

# Does the Mind Extend into the World?

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**Abstract.** In order to examine ideas on *extended mind* I will be looking at the writing of its exponents and its critics and using examples of *cognitive systems* from daily life and from research. I will show that the notion of extended mind, when linked with regularly cited examples, is at best a weak argument; at worst these examples are not part of any kind of cognitive system at all and are simply a way of retrieving and using information. The notion of extended mind depends on external elements (outside skin and skull) being *integrated* into the cognitive system such that the unconscious cognitive function is affected thus *changing this function*. I will show that the external components of the integrated system do not need to hold reliable information that fit with beliefs, mimic memory or support changing behaviour, as some writers would have it; instead the key to whether some external object or set of information is part of a cognitive system is dependent on the level of transparent integration within an unconscious part of that system.

## 1 INTRODUCTION

In 1998 Andy Clark and David Chalmers provoked the beginnings of a debate, which still continues, regarding the extent to which cognitive processes *include* constitutive components outside ‘skin and skull’. Their article ‘The Extended Mind’ attempts to make a case for “...active externalism, based on the active role of the environment in driving cognitive processes.” [1, p. 7]. Whilst they do not actually define Extended Mind (EM) in the 1998 article they give examples of processes involving internal and *external* elements which they believe are consistent with cognition. They refer to Kirsh and Maglio’s observations about the computer game Tetris where it is shown that on-screen rotation of the shapes are quicker than ‘mental’ rotation and that this process is used to *determine* whether the shape fits the slot (this is the aim of the game). They call this *Epistemic action* and this kind of action augments or aids cognitive processes [2]. Clark and Chalmers go on to say that “... 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 (so we claim) part of the cognitive process.” [1, p. 8]. Their criteria for EM also suggests that external elements of an internal/external coupled system are ineliminable – on removing or changing the external component “...behaviour may change completely.” [1, p. 9]. I confess I am confused by the notion that the removal of external components *may* change *behaviour*. Presumably something in the cognitive system (other than behaviour, perhaps subjective experience?) must change or the external component is not ineliminable.

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How we demonstrate that something (other than behaviour) is altered in the system may be more difficult than it first appears - I shall return to this later. Another important feature of external components of a cognitive process is reliability. Clark and Chalmers say that only those external components that are readily available, portable and relied upon can form part of an extended cognitive system [1]. Clark expands on these criteria in ‘Supersizing the Mind’ and I will summarise them thus:

- Parity – that the external component performs the same *function* as an internal component (but crucially *not necessarily in the same way* as the internal component).
- Reliability – the external component is consistently relied upon and is available, routinely used and has previously been endorsed.
- Integration – the external component is meshed or integrated into the cognitive system such that the system would ‘fail’ without it. The external component is not simply ‘coupled’ it is ‘poised’ for use in a particular way within the extended system. [3]

(Clark does not actually define what is meant by ‘poised’ or ‘particular way’ and instead tries to illustrate by example)

For Clark and Chalmers the Tetris game example meets their initial criteria for EM. The Tetris example as described is an extended cognitive process which includes an external element where the (external) on-screen rotation (functionally) *replicates* ‘mental’ (or imagined) rotation, during the game the ‘rotation button’ is *consistently and reliably available* and if the on-screen rotation part of the process was not used the *outcome would alter* (the player performs more slowly).

Adams and Aizawa argue that Clark and Chalmers have not defined what is meant by ‘cognitive’ and are therefore unable to say what is and is not a cognitive process. In their article ‘The Bounds of Cognition’ Adams and Aizawa refer to what they term ‘the mark of the cognitive’ and argue that no theory of extended cognition can stand up to scrutiny unless a set of criteria defining what is meant by ‘cognitive’ can be found. The purpose of their article is to try to identify “... necessary conditions on a state or process being cognitive.” [4, p. 53]. Broadly speaking they say that a cognitive process is made up of *intrinsic non-derived content*. They explicitly state that “...nothing in our mark of the cognitive says anything about the locus of cognition” yet they constantly refer to the difference in kind of ‘in brain’ cognition versus extended cognition. They believe that Clark and Chalmers fall foul of the *coupling-constitution fallacy* and argue that the idea that if some external tool is coupled with a ‘person’ it does not follow that the tool is constitutive of an extended cognitive process. The coupling may involve a *causal* relationship but *that is all* [4, p. 56]. They also

refer to the 'common sense' view that cognition is intracranial and conclude that "the sorts of processes that occur in brains seem to share certain sorts of regularities that they do not share with systems of brains coupled with tools" so there can be no science of extended 'tools and brains' [4, p. 63]. This suggests that nothing other than a 'brain' or something *exactly* equivalent to a brain could ever be considered by Adams and Aizawa as cognitive. I struggle to understand the notion of derived/non-derived content but even so there seems to be something amiss in their criticism of the Tetris example. According to Adams and Aizawa the external components of the cognitive process involved in playing Tetris has derived content because the **blocks are being rotated** on the screen [4]. But is it the **blocks** that are 'doing the work' or is it the **process of rotation and the ongoing feedback loop** that is the external part of this extended process?

## 2 HOW DO WE DRAW THE LINE?

One could argue that it might be important to 'draw a line' between causal and constitutive components of cognitive processes in order to avoid the 'coupling-constitution fallacy' but this is extremely difficult to do. It seems intuitive that some examples work better than others but, as we cannot say exactly *how* either internal *or* external components enable cognitive processes, getting hung up on this 'problem' may only serve to thwart the exploration. Appealing to the 'mark of the cognitive' (as yet undefined by Adams and Aizawa except in terms of the intracranial) *could* be seen as an attempt to reduce the irreducible to component parts that are *in themselves* cognitive and Clark criticises them for this. However, I am not sure that Adams and Aizawa actually put it like this and it seems to me to be a mis-understanding by Clark. Still, Clark makes a valid point that no individual components of 'mind' (whether internal or external) are cognitive *in their own right*. He also points out that Adams and Aizawa admit to an inability to clarify if every cognitive state in every cognitive process must involve non-derived content hence leaving the door open for cognitive processes involving derived content [5], [6]. Given that we have no idea, in any real sense, what enables us to 'think', 'perceive', 'believe' or have conscious subjective experience of ourselves there is no reason to exclude components based on an entirely hypothetical notion. Again we are in danger of missing the point. Clark is trying to *expand* the notion of what a cognitive process is in a useful way that tells us more about the 'mind' and, it seems to me, that one can always say that 'common sense' tells us cognition is in the 'brain' thereby shutting down the debate and thwarting the exploration. Adams and Aizawa are certainly correct when they say that in order to develop the ideas of EM further a definition of *cognitive* is required. It is not enough to say that the external component must be 'poised' in a 'particular way' if we don't say what this means.

Robert D Rupert recognises the potential significance of Clark and Chalmers' proposal in that if it were true it would "...significantly change our conception of persons." [7, p. 390]. His article emphasises the importance of the usefulness (to science, philosophy and understanding) of the way in which we carve up mind, body, world and processes, in particular which hypothesis "...offers superior explanations of the phenomena of interest to cognitive scientists." [7, p. 395]. Rupert relies on examples and other research to point out the flaws in extended

cognition preferring *embodied cognition* in which "...cognitive processes depend *very* heavily, in hitherto unexpected ways, on organismically external props and devices and on the structure of the external environment in which cognition takes place." [7, p. 393]. For Rupert, to include external components as *constitutive* of extended cognitive process would mean that those processes would be so enormously variable and flexible as to undermine any empirically useful 'science' of cognition. He also makes much of the difference argument – that brain-bound cognition is so different from what Clark is talking about that it cannot be described in any sense as cognition (a point that Adams & Aizawa agree with). Further, he describes extended cognition as having an eliminativist framework leading to problems in making any kind of causal or explanatory links relating to cognition. He also voices the concern that the central notion of the organism would be lost and somehow replaced by an ever shifting series of processes. For Rupert embodied cognition better supports the understanding of the interactions between 'persons' (who clearly have cognitive and mental capacities) [7]. Clark counters this by using examples (already mentioned elsewhere in this essay) that show how human cognition can be organism centred but does not have to be organism *bound* and that contrary to Rupert's assertion extended cognition has greater explanatory power as it prevents us from seeing neuronal activity as being the only possible vehicle for cognition, recognises that many cognitive processes are unconscious and reminds us that there is no 'executive driver' or homunculus (although I doubt whether any of his critics actually think that there is) [3].

From a *functionalist* viewpoint anything performing *the same function* (giving the same results/behaviour) as an 'internal' component of a mental process counts as 'the same' and is therefore part of that mental process. A shallow semantic argument can be made about what is meant by 'mind' - that it just is, by definition, what goes on inside the individual (maybe including brain, central nervous system and body). In which case the mind simply does not, *cannot* by definition, extend into the world. It seems that some of the arguments against Clark and Chalmers proposal (although sometimes dressed up in other ways) hinge on this argument but I would argue that they are missing the point. If we cease to use the word 'mind' and think in terms of *cognitive processes* then much more interesting questions arise. Is it not at least possible that external components could be constitutive of cognitive processes? And if so, to what extent are components of the external world or environment integrated into those cognitive processes? What does this mean for human development, learning, psychology and psychopathology? And, more importantly, how might we use this knowledge to enhance our lives?

## 3 DEFINING THE MARK OF THE COGNITIVE

In his 2009 article Mark Rowlands seeks to present a series of cognitive criteria as a response to Adams and Aizawa's demand for the 'mark of the cognitive'. Rowlands believes that the cognitive processes of the mind extend outside the body and recognises the need to 'define' what is meant by cognition in order to make progress in this area. He cites four criticisms of EM and attempts to dispel them. The *difference argument* states that internal and external cognitive processes are different

in *kind* and therefore incompatible (for full details see [7]). Rowlands believes we can counter this by defining what is meant by cognitive, using definitions from cognitive science as a starting position, and by showing that external components can meet the criteria. The *coupling-constitution fallacy* (developed by Adams and Aizawa, see above) will ‘fall away’ if we are able to give criteria for the ‘mark of the cognitive’, as only those systems or processes falling within the new criteria will be classed as cognitive (and therefore not simply causal). Further, the same would be true for the *cognitive bloat* argument – we would not be forever seeking to include more obscure and varied processes as only those meeting Rowlands’ criteria would be included [8].

Rowlands’ criteria for the mark of the cognitive is as follows:

- A process P is a cognitive process if and only if:
1. P involves information processing – the manipulation and transformation of information bearing structure.
  2. This information has the proper function of making available either to the subject or to subsequent processing operations information that was (or would have been) prior to (or without) this processing, unavailable.
  3. This information is made available by way of the production, in the subject of P, of a representational state.
  4. P is a process that belongs to the subject of that representational state.

[8, p. 8]

The criteria do seem helpful in that they move us further towards being able to ‘draw the line’ and attempt to give a boundary for a previously potentially open-ended notion of external/internal combinations as cognitive processes. I have difficulty with the notion of ‘representational state’ as I am unsure how we would know if one exists in the subject and, indeed, Clark would say that a representational state is not necessarily required in cognition. This aside, if we believe that representational states occur and are required for cognition it *is* possible to imagine when one might be present. Still, Rowlands’ criteria have a fundamental flaw, albeit one that he acknowledges, and this relates to *ownership*. He believes “...a cognitive process must belong to some or other representational subject..... there are no un-owned cognitive processes.” [8, p. 10]. Rowlands goes on to say that “understanding the sense in which cognitive processes have an owner.... is one of the hardest tasks in understanding the nature of cognition....” and “...is just as problematic for internalists about cognition as it is for defenders of EM.” [8, p. 10]. Rowlands states the importance of ownership, he states that there are no subjectless cognitive processes and that the owner is an individual (all though not necessarily a person) [8]. He uses the biological example of digestion to illustrate the difficulty with ownership. If food that *I* eat is digested outside *my* body such that the resultant energy produced can be used by *my* body then this is *my* digestive process (even if it does not occur in my body). Rowlands says that if this is correct then “...the specific character of the external device is irrelevant – as long as it permits its proper function to be realised.” [8, p. 16]. He goes on to say that ownership is determined by *integration*, not by bodily or spatial containment and appropriate integration is determined

by proper function. Cognitive process can be either personal (broadly speaking conscious) or sub-personal (broadly speaking unconscious) and Rowlands believes it is likely that “...sub-personal cognitive processes will be derivative upon ownership of personal level cognitive processes” [8, p. 17]. He does not elaborate on or defend this position and instead focuses on the fact that this ‘problem’ (the fourth criterion) is just as problematic for the internalist notion of cognition as it is for those who believe in *extended* cognitive systems. I suspect that when it comes to the conscious/unconscious distinction he has got this the wrong way round and in fact it is the integration of external components in *unconscious* processes that can truly be said to fulfil the criteria for EM and that conscious experiences derive from these unconscious processes. I will return to this later.

My intuitive reaction to Rowlands’ assertion about ownership is – yes we do know, at least in everyday terms, how to ‘explain’ ownership (and here I am talking about ownership by *persons* - not some other kind of individual). It seems that my *subjective experience* of my ownership of a cognition (of whatever type) is a sensible criteria (in the absence of anything better). If I think about writing this essay I know that it is me that is doing the thinking, if I perceive a person in the distance and think I might recognise them I know it is me that is doing the perceiving and the wondering about the recognition and if I overhear a cruel comment and feel tears in my eyes I know it is me who feels upset. I do not think it matters that some believe that conscious experience is an illusion (and I will not go in to this now) suffice it to say that *my experience* of my conscious self would not be altered if it turns out that it is an illusion.

So, does it help to clarify the notion of extended cognitive processes if we describe Rowlands’ fourth criteria in this way? Let us assume that the other three criteria work and then let us add that ‘the individual experiences the process as belonging to them’ to the fourth criteria. Let us examine some of the regularly cited examples.

It seems intuitively true that our environment affects us in many different ways. For example, if I am cold I might shiver and put on a jumper. But... So what? Is the cold weather partly constitutive of the thought ‘I’ll get a jumper’ or is it simply causal? And what is the difference, if any, between those environmental factors that are causal and those that are part of a cognitive system? It seems clear to me that as soon as I recognise I am cold and have a *conscious* thought about getting a jumper (which I can choose to do or not) then this thought is *not* partially ‘made up of’ external environmental factors (such as the weather). I’m aware that I feel cold, the weather isn’t integrated into (and is not constitutive of) this cognitive process and I can choose how I respond to being cold.

#### 4 WHAT’S WRONG WITH OTTO’S NOTEBOOK?

On my first reading of Clark and Chalmers I misunderstood the whole premise and was only considering conscious thought - logically or at least deliberately and systematically thought through – the kind of ‘thought process’ we might, in principle, be able to replicate in a computer. This made no sense to me as

it seems, intuitively, that conscious thought is ‘of the self’ (not in a Cartesian sense but in a ‘skin and skull’ sense) and does not include external components. I believe that if there is any case for extended cognitive processes it can only relate to *unconscious* processes. Clark’s article in *Mind* explores this further.

In his 2009 article Clark says that “...nothing in the arguments for EM should incline us to accept....an extended view of the mechanisms of the conscious mind or the vehicles of conscious experience...” [9, p. 968]. He says that EM relates to “...vehicles of non-conscious states such as states of dispositional believing...” [9, p. 967] and uses Otto’s notebook as an example. He criticises Alva Noë’s notion of ECM (extended conscious mind) by examining some ‘processing loop’ arguments and, using theories about how the brain constructs conscious experience, determines that it makes sense to draw the line between causal and constitutive at the boundary of conscious processing and unconscious processing. [9]. I confess that I find Clark’s arguments hard to follow nevertheless it seems intuitive that conscious experience is not a candidate for EM.

Lynne Rudder Baker in her article entitled ‘Persons and the Extended Mind Thesis’ makes much of the personal/sub-personal (or conscious/unconscious) distinction and whilst rejecting the ‘Andy Clark version’ of EM allows that “...enduring persons may be subjects of mental processes constituted by extended cognitive processes (sub-personal processes) that have bionic components.” [10, p. 650]. For Baker if a process is conscious (or personal) this relates to an intentional agent – a person – and, for her, ‘persons’ cannot be extended. If a process is unconscious it may feed into the ‘conscious’ life of the ‘person’ but it is only at the unconscious or sub-personal level that external components can be integrated into cognitive processes [10].

It seems intuitive that *abstract thought* and *conscious thought* are evoked *without* including the external environment. If I think about what I am going to write in this essay those thoughts may only be possible because I have read about the topic but *the conscious act* of thinking about the topic does not include anything outside my self (outside skin and skull). I do, however, think that Baker has a point here and I suspect that the sub-personal/personal or unconscious/conscious distinction is vital to our understanding of extended cognitive processes. But is Baker being too narrow here? Are there other external components that are *not* ‘bionic parts’ that are constitutive of sub-personal unconscious processes?

So, when and in what way do cognitive processes include the external world? Clark’s oft cited (and criticised) example of Otto’s notebook, can be said (at least to some extent) to fulfil the *function* of memory. Clark gives criteria whereby a note book could be said to ‘mimic’ memory by being: reliable, readily accessible and able to hold Otto’s dispositional beliefs [1]. I think it is correct that dispositional beliefs are held in the unconscious but I do not think that Otto’s notebook supports this unconscious process. I feel sure that if one were to ask Otto if he knows where MoMA is he would say *he* does not know. His experience of himself and his ideas about what he knows would not include what’s in the note book. He would probably say he

can’t remember and would need to look it up. Clark says that Otto’s notebook is transparent to him (Clark in Menary 2008, p.46) but I find this difficult to believe and as Otto doesn’t exist we can never know for sure either way (my assertion that it is *not* transparent holds no more certainty than Clark’s assertion that it is). Whilst it is clear that, if we are using Clark’s functionalist view and criteria, the notebook performs a similar function to memory it is hard to see it as a constitutive component of Otto’s cognitive process. Further, I fail to see how the notebook fits with Clark’s own notion (which I agree with) that EM does *not* relate to *conscious* processes (see above). It seems to me that the act of looking in the book (which he could choose to do or not) is not sufficiently *integrated* into the process to truly be *constitutive* of the process. I cannot see what *unconscious* feedback comes from the notebook – it is just a list of information and has no impact on Otto’s neural state. At best this is a *weak* example of extended cognitive process which relies on a strongly *functionalist* standpoint. It differs little from the act of looking up an address in the Yellow Pages (perhaps Otto would do this if he couldn’t find his notebook). Whilst I don’t know if Clark would define the use of the Yellow Pages as part of an extended cognitive process or not, it is clear that if he did do so this would simply add to the problem of ‘cognitive bloat’ (above). At worst Otto’s notebook is not an example of EM at all as it may fail to meet Clark’s own criteria of being ‘poised’ in ‘a particular way’ such that it is constitutive of an *unconscious* process. Whilst the idea of something being ‘poised in a particular way’ is undefined by Clark it is by no means obvious that Otto’s notebook meets the criteria of being *constitutive of an unconscious cognitive process*. I really think there is something in this – the individual’s *subjective experience* of the cognitive process would need to include the external component in a way that is transparent, ie: in some sense the ‘use’ of the external components are invisible to the individual and are thereby constitutive of unconscious processes. A good example which is truly integrated into an unconscious process is the cochlea implant [10] – *I cannot explain how I am using the implant*, I am not consciously using it, I can just *hear*.

A strong example of an extended cognitive process would need to be more integrated, perhaps seamlessly so, and would need to affect the *unconscious* in such a way that the cognitive process *as a whole* would be changed if the external component were removed. If we include the criteria of subjective experience as ownership then we can see that other examples work better than, for example, Otto’s notebook. An experiment comparing ‘expert’ cocktail waiters with novices showed that, given ‘cocktail specific’ glasses the ‘experts’ got the cocktails right every time and the novices did not. When these glasses were replaced with uniform glasses the ‘expert’ advantage disappeared. It seems that the cocktail waiters’ ability to get the drinks orders right were dependent on some kind of unconscious ‘prompting’ where the ‘correct’ glass formed part of the cognitive process. It seems that the glasses are more integrated than, say, a list of ingredients. Any reasonable person can follow a set of instructions, ie: mix a series of liquids to make a cocktail. But the cocktail waiter, *who believes he knows how to make the drinks*, is less able to get it right when the ‘cocktail specific’ glasses are replaced with uniform ones [11].

The neuroscientist Dr. RV Ramachandran ‘treated’ patients with phantom limb pain (specifically arm pain resulting from brachial plexus avulsion and from amputation of the arm) using a ‘mirror box’. The patient placed their normally functioning arm in a box with a mirror on one side such that the reflection (of the good arm) was in the position of the damaged arm. Whilst looking at the reflection the patients were asked to move their arm and all of them had the sensation that their ‘phantom’ arm was moving. Out of the dozen patients that Ramachandran saw half of them experienced a reduction in pain. He also compared phantom limb pain in those that had had traumatic amputation or nerve avulsion and those that had had slower limb loss (due to leprosy) and found that the two groups had significantly different ‘pain’ experiences [12, p. 56]. Ramachandran goes on to say that the notion (popularised by exponents of artificial intelligence) that the brain behaves like a computer with distinct modules performing specialised roles cannot be the case. He says that his experiments involving phantom limbs have taught him that the connection in the brain are “...extraordinarily labile and dynamic. Perceptions emerge as a result of reverberations of signals between different levels of sensory hierarchy, indeed even across different senses. The fact that visual input can eliminate the spasm of a non-existent arm and then erase the associated memory of pain vividly illustrates how extensive and profound these interactions can be.” [12, p. 56]. He goes on to say that his findings (here and elsewhere) show “.....that your body image..... is an entirely transitory internal construct that can be profoundly modified with just a few simple tricks.” [12, p. 62].

In the above example information (the reflection of the moving arm) is processed (Rowlands’ first criterion), the process could not have happened without the mirror box (or without some other virtual arm replication) (Rowlands’ second criterion), a representational state relating to the phantom arm moving is possible (Rowlands’ third criterion) and the individual experiences and has ownership of the movement in the phantom arm (Rowlands fourth criterion including *subjective experience* as the mark of ownership). It is clear to me that, in this case, the mirror box is *constitutive* of the *unconscious cognitive process* resulting in the perception of movement in the phantom limb. This cognitive process cannot happen without the mirror box, there is no conscious mental effort required in the process and indeed the participants were all surprised at the resultant subjective experience. Indeed, in some cases, patients had previously tried to ‘move’ the phantom arm through conscious effort and had found it impossible to do so. The integration of the mirror is, I believe, in some sense transparent as the ‘users’ are not consciously ‘using’ the mirror at all. I believe this is a much stronger case for extended cognitive process. Clark would say that the external components of the integrated system need to hold reliable, accessible and readily evoked information that supports beliefs, mimic memory and support changing behaviour [1]. Whilst one could argue that the reflection in the mirror ‘mimics’ the movements of a healthy (undamaged) arm and therefore mimics memory it certainly doesn’t hold *reliable* information - it’s a perceptual ‘trick’ - after all the damaged arm *cannot* move. Nor does it support a belief – the patients all know that their arm cannot move. Nevertheless, I would argue that under Rowlands’ (and my) criteria this ‘perceptual change’

is a cognitive process and the mirror box is a constitutive part of that process.

## 5 CONCLUSION

It seems to me that the possibility of something external being part of a cognitive process rests on transparency of ‘use’ as well as ownership and subjective experience of the whole process. This is necessarily tricky as seamless integration is likely to obscure the kind of external components we are looking for. In the ‘best’ (most integrated) cognitive processes the external components might be so well integrated that the individual is not really ‘aware’ that those external components are involved at all.

I wonder if our defensiveness against the idea of extended mind (and I include myself here) is really linked to fears about its implications. Could it be that we are so wedded to our notions of control, agency and individualism that we are unwilling to entertain the possibility that the environment has such a significant impact on us? This possibility - that our cognitive processes could include external elements - is the phenomenon to which Clark and Chalmers initial article is drawing our attention and, whether we agree with them or not about the ‘extended mind’, we cannot help but recognise the potentially huge area of possibilities about how the ‘world’ and ‘persons’ integrate.

I believe that Rowlands’ criteria go a long way to answering some of the criticisms of Clark and Chalmers’ original paper by giving us a definition for ‘the mark of the cognitive’. Further, if we consider Clarks’ later assertion that EM is specific to unconscious processes and take subjective experience as a ‘rough and ready’ way of understanding Rowlands’ fourth criteria (ownership) as it relates to ‘persons’ then we have a better account of what might truly constitute an extended cognitive process.

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