Karina Vold

The Parity Argument for Extended Consciousness

Abstract: *Andy Clark and David Chalmers (1998) argue that certain mental states and processes can be partially constituted by objects located beyond one's brain and body: this is their extended mind thesis (EM). But they maintain that consciousness relies on processing that is too high in speed and bandwidth to be realized outside the body (see Chalmers, 2008, and Clark, 2009). I evaluate Clark's and Chalmers' reason for denying that consciousness extends while still supporting unconscious state extension. I argue that their reason is not well grounded and does not hold up against foreseeable advances in technology. I conclude that their current position needs re-evaluation. If their original parity argument works as a defence of EM, they have yet to identify a good reason why it does not also work as a defence of extended consciousness. I end by advancing a parity argument for extended consciousness and consider some possible replies.*

1. Introduction

Andy Clark and David Chalmers (1998) (C&C, for short) argue that objects located beyond one's brain and body can serve as constitutive parts of one's mental states. In this sense, they argue the mind can 'extend' beyond what are traditionally thought to be its boundaries. But they explicitly deny that an agent's conscious mental states extend. A decade later we find that their reason for doing so is their belief that consciousness relies on neural processing that is too high in speed and bandwidth to possibly be found beyond the brain (in Chalmers, 2008, and Clark, 2009). My main objective in this paper is to evaluate C&C's reason for denying that consciousness can extend.

Correspondence:
Email: kvv22@cam.ac.uk

To do this I briefly explain C&C's parity argument for EM (Section 2). I then critically assess their reason for denying that consciousness can extend — a difference in timing and bandwidth between neural and extra-neural processes. I argue that the claim is likely false, it does not hold up against foreseeable advances in technology and, even if it turns out true, C&C still must explain why only conscious states, and not unconscious ones, require these features at the neural level (Section 3). For these reasons I conclude that C&C's parity argument supports extended consciousness just as well as extended non-conscious states (EM). Thus C&C's current position needs re-evaluation or a new line of defence. Finally I advance a parity-style argument for extended consciousness and consider some possible replies (Section 4).

2. The Parity Argument

C&C argue that, while minds may be centrally located in one's brain (and body), they can sometimes 'extend' to be located in objects beyond their core biological shells. So mental properties, according to EM, might be attributable to things other than one's brain or body. To defend this against the popular view that the mind is entirely located in one's brain, C&C offer what has since been dubbed the 'parity principle' (PP, for short), '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* (so we claim) part of the cognitive process.'[1] PP says that we should treat functionally equivalent processes with 'the parity they deserve', irrespective of whether there are internal or external to the brain (C&C, 1998, p. 6).

C&C then describe several cases in which, they argue, an object in the environment does play the same role for an agent that neural structures usually would (something we would surely count as a part of her mind). Their best known case is that of Otto and Inga:

> First, consider a normal case of belief embedded in memory. Inga hears from a friend that there is an exhibition at the Museum of Modern Art, and decides to go see it. She thinks for a moment and recalls that the museum is on 53rd Street, so she walks to 53rd Street and goes into the museum…
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> Now consider Otto. Otto suffers from Alzheimer's disease, and like many Alzheimer's patients, he relies on information in the environment to help structure his life. Otto carries a notebook around with him everywhere he goes. When he learns new information, he writes it down.

[1] C&C(1998,p.4). (All references to C&C, 1998, are from the online version, pp.1–12.)

> When he needs some old information, he looks it up… Otto hears about the exhibition at the Museum of Modern Art, and decides to go see it. He consults the notebook, which says that the museum is on 53rd Street, so he walks to 53rd Street and goes into the museum. (*Ibid.*, p. 11)

C&C argue that the information in Otto's notebook 'functions just like' the information in Inga's brain that constitutes an ordinary unconscious belief. C&C outline several conditions to explain how external resources, such as the notebook, function just like internal ones. They are conditions that must be met by any resource (internal or external) to be considered a part of one's mind. C&C treat them as independently necessary and jointly sufficient conditions. First, the external resource must be a constant in the agent's life, just as the brain is. Second the object must be highly accessible to the agent, as one's brain is. And finally, the agent must rely upon the object, such that he doesn't hesitate to use the information and endorse it as true.[2] So C&C argue that in cases that meet these conditions, such as Otto with his notebook, the object in the environment should count as the constitutive machinery of his mind. The parity argument can be summarized as follows:

(P1) What makes some object count as constitutive of a mental state is the role it plays.
(P2) An object beyond an agent's biological body (e.g. Otto's notebook) can play the same role as an object that surely constitutes an ordinary mental state (e.g. Inga's brain).
(C) Therefore, an object in an agent's environment can count as partially constitutive of an agent's mental state.

Otto and information in his notebook provided an example of an extended non-occurrent, unconscious belief state. But, as constructed, the parity argument should work just as well for any type of mental state (or process). C&C, however, maintain that it is 'far from plausible' that conscious mental states extend (*ibid.*, p. 7). So according to their thesis, EM, only non-conscious mental states can extend, while consciousness supervenes only on internal brain states. The question is, given that their parity argument seems to support both just the same, why do C&C deny extended consciousness?

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[2] I use the term 'object' loosely here (and throughout). First of all, it is the *information* in the notebook that constitutes Otto's mental states, not necessarily the entire notebook itself. Second, I remain open to the possibility that 'objects' could include properties, e.g. a particular ordering of objects.

3. Why Not Extended Consciousness?

The first glimpse at C&C's reasoning comes from Chalmers in his foreword to Clark's book. Chalmers says:

> An argument for extended consciousness would require twins with different states of consciousness: Olga and Twin Olga are internal duplicates, but what it is like to be Olga differs from what it is like to be Twin Olga. But no matter how hard one tries to construct an Otto-style story that works like this, the story does not seem to succeed. Perhaps part of the reason is that the physical basis of consciousness requires direct access to information on an extremely high bandwidth. Perhaps some future extended system, with high-bandwidth sensitivity to environmental information, might be able to do the job. But our low-bandwidth conscious connection to the environment seems to have the wrong form as it stands. (Chalmers, 2008, p. 6)

Thus, Chalmers reasons that consciousness does not extend because of some crucial difference in information processing features — speed, access, and bandwidth — between neural and extra-neural processes. He suggests that consciousness requires bandwidth and processing speeds that are in excess of what can possibly be met by any extra-neural resources. And although Chalmers adds, 'there is no principled reason why the physical basis of consciousness could not be extended', he 'tentatively' concludes that EM is compatible with a denial of extended consciousness (*ibid.*, p. 6).

Clark (2009) subsequently endorsed Chalmers' suggested distinction.[3] Clark explains that consciousness may require 'certain information-accessing and information-integrating operations whose temporal scale makes neural processes (just as a matter of contingent fact, in us humans) the only adequate "vehicle"'(Clark, 2009, p. 983). Clark cites the work of Chris Eliasmith (2008), who argues that the essential difference between neural and extra-neural dynamics is the 'speed of information flow (i.e. bandwidth), and the degree and kind of coupling'.[4] The idea is that our non-neural body is slower at transferring information to and from the world to the brain and so acts as a 'low-pass filter' — a physical medium that allows certain low-

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[3] Clark (2009, p. 983) writes, 'Chalmers (2008) does not develop this suggestion, but the direction seems promising'. It's worth noting that in this article Clark does not consider a parity argument for extended consciousness. Instead he considers arguments for extended consciousness based on 'dynamic processing loops' and enactivist views of mind. I don't discuss these because I think none is as strong as C&C's own parity argument.

[4] Eliasmith goes on, 'Because bodies have mass, they tend to slow down the transfer of information to the world from the brain (i.e.they effectively act as a low-pass filter). However, no such impediment to information flow exists between brain areas' (Eliasmith, 2008, p. 150, quoted in Clark, 2009, p. 984).

frequency signals to pass through, while blocking higher-frequency signals (Clark, 2009, p. 985). According to C&C this crucial difference between the neural and the extra-neural gives reason to reject P2 in a parity argument for extended consciousness. It explains why neural processes alone constitute consciousness while all other kinds of processes in the body and environment do not, though they may provide crucial causal support for neural processes.

3.i. Interpretations of and responses to C&C's claim

C&C's claim is a descriptive one, that just as a matter of contingent empirical fact, in order for consciousness to come about its physical realizers must be able to transmit and receive information with direct access and at a high speed and bandwidth. And this is why neural processes alone are able to perform the job — because they alone are able to instantiate these unique information processing features which consciousness requires. I will develop three interpretations of this claim and argue each is likely false.

(a) Perhaps the claim is that neurons require and in fact have direct access to information *from other neurons* on an extremely high bandwidth but that the same is not true of non-neural processes. That is, the rate of information sharing that can take place between two neurons can never be matched between any two non-neural objects. But this is surely false. This would amount to the claim that no non-neural system could ever process information at the speeds of our brains; that connections between two silicon chips, for example, could never reach the connections between two neurons. But non-neural computation can already occur at speeds that exceed brain operations. For example, computers are capable of executing more operations per second than the biological brain can.

(b) Recall Chalmers also says 'our low-bandwidth conscious connection to the environment seems to have the wrong form as it stands' (*ibid.*, p. 6). So perhaps what he means is that neurons require and in fact have direct access to information from other neurons on an extremely high bandwidth, but the same is not true between neurons and non-neurons. On this interpretation, a neuron can never transfer information to any kind of non-neuron at a high enough rate or speed for the non-neuron to play the same role as neurons do. So the concern is not whether connections between two silicon chips, for example, could reach the speed of neurons, but rather whether a silicon chip and a neuron could ever connect in the same way (or with the same speed and bandwidth) as two neurons connected to each other. This

interpretation better accords with Chalmers' description of our 'our low-bandwidth conscious connection to the environment' and with Clark's description of the body as a 'low-pass filter'.

But, at least in one sense of the term, extra-neural to neural 'information processing' already happens at sufficiently high speeds to make this claim false. For example, one form of information exchange is visual. We know that our conscious states represent visual information that comes in from beyond our brain in a rapidly changing manner. Information about the surfaces of objects is transferred when light hits the eye, which is subsequently transmitted to the brain. But the brain, which cannot transfer or receive information at the speed of light, slows this information processing down. So non-neural processes must be constantly reporting information back to the brain, through the low-pass filter Clark describes, at least as quickly as neural processes can operate.

At one point Clark acknowledges the fact that extra-neural bodily 'goings-on', such as muscular processes, must be a source of input in order for us to experience things like muscular action — an occurrent bodily process that has real-time impact on our conscious experience (Clark, 2009, p. 985). But he never explicitly considers the timescale at which these operations must occur in order for this to happen. He never addresses why, if the connections between neural and extra-neural processes are sufficient to cause real-time changes in the character of our phenomenal experience, they should not also be sufficient to *constitute* our conscious experience. The phenomenological evidence suggests that differences in processing speeds between neurons and non-neurons may not be relevant in determining their contributions to bringing about higher-level phenomenal conscious experiences. That is, even if extra-neural connections are relatively slower than inter-neural connections, they nonetheless suffice to realize a stream of consciousness that represents information from the outside in approximately real time.

(c) Finally, it is possible that the key difference between neural and extra-neural for C&C is really about 'direct access'.[5] It could be that neural processes do not have 'direct access to information' from nonneural processes. But the information sharing between neurons is direct, or unmediated. Here the same kind of response will do: even if extra-neural connections are relatively less direct than intra-neural connections, they nonetheless suffice to realize a stream of conscious-

[5] Thanks to David Chalmers for elaborating on this point in response to a presentation of this paper.

ness that processes information from the outside in approximately real time. If the claim is that our biological body has direct (unmediated) access to environmental information, but any add-on or 'extension' would not, this too seems false. After all, the access that my biological perceptual system has to visual information coming in from the environment is no more (or less) direct than the glasses I wear.

So C&C's claim can't come down to (a) a difference in speed and bandwidth between neural processing and non-neural processing, since computers can already process information at greater speeds than our brains. It can't come down to (b) a difference in speed and bandwidth connection between the neural and non-neural processes, since we know information from the environment must flow in at sufficiently high speeds. And finally, it can't be about a difference in (c) the 'direct access' of information, since the access that a biological perceptual system has to information from the environment is no more direct than an extended perceptual system, including a pair of glasses or corrective lenses. At least these three plausible interpretations of C&C's claim appear false. And it is unclear what else they might mean.

3.ii. In principle, speed and bandwidth don't matter

Another problem is that even if there is some interpretation that makes C&C's claim true in principle, features like speed and bandwidth just don't seem to matter. It's at least not obvious why lower, implementation-level features such as speed and bandwidth would matter to states at higher levels. In a well-functioning system, parts that realize that system may move at entirely different speeds. So long as each part plays its role at the *right* time, the system can function seamlessly.[6] Just as all the bits of a mechanical wristwatch may move around in different ways — you wind the spring, moving the gears, which turns the wheels forward. The parts work together, albeit at different times and with varying sorts of connections, to realize the whole functioning system.

Likewise, processes external to the brain do not in principle have to be as fast as neural processes to function with them in a larger system. They just have to play their particular role at the right time. Since we know that extra-neural processes interact with neural processes quickly enough to bring about real-time changes, it is consonant with our phenomenology that they also constitute our conscious experiences. So merely citing the bandwidth differences between the neural

[6] Thanks to Ian Gold for this way of thinking about the problem.

and extra-neural (while possibly true) is not relevant precisely because the speeds of neural and non-neural activity are manifestly appropriate to allow for the necessary interactions required. Thus even if C&C's empirical premise is true they still need to explain why these lower-level features are essential for bringing about conscious mental states, since it's not obvious why this should matter. There is one further problem with C&C's strategy to reject extended consciousness.

3.iii. Why isn't high bandwidth also necessary for non-conscious states?

Suppose that there are grounds for asserting that there is an important distinction between neural and non-neural processes. In order to use this as an objection against a parity argument for extended consciousness C&C still need to explain why differences in speed and bandwidth are relevant only to bringing about conscious states and not unconscious ones. Otherwise C&C risk handing over a strong objection against their own original argument for EM.

Consider the 'coupling-constitution' objection that Frederick Adams and Kenneth Aizawa (henceforth, A&A) raise to C&C's parity argument for EM.[7] A&A(2001) argue that C&C mistake the coupling of extra-neural resources to neural activity for their constitutive involvement in unconscious mental states. A&A argue that the mere coupling of a resource to a cognitive system does not imply the resource is constitutive of cognition. For example, the circulatory system is coupled to the cognitive system, i.e. circulation causally supports cognition, but circulation does not constitute cognition (A&A, 2008, pp. 10–11).

Clark (2005) responds that the burden of proof lies with A&A to come up with a principled reason, one that doesn't beg the question against EM, for maintaining that all mental states (even unconscious ones) are entirely constituted by neural resources and only causally supported by extra-neural ones. It is to this end that A&A(2005) argue that *original*, or non-derived, intentionality is the distinguishing 'mark of the mental'. *Original*, or *non-derived*, intentionality is meant to contrast with the *derived* intentionality that non-mental objects can display. So while non-mental objects, such as the words in a book, e.g. Otto's notebook, may display *derived* intentionality, original inten-

[7] See Adams and Aizawa (2001; 2008).

tionality is uniquely a feature of minds.[8] Thus, A&A argue that the notebook fails to be partially constitutive of Otto's mind because it lacks this 'mark of the mental' that — just as a matter of current contingent fact — only brains can realize.[9]

What is important to notice about this exchange between A&A and C&C is that C&C use the same strategy to object to extended consciousness that A&A first use against the parity argument for EM. So if Clark is right about where the burden of proof lies in his response to A&A, then he must accept that the burden of proof lies with him (and Chalmers) in rejecting P2 of the same argument for extended consciousness. If A&A must come up with a principled reason for asserting their coupling-constitution objection against P2 of the parity argument for EM, then for C&C's parallel strategy to work they too must find some principled reason for distinguishing between the contributions of neural and extra-neural processing. As we've seen, Chalmers (2008) has offered such a reason and Clark (2009) develops it, but I've argued that their claim is false on all plausible interpretations. Now, even if they turn out to be right, they must explain why high bandwidth does not equally pose an objection to their claim that non-conscious states can extend, otherwise the objection to extended consciousness will work just as well against EM.

Surely aware of this, Clark asks: 'When does such a difference [in bandwidth] make a difference?' He replies: 'Not, we can reasonably assume, in the case of non-occurrent states such as dispositional believings.'[10] Clark maintains that differences in speed and bandwidth only concern the substrates of conscious states, and not unconscious states. He argues that the contents of non-occurrent mental states do not require the high-speed, 'moment-by-moment' construction that the rapidly changing phenomenal characters of conscious states do. He says, 'it may be that synchrony correlates with attention, and that attentional modulation is what allows information to pass

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[8] This distinction has been around for some time, see e.g. Searle (1992).

[9] I won't respond to A&A's objection here. But notice that even if the objection works against the example of Otto and his notebook, their distinction would not block all possible cases of EM. We can imagine that instead of using a notebook Otto uses the mind of another agent, e.g. his long-time partner, to store the information that forms his beliefs. In this case the external resource is itself a brain, so it would be capable of original intentionality. The result would be an instance of a *socially extended mind* — where one agent's mind has extended into another's. (It's called 'social' because two distinct minds are involved. So it's not the case that if A's mind extends into B's there is now just one mind; rather, A and B maintain separate minds. Only A's mind is now partially constituted by information stored in B.)

[10] And Clark cites work by W. Singer (2003) 'for some of the evidence for this conjecture' (Clark, 2009, p. 984).

from perceptual buffers to working memory in the way that gives rise to conscious experience'.[11] So only conscious states depend on the very precise (down to the millisecond) temporal synchronies of the brain, as a means of binding together and transferring distinct bodies of neurologically represented information.

But it is not obvious why conscious and unconscious processes must rely on fundamentally different kinds of (neural) processes. The content of unconscious but occurent mental states could be changing just as rapidly as our conscious states, for all we know, only not at the level of our awareness. For example, expert behaviour happens quickly and unconsciously, e.g. the motor skills used in driving a car. The processes involved here are unconscious but still work fast enough to control our real-time behaviours. There is no evidence that this speed and high bandwidth is not also necessary for rapid changes in our unconscious processing. So high speed and bandwidth at the neural level might be also necessary for our unconscious processing. There is yet no decisive evidence that conscious and unconscious processes rely on fundamentally different kinds of (neural) processes.

I conclude that the principled distinction that C&C offer to reject extended consciousness does not hold up under close scrutiny. Moreover, if their principled distinction did hold up it would also give a reason to reject EM too, along with extended consciousness. Thus, even if C&C can offer an interpretation of their claim that picks out a real distinction between neural and non-neural processes, they must still find a principled distinction between conscious and unconscious processes that can explain why only the former and not the latter require the unique features of neurons to be constituted. Only then will C&C be able to consistently defend EM from an Adams-and-Aizawa-style coupling-constitution objection, while at the same time objecting to extended consciousness on similar grounds.

4. The Parity Argument for the Extended Conscious Mind Thesis (ECM)

So far it looks as though C&C's parity argument supports the view that conscious mental states can extend just as well as it supports their original thesis, EM. I will call this the extended conscious mind thesis (ECM). Here is the parity argument for ECM:

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[11] Clark cites Thiele and Stoner (2003) and Lamme and Spekreijse (1998) as support (Clark, 2009, p. 984).

(P1) What makes some object count as constitutive of a *conscious* mental state is the role it plays.
(P2) An object beyond an agent's biological body can play the same role as an object that surely constitutes an ordinary *conscious* mental state.
(C) Therefore, an object in an agent's environment can count as partially constitutive of an agent's *conscious* mental state.[12]

To support P2 of the argument for EM, C&C offer some examples, including Otto and his notebook. To help make sense of what kind of object beyond an agent's body might play the same role as the agent's brain, I start with the example of the iCog.

4.i. The iCog

Consider the Silicon Brain thought experiment.[13] Imagine a situation where your brain is deteriorating and in a medical effort to heal you doctors begin to replace some of your natural neurons with silicon chips. These silicon chips have been programmed to perform all the same functions of the neurons they are replacing. They work as 'artificial neurons'. We can imagine this replacement process continues until no part of your original biological brain remains. Philosophers have different views about what will happen to their mental life while this goes on.

Role functionalists maintain that if the chips really do perform all of the same functions as the neurons they replace, then your mental life will not be impacted, not by simply changing the physical realizers. Now, the first premise of the parity argument (P1) is meant to follow from the PP, which Chalmers (2008) says commits one to 'very weak functionalism'.[14] More specifically, Brie Gertler (2007) argues that the PP(and something like P1) commits one to role functionalism.[15] If role functionalism is right, then it should not matter where these silicon chips are or what they are made of, as long as they are responsible for performing the functional role that realizes mental states.

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[12] My presentation of C&C's parity argument is based on Gertler's (2007) longer summary of the argument.

[13] See Searle (1982; 1997).

[14] Chalmers(2008)doesn't say exactly what kind of functionalism he has in mind, though he says, 'One might support the view by invoking an attenuated functionalism: say, one where certain mental states (such as dispositional beliefs) are defined by their causal relations to conscious states, to behavior, and to other elements of the cognitive network' (p.7).

[15] At the very least PP depends on the multiple realizability thesis (MRT) — the view that mental states are multiply realizable. Wheeler (2010) agrees.

Now imagine that instead of entering your skull to replace your deteriorated neurons where they are, doctors consider it preferable and less intrusive to the biological shell to do as much as they can externally. So doctors tell you it will be safer to attach your remaining well-functioning neurons through tiny electrical nodes to an implant that threads a wire out your ear. They then attach this wire to an external device that contains your programmed silicon chips and which attaches to your person. We can imagine that after the operation you come to with a small wire now reaching out of one of your earholes. Attached to this wire is a small device that hugs your ear, much like a hearing aid. Doctors call it an iCog.

Of course the iCog is not currently available and may never be. My claim is that iCogs are conceivable and that they are logical and metaphysical possibilities. Furthermore, iCogs would be objects in an agent's environment — beyond her biological brain-and-body — that function just like the objects constituting the agent's ordinary conscious mental states (i.e. the neurons in her brain). I claim that iCogs are possible cases of ECM. Thus even if C&C's claim about the uniqueness of neural processes turns out to be contingently true, which I've given reasons to doubt, it seems at least pre-emptive to rule this out as a possible advance in technology.

To be fair, Chalmers mentions the possibility of a 'future extended system'(Chalmers, 2008, p. 6). So he should be receptive to the iCog as a future possibility. But he says, 'it is unlikely that any everyday process akin to Otto's interaction with his notebook will yield extended consciousness, at least in our world'. And, as I've noted, Clark says that consciousness requires these unique features 'just as a matter of contingent fact, in us humans' (Clark, 2009, p. 983). So Clark too should admit the possibility that technology might advance to the point where this contingent fact changes.

4.iii. Responses to the parity argument for ECM and the iCog

(a) Does the argument (or example) beg the question?

One might worry that the iCog begs the question by assuming that parity will one day be possible. I use the parity argument that C&C give to defend EM to support ECM. So if the parity argument for ECM begs the question then Otto's notebook may do the same. And of course the iCog meets the tentative conditions that have been set out for an external resource: it is a constant in the agent's life, the agent accesses information from the iCog regularly, and relies on this

information, endorsing it as true without hesitation.[16] But silicon-processing may turn out to be incapable of achieving the processing features of natural neurons, so the silicon iCog does rely on future possibility in a way that Otto's notebook doesn't — more on this in the next section, with the neuron-based iCog.

(b) Can parity be achieved?

C&C could continue to argue that the iCog will never be able to reach the high speeds and bandwidth connections of the brain. The electrical connections from neurons to a silicon iCog would be too slow. But of course, the iCog doesn't have to be made of silicon and the connection doesn't have to be electrical. What is important to the thought experiment is that we can imagine a device of this kind, located beyond the brain and body, fulfilling the role of neurons in the brain. So even if incredibly high speed and bandwidth connections turn out to be crucial features in realizing consciousness, it seems entirely possible that with advances in technology these could be features of some kind of non-biological materials as well. Now, C&C might give up their claim about speed and bandwidth but continue with their strategy of rejecting P2 of the parity argument by identifying some other principled distinction between neural and non- neural processes. But to do so they'd still need to find a way to block a corresponding objection to their own parity argument for EM.

Moreover, the iCog could itself be made of neurons. Either artificially made or naturally occurring biological neurons could be connected through one's ear by a long axon, also naturally occurring. If the iCog just turns out to be a clump of neurons attached to one's ear, by an axon or by a string of more neurons, then speed, bandwidth, or access can't possibly be relevant.[17] So in this case C&C can no longer appeal to a distinction between neural and non-neural processing. Since the brain and the iCog would both be composed of neurons, the entire realization-base of consciousness would still be

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[16] Zoe Drayson (2011) has argued that these conditions are meant to characterize only mental states of a particular kind, namely dispositional beliefs. This is the kind of mental state that C&C are describing when giving these conditions — the state that is realized by the information in Otto's notebook. (I would add that C&C are even more precise that the kind of mental state they describe in Otto's case is a non-occurrent, non-conscious belief state.) So the conditions were never intended to be independently necessary and jointly sufficient for all kinds of mental states. But since I don't set out here to provide new conditions for resources that constitute conscious states, I use them, tentatively.

[17] The neuron-based iCog reminds us that EM and ECM are about where the mind is, not what the mind is. So although C&C's parity argument, in particular P1, relies on functionalism and MRT (as Wheeler, 2010, Gertler, 2007, and others have argued) the two views need not and may be supportable on other grounds.

purely neural, only part of it would lie beyond the brain-and-body. So C&C would be hard pressed to find a principled distinction between the neuron-based iCog and the neurons in the brain that doesn't just come down to a difference between inner and outer. And this is just what their PP is meant to work against.

It's worth adding that Chalmers (2008) should be receptive to the conceivability of the neuron-based iCog, as he says '…in some possible worlds: one could imagine that some of the neural correlates of consciousness are replaced by a module on one's belt, for example' (Chalmers, 2008, p. 6). So, to reiterate, the resistance is over whether or not consciousness could extend in our world, and whether or not it is currently extending.[18]

(c) Direct perceptual access: the dual boundaries of perception and action

Chalmers (2008) suggests one way to pressure EM is by appealing to the dual boundaries of perception and action. He says: 'It is natural to hold that perception is the interface where the world affects the mind, and that action is the interface where the mind affects the world. If so, it is tempting to hold that what precedes perception and what follows action is not truly mental' (Chalmers, 2008, p. 3). The line of reasoning goes:

(P1) The boundaries that separate the mind from the external environment are the dual interfaces of perception and action.
(P2) One perceives through bodily senses and acts through bodily motions.
(C) Thus, the mind is brain-and-body bound.

A version of the argument directed against ECM would replace mention of 'the mind' with 'consciousness'. If the key difference between neural and extra-neural for C&C is really 'direct access',[19] the argument against ECM would be that our bodies receive 'direct access to information' from the world and that no extension to our brain would be able to replicate this natural interface. Since the iCog is not responsible for any perception it does not challenge either P1 or P2 of the above argument.

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[18] And notice, again, that this parallels A&A's position in resisting EM — A&A argue not that mind could not extend in any possible world, just that as a matter of contingent fact they do not extend in our world.

[19] Returning to an interpretation of C&C's claim discussed before, in C of Section 3.i.

I think the best way to respond is to accept P1, at least tentatively, but to argue that these interfaces are not stuck at the body, but can shift. So P2 is challenged by the example of corrective lenses. I argued before that the access that my eyes have to visual information coming in from the environment is no more (or less) direct than the corrective lenses placed on top of them. So one might perceive not just through the body, but through an extended perceptual system that includes their lenses. Recall Chalmers (2008) says: 'An argument for extended consciousness would require twins with different states of consciousness: Olga and Twin Olga are internal duplicates, but what it is like to be Olga differs from what it is like to be Twin Olga.' Imagine that Olga and Twin Olga are internal duplicates at time *t*, but what it is like to be Olga at *t* differs from what it is like to be Twin Olga at *t* precisely because Olga is wearing her corrective glasses, while Twin Olga hasn't put hers on yet. Without lenses both Olga's have very poor vision. So for Olga at *t* the world appears clearly and this has a particular quale. But for Twin Olga at *t* the world is a blurry, less welcoming place — one with very few affordances for action — and this has a different quale.

There is another way to challenge P2. Consider something like the neuron-based iCog that includes an extension of our perceptual apparatus. First imagine a transplanted hand, made of naturally occurring cells. Now imagine a bionic hand made from some kind of artificial material. In both cases the agent comes to perceive and to act through resources which lie beyond the natural biological body of the agent. Thus they would challenge P2.

(d) Reject P1 of the parity argument for ECM

A final consideration is that C&C could reject P1 of the parity argument for ECM. They could maintain that conscious states, unlike unconscious ones, cannot be individuated by their functional or causal roles. Chalmers (1996) argues that a reductive explanation of consciousness fails precisely because it cannot be analysed functionally. Thus, a complete functional analysis of the mind would not suffice to capture consciousness. One might think it would be a natural strategy for Chalmers to reject P1 of ECM, but we've seen that P1 is meant to follow from C&C's own PP. So to reject P1 while advancing PPwould require some explanation.

And we've seen this is not C&C's strategy. Chalmers (2008) maintains that EM does not commit one to any strong version of functionalism. He explains:

> I think that functionalism about consciousness is implausible, for example, but this implausibility does not affect the arguments for the extended mind thesis. One might support the view by invoking an attenuated functionalism: say, one where certain mental states (such as dispositional beliefs) are defined by their causal relations to conscious states, to behavior, and to other elements of the cognitive network.
> (Chalmers, 2008, p. 7)

So Chalmers argues that all one needs is the 'very weak functionalism' captured in PP, combined with something like P2, and the thesis follows.[20] This may explain why Chalmers' strategy to reject ECM is to argue that an object located beyond an agent's biological body is never functionally equivalent with neurons in the brain — an objection to P2.

5. Conclusion

I've argued that the position Clark and Chalmers take in defending the extended mind thesis (EM) about unconscious mental states while denying that consciousness extends (the thesis of ECM) does not work. The principled reason they offer to distinguish between the contributions of neural *vs.* extra-neural processes — a difference between timing and bandwidth — does not hold up against the test of foreseeable advances in technology, nor does it hold up against phenomenological reflection. This means that if their original parity argument works as a defence of EM, they have yet to identify a good reason why it should not also work just as well as a defence of ECM.

Finally, one popular way to object to EM has been to deny that unconscious states are really a part of the mind at all, and to instead contend that all of our mental states are conscious. C&C (1998) say this is the most consistent way to deny their thesis. In this case it would continue to be true that the information in Otto's notebook counts as his standing beliefs, but since standing beliefs are not a part of one's mind, in no sense would the mind extend. But if the parity argument supports conscious mental state extension just as well as unconscious state extension then this strategy to reject EM is off the table. Since even if one denies that unconscious states are really a part

[20] Chalmers (2008, p. 7): 'Combined with the observation that there are no relevant differences in the relevant cases — an observation that does not require functionalism for its support — the thesis follows.' I'm not sure I agree with Chalmers about this, but I don't take this point up here.

of the mind (a claim that, for many, is radical), one still needs to find a reason to deny that conscious states can extend.[21]

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