

The Bounds of Selfhood: Extended Cognition, Extended Mind, and Extended Selfhood

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Abstract

Based on empirical research, some philosophers and cognitive scientists have put forth the hypothesis that human cognition, at least some part of it, is not merely happening in the brain but extended beyond the skull to the body and environment. Since cognition constitutes an essential part of the mind and self, this hypothesis implies that our mind and selfhood are not skull-bound but extended. This paper reviews both the arguments of four major proponents of the extended cognition—O'Regan, Noë, Chalmers, and Clark, and the counterarguments of their attackers—Shapiro, Adams and Aizawa, concerning three particular cognitive processes—perception, memory, and thinking. Through discussion, it will be pointed out that though the extended thesis stands up and pushes cognitive science to extend its boundaries, its philosophical implications about the self raise puzzles and absurdities. While these vexing puzzles pose a threat to the validity of the extended thesis, they can also be construed as a starting point for a reconception of the nature of self and personal identity.

Key words: extended cognition, extended mind, selfhood, personal identity

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Cartesian mind-body dualism has heavily swayed our conception of mind, body and selfhood for centuries, according to which we are essentially our thinking mind that is separable from our body. With the advent of modern computers in the twentieth century, cognitive scientists have been developing a computational framework of mind. Under this framework, our cognition begins with inputs to the brain and ends with outputs from the brain, and our mind is essentially a computer operating algorithmically over symbolic representations with the neural components of our brain functioning as hardware. In this way, our mental processes are conducted in the brain, and we should investigate our mind within the skull.

However, it has seen increasing research efforts in the name of *embodied cognition* for the last two decades, which in different ways incorporate the essential roles of the body (and often the environment) into human cognition and thus are often presented as a challenger of the standard computational cognitive science. One of the major themes debated between embodied cognition theorists and standard cognition theorists is the boundary of human cognition, i.e., whether human cognition essentially happens in the brain or some cognitive processes take place outside the brain and in the body and environment. Going by the label *extended cognition*, the advocates put forth various extended theories with radical implications concerning the mind and selfhood.

In this paper, I will examine O'Regan and Noë's sensorimotor theories of perception and Chalmers and Clark's extended thesis as two prominent examples of extended theories, each of which followed by the criticisms from Adams, Aizawa and Shapiro. After evaluating the case from the both sides, I will go on to discuss the puzzles and absurdities resulting from the radical

philosophical implications of the extended thesis. I hope this discussion can contribute valuable insights to our understanding of the self and personal identity.

1. O'Regan and Noë's Sensorimotor Theories of Perception

1.1 Vision as a Mode of Exploring the World

According to standard cognitive science, we have our visual experiences because our neural patterns in the brain tissue somehow represent or map the outside world whose activation on the retina generates our vision. When we view the Empire State Building from the top of Rockefeller Center, the visual information of the building is first available on the retina, from which the brain derives the visual information and forms corresponding neural circuits as a representation of the building so that we have the visual experience of seeing the Empire State Building from that particular perspective.

O'Regan and Noë (2001) reject this standard model of perception and argue that "neural activity alone is not sufficient to produce vision" (p. 967). There is no longer one-to-one mapping between visual experiences and neural patterns. Instead, vision is the subject's activity of exploring the environment. To explain the nature of vision, we need to have the knowledge of how the visual apparatus interacts with the environment. This knowledge is what O'Regan and Noë called the knowledge of sensorimotor contingencies. Sensorimotor contingencies are basically various regularities obeyed by the interaction between the visual apparatus and the external world. O'Regan and Noë (2001) illustrate sensorimotor contingencies by an example: consider you are now looking at the midpoint of a horizontal line, and the line produces a great arc on the retina. As you move your eyes and shift your focus to a point above the line, the curvature of the line on the retina will change so that represented on a flattened-out retina, the line would now be curved (initially it is straight on the flattened-out retina). The lawful change

of the line's image on the retina as the eyes move upward is a sensorimotor contingency, and the perceiver's visual experience of the horizontal line is constituted by his knowledge of various sensorimotor contingencies, which depending on the characteristics of his visual apparatus, the properties of the line, and their interaction. Therefore, we see the Empire State Building from Rockefeller Center because we have knowledge that if our eyes move upward or downward, the sensory stimulation on the retina will change in a particular way. There is no passive mapping in our brain. We see different things by actively exploring the world and mastering the interaction between our body and the external world. To put this point in Noë's (2004) powerful words, "perceptual experience acquires content thanks to our possession of bodily skills. What we perceive is determined by what we do (or what we know how to do); it is determined by what we are ready to do...we enact our perceptual experience: we act it out" (p. 1).

Apparently, O'Regan and Noë want to reject the view that visual experiences result from neural representations and thus vision is an internal process, and contend that the brain is not the only constituent of visual experiences, and bodily activities in the world also play a constituent role. As perception is a kind of cognition, O'Regan and Noë are upholding an extended cognition thesis in the sense that some constituents of cognition (perception) extend beyond the skull into the body. After appreciating the constituent roles played by tools and language in various mental activities, Noë (2009) later develops his point so far that he is actually embracing an extended thesis about the mind and self, "Brain, body and world form a process of dynamic interaction. That is where we find ourselves...we are partly constituted by a flow of activity with the world around us. We are partly constituted by the world around us. Which is just to say that, in an important sense, we are not separate from the world, we are of it, part of it" (p. 95).

1.2 Causes or Constituents?

Recall that we are now concerned with the boundaries of cognition, so the issue is what should be included in cognitive or mental processes. More than demonstrating that our bodily activities are necessary for our perception, O'Regan and Noë clearly intend to incorporate bodily activities into cognitive processes themselves and make them constituents of cognition. Are they, nevertheless, well justified to establish this?

As Aizawa (2007) points out, Noë fails to offer sufficient evidence for the hypothesis that bodily activities are constituents of cognition. Aizawa draws our attention to an important distinction between cause and constituent that Noë might have ignored. A cause of a process is different from a constituent of it. Consider a washing machine. My sliding six quarters into the slot of a washing machine in the laundromat is the cause of its following process of cleaning my laundry, but it is hard to say that my inserting coins is part of the washing machine's mechanical cleaning process itself, which includes drawing water, rotating the drum, draining water, spin-drying, etc. As a cause, inserting coins is separable from the cleaning process (imagine I had my own washing machine at home which would do cleaning without my inserting any coins). By contrast, drawing water cannot be separated from the washing machine's cleaning process. It is a constituent of the machine's cleaning process. Aizawa (2007) then invites us to look at two competing hypotheses:

(COH) Perceptual experiences are constituted, in part, by the exercise of sensorimotor skills.

(CAH) Perceptual experiences are caused, in part, by the exercise of sensorimotor skills.

COH is Noë's hypothesis. Aizawa then demonstrates that Noë is not justified to favor COH over CAH, based on empirical evidence. According to Aizawa, Noë has confused causes with constituents and thus has failed to establish the truth that perception spans brain and body. Perhaps my eye movement plays a causal role in my visual experience of seeing the Empire State Building, but this does not mean that my eye movement is part of my perception of the building.

There is even evidence suggesting CAH should be preferred to COH. Aizawa (2007) refers to the case of paralysis, where the patient is reported to experience pain and sounds after being immobilized by the anesthesiologist. If Noë is right that one must exercise his sensorimotor skills to have perception, then people under anesthesia and unable to move should not acquire any perception. If Noë thinks that one is not required to actually exercise his sensorimotor skills, and that having sensorimotor knowledge acquired from the previous exercise of sensorimotor skills is enough for one to have perception, then there is no reason why this sort of practical knowledge cannot be encoded in the brain, like our practical knowledge of how to swim is encoded in the brain once we learn how to swim. If sensorimotor knowledge can as well be located in the brain, as Shapiro (2011) points out, "the sensorimotor theory of perception would count as an embodied theory only in the sense that it emphasizes the importance of the body in perception—a posit with which a standard cognitive scientist might eagerly agree, or, if previously not appreciative of the body's significance, accept with feigned indifference as a helpful reminder" (p. 169).

1.3 Summary

O'Regan and Noë's sensorimotor theories of perception are committed to the view that perceptual experiences are not inner processes in the brain but are partly constituted by the

knowledge of sensorimotor contingencies. In this way, perception extends beyond the skull and is partly constituted by bodily activities.

However, they unjustifiably draw the conclusion from the observation of sensorimotor contingencies that perception is extended, because they fail to appreciate the key distinction between causal influences on cognition and constituents of cognition. Another thing is that they are ambiguous about their conception of sensorimotor knowledge. If one is required to actually exercise sensorimotor knowledge or skills to acquire perception, then the empirical evidence (the case of paralysis) disconfirms this. If this practical knowledge does not need to be actually exercised, then it can be represented in the brain, which would trivialize the sensorimotor theories as a reminder of the body's significance in perception which is still in the brain. In summary, O'Regan and Noë have not made good at building a case for their extended hypothesis.

2. Clark and Chalmers' Extended Thesis

2.1 Argument of Self-Generated External Structures

Unlike O'Regan and Noë, Andy Clark is well aware of the distinction between cause and constituent. To argue that some external processes which are causally related to internal processes are indeed cognitive constituents, he draws on the idea of self-generated input. Consider a familiar example of a turbo-driven automobile engine (Clark, 2008, p. 131). The engine produces exhaust gases. These gases then are used by the turbocharger to spin the turbine, which in turn spins an air pump that compresses the air flowing into the engine's cylinders. The compression allows more air to enter the cylinders, creating more powerful explosions. Consequently, the engine produces more power and more exhaust gases which can be fed into the turbocharger that spins the turbine. It is noted that the exhaust is both the turbo-driven engine's output and its self-generated input. This self-stimulating mechanism significantly

improves the total power generated by the engine, which makes it reasonable to think that the exhaust flow is part of the automobile's power-generating system, even though it is something external relative to the automobile's metal structures.

Concerning similar self-generated external structures in cognitive systems, Clark calls attention to our thoughtful gestures. What is remarkable about gestures is that they seem to be more than the expressions of the speaker's fully formed thoughts and the communicative tool to facilitate the listener's grasping of what the speaker means. This is evidenced by the facts that we often do gesturing when we are talking on the phone, when we are talking to ourselves, when we are blind, when we know the listener is blind, and even when we are blind from birth. It is very perplexing why we would do gesturing in those situations if gesturing is a purely expressive and communicative motor act. However, it would make much more sense if the act of gesturing is part of the process of thinking and contributes to thought like the exhaust contributes to power-generation. In other words, gesturing as our self-generated input is actually a constituent of our cognitive system like the exhaust flow as the automobile's self-generated input is a constituent of its power-generating system. That is why we feel easier to organize and produce our thoughts when we gesture.

Clark (2008) also compares gesturing to writing, "It is not always that fully formed thoughts get committed to paper. Rather, the paper provides a medium in which, this time via some kind of coupled neural-scribbling-reading unfolding, we are enabled to explore ways of thinking that might otherwise be unavailable to us" (p. 126). For this reason, Plato is wrong to think that writing is just for reminding and not true wisdom (*Phaedrus*, 274c-279c). Rather, writing is part of our active thinking and we often think best by writing. (Ironically, Plato as a great philosopher is also a great writer.) Therefore, Clark (2008) concludes "the key distinction

between ‘merely impacting’ some inner cognitive process and forming a proper part of an extended cognitive process looks much less clear...in cases involving the systematic effects of self-generated external structure on thought and reason” (p. 126). We can extrapolate this reasoning to the case of perception, and argue that our eye movement is part of our perceptual process without recourse to O’Regan and Noë’s sensorimotor knowledge, as it is a self-generated act that in turn contributes to perception.

2.2 Does the Pencil Think?

Remember Aizawa’s criticism that Noë is insensitive to the difference between cause and constituent. The same criticism also applied to Clark’s argument of self-generated external structures. Aizawa and Adams (2009) claim that Clark and other proponents of extended cognition have committed the so-called “coupling-constitution fallacy”, which is a fallacious move “from the observation that process X is in some way causally connected (coupled) to a cognitive process Y of type Φ to the conclusion that X is part of a process of type Φ ” (p. 81). In their mind, Clark fallaciously moves from the observation that gesturing or writing is causally coupled to inner neural process of thinking to the conclusion that gesturing or writing is part of the process of thinking. For this reason, Adams and Aizawa (2010) mock Clark and write:

Question: Why did the pencil think that $2+2=4$?

Clark’s Answer: Because it was coupled to the mathematician.

(p. 67)

On the one hand, Adams and Aizawa are right to identify the coupling-constitution fallacy; on the other hand, Clark’s argument of self-generated structures has so strong intuitive appeal that we may reasonably take those structures and processes (e.g. gesturing, scribbling) as part of the corresponding cognitive systems.

It is noteworthy that Adams and Aizawa might have misinterpreted Clark's position. As Shapiro (2011) noticed, "Clark is not committed the view that parts of a cognitive system or process must themselves be doing cognitive processing...Cognition need not be "going on" in non-neural constituents of cognitive processes for Constitution to make sense. Rather, these constituents must...be integrated with other parts of a cognitive system in a way that certifies them as constituents of the system" (pp. 181-182). That is to say, Clark's pencil does not itself think, but is part of thinking process because it is well integrated with other parts.

Now it seems that the dispute becomes a linguistic controversy. Some take "good integration" as the sufficient condition of constitution, others think integration or coupling is not enough. Intuition plays an important role in distinguishing cause from constituent and truth becomes relative to people's linguistic conception. If this is the case, then Aizawa, Adams and Clark have no real disagreement because they just use words with different meanings.

Gladly, the dispute actually runs deeper. Aizawa and Adams (2009) believe that some processes are not part of a cognitive system not only because coupling is not enough for constitution, but also because those processes lack cognitive nature in themselves, which means that a process is supposed to have the mark of the cognitive to qualify as part of a cognitive system. On the other hand, Clark and Chalmers intend to "offer an argument concerning conditions...for recognition as part of the physical substrate of a cognitive system" (Clark, 2008, p. 88). There still exists a real and significant dispute over the criteria of the recognition of the cognitive. Now Clark and Chalmers' parity argument for their extended thesis is in order.

2.3 Clark and Chalmers' Parity Argument

Clark and Chalmers (1998) have given us a notorious illustration of extended cognition. Inga wants to go to MoMA to see an exhibition. Ingo who has normal capacities for memory

then recalls that the museum is on 53rd Street, so she walks to 53rd Street and goes into MoMA. Now consider Otto, who suffers from Alzheimer's disease and relies on a notebook for memory. He carries his notebook wherever he goes. He writes it down when he learns new information and looks it up when he needs old information. Today like Inga Otto also wants to go to MoMA. But unlike Inga, Otto consults his notebook instead of retrieving memory from his brain to learn that MoMA is on 53rd Street before he goes there. In this case, the notebook plays for Otto the same role that neural memory plays for Inga. It seems that Otto believed that MoMA is on 53rd Street before he consulted his notebook, just as Inga believed it before she consulted her memory, which means that Otto's notebook entries are his stored beliefs.

The moral of this thought experiment is that belief as a mental state is not bounded by the skull and skin. There is no reason why belief cannot be located outside the brain and even outside the body, as it is has been persuasively demonstrated that belief can be located in external objects such as Otto's notebook, which plays the same role as stored beliefs in all important aspects.¹ From this example, Clark and Chalmers (1998) derive a parity argument, "If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is...part of the cognitive process. Cognitive processes ain't in the head!" (p. 9)

Thanks to Clark and Chalmers, we now have a very compelling argument for extended cognition and extended mind. But how are we to evaluate this argument?

Adams and Aizawa (2009) criticize that the defenders of the extended thesis lack a proper theory of distinguishing the cognitive from the non-cognitive—How can they know if a process is part of a cognitive process when they even do not have a theory of what counts as cognitive?

¹ Clark and Chalmers (1998) consider several conditions (reliability, availability, etc.) that stored beliefs ought to meet, and demonstrate that Otto's notebook meets all those conditions.

However, much power of the parity argument lies in its sidestepping any need to give a theory of the mark of the cognitive, because the parity argument just requires that external constituents play the same functional roles as their counterparts in the brain and thus leaves open how their counterparts count as constituents of a cognitive process (Shapiro, 2011, p. 186). Whatever the mark of the cognitive is, we would recognize some external process as part of a cognitive process if we would recognize their neural counterpart as a constituent of the cognitive process.² After all, it is one thing to identify constituents of a cognitive process, and another to find out if the process is a cognitive one. As long as it is assumed that memory is a cognitive process, Otto's notebook is a constituent of the cognitive system according to the parity principle.

2.4 Summary

Clark and Chalmers have put forth two arguments for the thesis that cognitive processes and mental states are not bounded by the skull and skin. Fully aware of the key distinction between cause and constituent, Clark's first argument of self-generated external structures makes it plausible that some coupled external processes (e.g., gesturing, scribbling) are indeed constituents of corresponding cognitive processes. Adams and Aizawa's objection of the coupling-constitution fallacy does not have so much bite in Clark's argument as in Noë's, especially when we find that Adams and Aizawa might have misinterpreted Clark's position as saying that each constituent of a cognitive system is itself doing cognitive processing. Derived from an illustrative thought experiment, Clark and Chalmers' parity argument is very compelling. Although Adams and Aizawa strive to show that external processes lack the marks of the cognitive, the parity argument is unaffected as it does not need to show that external processes

² Though the parity argument sidesteps the need to find a theory of the mark of the cognitive, Clark (2008, pp. 89-99) demonstrates that the marks of the cognitive suggested by Adams and Aizawa fail to disqualify external processes from becoming constituents of cognitive processes.

meet the marks of the cognitive. All it seeks to show is that there are processes we would recognize as constituents of a cognitive system whether they are outside the brain or inside.

3. Where Am I?

As the discussion above suggests, we have reason to believe that part of our cognitive processes and mental states extend beyond the brain to the body and environment. The extended thesis is, at least, a good defensible alternative for us to view our mind and cognition. If the mind is not skull-bound, then what of the self? Does the self also outstrip the boundaries of the skin and span the brain, body and environment? Where am I? In my brain? In my body? Or also in my pencil and paper?

In his essay '*Where Am I?*', Dennett (1978) imagined an intriguing scenario. Dennett, who now is a secret agent of the Pentagon, has his brain removed from the cranium and kept in a vat in Houston so that his brain will be intact here in Houston when his body works on an extremely dangerous mission in Tulsa, Oklahoma. His body and brain are still hooked up by elaborate radio links and all the connectivity is preserved, as his brain surgeons told him before the surgery, "If your brain were just moved over an inch in your skull, that would not alter or impair your mind. We're simply going to make the nerves indefinitely elastic by splicing radio links into them." After the surgery and before he is sent off on his mission, he (his body) goes to visit his brain. Upon seeing his brain, he is dizzied and wonders why he is now seeing his brain from his body, but not otherwise. He then asks himself, "Yorick's my brain, Hamlet's my body, and I am Dennett. Now, where am I?" On the one hand, it seems ridiculous to say where Hamlet (Dennett's body) goes there goes Dennett, for it is Yorick (Dennett's brain) who keeps all the details of Dennett's autobiography so that Dennett can still be himself even when Yorick is transplanted to another body other than Hamlet. On the other hand, if Dennett is in Yorick, then

the law will apply to Yorick in the vat when Hamlet commits a felony in California. While Yorick is locked up in some institution with the life-supporting system provided, Hamlet is allowed to go free. In this situation, Dennett would consider himself as free as before. After considering the above situations, Dennett suggests that he is wherever he thinks he is. By shifting the point of view, His selfhood can sometimes be in Yorick who is in the vat, and at other times be in Hamlet who is outside the vat. Dennett also considers the possibility that he is a scattered individual both inside the vat and outside it, though he later finds it undeniable that all of him, not part of him, is working on the secret mission in Tulsa.

As Dennett's thought experiment shows, it is perplexing how the self is distributed or located in the brain-body complex. The extended thesis does not make this question less puzzling but raise other counterintuitive absurdities. Let's consider some of those absurdities.

Taking an enlarged view of the self, Otto would fall beyond the skin and have his notebook part of his personal identity. How can it be that external objects become part of our selfhood? I found this extended implication, though looking counterintuitive at first glance, might contain deeper truth about personal identity. Many people have experienced special attachment to certain objects, such as their albums, CD players, old cars, cellphones. Smartphone-obsessed generation nowadays make most of their communication and entertainment on their smartphones, and feel anxious when they are disconnected. In the past, we might call such attachment to external objects as nostalgia or fetishism. Looking through the lens of the extended thesis, we might rightly say that smartphones, having largely changed the way we work, entertain ourselves and communicate with others, are literally part of ourselves. We cannot live without our smartphones because in that way we would have part of ourselves missing. Surely, smartphones are not necessary for our bodily survival. Nevertheless we have to

try hard and change ourselves to accommodate to a life without them. After all, human life is much more than bodily survival.

If it still sounds bizarre that external things could be part of the self, consider another example of one's partner. Clark and Chalmers (1998) observed that some people with very bad memory would rely on their partners to remember things, and hence suspected that one's beliefs and other mental states could be partly constituted by those of other persons. This socially extended thesis is very provocative. We trust our partners and we love them. A person may love his partner not merely as somebody else who is loveable to him, but as some important part of himself. When this person loses his beloved, he feels like he has lost part of himself as well, because he has extended his selfhood into his beloved. Possibly, Love is so wonderful due to the extension of selfhood inherent in it.

Admittedly, the extended thesis may well cause confusion to our moral and social life. Clark and Chalmers (1998) anticipated, "there will also be effects in the moral and social domains. It may be, for example, that in some cases interfering with someone's environment will have the same moral significance as interfering with their person. And... certain forms of social activity might be conceived as less akin to communication and action, and as more akin to thought" (p. 19). That is to say, harming another person's special ones may be equal to harming his own person. And the line becomes blurred between private thought and social thought, leading to dramatic legal and political ramifications—If social forces have so much influence on us that they are literally part of our selfhood, how can we be blamed for our transgressions?

Considering the absurdities above, maybe we should take a more conservative attitude toward the self, even if we accept that there are extended cognitive processes and mental states. But I think those seemingly radical implications of the extended thesis do not make it necessary

to reject the notion of extended selfhood. One of the most important lessons we could learn from Dennett's thought experiment is that non-extended selfhood which is located in the brain could cause no less mysteries than extended selfhood. While extended selfhood could cause some its own absurdities (e.g. individual responsibility), it might solve other mysteries (e.g. our special attachment and love to other things and people). As a possible alternative, the thesis of extended selfhood invites us to re-conceptualize the self: its boundaries, its relations with brain, body, external objects and other selves, its environmental, social and moral dimensions, etc. Perhaps we need to take both extended and non-extended perspectives when tackling the enigmatic nature of the self and personal identity.

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