

“Can Functionalism Accommodate Extended Cognition?”

Introduction:

The Extended Mind Hypothesis (henceforth EMH), as defended by Andy Clark and David Chalmers, proposes that human cognitive processing “may at times extend into the environment surrounding the organism.”^[1] This is intended, in its strongest form, as a mereological claim, that what can compose or constitute the mind as a part need not be located within the limits of the skin of the organism. In weaker versions of the hypothesis, it claims only that our mental states and mental processes (as opposed to our minds) may have external components. In this essay, I will offer two “differences arguments” against the familiar notebook case^[2] which motivates EMH. According to Rowlands^[3], a differences argument against EMH is an objection that “points to the significant differences between internal cognitive processes and the external processes that EMH alleges are also cognitive” (Rowlands, 2009). Rowlands argues that EMH escapes most differences arguments^[4] because it relies on a more liberal form of functionalism than its opponents assume. In this liberal form of functionalism, the same computational role is sufficient for a mental state to be of the same psychological kind. However, my differences arguments will grant a functionalist computational account of belief. I will ultimately argue that EMH needs an account of functional kinds that is broader than the sameness of computational role but more fine-grained than an overall account of the cognitive itself.

In Section 1, I will explicate both functionalism and EMH in greater detail. In Section 2, I will explain two strategies in which the former can support the latter, . In Section 3, I will explore the first of these strategies and demonstrate why it fails based on a fine-grained individuation of functional types. In Section 4, I will explore the second of these two strategies, and show while this second option is possible but difficult, and will require a supplementary argument appealing to principles of theory selection. Finally, I will suggest an intermediate strategy, one which may diminish the problems with its predecessors.

I. Extended Minds and Functionalism

EMH is an ontological hypothesis rather than an epistemic hypothesis (Rowlands 2009). Clark and Chalmers are not making a claim about the best way to comprehend the mind, or the best heuristic for doing so. Instead, they are making the much stronger statement, that minds or mental processes *can be* composed of parts that are not internal to the organism^[5], but rather external to it.^[6] Therefore, for the EMH proponent to defend his position, he need only convince us of the existence of one instance of an extended mind.^[7]

Broadly, two versions of EMH can be identified throughout the literature. These I will refer to as SEMH (Strong Extended-Mind Hypothesis) and WEMH (Weak Extended-Mind Hypothesis). They can be formulated as the following:

(SEMH): An object or process external to the skin of an agent can, in the right circumstances, compose or constitute that agent's mind as one of its parts.

(WEMH): An object or process external to the skin of an agent can, in the right circumstances, compose or constitute a cognitive process of that agent, as one of its parts.

Though my arguments will apply to both of these theses, there will be subtle differences in how functionalism specifically supports each. These differences will become clearer in the course of developing my arguments.

The paradigmatic case that Clark and Chalmers propose is the case of "Inga and Otto." In this case Clark and Chalmers argue that a belief, a certain type of mental state, can be constituted by an ordinary notebook. Two agents, Inga and Otto, both have a desire to go to the Museum of Modern Art, to attend an art exhibit. Inga is able to introspect, and recall her belief that the museum is on 53rd street. Though her belief was not occurrent prior to introspection, she held the belief nonetheless. Sadly, Otto is afflicted with Alzheimer's disease. Because of this disease, Otto lacks a functional long-term memory. Unlike Inga, he must consult a notebook that he carries with him throughout his daily existence. Otto reads from his notebook that the museum is on 53rd street and then walks to the museum to attend the art exhibit.

Clark and Chalmers argue that the best explanatory account of this scenario is that Otto already held the belief that "the Museum of Modern Art is on 53rd street" prior to the consultation of his notebook. His reading of the notebook is analogous to Inga's moment of introspection. Otto's belief is constituted by the notebook and Otto standing in the right relations to the notebook[8]. Clark and Chalmers hold this explanation to be a better alternative than the explanation that Otto has no belief about the matter until he consults his notebook. One reason for the inferiority of this interpretation, Clark and Chalmers hold, is that if we were to follow Otto around throughout the day, and see him consult his notebook repeatedly, it would be a superfluous explanation to describe Otto as acquiring new beliefs, forgetting them, and then acquiring them once again. It would be more natural instead to say that the beliefs are already present in Otto's mind as dispositional beliefs in virtue of being recorded in his notebook. Clark and Chalmers claim that the cases of Otto and Inga "precisely mirror each other", and to hold otherwise is to "unnecessarily complicate the situation." They do not wish to argue about whether or not this example of an extended dispositional belief fits the common usage of "belief". However, they expressly hold that the term "belief" ought to be used in a way that includes Otto's extended belief[9], constituted by his notebook, as a token.

II. Two Strategies

A functionalist strategy that develops the extended mind hypothesis would be committed to one of the two following claims: (a) some standard mental states are realized externally or (b) that some cognitive states (possibly non-standard) are realized externally. For (a) to be developed, EMH must establish a similarity criterion, where if the external state satisfies the functional definition of a standard mental state, then the external state is an example of an extended mental state. In the next section, I will argue that this is not possible given any tenable account of functionalism, due to differences arguments.

For the alternative (b) to be developed the EMH theorist could pursue one of the following. The first, (b1), would establish what is called in the literature a “mark of the cognitive.” This would require a general definition of “cognition” or “the cognitive”, (possibly even a non-functional definition) as an umbrella-type that subsumes all taxonomically lower psychological types beneath it. I will argue that this approach may not offer a very compelling case for EMH, and should be abandoned in favor of (b2). This second sub-strategy, (b2), would establish higher level cognitive types that do not subsume all lower level cognitive types beneath it, but instead, simply identify higher-level cognitive type in which standard cognitive types, such as beliefs, are a species. I will eventually conclude by arguing that (b2) is the most favorable path for the EMH theorist to follow.

III. A Similarity Criterion [Strategy (a)]

There are two interpretations of what a sufficient similarity criterion for “being an extended cognitive process” is that can be extracted from Clark and Chalmers’ original proposal.^[10] Both can be found in a passage usually referred to as the “parity principle.” The claim, directly from Clark and Chalmers is the following:

“If, as we confront some task, a part of the world functions as a process which, were it to go on in the head, we would have no hesitation in accepting as part of the cognitive process, then that part of the world is (for that time) part of the cognitive process.”^[11]

The first interpretation of this passage, I will call the non-modal parity principle (NMPP):

(NMPP): If a certain external process P, functions *in the same way* as another process, P*, where we consider P* an ordinary and uncontroversial example of a mental process, then P counts as an extended cognitive process.

This criterion is fairly straightforward. If an external process is a token of the same functional type as some internal process that is an example of an ordinary cognitive process, then the external process is also a cognitive process. This condition is most prone to differences arguments. Recall that differences arguments, as characterized by Rowland, are processes that point to “significant differences between internal cognitive process and the external process that EM alleges are also cognitive.” Before introducing the other possible conditions for an extended cognitive process, I will formulate two difference arguments which conclude

that the case of Otto's notebook violates (NMPP). This will entail that (NMPP) cannot be a necessary condition for extended cognition. It will also show that even on a liberal non-chauvinistic formulation of functionalism[12], the states in question are playing a different computational role.

Presumably, Otto has some sort of functional short-term memory. If he did not, he would never be able to walk to the museum because he would continue to forget the location of the museum as he was walking. Otto's notebook, therefore, is the surrogate for his long-term memory rather than his short-term memory. When Otto acquires a belief through, say, perception, the belief becomes embedded for some brief amount of time in his short term memory. In order to retain this belief, Otto must record the belief in his notebook, a voluntary action. This, in itself, is not an objection to (NMPP), because people perform certain actions to help them retain or remember their beliefs frequently. For example, I might recite a friend's phone number aloud to help me retain it in my long-term memory. In this case, I am voluntarily performing a certain action in order to embed a belief in my long term memory. Yet, ordinarily, voluntariness is not *necessary* for belief retention. There are many beliefs that constitute my memories that I wish not to retain. For example, I may wish to forget about the fact that my ex-girlfriend lives with her new boyfriend above me in the upstairs apartment, because of the feeling of distress that it causes me. I also may wish to forget that the Celtics game is on television tonight, so I am not tempted to neglect my work.

Inga's long term memory shows an important difference from Otto's external notebook memory. For Otto to retain a belief, a desire to do so is necessary, since he must voluntarily record it in his notebook. Therefore, desire is playing a necessary role in belief retention. Otto could even voluntarily form false beliefs, for pragmatic purposes, by recording statements he knows to be false in his notebook. For example, let's imagine that Otto wishes to quit smoking. Otto may well just neglect to record where his sister keeps her carton of cigarettes, so that he isn't tempted to smoke. Otto could even write in his notebook that "Smoking is against the law" or "Smoking causes migraines" to increase the chances that he will refrain from smoking.

The difference between Inga and Otto's long term memories that I identified here, is inconsistent with our ordinary conception of belief[13]. Analytic functionalism aims to preserve our ordinary folk conceptions of mental states by identifying each type of mental state with a functional type. Here, the supposed process of belief retention is functioning differently than what is normally designated as belief retention.

Normally, functionalists propose that what makes a process a token of a mental type are its "actual and potential, or its typical, causal relations to sensory stimulations, behavior, and other mental states." [14] While functionalists are not usually specific about what exactly these relationships are, Brian Loar (1981), as an exception, presents a series of possible relationships for belief as a propositional attitude-- none cite desire or voluntary action as being necessary for belief formation or retention.

The argument from the voluntariness of belief retention that I have just mentioned may not be compelling to the reader. If we consider dysfunctional cognitive states as ordinary examples of cognitive states, Otto's notebook could play the same functional role as a dysfunctional

internal mental state. Consider a case where an agent's biological long-term memory vehicle is such that it still is able to retain content (unlike Otto), and differs only in that it requires the agent to recite the belief aloud in a voluntary way to allow the agent to retain this belief. This case *may* be a counterexample (though it is not obvious) to my claim that Otto's extended belief is computationally of a different functional kind than any ordinary belief state. However, if this argument is not convincing based on this concern, here is another difference argument that cannot be accommodated by the (NMPP).

One particular version of functionalism that has been proposed to support EMH is computational functionalism. Computational functionalism, according to Shagrir, is the view that:

Mental states and events – pains, beliefs, desires, thoughts and so forth – are computational states of the brain and so are defined in terms of 'computational parameters plus relations to biologically characterized inputs and outputs.' (220)

A mental process, therefore, would resemble a sequence of mental states, where the mental states are causally integrated in the correct way, along with its inputs and outputs. According to computational functionalism, a mental state like "being in pain" for example can be expressed by an algorithm of the following kind:

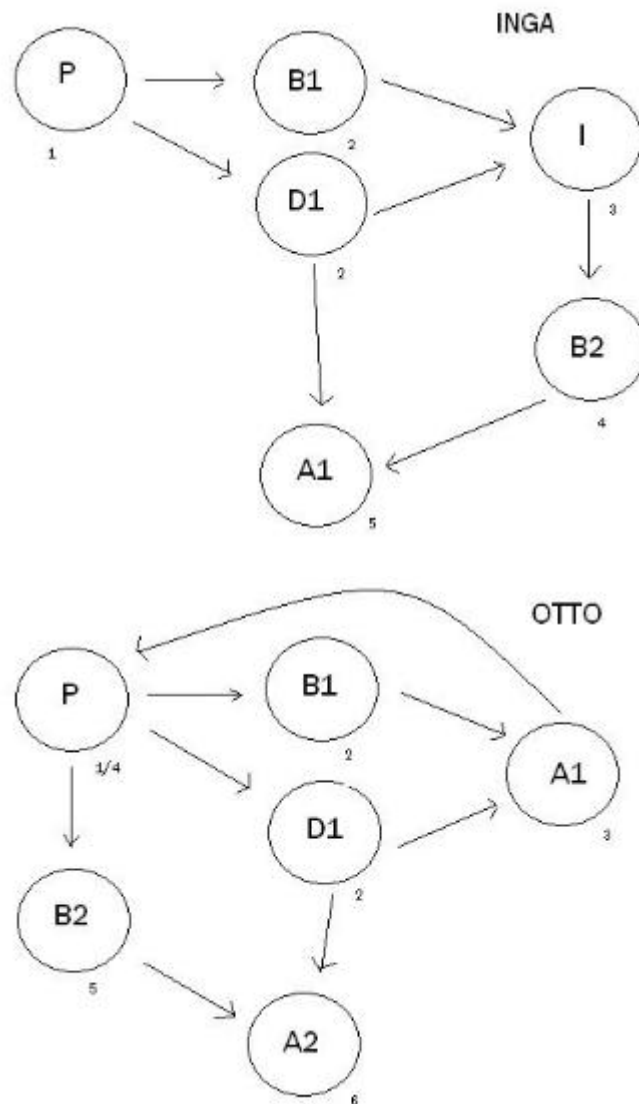
Being in pain = being the fifth of n states S_1, \dots, S_n , whose relations to one another and to inputs and outputs are specified by $FO(S_1, \dots, S_n, i_1, \dots, i_k, o_1, \dots, o_l)$. [15]

For example, a soda machine will enter state S_2 , the state of "10 cents" iff it receives the i_1 , of either one dime, or two nickels. Likewise, a person with functioning eyesight, who receives i_1 , the direct perceptual attention to a cat, will typically cause the belief S_2 , with the content "there is a cat over there." Additionally, if this belief, S_2 , is coupled with another state that is present, S_3 , a desire to express that belief, the agent will typically express that belief. This is the kind of account that the machine functionalist is interested in: the inputs, outputs, and internal states of the system. There is no restriction on other mental states being included in the relation, as this is the virtue of the theory that makes it favorable to analytic behaviorism.

In the case of Inga, her belief that "there is an exhibition at the museum of Modern Art" (B_1) comes presumably through some perceptual faculty (P). This belief, coupled with her desire to attend to exhibit (D_1), conjointly causes her moment of introspection (i_1), which bring her dispositional belief that "the Museum of Modern Art is on 53rd street" (B_2) to the forefront of her consciousness. Her dispositional belief is now an occurrent belief. This latter belief (B_2), coupled with the desire to attend the exhibit (D_1), causes her to walk to 53rd street (A_1).

However, in the case of Otto, perception is playing a double-role. Through perception (P), Otto forms the belief that "there is an exhibition at the Museum of Modern Art." (B_1) This belief (B_1), coupled with a desire to attend the exhibition (D_1) causes an intentional action (A_2), the act of opening his notebook (A_2). Otto must perform an intentional action (A_2), and employ his perceptual faculties once again (P), to recall his dispositional belief that "the museum is on 53rd street" (B_2). Finally, this belief (B_2), now occurrent, coupled with his desire to attend the exhibition (D_1), causes Otto to walk to 53rd

street (A_1). See the node diagrams below for a visual account of the differences between these two systems. The numbers to the bottom right of the nodes temporally order the processes and mental contents as they would appear in the causal sequence.



Consider an analogy between Inga's mental processes to Turing Machines. Since, (P) is an input, it would be analogous to some user input, perhaps some strip of tape fed into the machine that contains a series of values. This series of values produces (B_1) and (D_2), two states of the machine. When these two states are both present, the Turing Machine uses some internal data recall method (i_1) to recall from memory a piece of data (B_2). The machine then executes a program (A_1) that occurs when the machine is conjointly in states (B_2) and (D_1).

Next, consider the Turing Machine case as analogous to Otto's purported mental processes. (P), once again, is an input, that put the machine in states (B_1) and (D_2). These states would then request the user to input more information from (P) rather than using the data recall method (i_1) in the last example. The computer would output (A_2), requesting more input from the user. The user would once again feed input into the machine, this time entering (B_2).

When (B₂) and (D₁) are both present as states of the machine, the machine executes program (A₁).

One might object that I am assuming that the second input (consultation of the notebook) comes from outside the machine. However, this misses the point. The problem for the EM model of Otto's belief is that it uses the *same* process for input that it does for internal data recall. Since this is the case, Otto's notebook is functioning differently than Inga's internal memory source. Therefore, the EM theorist cannot use a similarity criterion as its theoretical foundation.

For these reasons, (NNMP) along with computational functionalism is too narrow to allow the inclusion of the case of Inga and Otto. Otto's notebook and Inga's memory are clearly of different functional types. Therefore, (NNMP), coupled with computational functionalism cannot be sufficient to allow extended cognition in the case of Otto's notebook. The problem however, isn't obviously restricted to computational functionalism, but would seem to infect any plausible functionalist thesis that with which EMH might be paired.

There is, however, a second more inclusive interpretation of the parity principle that we can extract from the reading that is more inclusive than (NNMP). The following I call (MPP):

(MPP): If some external process, P, functions in the same way as some other process, P*, where P* is some possible process internal to the head and skin of an organism and we would ordinarily assent to P* being a cognitive process, then P is an extended cognitive process.

(MPP) is more inclusive than (NMPP) because not only does it identify extended cognitive processes by external processes of the same type as actual mental states, but instead identifies extended cognitive processes by external process of the same type as any possible mental state. There is a question, about whether this condition will allow EMH to avoid differences arguments. [16] However, for the moment I will assume that it does in fact make EMH invulnerable to differences arguments.

The worry with claiming that (MPP) is a sufficient condition for a process being an extended cognitive process is that while it may make EMH impervious to difference arguments, at the same time it makes the theory vulnerable to slippery slope or cognitive bloating objections. A cognitive bloating objection, as characterized by Rowland [17], is an argument that the conditions which allow something to be an extended mind would permit too much. To avoid a slippery slope, the EMH theorist then owes us an account of the cognitive to relieve these worries.

The cognitive bloating worry can be clearly illustrated through a number of examples. Consider a possible future, where because headphones are so easily lost, XM radio introduces a neural implant that is surgically placed inside the brain of a subject, to replace the portable accessories that users normally use to listen to XM radio. Instead of listening to their favorite satellite radio stations through their auditory faculty from an external source, the recipient of the implant is able to have an almost identical qualitative experience to that of listening to the former portable external devices. According to (MPP), if we would assent to the possible internal satellite radio realizing a mental process, it follows that the actual

portable radios are also the realizers of mental processes. If the reader is skeptical of “artificial” or silicon-based neural implants constituting a mental process, consider instead a possible world where the same neural chip is biologically grown inside the brain through voluntary mutation. If this is still not intuitively a mental state, imagine a race of future beings that evolved to naturally receive satellite signals. Consider a similar scenario for any external process. It seems that (MPP) is too strong in that it would allow most external processes that we encounter or use regularly in the actual world to be tokens of extended cognitive processes.

Nonetheless, even if the cognitive bloating objection can be tolerated, (MPP) still may not play the role in EMH that proponents wish. Difference arguments can still be used to challenge (MPP). Instead of considering whether an actual internal process and some proposed extended mental process are playing the same role, we must consider whether this possible internal process that we conceived of and the extended mental process in question are playing the same role. In the case of the internal radio and the portable external radio, it seems clearly not. Once again, much like Otto’s notebook and Inga’s long-term memory, it is not clear that the hypothetical internal radio and the traditional portable radio are of the same functional kind. Since this is the case, EMH cannot rely on the parity principle, and as a result the debate becomes a debate about the nature of the cognitive.

These arguments are against the parity principles being sufficient conditions for extended cognition. Clark has recently rejected the parity principle as a “demand for fine grained similarity.”[\[18\]](#)

EMH theorist could, as an alternative, give a string of necessary conditions which are broad enough to include all of our ordinary examples of cognitive processes, but also limit inclusivity enough so as not to fall into cognitive bloating objections. As I mentioned earlier, some of these conditions are (1) availability (2) accessibility and (3) endorsement. Levy has argued that none of these conditions can be necessary but only sufficient, since positing their necessity would fail to include many ordinary examples of cognitive processes. For example, there are many subliminal beliefs that we do not consciously endorse[\[19\]](#). Additionally, beliefs can be repressed in such a way that the agent who holds the belief may not have conscious access to that belief. However, if each of these is sufficient for being part of an extended cognitive process, then EMH would be inclusive enough to allow most external objects we come into contact with to be examples of mental processes. There are many devices, information-bearing objects, including ones that we “endorse”, that we come into contact with on a daily basis. Cognitive bloating such as this is worrisome because it may lead to a conceptual confusion in which it is no longer clear what the objects of study in the cognitive sciences are.

IV. The Demarcation Strategy [Strategy (b1)]

Still, Rowlands and Menary argue that EMH does not rely on a similarity criterion. They instead take an “integrationist” approach, arguing that the differences between disparate types

of mental states are just as important as their similarities. A cognizing organism integrates external processes or objects to accomplish tasks it ordinarily cannot [20]. This is the case for Otto only because he lacks the normal ability to retain memories in the long term. He does not adopt the notebook *because* it has features that ordinary long-term memories don't have. He adopts it to replace a normal capacity that he has lost. Rejecting the parity principle as a similarity criterion and claiming that differences between ordinary cognitive processes and extended cognitive processes are a necessary condition for extended cognition, would limit EMH to a theory including only examples of augmentation. It would be counterproductive to the enterprise of EMH to exclude processes or vehicles that function identically to ordinary examples of mental processes or vehicles but differ solely in their location with relation to the skin. For example, imagine a kind of digital notebook that automatically recorded one's short-term memories to the notebook, regardless of one's desire to do so.

Rowlands argues that adopting the integrationist approach deflects differences objections only to become susceptible to the mark of the cognitive objection. Since EMH cannot rely on the parity principle or functional similarities it must instead demarcate the cognitive from the non-cognitive. This objection may leave EMH open to the charge of question-begging, since they have not argued for an acceptable account of the "cognitive" which accommodates their view. Rowlands has offered an account of the cognitive, which ambitiously aims to include all processes we normally consider cognitive processes. His account is the following:

A process P is a cognitive process if and only if:

1. P involves information processing – the manipulation and transformation of information-bearing structures;
2. this information processing 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. [21]

Rowlands considers this to jointly be a sufficient condition for a cognitive process, but not a necessary condition. Clearly, if these conditions were jointly necessary, any good Freudian or critic or self-intimation [22] would be quick to introduce counterexamples. Repressed mental states that the subject does not have conscious access to would not be accommodated by these conditions.

Still, it may be a worry that Rowland's conditions would include anything from televisions, computers, digital telephones and PDA's, thermometers, watches, clocks, tattoos, books, or anything else that is a vehicle for information that we may come across to be an example of a

part of a mental process. This, once again, is an example of the danger of cognitive bloating. To avoid this problem, necessary conditions would need to be added to avoid the bloating problem.

Additionally, if the “cognitive” is a natural kind which is identified an object of a special science, there has not been offered any compelling reason for adopting an EMH thesis over the weaker thesis that internal cognitive processes simply depends heavily on the external, rather than the counterintuitive position that these objects constitute them[23]. This also violates principles of theoretical conservatism, in that it disposes of an old theory in favor of a newer theory without a persuasive reason to adopt it. Until EMH theorists offer us a new account of the cognitive along with a compelling argument to adopt this account, there is no principled reason why we should adopt it. Until this is done, the thesis will continue to rely on functionalism and be susceptible to difference arguments.

V. An Intermediate Strategy [Strategy (b2)]

Identifying and formulating the multifarious kinds of functional types of which our mental states are tokens will certainly be a many-layered ordeal. As we stated, a functional or non-functional account of the cognitive must subsume all other, more specific mental states beneath it. The picture which will surely surface when a complete functionalist account is offered will be an intricate taxonomy.

As I have shown, our ordinary tokens of beliefs are not clearly of the “same” functional type as some of those external processes that the proponent of EMH wishes to include as token mental states or parts of mental states. However, it is not clear that because these are functionally different at the computational level, we must give an account of the entire “cognitive” to support EMH. This would invite the thorny situation problem of demarcating the cognitive from the non-cognitive. Suppose instead that these ordinary tokens of beliefs are included with these external processes within a more inclusive, higher-level taxonomical category of non-standard cognitive states called “acceptances”. Both beliefs and extended-notebooks are examples of acceptances, a functional type formulated liberally enough, to include the differing roles that these processes played in the systems I described earlier. A tentative account of acceptances may be the following:

P constitutes an acceptance of subject S iff

- (1): P is a potentially behavior guiding representation of some proposition Q
- (2): proposition Q was previously endorsed by S
- (3): Were S to consciously entertain Q, S would assent to Q
- (4): P would be both easily available and readily accessible given a fully functional brain or perceptual system.

The above set of jointly necessary and sufficient conditions is a rough sketch of what an account of acceptances might look like. Since P is potentially action or behavior guiding, it serves to produce the typical behavioral outputs of both belief states and extended notebooks. Condition (2) accounts for repressed mental content and content that is temporarily forgotten or inaccessible. For example, I might have the repressed belief that Michael Jackson is deceased (since I am in a state of denial) but there was a time where I fully entertained and endorsed this belief. Similarly, Otto would also have to have previously entertained and assented to all the propositions recorded in his notebook. Condition (3) limits bloating worries because it is clear that Otto would assent only to propositions in his notebook, and not any piece of paper he happens to carry around in his wallet. Condition (4) also limits bloating worries, since the object which realizes or constitutes the extended content or process is must be a fairly regular object in the life of the subject. This last condition also accounts for dysfunctional states, since it includes a requirement for availability in counterfactual situations of both a fully functional brain and fully functional sensory apparatuses.

Though extended-notebooks are not beliefs as required by the computational functionalist, they are cognitive processes within this broader, more liberal, functional type. With this strategy, a new notion of the parity principle may be able to be formulated that also includes the necessary differences of the integrationist approach at the fine-grained computational level. A mental process would be an example of an extended process if this process was in a functional genus identical to a process that we normally consider a cognitive process, but not necessarily the same species.

Conclusion:

I have argued that computational functionalism cannot accommodate extended cognition based on a functional similarity criterion between standard internal cognitive processes and external processes, based on two arguments. However, if the EMH proponent rejects a functionalist similarity based criterion, then it would appear that they must offer an account of the cognitive. Still, this attempt at demarcation cannot stand alone and avoid question-begging without also offering a compelling reason for why this counterintuitive account of the cognitive is more worthwhile than rival dependence theses which are just as explanatorily potent. If a further functionalist account of the cognitive is given, this account will have to be inclusive enough to include all ordinary examples of cognitive states, which will leave EMH open to bloating objections.

As an alternative, I have offered another, less ambitious strategy where a functional type that is broader than mere belief is offered, but more narrow than an account of the entire cognitive. This intermediate level of cognitive type will be able to avoid both difference arguments and cognitive bloating worries, as well as evade the requirement of defining the cognitive.

Works Cited

- Audi, R. (1994). Dispositional Beliefs and Dispositions to Believe. *Noûs*, Vol. 28. No. 4 , 419-434.
- Baker, L. R. (2009). Persons and the Extended-Mind Thesis. *Zygon (forthcoming)* .
- Clark, A. (2007). Curing Cognitive Hiccups: A Defense of the Extended Mind. *The Journal of Philosophy*, Volume CIV, No. 4 , 1-63.
- Clark, A. (2005). Intrinsic Content, Active Memory, and the Extended Mind. *Analysis* 65 , 1-11.
- Clark, A., & Chalmers, D. (1998). The Extended Mind. *Analysis* 58 , 7-19
- Fodor, J. (1994). The Mind-Body Problem. In R. Warner, & T. Szubka, *The Mind-Body Problem* (pp. 24-40). Oxford: Blackwell.
- Gertler, B. (2003). Introduction: Philosophical Issues about Self-Knowledge. In B. Gertler, *Privileged Access: Philosophical Accounts of Self-Knowledge* (pp. xi - xxii). Burlington: Ashgate.
- Horgan, T., & Kriegel, U. (2008). Phenomenal Intentionality Meets the Extended Mind. *The Monist* , 353-380.
- Levin, J. (2009, April 6). *Functionalism*. Retrieved October 12, 2009, from Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu/entries/functionalism/>
- Levy, N. (2007). *Neuroethics: Challenges for the 21st Century*. Cambridge: Cambridge University Press.
- Loar, B. (1981). *Mind and Meaning*. Cambridge: Cambridge University Press.
- Pitt, D. (2008, July 21). *Mental Representation*. Retrieved October 4, 2009, from Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu/entries/mental-representation/>
- Putnam, H. (1997). The Nature of Mental States. In P. Morton, *A Historical Introduction to the Philosophy of Mind* (pp. 320-327). Ontario: Broadview Press.
- Pylyshyn, Z. W. (1986). *Computation and Cognition: Toward a Foundation for Cognitive Science*. Cambridge: MIT Press.

Rowlands, M. (2009). The Extended Mind. *Zygon*, vol. 44, no. 3 , 628-641.

Rupert, R. (2004). Challenges to the Hypothesis of Extended Cognition. *The Journal of Philosophy*, 101:88 , 1-50.

Schwitzgebel, E. (2006, August 14). *Belief*. Retrieved 10 4, 2009, from Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu/entries/belief>

Shagrir, O. (2005). The Rise and Fall of Computational Functionalism. In Y. B.-M. (ed.), *Hilary Putnam (Contemporary Philosophy in Focus)* (pp. 220 - 259). Cambridge: Cambridge University Press.

Shapiro, L. A. (2008). Functionalism and Mental Boundaries. *Cognitive Systems Research* 9 , 5-14.

Weiskopf, D. (2008). Patrolling the Mind's Boundaries. *Erkenn* 68 , 265-276.

[1] Clark (2007).

[2] Clark & Chalmers (1998).

[3] Rowlands (2009) argues that EMH is impervious to differences arguments. By the end of the essay, I hope to persuade the reader otherwise.

[4]

[5] There is some question about the nature of persons if they can have parts external to their skin, or have parts not co-located with bodies. EMH possibly entails the eliminations of persons. See Baker (2009).

[6] The contingency of this relationship is important to emphasize, as it is not the case that an organism or person need necessarily have components external to its skin as its parts, but rather that it is possible, although probably uncommon. There are further questions about what is meant by possibility. Proponents of EM have ranging views about how widespread extended cognition is in the actual world. Weaker claims (Weiskopf, 2008) have argued that extended cognition may merely be possible but not instantiated in our world contingently.

[7] These claims are different from the much weaker claim that minds or mental processes merely depend on external entities. EM, in contrast, is a claim about constitution or composition. (See Rupert, 2004)

[8] Or, if it is preferred Otto is "coupled" with the notebook.

[9] There is some ambiguity in EMH about whether the notebook must constitute the belief itself. The sentence, as recorded in the notebook, could merely be a representation of an abstract proposition according to some representational theories of mind and propositional attitudes.

[10] Clark & Chalmers (1998)

[11] Ibid, (8).

[12] This is a version of functionalism where identical computational role is sufficient for sameness of psychological kind.

[13] According to doxastic voluntarism (Montmarquet, 1986; Audi, 2008), desire can play a role in belief formation and retention. However, this view is not inconsistent with the Voluntary-Belief argument, because in Otto's case, desire is playing a *necessary* role in belief retention.

[14] Schwitzgebel (2006)

[15] Shagrir (2005)

[16] See Rowland, (2009).

[17] Ibid.

[18] Clark, 2008.

[19] Rowlands, 2009.

[20] Rowlands, (2009). (636)

[21] Rowlands (2009)

[22] Self-intimation is the thesis, where M ranges over mental states, if S is in M, then M believes or is aware that he is in M. (Gertler, 2003)

[23] Rupert (2004) argues, that adopting EMH will actually obscure and confuse many of our questions in the cognitive sciences, cognitive psychology, and developmental psychology.