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Is external memory memory? Biological memory and extended mind ☆

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ABSTRACT

Clark and Chalmers (1998) claim that an external resource satisfying the following criteria counts as a memory: (1) the agent has constant access to the resource; (2) the information in the resource is directly available; (3) retrieved information is automatically endorsed; (4) information is stored as a consequence of past endorsement. Research on forgetting and metamemory shows that most of these criteria are not satisfied by biological memory, so they are inadequate. More psychologically realistic criteria generate a similar classification of standard putative external memories, but the criteria still do not capture the function of memory. An adequate account of memory function, compatible with its evolution and its roles in prospection and imagination, suggests that external memory performs a function not performed by biological memory systems. External memory is thus not memory. This has implications for: extended mind theorizing, ecological validity of memory research, the causal theory of memory.

1. Criteria for memory

1.1. Clark and Chalmers' criteria for memory

The core case discussed by Clark and Chalmers in their original argument for the extended mind hypothesis is that of Otto, a fictional Alzheimer's patient:

> 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 caries a notebook around with him everywhere he goes. When he learns new information, he writes it down. When he needs some old information, he looks it up. For Otto, his notebook plays the role usually played by biological memory. Today, 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.
>
> Clearly, Otto walked to 53rd Street because he wanted to go to the museum and he believed the museum was on 53rd Street. And ... it seems reasonable to say that Otto believed the museum was on 53rd Street even before consulting his notebook. [...] The information in the notebook functions just like information concerning an ordinary non-occurrent belief; it just happens that this information lies beyond the skin.
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> [...] Otto is constantly using his notebook as a matter of course. It is central to his actions in all sorts of contexts, in the way that an ordinary memory is central in an ordinary life. The same information might come up again and again, perhaps

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> being slightly modified on occasion, before retreating into the recesses of his artificial memory. Clark and Chalmers (1998, pp. 12–13)

My focus here is on the claim that the notebook constitutes a sort of *external memory* for Otto.[1]

My aim is not to argue against the extended mind hypothesis but rather to deal specifically with the concept of external memory: the question is not whether external memory really involves storage of mental contents (even dispositional beliefs) but rather whether external memory is really *memory*. That external memory is memory presumably implies that external memory stores mental contents, which would establish the extended mind hypothesis, but there are alternative routes to this conclusion. According to the parity principle, endorsed by extended mind theorists, what matters is the function of a resource, not its location relative to the agent's body or brain: an external resource counts as cognitive when it performs a function that would be counted as cognitive, were it performed by an internal resource (see Sutton (2010) for discussion). Even if external memory turns out not to be a type of memory, i.e., not to perform the function that is actually performed by biological memory, it clearly performs a function that we would count as cognitive if it were performed by an internal resource. Granted the parity principle, this is enough to establish the extended mind hypothesis.

Nevertheless, while my argument is compatible with the extended mind hypothesis, it does have implications for theorizing in the extended mind framework; I discuss these in Section 3. Additionally, it has implications for the ecological validity of work on memory using standard laboratory paradigms and for the traditional causal theory of memory in philosophy, also discussed in Section 3. Though I do not explore them here, the conclusion that external memory is not memory also has broader implications: what becomes, e.g., of Donald's anthropological account if his contention that external memory "is the *exact* internal analog of internal, or biological memory" (Donald, 1991, p. 309) turns out to be false?

One might worry that the claim that external memory is not memory is paradoxical, but any appearance of paradox here is misleading. My claim is, roughly, that external memory is so unlike memory that it does not belong to the same natural kind, that there cannot be a theory memory covering both biological memory and external memory and assigning them both the same role. This is no more paradoxical than the claim that fool's gold is not gold.

Given that I argue that the conclusion that external memory is not memory does not tell for or against the extended mind hypothesis, my argument should be distinguished from other discussions of differences between internal and external memory, in which such differences are taken to bear directly on the extended mind hypothesis. In such discussions, which focus on the search for a "mark of the cognitive" (Adams & Aizawa, 2001, 2010), it has sometimes been suggested that differences between internal and external memory mean that external memory is not a type of memory, but the suggestion has not in general been supported by a *systematic* discussion of the nature of internal memory. Rupert (2004) comes closest to a systematic approach (and he does explicitly maintain that "external memory" is a different explanatory kind than internal memory), but his focus differs significantly from mine. Rupert is concerned to attack the hypothesis of extended cognition itself (supporting instead the hypothesis of embedded cognition) and targets the claim that external memory is memory primarily in order to undermine the hypothesis. Thus, while he does discuss interference effects and other consequences of construction, his argument does not focus on the broader constructive character of memory; nor does he discuss forgetting or metamemory in any detail. As far as the question whether external memory is memory is concerned, Rupert's argument is largely compatible with mine here, though I do not take either his or my argument to significantly undermine the extended mind hypothesis.

The Otto case is intuitively plausible as a case of external memory. In order to explain why this is so, Clark and Chalmers point out that it satisfies four criteria (Clark & Chalmers, 1998, p. 17):

1. the agent has constant access to the resource;
2. the information in the resource is directly available to him without difficulty;
3. he automatically endorses information retrieved from the resource;
4. information is stored in the resource as a consequence of past endorsement by the agent.[2]

They do not, however, provide any argument for the adequacy of these features as criteria for memory. Obviously, we cannot evaluate the criteria in terms of their adequacy with respect to external memory, since we have little independent purchase on the category. But clearly the criteria should get things right with respect to internal, biological memory, since this category is well-understood (even if there is no uncontroversial characterization of biological memory in general available (Michaelian, 2011))—if the criteria are not satisfied by biological memory systems, they are inadequate.

[1] I focus on external memory in the form of artifacts, setting aside cases in which the memory system of one agent apparently serves as an external memory for another agent (a possibility mentioned by Clark and Chalmers); while, in such a case, the resource in question is obviously a memory, it is less obvious whether it is a memory *for* the relevant agent. Neither will I deal with the related phenomenon of group memory, which raises additional complications (since here the coupling goes in multiple directions) (Theiner, 2009, Theiner, Allen, & Goldstone, 2010; Sutton, Harris, Keil, & Barnier, 2010).

[2] They hedge their bets with respect to criterion 4 ("perhaps one can acquire beliefs through subliminal perception, or through memory tampering?" (Clark & Chalmers, 1998, p. 17)), but it fits naturally with their overall picture of memory, and presumably they take ordinary cases of memory not to involve such processes. See also (Clark, 2008, p. 80).