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# CAN AN ENACTIVIST APPROACH ENTAIL THE EXTENDED CONSCIOUS MIND?

*abstract*

*This paper discusses the enactivist attempt to entail the hypothesis of extended conscious mind (ECM). The enactists suggest that conscious experience is a relational interaction between the subject and the external environment; this personal-level description of conscious experience naturally entails an extended sub-personal characterization of the material basis of conscious experience (i.e. the ECM). However, in this paper, I am going to argue that the enactivist description at the personal level is still open to an internalist challenge at the sub-personal level. In response to this challenge, I suggest combining enactivism with the concept of predictive processing, delineating a sub-personal characterization of conscious experience that corresponds to the enactivist interpretation at the personal level.*

*keywords*

*enactivism, extended conscious mind, predictive processing*

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## 1. Introduction

The concept of the 'extended mind' (Clark & Chalmers, 1998) suggests that the material basis of *non-conscious mental states* can be extended beyond the physical substrates of the human brain (i.e. to the external environment). Ever since this proposal was published in 1998, there have been many heated debates on the topic of how we should interpret the function of the human mind in regards of both the human brain and the external environment. Among these debates, the enactivists made an even bolder claim than Clark and Chalmers, claiming that the material basis of *conscious experience* should also be extended to the external world. In particular, the enactivists suggest that conscious experience is made possible by the relational interactions between the subject and the environment. In other words, conscious experience is not only dependent on the physical properties of subject's body and brain, but is also dependent on properties of the external environment. The enactivist approach of explaining the conscious experience is claimed to be able to entail the hypothesis of extended conscious mind (ECM): the physical machinery of conscious experience can be extended to the external environment.

In the following sections, I am going to explain how, from the enactivist perspective, the relational character of conscious experience can entail ECM, and the challenges of supporting this argument. I will firstly analyze the current debate concerning ECM, and point out that the enactivist approach, which focuses mainly on the personal level description,[1] is still wanting at the sub-personal level characterization. After this, I will introduce the concept of predictive processing (PP) and explain why I think combining this concept with the enactivist approach is helpful in the latter's attempt to argue for ECM at the sub-personal level.[1]

## 2. The debate on ECM

Conscious experience has always been an intriguing subject for researchers in the fields of psychology and philosophy. Many attempts have been made to explain the well-known hard problem: how can the human brain, a physical substance, bring about the phenomenal conscious experience?[2] No consensus has been reached so far. Despite the great difficulty in bridging the gap between phenomenal consciousness and its material basis, some theorists

1 Sub-personal level: the level of explanation about the event itself, for example, the mechanism realizing this event (Drayson, 2012; Ward, 2012); Personal level: the level of explanation that focuses on the causes and consequences of a particular event (Drayson, 2012).

2 Phenomenal conscious experience: the subjective feeling of a human being.

(e.g. Clark & Wheeler) insist that conscious experience can only be realized in the human brain, while the external environment plays only a causal role in triggering conscious experience. Some theorists (e.g. the enactivists), on the other hand, attempt to bridge the gap (or even negating the existence of the "gap", e.g. Noë, 2004) by interpreting the conscious experience as realized by a complete system including both the human brain and the external environment. This latter position sees the external environment as playing a constitutive role in giving rise to conscious experience. These opposing arguments about the role of external environment in conscious experience (causal vs. constitutive) lay the backdrop of the discussion surrounding ECM.

It is important to note that both the extended mind thesis (EM) and the ECM concern only the material basis of conscious experience. Advocates of the EM such as Andy Clark (2009) emphasizes that EM applies only to the machinery of "non-conscious mental states such as states of dispositional believing" (p.5). In the case of conscious experience, the material basis still resides within the brain while the environment is considered as a causal, instead of a constitutive factor. In particular, Clark argues that the enactivists' emphasis on the interaction between the brain and the external environment does not by itself necessarily entail their conclusion that the environment plays a constitutive role in realizing conscious experience. The reason is that this interaction cannot convincingly disprove that neural activities alone are sufficient to realize the consequence of the interaction enactivists propose. Advocates of enactivism such as Ward (2012), in response to Clark, defend the enactivist attempt to entail ECM by pointing out that the enactivist interpretation of conscious experience is not intended to give direct evidence at the *sub-personal level* (that is, the material basis) to justify ECM. Instead, the enactivist interpretation is a *personal level* description that can naturally entail an extended version of the sub-personal level characterization of conscious experience.

In the following subsections, I will discuss the enactivist interpretation of conscious experience in detail and explain how it can naturally entail ECM, as suggested by Ward (2012). In particular, I will be relying on Noë's arguments (2004, 2006, 2008) regarding visual conscious experience as an example.

### 2.1 The enactivist attempt to entail ECM and its limitation

The enactivist interpretation about conscious experience was originally proposed as an antidote to the cognitivist understanding that regards conscious experience as particular symbols represented by the brain according to the incoming stimuli from the external environment (Varela, Thompson & Rosch, 1991). Instead of regarding it as representing the environmental stimuli, the enactivist position interprets the brain as a regulator of the interaction between the subject and the environment; conscious experience is thus realized through this interaction instead of merely being registered by neural activities. Noë (2004) suggests that this interpretation can explain the inconsistency between the impoverished information encoded by sensory organs and the perceptual experience of details that exceeds the information encoded. For example, despite the poor color-sensitivity of the parafoveal cells in our visual system, our visual field is unaffected and is still considered as colorful. According to Noë, the challenge of this inconsistency can be resolved by the concept of virtual presence (2004; 2006). That is to say, details exceeding the encoded information are virtually presented in our experience; they are not automatically filled in or added on by our brain as a way to make sense of the incomplete information. Instead, they are presented as accessible to us if we move around and turn our attention to them. The content of these exceeding details are made possible by our interactions with the world and our sensorimotor knowledge ("Sensorimotor knowledge": the implicit understanding of the sensory results regarding the perceived target if we take actions on it). In this sense, according to the enactivist approach (Noë, 2004; 2006), sensorimotor knowledge compensates the impoverished information

encoded and enables the subject to properly relate herself to the environment, which then makes her conscious experience as complete as in the phenomenal sense. At the personal level, conscious experience is not something caused by the stimuli from the environment (although it certainly benefits from the external stimuli a lot), but rather, it is an evolving interaction between the subject and the environment based on the subject's mastery of sensorimotor knowledge.

Ward (2012) claims that given the enactivist description of conscious experience at the personal level, it is natural for the enactivist to entail ECM. The reasons given by Ward to justify his claim are based on the need of maintaining a consistency between the personal level description and the sub-personal level characterization (ibid, p.741): if we consider conscious experience at the personal level as a relational interaction between the subject and the environment, it is implausible for us to restrict to neural properties at the sub-personal level; once we accept the view that at the sub-personal level, the environment is merely a causal factor triggering conscious experience, it seems inconsistent for us to view the conscious experience at the personal level as a relationship between the subject and the environment. However, although the personal level explanation of conscious experience put forward by enactivism indeed motivates an externalist characterization of conscious experience at the sub-personal, this account is still susceptible to criticism given the fact that enactivists have not developed any direct supporting claims at the sub-personal level. In particular, the enactivist argument does not specify why the neural activities are insufficient in realizing the consequence of the interaction between the subject and the environment, which is emphasized by the enactivist interpretation as key to conscious experience. The enactivist attempt to entail ECM is still wanting, as can be seen in Ward's comparison of conscious experience to an episode of knowledge (2012):

> ...knowledge is essentially a relationship between a subject and the worldly state of affairs known. Episodes of knowledge thus depend not just on properties of the subject that can be specified independently of the state of the world and their standing in it (...), but also on the way the world is. Given such a conception of knowledge, if we are interested in delineating the material events and processes that underpin an episode of knowing – in giving a sub-personal characterization of a personal-level state of knowing – then we must look further than the internal properties of the knower. (p.13)

In the above description, Ward has tried to demonstrate how the personal-level description is able to circumscribe the sub-personal characterization of particular mental events. When we delineate the material basis of an episode of knowing, it is plausible to include the internal states of the subject as well as the external environment as constitutive to the episode as a whole. However, what we are interested in is the subjective knowing, which focuses mainly on the subjects. The internalists might agree that we should include the external world as part of the material basis that is necessary for the episode of knowing to happen while insisting that the sense of knowing of the subjects is still realized only by their neural activities. For example, to perceive a green apple, it is required for the subject to gain the knowledge that "apples can be green" and the process of knowing is constituted by both the subject's internal properties to grasp the knowledge, as well as the presence of the green apple; but the sense of knowing the fact that "apples can be green" is still plausible to reside internally in the brain as a result of changes in the subject's internal properties caused by the presence of the green apple. A relational interaction between the subject and the world that constitutes knowledge at the personal level is consistent with an internal characterization of the realizer of the subjective knowing at the sub-personal level. Similarly, even if we assume that at the personal

level, conscious experience relies on an interaction between the subject and the environment, it is still plausible to claim that at the sub-personal level, it is the neural activities caused by the interaction that constitute the mechanism that realizes conscious experience.
According to the enactivist approach, we should interpret conscious experience as a way for the subject to relate to the world instead of being constituted by symbols represented by the neural activities within the brain. However, it is not clear how this interpretation can entail the ECM when the mastery of sensorimotor knowledge and the acknowledgment of the accessibility of information[3] can be reasonably realized within the brain (Wheeler, 2015).
Accepting the enactivist understanding does not lead to a direct acceptance of ECM, as it is possible to adopt an internalist view at the sub-personal level in a way that is consistent with the enactivist description of conscious experience at the personal level. Ward's paper is successful in elucidating the point that the enactivist interpretation of conscious experience can entail ECM, but it lacks the necessary arguments to defend this interpretation against opposing opinions. The problem of the enactivist interpretation is that its explanation of conscious experience is primarily at the personal level. In order to justify the enactivist attempt to entail ECM, enactivists need an account of conscious experience that can apply the enactivist approach to a sub-personal level characterization, that is, to the material basis itself. In particular, this account should be helpful in explicitly demonstrating that neural activities alone are insufficient for the content of conscious experience.
In the next section, I will introduce the concept of predictive processing (PP). PP is a concept developed from recent studies in cognitive science about how the brain functions in reaction to changes in the environment. Successful integration of the enactivism with PP helps better demonstrate the enactivist implementation in the sub-personal level characterization of conscious experience and point to new directions to justify ECM by empirical studies.

## 3. Combining the concept of predictive processing and enactivism

I now introduce the concept of predictive processing from the enactivist perspective (Gallagher & Allen, 2016) in order to help demonstrate the insufficiency of neural activities to constitute the realizer of conscious experience at the sub-personal level. Predictive processing, in general, refers to a process in which the subject generates predictions (base on her past experiences) about incoming environmental stimuli and at the same time interacts with the environment to gather sensory information that conforms to these predictions. In this process, both prediction-generation and actions based on the environmental intake aim at minimizing the disparities between the predictions generated and the actual information in the environment (i.e. minimize predictive errors). According to the "free energy principle" (Friston, 2013), a biological system open to the influences of the environment maximizes its survival rate by minimizing "free energy" (i.e. the unexpected states of the system caused by its interaction with the environment that may overwhelm its integrity). The concept of predictive processing can explain the minimization of free energy of a human being as the subject interacts with the environment. In particular, the biological system of a human subject maintains its integrity – that is, minimizes the free energy – during its dynamical interaction with the environment by either accurately predicting the environmental states, or acting on the environment to render the sensory income unsurprising (Gallagher & Allen, 2016).
What differentiates the enactivist version of predictive processing (EPP) from other interpretations of predictive processing (e.g. Clark, 2016; Hohwy, 2016) is its understanding of the brain as part of the whole body in the process of energy minimization, instead of as the

3 The mastery of sensorimotor knowledge and the acknowledgement of the accessibility of information are regarded as constitutive to the content of conscious experience by enactivism (e.g. Noë, 2004; 2008).

only center of this process. While both Clark (2016) and Hohwy (2016) interpret the predictive processing as a way the subject interacts with the environment to confirm predictions generated by the brain (i.e. predictive patterns of neural activities), EPP demonstrates it as a function of the subject's whole body responding to and shaping the environmental changes by generating predictive models (Gallagher & Allen, 2016). Studies have found that at the earliest stage of visual stimulation processing (that is, before the conscious visual identification of the perceived object), the predictive patterns of activities based on prior encounter with the environment are activated not only within the brain but also throughout the subject's whole body including, for instance, her muscular and hormonal systems (Barrett & Barr, 2009). This suggests that affective responses of the subject's body are not separated from her visual perception. In this case, during the subject's interaction with the environment, the process of minimizing free energy is not only enabled by the predictive pattern of neural activities, but also by the predictive activities in other parts of the subject's body. According to EPP, we should regard the subject's body as a whole biological system actively engaging in worldly interactions by adjusting itself to the environmental changes. In this process, the brain is just one part of the whole body that plays an important role in regulating the responses of the body to the environmental stimuli; the boundary between the brain and the environment is transcended by the actions of the subject's body.

If we apply EPP in the analysis of the material basis of conscious experience, there seems to be no obvious reason for us to prioritize the brain as the only realizer of conscious experience. Although ECM does not immediately follow, the EPP at least suggests that both the brain and other parts of the subject's body are involved in generating predictive models in reaction to the environment. By bringing the rest of the body into the picture, EPP emphasizes active engagement of the whole body in the environment during perceptual activities. That is to say, conscious experience is no longer realized by a particular predictive pattern of neural activities in the brain that wait to be adjusted or to be conformed to; instead, the brain functions as a regulating system that facilitates the body to engage in the interaction with the environment; and it is this interaction that realizes conscious experience. Combining enactivism with the concept of PP thus allow us to successfully stretch the former's personal level description of conscious experience (i.e. conscious experience is a relational interaction between the subject and the world) to encompass a more directly sub-personal characterization, in which the brain alone is no longer sufficient.

It is important to note that, according to EPP, the predictive models generated by the body (including the brain) are not contentful; that is to say, the models are not predictions of the subject as the content of her conscious experience. Rather, they function as the organismic preparations that enable the subject's body (including the brain) to properly react to the environmental stimuli. This interpretation corresponds to the enactivist description at the personal level, as mentioned in section 2.1, that in the process of perceptual activity, details of objects are presented to the subject as "accessible" based on her mastery of sensorimotor knowledge. In particular, her mastery of sensorimotor knowledge is realized by the predictive activities of the biological system of the subject that enable her to relate to the environment properly in the way that minimizes free energy during interaction with the environment. As for the conscious experience of "accessibility", it is derived from the subject's consciousness of her body as constantly situated in a changing environment, which is realized by the body's (including the brain) constant interactions with the environment. On this account, the subject's conscious experience of the world is plausibly interpreted as the result of the dynamical interactions between the subject's body and the environment that are enabled by the predictive body and the changing environment. These interactions are akin to a physical force (conscious experience) arising from a situation where two rocks (the predictive body

and the changing environment) are constantly in collision. Restricting the material basis to the brain, or to the body (including the brain), alone is like explaining the material basis of the physical force as only one of the rocks whilst ignoring the other one. EPP, therefore, provides a way to justify the constitutive role of the environment at the sub-personal level characterization of conscious experience.

One potential objection to EPP's attempt to justify ECM could be derived from the fact that the rest of the subject's body is under the supervision of the brain (Barrett & Bar, 2009), which implies that the brain is the center of the perceptual activity. Adding the fact that the information flowing speed of the brain is significantly faster than that of the rest of the body (Clark, 2009, p.22), the brain might be seen as being more qualified as the realizer of a higher-level function like the conscious experience. A possible response from the proponents of EPP to this objection could be: firstly, the crucial role the brain plays in perceptual activities does not add to the ability to realize conscious experience all by itself. As stated earlier, according to EPP, the brain is an important part of the whole body and regulates the body's interactions with the environment. The predictive activities of the rest of the body are initiated by the brain (e.g. by the medial orbital frontal cortex) and constitute the biological system's predictions about the perceived object. Both the brain and the rest of the body are involved in acts of predictions in the subject's interactions with the environment. The brain's function of regulating the body, therefore, is embedded in the subject's dynamical interaction with the environment. The faster information flow in the brain can be interpreted as serving the purpose of regulating different sensory information and affective responses, which are more demanding than functions in other parts of the body. But this doesn't mean the brain is all that is needed in realizing conscious experience.

So far, we have arrived at a more thorough picture of ECM with the sub-personal characterization of conscious experience by EPP. This picture implies a potential advantage of ECM in explaining the "emergence" of subjective conscious experience from objective physical entities such as the brain and the body. In particular, as mentioned above, ECM's emphasis on interaction between the body and the environment delineates the conscious experience as a force-like entity created by the interaction between the internal states of the subject and the external states of the environment. In this case, the ECM inspires a way to solve the hard problem mentioned at the very beginning of section 2 by sidestepping the puzzling emergence of a phenomenal experience from one single physical substance and explaining the phenomenal experience as realized by the interaction between two physical entities.

## 4. Conclusion

In this paper, I have explained how the combination of PP with the enactivist approach is helpful to the enactivist attempt to entail ECM. Additionally, with supposition of the delineation of ECM at the sub-personal level, the hard problem of conscious experience seems to be resolvable from this alternative perspective. However, the discussion so far in this paper is based on the assumptions of enactivism and EPP. Different interpretations of the concept of PP (e.g. Hohwy 2016; Clark, 2016) still threaten to restrict the material realizer of conscious experience within the brain by emphasizing the boundary between predictive activities in the brain and the stimulus from the external environment. Despite a number of studies (e.g. Barrett & Bar, 2009; Barrett & Simmons, 2015) that are heuristic in involving more than just the brain in the process of perceptual activity, more details about the exact functions of the brain remain wanting. In particular, empirical studies that demonstrate how the brain regulates the rest of the body and how the presence of environment constitutes the subjective realization of experience are needed in further proving this position suggested by EPP.

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