a way that the same organization is constantly regenerated by the activities of the processes themselves (Scarinzi 2012; Johnson 2017; Di Paolo, Buhrmann, Barandiaran 2017).

The subject's embodied evaluation of the consequences of her interaction with the environment for the conservation of her identity is possible thanks to bodily sense-making. The core idea of bodily sense-making is that the whole organism is a vehicle of meaning which is dynamically constructed by the subject having a perspective on the world. In the interaction with and adaptation to the environment, bodily sense-making is the evaluation of an adaptation and takes place in the organism's coupling with the environment. It has both the function to contribute to maintaining the organismic integrity of the subject (regulation) and to expand the subject's cognitive domain through the active selection of viable environmental factors to be integrated into the subject's cognitive domain (Scarinzi 2012) - the viable world each agent selects from the environment according to her autonomous mode of coupling. Maiese's criticism can be rejected also from this point of view. It is true that the subject and the environment are two separated and distinguished entities and that the enactive embodied subject is committed to the conservation of her identity, but in the sensorimotor exploration of the environment the subject-sense-maker is capable to expand her cognitive domain by integrating factors of the environment according to her viability and creating her own experience through her actions. A skier or a saxophone player can be seen as the result of the unfolding of embodied cognition in the expanded viable cognitive domain of a sense-maker through the coupling with skis or with a saxophone.

The enactive body as a sense-making system can be described also in phenomenological terms as the relation between the lived and the living body, as Fuchs (2018) shows. The lived body (the inner) is the dynamic condition and the performance of the living body in the interaction with the environment (the outer) in a relation of co-determination. It is a backdrop of the actions of the subject's living body. One's own body shows itself to be a material thing animated

from within by sensation and motility (Fuchs 2018). In other words, our enactive body allows the life we live while we are engaged in doing things, in appreciating our environment, in organizing our activities. This is our sensorimotor life – “the ongoing bustle of animate embodied being” (Di Paolo, Buhrmann, Barandiaran 2017). The enactive body is characterized by three dimensions of embodiment: 1) the organismic regulation of the entire body; 2) sensorimotor coupling between organism and environment (sensorimotor life); 3) intersubjective interaction that involves the recognition of the intentional meaning of actions and linguistic communication. Each perceptual experience is a way of acting, constituted in part by the perceiver's skilful mastery of the relation between sensory experience and movement (Scarinzi 2012). In order to understand this way of acting, the difference between moving and acting is necessary and it is provided by the enactive community. In the following, the criticism by Manzotti and Chella (2018) that enactivism does not provide a definition of movement and action can be rejected.

Di Paolo, Buhrmann and Barandiaran (2017) point out that a movement is simply a teleological change of position with the purpose of exploring the environment a system interacts with. For example, sounds get louder as you move towards their source but stay constant in volume when you travel at a fixed distance around them. In the enactive approach, movement has also the role to make possible the cognitive-emotional evaluation of a situation (Scarinzi 2014). More precisely, the notion of bodiliness and grabbiness (O'Regan 2011) helps understand the enactive role of movement in bringing forth the emotional evaluation of sense-making. Bodiliness expresses the dependence between body motion and sensory input in a sensory modality. When you move your body, incoming sensory information immediately changes. Grabbiness is the capacity of a sensory modality of grabbing our cognitive processing. It is the capacity of something to attract one's attention (O'Regan 2011), to grab it away from what you were doing. As it is argued in Scarinzi (2014), the former is grounded in the motor lived body, an implicit I can and do move in this and that way. The latter is grounded in the cognitive-emotional lived body, in the subjective experience of the evaluation of the aroused subjective cognitive-emotional lived body. The feel of the emotion 'fear', for example, emerges from the sensorimotor coupling of the subject with the environment determined by bodiliness and grabbiness grounded in the motor and cognitive-emotional lived body, which as a backdrop of the actions of the subject's living body in the environment co-determines the subject's sense-making of the fear-provoking situation she interacts with. In this case, movement is constitutive of the feel of an emotion (Scarinzi 2014). A combination of movements that has some effects on or changes the environment we interact with is an action and is activity-dependent. In other words, actions allow an agent

to act on and change the affordances of an environment. For example, falling a tree or traversing a complicated terrain or picking up a cup of hot tea and putting it to the lips are actions. Sensorimotor life is possible because every sense-maker is an agent that needs a rich environment to unfold and make sense of her possibilities of actions through active perception. In O'Regan's words:

the agent will have to be situated in a context which is sufficiently rich for it to make sense to say that there are a variety of behaviors which the agent can choose from and a variety of situations that it can be cognitively accessing. (2011, 90)

Against this background, the criticism by Manzotti and Chella (2018) that enactivism does not provide a definition of body and do not explain what a movement and what an action is, can be considered to be implausible.

## 5 Conclusion

Are 4E's too much in the anti-Cartesian approach to cognition? This contribution argues that a non-cognitivist approach to human cognition and experience that aims at overcoming the mind-body dualism is not compatible with the extended mind thesis by Clark and Chalmers (1998). The extended mind thesis preserves an inner-outer dualism by ascribing to cognition an original starting point: cognition arises from an inside world of brain processes. This is not compatible with the anti-Cartesian enactivist approach to the mind which is always relational. Maiese's criticism was discussed. She considers that the enactive mind cannot extend because the idea that a living organism can extend and incorporate non-organic elements of the environment blurs the distinction between organism and environment the enactive approach is committed to. It was shown that in the enactive approach this distinction is necessary for relational cognition to take place and for the appropriation of the tools allowing cognition to unfold in the environment. It was argued that it is the distinction Maiese refers to that makes possible that the objects of the environment can count as extended parts of the cognitive system in sensorimotor coupling. The enactive mind does extend in the sense that embodied cognition unfolds through the objects of the environment that expand the subject's possibilities of embodied action and hence of perception and engagement with the environment. Enactively extending a cognitive process is extending the part of the world the sense-maker can engage with and her enactive body is involved in. This can be achieved by involving specific artefacts in the interaction that serve to structure the sense-maker's perceptually guided cogni-

tion constrained by her skilful interactions with the specific artefact.

Against this background, this contribution supports the view that appropriation and transparency the enactive body is involved in make cognition extension possible and the extended mind thesis superfluous in 4E's cognition. By moving back to 3E's, the anti-Cartesian approach to cognition would escape the Cartesian inheritance of inner-outer dualism the extended mind thesis still conveys.

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