Límite | ***Revista Interdisciplinaria de Filosofía y Psicología***
Límite | ***Interdisciplinary Journal of Philosophy & Psychology***
(2020) 15: 20

TRANSPARENCY AND THE PHENOMENOLOGY OF EXTENDED COGNITION

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Recibido septiembre de 2018/Received September, 2018
Aceptado septiembre de 2019/Accepted September, 2019

ABSTRACT

Extended cognition brings with it a particular phenomenology. It has been argued that when an artifact is integrated into an agent's cognitive system, it becomes transparent in use to the cognizing subject. In this paper, I challenge some of the assumptions underlying how the transparency of artifacts is described in extended cognition theory. To this end, I offer two arguments. First, I make room for some forms of conscious thought and attention within extended cognitive routines, and I question the close association drawn between attention and effort. Second, I vindicate the importance of paying careful attention to individual differences and the diverse ways in which bodies and technologies can be experienced. I end by offering some hints toward an alternative, and more accurate, account of the phenomenology of extended cognition.
Key Words: Extended cognition, transparency, skills, artifacts, embodiment.

1. INTRODUCTION

A simple look around reveals the number of things that surround us. We rely on dictionaries for definitions, maps for directions, calendars for keeping track of our activities, diaries for keeping an account of the happenings in our lives –and the list could go on and on. If we briefly reflect on the roles such things play in our lives, we will easily see that, among many other roles, they play an important role in our cognitive activities.[1] They support our memory, our ability to perform mathematical operations, and our navigational abilities, to give some examples. In fact, some of them play an indispensable role in the smooth unfolding of our cognitive lives. We can call such things *cognitive artifacts*, that is, "physical objects made by humans for the purpose of aiding, enhancing, or improving cognition" (Hutchins 1999, p. 126).[2]

According to the *extended cognition theory*, our interaction with some of these cognitive artifacts sometimes becomes so pervasive and intimate that they no longer play only an instrumental role, but also a constitutive one.[3] Under certain circumstances, some of the artifacts we interact with become genuine components of our cognitive processes. Cognition spatially extends into the environment. This means that the material realizers of cognition sometimes encompass brain, body and parts of the environment.[4]

When this happens, a particular phenomenology accompanies it. It has been argued that when an artifact is a genuine part of our cognitive system it becomes "transparent equipment" (Clark 2008a, pp. 33-39). The main idea here is that we do not experience the artifact as a tool or a piece of equipment that we carefully deploy. While interacting with it, it has been argued that the artifact fades

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Acknowledgements: Thanks to Jesús Vega and two anonymous referees for helpful comments on a previous draft. Thanks to Robert Clowes for insightful discussions on the topic. This work was funded by research grants UID/FIL/00183/2020 and FFI2017- 87395-P MINECO/FEDER, EU.

away from our conscious thought. It is experienced as something within our own boundaries, something that is part of the machinery with which we engage in cognitive activities or encounter the world around us. This particular 'feel' or experience helps us to differentiate between "'merely tool-like' and agent-extending technologies" (Carter, Clark and Palermos 2018, p. 332).

In this paper, I focus on the *transparency* of cognitive artifacts in extended cognition. My main aim is to reflect on some of its underlying assumptions in order to motivate a more accurate account of the phenomenology of extended cognitive processes. To do so, I begin by presenting the transparency thesis's central tenets (§2). Then I provide two arguments that challenge its standard interpretation. First, I make room for some forms of conscious thought and attention in extended cognitive routines (§3). Second, I vindicate the importance of paying careful attention to individual differences and the diverse ways in which bodies and technologies can be experienced (§4). I end by offering some hints toward an alternative account of the phenomenology of extended cognition, which hopefully will guide future research (§5).

2. TRANSPARENCY AND EXTENDED COGNITION

According to the theory of extended cognition as I will understand it throughout this paper, cognition is extended (*i.e.*, crosses the boundaries of brain and body) in virtue of the subject's sensorimotor interaction with an environmental resource. This last bit is crucial. Cognition is extended in virtue of how a subject interacts with a given artifact.

Sensorimotor interaction allows us to distinguish instances of extended cognition from a set of cases that draw on a nearby but different thesis. Employing the terminology proposed in a recent paper by David Chalmers, we can call this nearby thesis the *extended circuitry thesis*.[5] According to this latter theory, cognitive circuitry extends in cases in which the brain circuit is replaced by an external circuit that is "connected directly (*e.g.*, by wiring or radio transmitters) to the rest of the brain" (Chalmers 2019, p. 11). Leaving aside whether cases like this one are feasible in real-life settings, what matters here is that according to this thesis, external bits of the world become parts of the material realizers of cognition, by means that do not require any interaction from the cognizing subject. We must assume that this extension is achieved by subpersonal mechanisms.

However, in extended cognition cases, sensorimotor engagement plays a central role. It is the subject's manipulation of an environmental resource (*i.e.*, a cognitive artifact) that extends the boundaries of cognition.[6] This interaction is what makes it more interesting and probably also more controversial. After all, the claim that by touching, holding, writing and reading, our cognition literally comprises the artifact with which we are interacting, might seem rather weird for those who have always assumed that their skin is their ultimate limit, and that's probably quite a widespread assumption.

Once we have a clearer understanding of what the target cases are, we can give an account of extended cognition following different strategies. For instance, we can focus on the function that a cognitive artifact (*e.g.*, a notebook or a smartphone) performs in an agent's cognitive system, and argue that if it performs a function that we would usually consider to be cognitive, given our common knowledge about cognition, then it should be considered a proper part of an agent's cognitive system, despite its location and material implementation.[7] In the terminology of Sutton (2010), this strategy is an instance of *first-wave extended cognition*.

Take for instance the case of Otto and his notebook, as portrayed in the canonical work of Andy Clark and David Chalmers. Otto is an individual who suffers from a mild form of Alzheimer's disease, and as a consequence, he heavily relies on a memory notebook. He has developed the habit of writing down every new piece of information he acquires, and reading this information whenever he wants to perform an action. The common-sense functional role associated with memory consists in the storing and retrieving of information that guides action and explains behavior.[8]

On one famous occasion, Otto wants to go to the MOMA museum, and in order to do so he must check his notebook to retrieve the information 'The MOMA museum is on 53rd street'. The central idea here is that Otto's notebook and his interaction with it plays the role usually associated with memory, in terms of storing and retrieving information. While another agent might retrieve this information from their biomemory in order to get to the MOMA museum, Otto does this with his notebook, where

he stores information relevant for his daily routines; thus the moral is that they are functionally *on a par*.

On the other hand, in order to illuminate extended cognitive routines, we can focus on how different biological and environmental elements integrate with each other in order to perform a cognitive task. Emphasis is placed on the complementary relation between the different elements that make up a cognitive system. This is analyzed across dimensions of integration. The dimensions are built on Clark and Chalmers' original 'Glue and Trust' conditions according to which a cognitive artifact should be available, easily accessed, and automatically endorsed for it to be a genuine cognitive extension. More thorough analyses of integration include the dimensions of reliability and individualization, among many others.[9]

Roughly, the idea is that genuine cases of cognitive extension require deep integration with the agent's cognitive system. On the other hand, lower degrees of integration suggest that the cognitive artifact is better accounted for as a tool or an aid to cognition. Pursuing this strategy is, again employing Sutton's (2010) terminology, an instance of a *second-wave approach* to extended cognition.[10]

The two waves are not radically different from each other, but they do set different agendas for research on extended cognitive routines.[11] The former focuses on functional parity. It helps us to lift 'the veil of metabolic ignorance' (Clark 2008a, p. 114) and provides an easy way of attributing cognitive functions to environmental entities. The latter moves beyond functional similarities, and explores the different functionalities that extended cognitive routines afford to the cognitive agent.[12]

My focus in this paper is the phenomenological aspect of cognitive integration. I will reflect on the experience of extended cognitive routines. After all, it makes sense to expect genuine cognitive extension to bring with it a particular 'feel'. Indeed, it has been argued that when a cognitive artifact is deeply integrated into an agent's cognitive system, it is *transparent* to the agent who interacts with it.[13]

Before delving into the issue of how the transparency of cognitive artifacts in extended cognition is described, I will say something about its origins. The notion of 'transparency' is inherited from phenomenological studies of tool use and skill acquisition where the transparency of tools is taken to be a phenomenological marker of the process of *incorporation*. A canonical example is the case of a blind agent who explores the environment using a stick.[14] After frequent use, there comes a point when the agent is "able to perceive features and elements of the environment at the tip of the stick, not at the tip of their fingers or the palm of their hand" (Carijo *et al*. 2013, p. 686). This means that the stick is experienced as part of the agent's perceptual machinery and not as a tool. In other words, it is *incorporated* and thus *transparent* (as a tool) to them.

Several studies show that, following a certain amount of practice with a tool, the representation of personal space in the brain is modified. This is interpreted as a tool being incorporated into the *body schema.*[15] The body schema has been defined as a neural representation of the body's shape and posture (Gallaguer 2005: 24), and, more recently, as a cluster of action-oriented sensorimotor representations (de Vignemont 2009, p. 11). The central idea here is that when a tool is incorporated into the body schema, the brain represents it as part of the body.[16]

Extended cognition draws on this phenomenon of incorporation and takes the phenomenological transparency of the cognitive artifact in use (*e.g.*, a notebook or a technological artifact) as a *marker* or *clue* for deep cognitive integration.[17] This is empirically supported by experiments such as those of Maravita and Iriki (2004), who found several neural changes in the brain's body representation after training macaques to use a tool.

In his careful and insightful treatment of the different dimensions of integration of extended cognitive systems, Richard Heersmink distinguishes between *procedural* and *informational* transparency. On the one hand, procedural transparency is described as "the *effortlessness* and *lack of conscious attention* with which an agent deploys a cognitive artifact" (Heersmink 2012, p. 4, my emphasis). The central idea here is that the agent's perceptual-motor processes are proceduralized to the extent that they do not consciously think about how to deploy the artifact or about when to use it. This has been described as remaining "below the threshold of consciousness" (Heersmink 2014, p. 589). The artifact is experienced as part of the agent's body in action. Procedural transparency is thus the traditional notion of transparency inherited from the previously mentioned literature on the embodiment of tools.

On the other hand, informational transparency concerns the "*effortlessness* with which an agent can interpret and understand information" (Heersmink 2014, p. 590, my emphasis).[18] This type of transparency requires the acquisition of abilities beyond motor skills, and in many cases requires literacy due to the particularities of the cognitive artifact (*e.g.*, Otto needs to read and write) and other interpretative skills. This notion of informational transparency departs from the classic reading of transparency, and is attuned to the particularities of cognitive artifacts. In this regard, it is determined by the agent's interpretative skills together with the informational properties of the artifact. Despite this difference, the features associated with informational transparency –effortlessness, lack of attention, and lack of conscious monitoring– are shared with the general notion of transparency.

The standard description of the transparency of cognitive artifacts can be illustrated with these quotes from Andy Clark's *Supersizing the Mind.* Lack of procedural and informational transparency is described in the following terms:

> … imagine you are struggling to use a new piece of software to solve a problem. Phenomenologically, our experience in such cases is not at all suggestive of anything like tool-based cognitive extension. Instead, you are likely to feel quite alienated from the tool in question. The software package dominates as the local problem space that you confront rather than as a piece of transparent equipment through which you confront a wider world. (Clark 2008a, p. 74)

When a device is not phenomenologically transparent, we struggle to use it. We notice the separation between ourselves and the device. It is something that is part of the 'problem space' rather than of the machinery with which we approach a given problem or cognitive task. Now, contrast this with how Clark describes Otto's interaction with his notebook.

> Otto is so accustomed to using the book that he accesses it automatically when biomemory fails. Calls to the notebook are as deeply and subpersonally integrated into his problem-solving routines (…) The notebook has become transparent equipment for Otto, just as biological memory is for Inga. (Clark 2008a, p. 80)

Otto is described as automatically accessing his notebook. It is transparent to him, and this means that it is experienced as Otto's cognitive machinery rather than as a detached tool that he deploys. For that to happen, Otto must be highly skilled in his interaction with it.

In the following two sections I will raise some doubts about the assumptions underlying how the transparency of cognitive artifacts is described in extended cognition. I will do this by pursuing two different strategies. First, I will address the close association drawn between skilled interactions and automaticity on the one hand, and between attention and effort on the other. Second, I will question the very idea of body transparency from which the demand for artifact transparency arises. The different ways of experiencing our cognitive and embodied lives will reshape our description of the phenomenology of extended cognitive processes. Let's get to it.

3. HABITUAL ACTIONS AND SKILLED GESTURES

A cognitive artifact becomes *transparent* in use when we habitually rely on it. This usually requires practice and the development of what Robert Clowes (2019) has called *skilled gestures*. Going back to the case of Otto and his notebook, we have seen that Otto's notebook becomes "transparent equipment" once Otto has become skilled in his procedural and informational interaction with it, to the point that he is described as deploying and accessing the notebook *automatically* and *effortlessly*.

In this section, I will defy the well-entrenched idea that once we are skilled in doing something, we do it automatically and effortlessly. I will suggest that our cognitive world is much more complex than has traditionally been conveyed, and in this regard, I will proceed to show that automaticity, lack of attention and effortlessness are not essential features of *all* of our cognitive skills, and in particular, not all of our extended ones. Before doing this, it will be useful to dig a little bit deeper on the question of what grounds the standard description of the transparency of cognitive artifacts in extended cognition.

Habitual actions have usually been associated with automaticity and effortlessness. As William James famously said (1983, p. 126), habits are driven by "the effortless custody of automatism". In contrast, *consciousness* and *attention* have often

been conceived of as effortful cognitive activities.[19] This helps us to illuminate the standard description of the transparency of cognitive artifacts. As we have just seen, in extended cognitive processes, the artifact is habitually deployed. Consequently, it makes sense that the agent's interaction with it has been described as effortless, given that this is how habitual actions have traditionally been accounted for. Moreover, if a cognitive activity is described as effortless, this usually means that it lacks conscious monitoring and attention, since attention and conscious thought have traditionally been described as effortful cognitive activities. This explains why, when a cognitive artifact is transparent to the agent, this means that the artifact is effectively deployed without conscious thought or attention.

The standard description of the transparency of cognitive artifacts in extended cognition is further illuminated by attending to the influential phenomenological analysis of skill acquisition put forward by Dreyfus and Dreyfus (1986). According to this account, skilled actions are guided by *automatic* responses that are *fast* and *effortless*. The central idea here is that once a skill is acquired, its execution is based on automatic action. It is only during learning phases or abnormal circumstances (that is, circumstances to which the agent is not habituated) that a form of conscious monitoring of the activity plays an important role.[20] This explains why, if transparency is achieved in virtue of a skilled interaction, the deployment of the artifact is expected to be effective without conscious monitoring or attention.

Having clarified the reasoning behind the standard description of the transparency of cognitive artifacts in extended cognition, we are now in a position to question some of its underlying assumptions. To do so, first, I will present some newly emerging literature that expands the role of conscious thought and attention in skill execution. Then I will question the close association drawn between attention and effort.

Let us begin with the role of conscious thought and attention in skill execution. Dreyfus and Dreyfus's model has greatly influenced the literature on skills, to the point that after their influential writings, almost everybody assumed that conscious thought and attention had a very limited role in expert skill execution.[21] There seemed to be a shared fear according to which expanding the role of consciousness in action would awaken the ghosts of Cartesianism–and we all know that putting them to sleep was anything but an easy task.

However, during the last ten years, a growing literature has questioned the limited role of conscious thought and attention in skilled action. In particular, it has been argued that conscious thought and attention can dynamically accompany habitual and highly skilled activities, and that consequently this is not a strategy reserved only for unusual circumstances and learning strategies.[22] It has also been argued that conscious thought and attention might even be beneficial for sustaining a successful performance.[23]

For instance, according to what has been called the *Applying Intelligence to Reflexes Model* –put forward by John Sutton, Doris McIlwain, Wayne Christensen and Andrew Geeves– conscious thought should not be conceptualized as "an inner realm *behind* practical skill" (Sutton *et al*. 2011, p. 95, emphasis in the original). This is because conscious thought can play an active and dynamic role in the execution of complex cultural and physical activities. According to this model, being skillful in a given activity is characterized by building dynamic connections between thinking and doing, not by bypassing conscious thought in action (Sutton *et al*. 2011, p. 95). Obviously, this will vary depending on the skill (*e.g.*, playing chess or dancing), and it might even be open to variation according to cultural and personal particularities. Nevertheless the idea is that skill execution is compatible with conscious thought.

Along similar lines, Barbara Montero (2010, 2016) has recently vindicated the role of conscious thought in expert performance. To cut a long story short, Montero criticizes the established view according to which experts (of various types) do not think during online performance, and in fact should avoid doing so –a principle that she has variously called *the maxim* (2010) or *the just-do-it-principle* (2016). Reviewing her work goes beyond the aim of this paper, but I will briefly present a case that she describes where conscious thought has a positive effect on performance.

Montero recounts the case of a classic guitar player who consciously monitors his movements, both while practicing and while performing (2010, pp. 112-113). In particular, he directs his attention to his movements and thinks about what he is doing while playing. As Montero writes: "for him, skillful playing involves extensive conscious thought about what to do and when to do it" (*ibid*., p. 113).

The main idea, which is further developed in her 2016 book, is that experts do not focus on every minute detail, "but they may beneficially focus on some" (Montero 2016, p. 40). Consequently, the role of conscious thought and attention is not as restricted as Dreyfus and Dreyfus's influential model suggests.

Before explaining the bearing that this new literature has on the standard description of the transparency of cognitive artifacts in extended cognition, there is something else that I want to consider, which is the close association drawn between attention and effort. As we saw before, when a cognitive artifact is described as *transparent*, this is taken to mean that the agent's interaction with it is *effortless* and *lacks conscious attention.*

In cognitive psychology, attention has been closely associated with effort (Kahneman 1973). In fact, attention has been commonly characterized as an effortful cognitive activity. To describe a cognitive activity as effortful refers, on the one hand, to an objective measure of increase in the brain's metabolic activity and, on the other, to the agent's subjective feeling of exertion while engaged in that cognitive activity.[24] What interests us here is the subjective feeling of exertion or struggle.

Here again, some new literature has emerged to challenge what used to be the standard characterization of attention as necessarily an effortful activity.[25] For instance, Brian Bruya and Yi-Yuan Tang have claimed that some high-attention tasks are not experienced as effortful. For this reason, they argue, research on attention "should include high-attention tasks that may not necessarily be experienced as effortful, such as various forms of meditation, as well as games (including video games), hobbies, crafts, and sports" (Bruya and Tang 2018, p. 8). This would give us ecologically valid evidence. The moral is that although it is true that automation usually brings a decrease in one's feeling of effort,[26] we should not assume that attention is always effortful. Here again, it is important to look carefully at the role of attention in different activities, since at least as far as the subjective feeling of effort goes, attention does not necessarily come with effort. In fact, there is an increasing bulk of evidence to support the hypothesis that some high-attention tasks involve a feeling of flow and immersion.[27]

Having said all this, we are now ready to return to the procedural and informational transparency that characterizes cognitive artifacts in extended cognition. As we have just seen, the transparency of cognitive artifacts is obtained in virtue of a skilled and habitual interaction with it. Our highly *skilled gestures* allow us to rely on them in such a way that they give rise to an experience similar to the experience of relying on our onboard cognitive capacities. The transparency of cognitive artifacts means that our conscious thought passes through them; after all, they are *transparent* to us, just like our cognitive capacities. This is not to say that we cannot pay conscious attention to our onboard cognitive capacities –for instance, to our *biomemory*– but the main idea here is that we do not normally do this, but rather rely on them automatically and by default.

The reader might already have noticed that my main discomfort with how the transparency of cognitive artifacts in extended cognition has been accounted for is the claim that our deployment and interaction should remain "below the threshold of consciousness" (Heersmink 2014, p. 589). We have just seen that, contrary to the phenomenology usually associated with habitual and skilled actions, conscious thought and attention are not an isolated realm of mentality, but instead can be meshed in online action without this having any negative effect. In fact, as we have seen, under some circumstances and for some agents, they might play an important role in online habitual and skilled action. Our rejection of the Cartesian myth should not lead us to detach conscious thought and attention from our daily lives. This means that we should not simply accept that lack of attention or consciousness in an effective interaction with a cognitive artifact is required for it to be a genuine cognitive extension. After all, conscious monitoring and attention might in fact play a role in sustaining a successful performance, and thus in sustaining the required procedural efficacy, and they might also be crucial for interpreting the information implemented in the artifact.

Moreover, given the particularities of some of the cognitive artifacts that feature in extended cognition cases, as in the paradigmatic case of Otto and his notebook, a form of conscious attention might be indispensable. We should not forget that Otto needs to write, read and interpret in real time the information conveyed by his notebook. That is why making room for some forms of attention within extended cognitive processes is crucial, and might even be useful for Otto's epistemic standing,

insofar as he will be able to be more diligent or virtuous in his interaction with it.[28]

Additionally, we should not swiftly assume that if an agent pays attention to a cognitive artifact while interacting with it, then this makes it an effortful cognitive activity. It might be the case that many of our intimate and pervasive interactions with our cognitive artifacts (*e.g.*, a notebook or a smartphone) are cases where we are highly attentive to many details of our interaction, but that nevertheless we do not experience a feeling of exertion. What we need to do is study tasks in ecologically valid situations; but at least for now, we may conclude that the phenomenology of our interaction with a cognitive artifact should not be strictly conceptualized as a complete lack of conscious attention.

The question we are left with is how to characterize the phenomenology of extended cognition. As we have seen, transparency is a clue or marker of cognitive integration, and intuitively it makes sense to expect that our experience of a given cognitive artifact that is part of our cognitive system–despite being external to our biological boundaries–must have a special experiential quality that is lacking in our interaction with other artifacts, which might be better conceptualized as cognitive aids or scaffolds.

We already know that extended cognition partly builds its case from the phenomenon of incorporation. When a cognitive artifact is cognitively integrated, it is part of the cognitive machinery that we pervasively and stably use. In this regard, it makes sense to expect that once a cognitive artifact is integrated, we does not need to consciously recruit it every single time. However, to expect that during the interaction the agent must be totally unaware of the cognitive artifact (or their interaction with it) is not very plausible. After all, cognition is extended in virtue of the agent's embodied manipulation of a cognitive artifact.

For now, we can say that the transparency of cognitive artifacts in extended cognition cannot be interpreted simply as a complete lack of conscious thought or attention, since conscious thought is not entirely detached from highly skilled actions. Moreover, we have seen that attention does not necessarily entail a feeling of exertion. In the last section of this paper, I will give some hints toward an alternative account of the phenomenology of extended cognition: one that makes room for consciousness and awareness. Now I will present another challenge to the standard description of the transparency of cognitive artifacts.

4. COMPLEMENTARITY AND INDIVIDUAL DIFFERENCES

When a cognitive artifact becomes transparent equipment, it inherits its transparency from the alleged transparency of the agent's body in action. Once integrated into our cognitive system, the idea is that the artifact becomes as transparent as our embodied cognitive capacities. In the following paragraphs, I challenge the standard description of the transparency of cognitive artifacts by vindicating the importance of attending to individual differences and the diverse ways in which bodies and technologies can be experienced.

Let me begin by saying that this challenge is a consequence of my understanding of what it is to investigate extended cognition from a complementarity perspective. As we briefly saw in the first section of this paper, the complementarity path to extended cognition frees us from the quest for functional similarities between intracranial cognition and extended routines (*i.e.*, biomemory and extended memory). The emphasis on their different complementary functions allows us to dig into individual differences and the different ways in which people interact with cognitive artifacts. As John Sutton writes:

> … parity leaves no obvious space for investigating individual differences in relation to EM [extended mind], because it asks us to focus on generic features of cognitive states and processes, whether in the world or in the head. Yet we often want to understand the specificities of particular embodied subjects: just why and how one system –such as a particular embodied agent of one kind or another– can move between a variety of different artifacts. (Sutton 2010, p. 199)

Following my interpretation of this line of thinking, I will begin by challenging the universality of the experience of *body transparency*. Then I will question the methodological strategy of trying to understand the experience of extended cognition in terms of the experience of unextended cognition.

As Michele Merritt (2010, p. 212) claims, it is the agent's relation *to* the artifact that determines an artifact's transparency. In the following paragraphs, I will briefly examine how different ways of

experiencing our cognitive and embodied lives might affect our description of the phenomenology of extended cognitive processes. My ultimate goal is to encourage extended cognition advocates to resist the homogenizing trend of taking one particular way of experiencing their body in action, and uncritically imposing this on how cognitive artifacts should be experienced in order for them to count as genuine cases of cognitive extension.

The transparency of bodies has traditionally been conceived of as a characteristic feature of the experience of embodiment.[29] In fact, a form of transparency has long been taken to be a universal feature of the body. However, its universal aspect has been criticized within feminist phenomenology. In particular, it has been argued that how bodies are lived and experienced is open to change through *enculturation* and *socialization*. As Iris Young (2005) writes in her canonical essay 'Throwing like a Girl':

> The body as lived is always enculturated: by the phonemes a body learns to pronounce at a very early age, by the clothes the person wears that mark her nation, her age, her occupational status, and in what is culturally expected or required of women. The body is enculturated by habits of comportment distinctive to interactional settings of business or pleasure; often they are specific to locale or group. Contexts of discourse and interaction position persons in systems of evaluation and expectations which often implicate their embodied being; the person experiences herself as looked at in certain ways, described in her physical being in certain ways, she experiences the bodily reactions of others to her, and she reacts to them. (Young 2005, p. 17)

If we take this claim seriously, that is, the claim that how we experience our cognitive and embodied lives can change due to the process of enculturation,[30] then we can expect a similar change and variation in how we experience our relations with different cognitive artifacts, and more precisely with our cognitive extensions. At least, we should not take transparency for granted, nor take it to be the default experiential mode.

To illustrate, Iris Young emphasizes the way in which some women (not all women, but women situated at a particular time, and in a cultural and social environment of industrial western culture) often experience their body *as a burden* (Young 2005, p. 36). That a body is experienced as a burden, of course, stands in clear tension with its (purported) transparency. Burdens are heavy, hard to move, and tend to remain still precisely because of that. So, one may wonder, how does cognitive extension fit with these cases. Should a cognitive artifact be transparent (in order for there to be extension), when not even one's experience of one's own body is?[31]

Answering this question is not an easy task. Let me remark that I do not mean to suggest that norms of comportment might make some group of individuals unable to extend their cognitive systems, since I take extended cognition to be a general theory about the human mind. However, what I do want to emphasize is that one lesson to be learned from feminist phenomenology is that more attention needs to be devoted to investigating how individuals experience their own cognitive and embodied lives, and how this might vary depending on their learning histories and cultural settings.[32]

Given the effects of enculturation, we should at least be open to the idea that a lack of conscious attention and effortlessness are not universal features of the experience of embodiment, and consequently that further conceptual and empirical work needs to be done in order to support the claim that transparency should, in fact, be taken as a marker or clue for extended cognition.

This brings us to the second part of this section. Even if we were to grant, after careful examination, that lived bodies and embodied cognitive capacities are in fact experienced *transparently*, we should question the extent to which cognitive extensions must be experienced similarly. As we have seen, it has been assumed that our experience with genuine cognitive extensions should mimic our experience when we rely on our cognitive and embodied capacities while acting. However, we have also seen that the complementarity path to cognitive extension frees us from searching for such similarities. In the following paragraphs, I will suggest that there are good reasons to abandon the quest for phenomenological similarities, since this strategy might preclude us from fully grasping the qualitative aspect of extended cognition.

To do this, I will pay attention to recent work concerning the experience of young people when they use an aided *Augmentative and Alternative*

Communication System (AAC system). An aided AAC System is a technology that individuals with speech disorders of various origins use to communicate when they lack the physical ability to use verbal speech or writing (Light 1989). In order to communicate effectively, individuals need to acquire linguistic and social competences, as well as the technical skills needed to operate the AAC system. These technical skills include "skills to use the access method(s) or transmission technique(s), as well as skills to operate specific device features (*e.g.*, the on/off switch, volume control, output mode selection, etc.)" (*ibid*., p. 140).

Kathy L. Howery (2018) presents and articulates the experience of teenagers speaking through an AAC, in particular a speech-generating device (SGD). Given the particularities of this specific assistive technology, the temporal demands of speaking through an assistive technology of this sort are radically different from those of unaided speaking. As Howery writes:

> For those who speak there is not thinking about speaking, there is only speaking what we are thinking. Navigating in the time stream of spoken language seems *quick*, *easy*, and *effortless*. Yet *this hardly seems to be the case for people who must use an SGD* to speak their thoughts aloud. (*Ibid*., p. 42, my emphasis)

People who use a speech-generator device communicate at a rate that is 15 to 25 times slower than natural speech (Beukelman and Mirenda 2013). This is partly why their experience does not seem as *quick*, *easy* or *effortless* as their experience of unaided speaking. This difference in timing usually creates difficulties for its users, who are not given the temporal space that is usually needed for actively participating in a conversation.

Howery considers that this difference could, at least in principle, be eradicated once technologies "transform thought held in a person's brain directly to speech" (Howery 2018, p. 47). However, given the current state of the technology, people who use SGDs "will always be out of synch with the talk time that rules that govern human conversation expect" (*ibid*., p. 47). Confronted with this situation, Howery wonders whether the problem is not with the technology *per se*, but rather with the time given to people using an ACC of this sort to communicate their thoughts. In her own words:

> Perhaps it is not technology that is needed for young people with complex communication needs to speak, but it is *time*. Time needs to be *given* so they can construct the messages they are so desperately trying to convey quickly enough to be heard. (Howery 2018, p. 47, emphasis in the original)

Howery argues that speaking through a SGD device gives rise to a different experience from that of unaided speaking. In particular, people using SGDs have a "unique lived experience of time" (Howery 2018, p. 42). That is why trying to understand what it feels like to speak through a SGD by comparing it with what it feels like to speak without such a device is an inadequate strategy, and it prevents us from genuinely grasping what is going on in this particular case of human-technology interaction. Moreover, if this difference is not acknowledged, we will not adequately adapt our conversational rules and temporal paces to the rhythm of speaking through a SGD. This is an important lesson to be learned for our theorizing about extended cognition: by comparing the phenomenology of interactions with cognitive artifacts with the experience of unextended cognition, we miss the subtleties of what is really going on.

My contention is that the feel of extended cognition will remain hidden unless we abandon the quest for (experiential) similarities. In fact, this strategy is in tune with the central tenets of the complementarity-based agenda for extended cognition. By being open to the difference between unextended and extended cognition (*i.e.*, between biomemory and extended memory), we might discover differences in their temporal paces, rhythms, and their overall experience, just as there are deep experiential differences between speaking through an SGD and speaking without it. We should thus resist the temptation to think that figuring out the phenomenology of extended cognition by comparing it with the phenomenology of *intracranial* cognition will be illuminating enough, since otherwise we might overlook what it really feels like to rely on our cognitive extensions.

One possible reaction from a transparency advocate would be to accept those considerations, but nevertheless insist on the importance of the quest for similarity, and thereby hold that, in cases where the phenomenology between intracranial and extended cognition is not sufficiently similar,

there will probably be no cognitive extension. However, the lesson I take from Howery's work is that we must recognize their differences if we are to fully understand the phenomenology of extended cognition.

For instance, imagine a cognitive artifact that is directly connected with our intracranial processes. In such cases, we can postulate that the experience of relying on the cognitive artifact would be *very* similar to relying on an intracranial cognitive capacity. In fact, one might take this to be the paradigmatic case of cognitive extension and claim that the further a particular interaction with a cognitive artifact differs from this case, the less likely it is to be a genuine case of extended cognition. However, there are good reasons to reject this approach.

First of all, as we saw at the beginning of this paper, *extended cognition* is different from the *extended circuitry thesis,* and it makes sense to expect this difference to be reflected in their phenomenologies.

Second, if we go back to Howery's previous remarks concerning the current state of SGDs, we have seen that she invites us to change our perspective, given that part of the problem faced by people using a SGD is that they are not given enough time, since they are expected to speak like unaided speakers. In line with this, by emphasizing similarities, we might be less inclined to consider a particular interaction with a cognitive artifact as a case of extended cognition, simply because it differs from its alleged unextended variant. For instance, Otto's reliance on his notebook might be more effortful than another subject's reliance on their biomemory, but Otto's notebook might nevertheless be a genuine cognitive extension. The moral here is that we need to move beyond similarities and attend to real-life settings, and to diverse and pervasive interactions with cognitive artifacts, in order to understand what it feels like.

To wrap up, in this section I first claimed that the phenomenology of extended cognitive processes varies due to enculturation and our varied learning histories, and that this entails that body transparency might not be a universal feature. Second, even if body transparency is a universal feature of human experience, I have claimed that trying to understand the experience of extended cognition by comparing it with the experience of unextended cognition will not completely illuminate the phenomenology of extended cognitive routines. Now the challenge we are left with is how to give an account of the phenomenology of extended cognition. In the next section I will give some hints on this.

5. THE 'FEEL' OF OUR COGNITIVE EXTENSIONS

Let me begin by recapitulating our discussion so far. We have seen that for there to be extended cognition, the inner and outer elements need to coordinate as a single problem-solving ensemble. This not only requires the development of motor skills that permit an effective procedural interaction, but also other interpretative skills related to the cognitive task in question (*e.g.*, remembering something, locating a particular place, performing a mathematical operation, etc.).

Insofar as cognition is extended in virtue of the agent's skilled interaction with a cognitive artifact, I have suggested that space should at least be made for an effortless form of attention and conscious monitoring. Additionally, I have emphasized the importance of looking at the different ways in which our cognitive and embodied lives can be experienced, which in turn has led me to question the extent to which the way we experience our cognitive and embodied lives might be entirely illuminating for understanding extended cognitive routines.

Now that I have challenged some of the assumptions underlying the standard characterization of the transparency of cognitive artifacts in extended cognition, the pressing question becomes that of how we should conceptualize the phenomenology of extended cognitive processes. As I said at the beginning, it is intuitively appealing to think that interacting with our cognitive extensions should be qualitatively different from our experience of interacting with other types of cognitive aids or scaffolds, and, albeit inaccurately, the transparency of cognitive artifacts aimed to draw that distinction.

Talk of transparency evokes seeing through the equipment for the task at hand, and making room for conscious thought and attention seems to shift us away from this idea. That is why, after my analysis, it does not seem adequate to talk about the transparency of cognitive artifacts, at least as this has previously been conceptualized (*i.e.*, lacking conscious thought and attention, and being below the threshold of consciousness). Does this mean that we should give up the quest for a particular experience as a marker for extended

cognition once and for all? I think not, and in this final section, I will give some hints toward what the phenomenology of extended cognition might be like.

First, the phenomenology of extended cognition must have a *sensory* dimension. Cognition is extended in virtue of our sensorimotor interaction with an environmental entity'. These *skilled gestures* will give rise to a multimodal sensory experience. For instance, returning to the canonical case of Otto and his notebook, Otto's interaction with it will elicit a sensory experience. That is, Otto will notice that the notebook has a particular color, size, weight, texture, etc. However there seems to be more to the story. For instance, while interacting with it, Otto might recognize the particular feel of *his* notebook, *his* handwriting or how *he* organizes information. Also, given the central role that the notebook plays in his cognitive life, the notebook might be special to him in a particular way. That is why it makes sense to expect the phenomenology of extended cognition to also have an *affective* dimension.

To flesh this out, I will bring to the fore some ideas recently developed by Frederique de Vignemont (2018) in relation to the phenomenology of bodily ownership.

In her recent careful treatment, de Vignemont argues that the feeling of bodily ownership has both a sensory and an affective component.[33] We constantly receive sensory information about our own bodies (via vision, touch, proprioception, the vestibular and the interoceptive systems).[34] But, the phenomenology of bodily ownership is not only sensory. According to de Vignemont (2018, pp. 190-196), the phenomenology of body ownership also has a crucial affective component.[35]

In order to shed light on this affective component, de Vignemont's starting point is the metacognitive feeling of *familiarity*. Let me briefly remind the reader that metacognition is a complex capacity that monitors the performance of different cognitive processes on the basis of cues and heuristics. According to a leading theory of metacognition, metacognition elicits metacognitive feelings as outputs of these monitoring processes.[36]

The feeling of familiarity is described as "a specific type of affective phenomenology elicited by the perception of objects and events that have personal significance" (de Vignemont 2018, p. 191).[37] Everybody would accept that, under normal conditions, one's body is familiar to oneself. Familiarity can be a matter of degree and the feeling of familiarity we have toward our own bodies is, as de Vignemont puts it, "extreme" (*ibid*., p. 192). However, de Vignemont convincingly argues that this feeling of familiarity does not fully capture the phenomenology of bodily ownership. This is mainly due to the fact that the phenomenology of bodily ownership needs to have a clear positive valence that motivates us to protect it, and this positive valence is lacking in the feeling of (extreme) familiarity alone. Things and bodies can be familiar and have a personal significance, while lacking a positive valence (*e.g.*, familiar enemies or threats). The moral is that a feeling of familiarity cannot capture all there is to the affective component of the phenomenology of bodily ownership, since the function of such a feeling is not to track exclusively one's own body, but also other familiar bodies and objects.

De Vignemont proceeds to argue that the feeling of bodily ownership expresses the significance of our own bodies for survival, which, in her own words, is the awareness of "the narcissistic significance of the body" (*ibid*., p. 194). This narcissistic function motivates us to protect the body, and expresses its *vulnerability*. Due to their significance, there will be body parts that elicit a feeling of extreme ownership, and thus a motivation for extreme protection. In this regard, the feeling of bodily ownership is also open to gradation. In de Vignemont's own words:

> …one may argue that the significance for survival of the different parts of one's body is not a matter of all or nothing. Roughly speaking, the little finger seems to be less worthy of protection than the index finger. If the sense of bodily ownership expresses this special significance, then it should also be continuous rather than discrete. Degrees of significance would then correspond to degrees of ownership. (*Ibid*., p. 196)

Summing up, de Vignemont's proposal is that the affective component of the phenomenology of bodily ownership captures the narcissistic significance of the body that motivates us to protect it. Importantly, it also expresses its vulnerability.

There are some illuminating lessons for extended cognition theorists to take on board from de Vignemont's careful analysis. The first lesson is that the personal significance of objects can

give rise to specific affective feelings, such as a feeling of familiarity or a feeling of ownership. In this regard, we can say that cognitive extensions should definitely give rise to or elicit a feeling of familiarity in the agent. Briefly returning again to the case of Otto and his notebook, we can imagine that the notebook must at least feel *familiar* to Otto. This familiarity is elicited by the crucial role that the notebook plays in Otto's cognitive life. However, different cognitive aids or scaffolds might also be familiar to us (*e.g.*, our familiar calculator), without them being experienced as part of our cognitive machinery while we are engaged in cognitive tasks. That is why, if we want to truly capture an experiential difference between 'extending' versus 'tool-like' technologies, we need something more than familiarity.

This connects with the second lesson to be learned from de Vignemont's account: different types of personal significance might give rise to different affective feelings, some of which have a positive valence. As we have seen, the feeling of bodily ownership has a positive valence: due to the body's personal significance, we are motivated to protect it (*e.g.*, by moving our hand away to prevent it from being hurt). Albeit to a different degree, given the central role that cognitive extensions play in our cognitive lives (*e.g.*, the notebook in Otto's case), we can postulate that extended cognition should also elicit feelings with positive valence, due to its personal significance.

First, genuine cognitive extensions (as opposed to other types of aids and scaffolds) play a crucial role in the agent's cognitive life. This special significance might elicit an affective feeling with positive valence that also reveals a specific type of vulnerability.[38] After all, losing the notebook would have disastrous consequences for Otto. Second, the skilled interaction in virtue of which cognition is extended will give rise to a positive feeling such as a feeling of fluency.[39]

The third lesson to be learned from de Vignemont's proposal is that affective feelings (such as the feeling of familiarity and the feeling of ownership) are open to gradation. We may expect higher degrees of cognitive integration to entail more intense affective feelings than lower ones. In this regard, interaction with our cognitive extensions will score highly in affective feelings (*e.g.*, feelings of familiarity and ownership) precisely due to their strong significance, while scaffolds and aids will score lower. Also, metacognition is an active process: hence the positive valence of the phenomenology of cognitive extension will be reinforced by reliable, successful and stable interactions with it. Moreover, given its active nature, this will be open to change. For instance, if Otto's notebook strategy started to fail, the positive valence associated with his interaction with it would be diminished.[40]

All this being said, and returning to the standard description of the transparency of cognitive artifacts, we can say that cognitive extensions are not entirely transparent. I have suggested that extended cognition has both a sensory and an affective dimension, and this tells against the transparency of cognitive artifacts; if by that we mean that our interactions with them happen below the level of consciousness.

Before concluding, let me address a worry that my account might give rise to. At this point, someone might object that I am pursuing the same strategy that I have criticized in the previous section, *i.e.*, that of assuming that cognitive extensions should be experienced similarly to how we experience our own bodies. However, although I have argued that the phenomenology of bodily ownership can help us to begin to understand the phenomenology of extended cognition, this will not fully illuminate the particularities of the phenomenology (in both its sensory and affective dimensions) of extended cognition.

First of all, I am assuming that the difference between unextended and extended cognition also entails a difference in their phenomenology. For instance, the sensory aspect of our experience with cognitive extensions will clearly be different from that of intracranial cognition, given precisely the skilled gestures in virtue of which cognition is extended. Also, we constantly feel our own bodies (via proprioception, the vestibular and the interoceptive systems), and there are no such direct sensory channels to our cognitive extensions. Moreover, I expect there to be a similar difference concerning the affective dimension of our experience of extended cognition, and this difference need not only be a matter of degree. However, what I have hinted at throughout this last section is that this difference does not leave us unequipped to identify, at least conceptually, the phenomenology of extended cognition.

To recap, I have suggested that the phenomenology of extended cognition will have sensory and affective dimensions, which might

include affective feelings such as a feeling of familiarity, a feeling of ownership, and a feeling of fluency. In this regard, we can say that cognitive extensions are not entirely transparent, but are instead characterized by intimate sensory and affective components. Identifying the particularities of these feelings, together with their cultural and individual variation, is the challenge we are left with.

6. FINAL REMARKS

Summing up, at the beginning of these reflections on the transparency of cognitive artifacts in extended cognition, we saw that a marker or clue for the integration of an artifact into a cognitive system is that the cognitive artifact becomes, for the agent who interacts with it, 'transparent equipment'. The transparency of cognitive artifacts has been conceptualized as an effortless interaction, which does not involve conscious thought or attention, and as an effective interaction that remains below the threshold of conscious processing. In this paper I have explored two paths that ultimately question the legitimacy of this characterization. First, I have shown that room can be made for conscious thought and attention within skilled actions, and I have queried the close association drawn between attention and effort. Second, I have emphasized the importance of looking at the different ways in which our cognitive and embodied lives can be experienced, which in turn has led me to question the idea that technological artifacts should be experienced transparently. Finally, I have hinted at what we can expect from the phenomenology of extended cognition. Cognitive extensions, thus, are not entirely transparent, since they give rise to different sensory and affective feelings.

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NOTES

1 Other roles might be medical support, socialization and entertainment, to mention some.
2 See Heersmink 2013 for an insightful taxonomy of the different types of cognitive artifacts.
3 It is important to notice that the sense of constitution in play here is not the strong sense of conceptual intertwinement, but rather a weaker sense of being part of the physical machinery that implements something (see Clark 2008a, p. 238).
4 See the essays in Menary 2010.
5 See also Farkas 2012.
6 Mark Rowlands (1999, 2010) and Richard Menary (2007, 2010) have called this 'the manipulation thesis'.
7 Clark (2008b) relies on common-sense functionalism, as formulated by Braddon-Mitchell and Jackson (2006). See also Clark and Chalmers 1998 and Clark 2008a.
8 See Clark and Chalmers 1998, Clark 2008a, 2008b.
9 For a comprehensive account of all the dimensions of integration on offer in the literature, see Heersmink 2014.
10 See Clark 1997, Menary 2007, Sutton 2010, and Heersmink 2014.
11 See Kiverstein and Farina 2011 for an argument concerning the relation between these two waves of extended cognition.
12 This is captured in Sutton's articulation of the complementarity route to cognitive extension, which reads: "In extended cognitive systems, external states and processes need not mimic or replicate the formats, dynamics or functions of inner states and processes. Rather, different components of the overall (enduring or temporary) system can play quite different roles and have different properties while coupling in collective and complementary contributions to flexible thinking and acting" (Sutton 2010: 194).
13 See Clark 2008a and Heersmink 2014.
14 This case can be found in Merleau-Ponty 1945, Gibson 1966 and Hirose 2002, among others.
15 See Menary 2007, 2010 and Clark 2008a.
16 Cf. Cardinali 2009 and Holmes 2012. Also, it should be noticed that the extent to which technologies and artifacts can be fully incorporated is still an open empirical question. See Makin *et al*. 2017.
17 Clark explicitly acknowledges that experience is a marker or a clue, rather than a necessary condition for extended cognition. In his own words: "Experience is, of course, no *more* than a clue. I do not mean, here or elsewhere, to advance any arguments of the form 'it seems to us as if we are/are not cognitively extended; therefore, we are/are not cognitively extended'!" (Clark 2008a, p. 238). Nevertheless, in his more recent work, a lack of conscious engagement seems to be viewed as more than a clue, since he argues that consciously encountering an artifact prevents extended cognition. See Clark 2015 and Andrada 2019.
18 Let me briefly remark that information is a highly contested notion, and that there is no agreed definition on what information is within the cognitive sciences.
19 See Kahneman 1973 and Oliveira and Goodman 2004.
20 Also in Dreyfus 1997, Clark 2008a, p. 39 and Rowlands 2010, p. 158.
21 See also Fitts and Posner 1967.
22 See Sutton *et al*. 2011.
23 See Montero 2010, 2016 and Toner *et al*. 2015.
24 See Bruya and Tang 2018, p. 5.
25 Bruya and Tang's working hypothesis (2017, p. 1) is that the attention that occurs under sympathetic dominance can be experienced as effortful, while the attention that occurs under parasympathetic dominance is likely to be experienced as effortless.
26 See Oliveira and Goodman 2013.
27 See the essays in Bruya 2010 for a comprehensive account.
28 For an argument against the compatibility of conscious thought and extended cognition, see Clark 2015, and for a defense, see Andrada 2019.
29 Special mention should be given to Merleau-Ponty 2012 [1945].
30 For a thorough account of enculturation, see Menary 2018. Roughly, we can understand enculturation as the acquisition of normative patterned practices, spread across a population. See also Andrada (2020) for a commentary on enculturation and the importance of a critical philosophy of cognitive science.
31 A related and crucial question is whether norms of embodiment, together with how technologies are designed (and for whom) might preclude the extension of an individual's cognitive system. This is certainly an important question, although I will not address it here.
32 Along these lines, see Yap (2016) for an account of how feminine norms of embodiment limit one's perceived ability to act on other agents. See also Brancazio (2018) for an account of the impact of gender influences on the minimal sense of agency.
33 Whether an affective experience is distinct from a sensory experience is a conceptual issue concerning the nature of phenomenology. These can be conceived as two different experiences (Dokic and Martin 2015); or alternatively, the affective component can be conceived as a specific mode of presentation of the sensory content of perceptual experiences (Matthen 2006). As de Vignemont claims (2018, p. 194): "I thus doubt that one can empirically settle the debate between the two interpretations of affective feelings. It then becomes purely a conceptual issue on the nature of phenomenology."
34 See de Vignemont 2011.
35 By differentiating between the sensory and affective components of bodily ownership, de Vignemont is able to neatly explain syndromes such as the Capgras delusion, where patients retain their sensory phenomenology "while their affective one is missing" (de Vignemont 2018, p. 195).

36 For defenses of an experience-based control of metacognition, see Proust 2007, 2012 and Arango-Muñoz 2013, 2018. Cf. Carruthers 2009.

37 See also Dokic and Martin 2015.

38 See Carter and Palermos 2016 for an account of the ethics of extended cognition, wherein they claim that if extended cognition is true, harming our cognitive extensions should be considered personal assault.

39 Along these lines, Palermos 2014 mentions the metacognitive feeling of fluency that results from cognitively integrating an artifact into one's cognitive system. See also Oppenheimer 2008.

40 This analysis seems to be in tune with a recent account of scaffolded memory proposed by Santiago Arango-Muñoz (2014). Arango-Muñoz argues that the selection of internal memory strategies for recalling a particular piece of information is motivated by positive noetic feelings (*e.g.*, a feeling of knowing), while the selection of an external (scaffolded) resource is motivated by the absence of positive noetic feelings or even the presence of negative ones (*e.g.*, a feeling of forgetting). It makes sense to expect the selection of genuine cognitive extensions to be elicited by positive feelings, and this might be a way of differentiating them from cognitive scaffolds. In this regard, I wonder whether there might be something like 'a tip of the notebook' or 'tip of the hand' feeling for Otto, elicited by the notebook's constant presence. I will come back to this issue in future work. See also Clowes 2017 for the role of epistemic feelings in extended memory.