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BOOK REVIEW

A review of Frederick Adams and Kenneth Aizawa, *The Bounds of Cognition*

REVIEW OF: The Bounds of Cognition, Frederick Adams and Kenneth Aizawa, 2008, Malden: Blackwell Publishing.

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Abstract In *The Bounds of Cognition*, Fred Adams and Kenneth Aizawa treat the arguments for extended cognition to withering criticism. I summarize their main arguments and focus special attention on their distinction between the extended cognitive system hypothesis and the extended cognition hypothesis, as well as on their demand for a mark of the mental.

Keywords Cognition · Extended cognition · Embodied cognition · Intentionality

Fred Adams and Ken Aizawa have done a fine thing in this short and engaging challenge to the hypothesis of extended cognition. In brief, they have (i) summarized and documented the main arguments in favor of extended cognition; (ii) criticized these arguments; (iii) suggested a theory of cognition according to which claims of extended cognition should be judged; and (iv) offered some thoughts on the direction extended cognition should take in the future. Some of the criticisms Adams and Aizawa offer are obvious on a moment's reflection, and I suspect that proponents of the arguments that they target are likely to cry foul. No doubt Adams and Aizawa had this suspicion as well: most arguments they examine are well-documented, with quotations aplenty with which to support their reading. Philosophers wishing to respond to many of Adams and Aizawa's charges are going to have a difficult time making the case that they have been misinterpreted (we'll see below that Adams and Aizawa are not as diligent when it comes to arguments for what they call the hypothesis of extended cognition). Thus, proponents of extended cognition who wish to meet the challenges set in *The Bounds of Cognition* face the harder task of clarifying and refining their views or finding flaws in its arguments. This, of course, is all for the better.

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The book's ten chapters are sensibly organized. The first offers a summary of what's to come, the second begins the work of refining the various issues involved in the debate between traditional cognitivists and extended mind theorists. This chapter also begins to make the case for needing a "mark of the mental" in order to defend a theory of extended mind. The third and fourth chapters present and defend Adams and Aizawa's candidate for what this mark of the mental should be. Chapters five through nine then turn critical. The fifth chapter criticizes some marks of the mental that advocates of extended cognition have offered (they are too profligate—leading to the conclusion that there is cognition going on in your DVD player). The sixth charges some supporters of extended cognition with sliding from the claim that extra-cranial items are causally coupled to cognitive systems to the claim that these items are constituents of cognition. Chapter seven extends this criticism to the stronger claim that extra-cranial items may actually contain cognitive processes. The eighth chapter scrutinizes arguments for extended cognition that depend on parity claims, observations of complementarity, and considerations drawn from evolutionary theory. Chapter nine is focused on enactive theories of perception. Finally, Chapter ten offers some closing thoughts about the direction extended cognition might take if, as Adams and Aizawa believe, its current path is headed the wrong way.

Some of the book's content will be familiar to people who have kept abreast of the critical literature about extended cognition that has accumulated in the past few years. Adams and Aizawa are responsible for much of this literature (Adams and Aizawa 2001; Aizawa and Adams 2005; Aizawa 2007; and a number of well-circulated forthcoming papers). Notable also are critical pieces by Rupert (2004), Block (2005), and Prinz (2006). However, there is enough new material in the book, as well as more extensive and leisurely discussions of older material, to justify owning a copy.

On my view, the most important contributions the book makes to the debate between extended cognitivists and more traditional cognitivists are, first, a distinction between the *extended cognitive system hypothesis* and the *extended cognition hypothesis*; and second, the claim that one must defend a mark of the mental in order to make a case for extended cognition.

The distinction between the extended cognitive system hypothesis and the extended cognition hypothesis receives motivation from the following concern. What does it mean to say that cognition extends beyond the head? This might mean that the system that does the cognizing is not limited to the brain. Thus, pencil and paper, notebooks, environmental cues, motor skills, PDAs, and so on, might play roles in the performance of cognitive tasks such as computing the product of two large numbers, remembering the location of a museum, finding one's way home, perceiving relative distance, and other such activities. Insofar as the system that accomplishes these tasks consists of the brain *plus*, the system is not located just in the head. Hence, the cognitive system is extended, but are the extra-cranial bits *constituents* of cognitive processes?

The fault in this hypothesis, as Adams and Aizawa see it, is its failure to justify why parts of a system should be considered constituents of a cognitive process rather than causal contributors to cognitive processes taking place in the brain. Why, that is, take pencil and paper to be a constituent of a cognitive process, in the way that oxygen is a constituent of water, rather than as tools that enable cognitive processes in the brain to perform tasks for which they are otherwise ill-suited? When I dig a

hole, the shovel aids me in this task, and it may even be true that I could not dig the hole without the shovel. But this does not extend my musculature or muscular processes into the shovel. According to Adams and Aizawa the same story holds true, *mutatis mutandis*, for cognition and its external accessories.

Yet another answer to the question about the meaning of extended cognition is the proposal that cognitive processes of the sort that cognitive psychologists describe as going on inside the head are in fact taking place outside the head as well. Thus, pen and paper, notebooks, landmarks, and so on extend cognition not only by being constituents of cognition, but also by containing cognitive processes. Cognition—computational processes over semantically laden states or symbols—is occurring in objects that are external to the brain.

Clearly, the hypothesis of extended cognition is much stronger than the hypothesis of extended cognitive systems. Indeed, not only is it stronger, but its implausibility all but wags its tail in your face. Does anyone really believe that cognitive processes take place in pen and paper, notebooks, muscles, or landmarks (maybe they take place in PDAs—more on this shortly—but even if they do, these are not the agent's cognitive processes, but the PDA's). Adams and Aizawa charge Port and van Gelder (1995), Haugeland (1995), Clark and Chalmers (1998), and Wilson and Clark (2009) with holding the hypothesis of extended cognition, but matters are not so clear.

For instance, they quote van Gelder and Port, who say "Cognitive processes span the brain the body, and the environment" (Port and van Gelder 1995: ix). But this claim needn't be read as a commitment to the view that cognitive processing occurs outside the brain. Part of the problem concerns the vagueness in terms like "processes". One might reasonably say that circulatory processes span the heart, arteries, veins, and capillaries, but not know how to answer the question "Does circulation take place in this vein?" The answer I favor would be this: "the events that take place in this vein are part of the overall process of circulation." This strikes me as distinct from the claim that circulation takes place in the vein, but consistent with the claim that circulatory processes span the heart, arteries, veins, and capillaries. If this is right, Adams and Aizawa have not made the case that comments like van Gelder and Port's reveal a commitment to the hypothesis of extended cognitive processes.

Similarly, Adams and Aizawa's efforts to pin the hypothesis of extended cognitive processes on Clark and Chalmers (1998) are not completely convincing. They admit that a crucial passage in Clark and Chalmers (1998) is open to various interpretations, but even if they are right that Clark and Chalmers are making a processing claim, there remains the possibility that this claim might be interpreted in the way I suggested above, making it consistent with the denial that cognitive processes take place in things like notebooks.

Nevertheless, even if proponents of extended cognition can shake the charge that they are committed to something as outlandish as the hypothesis of extended cognition, they must then defend themselves against the criticisms that Adams and Aizawa make of the hypothesis of extended cognitive systems, or they must articulate a new hypothesis that captures some other sense of extended cognition. Thus, Adams and Aizawa might pose the following dilemma: proponents of extended cognition must subscribe to either the hypothesis of extended cognition or the hypothesis of extended cognitive systems. The former hypothesis is implausible, but the latter hypothesis confuses constitution with

causation, and so fails to show that cognition extends. An attempt to answer the complaint of constitution/causation conflation, or to characterize a hypothesis of extended cognition distinct from those Adams and Aizawa present, then becomes the burden of extended cognitive theorists.

The second main contribution of the *The Bounds of Cognition* is its insistence that there be a mark of the mental in place prior to efforts to justify extended cognition. Initially I was skeptical of this demand, as Adams and Aizawa kindly remind me in a footnote (p. 22).[1] My thought at the time was simply that much of science proceeds unproblematically without having in hand marks of the living, or marks of the physical, or marks of the social. However, I now believe that Adams and Aizawa are right. If the goal is to say something about where cognition is, one must be able to distinguish the cognitive from the non-cognitive. Analogously, one cannot say where life is—Is there life on Mars? Is there life in this virus?—without first establishing some conditions for distinguishing the living from the non-living.

Without a mark of the cognitive, Adams and Aizawa correctly wonder how it is possible to defend the claim that cognition extends. If cognition is just information processing, of course cognition takes place outside the head, for many artifacts, like the PDA I mentioned earlier, process information. If cognition requires consciousness, many information processors are not cognitive, and perhaps many organisms that can solve problems, respond to their environments, and learn, are similarly not cognitive. The point is, judgments about the kinds of systems or processes that are cognitive depend crucially on a theory of cognition.

By Adams and Aizawa's lights, cognition bears two marks. The first is nonderived, or intrinsic, or original, content. This is the idea that genuinely cognitive systems will have content-bearing states whose content is not the product of someone else's assignment. Cognitive systems found in organisms have such states, for the content of these states derives from conditions that some naturalistic theory of content will describe. On the other hand, the content of states or symbols in a computer, or in a book, or in a map, is derived. The states or symbols mean what they do because human beings assigned these meanings to them (this is not to say that there is a univocal account of such assignments—maps may receive their content one way and words another).

The second mark of the cognitive focuses on a distinctive form of processing. Adams and Aizawa claim that cognitive processes are of a special sort. The mechanisms by which organisms remember, perceive, attend, learn, and so on lend themselves to investigation by a fairly uniform array of tools and methods. Cognitive psychologists who study these phenomena rely on reaction time experiments, recall tasks, primes, and other experimental devices. A rules and representation framework provides a compelling means by which to describe and understand these phenomena. These facts suggest that the abilities that cognitive psychologists study can be distinguished by the nature of the processes and mechanisms involved in their implementation.

There are several points to make about Adams and Aizawa's marks of the cognitive. First, regardless of whether they are right that original content or processing details are the correct marks of the cognitive, Adams and Aizawa have thrown down a glove that

[1] Richard Menary (2007: 195, fn. 2), too, has doubted the need for a mark of the cognitive.

defenders of extended cognition cannot ignore. If Adams and Aizawa are right, extended cognition theorists need to explain how extended cognition has both original content and utilizes the right sort of processing. If Adams and Aizawa are wrong, extended cognition theorists need to explain why they are wrong, *and* they need to propose an alternative theory of cognition.

Second, Adams and Aizawa's marks of the cognitive do not, as they note, rule out the possibility of extended cognition. They are careful to observe that it is simply a contingent matter that cognition is intra-cranial (p. 55). There is no reason to believe, however, that extended cognition is physically impossible. It just so happens that the only cognitive systems of which we are aware, i.e. the only systems that exhibit the right sort of processing and have states with original content, are brains or nervous systems, and these things tend to be in heads.

The third point about Adams and Aizawa's marks of the mental is potentially quite damaging. Adams and Aizawa rely on these marks to challenge the idea that cognition extends. On many occasions they point to purported examples of extended cognition, claim that such systems lack the marks of the cognitive, and on this basis deny that the system is genuinely cognitive. For example, they are willing to accept the possibility that pencils and notebooks do extend cognition, but only "if the pencil and notebook were, in whole or in part, to satisfy conditions on the possession of non-derived content and participate in the kinds of causal relations that we theorize are distinctive of cognitive processes…cognitive processes do not extend, because they do not bear what we take to be the mark of the cognitive" (p. 129). My concern is limited to the first of Adams and Aizawa's two marks of the cognitive, so I acknowledge that if they cannot meet my concern they can still fall back on the second of their marks, although their critical strategy would, I think, lose the better part of its strength.

The problem with using original content as a mark of the cognitive is that there is today no received theory of how original content comes to be in the first place. Adams and Aizawa mention three theories of content that purport to explain how original content arises naturally. These are Dretske's (1981, 1988), Fodor's (1990), and Cummins' (1996). None of these theories, however, is without its critics, and moreover there is no reason to believe that all of these theories will produce the same results. These considerations suggest the following possibilities. First, the "right theory" of original content may still be awaiting discovery. If so, Adams and Aizawa cannot at this point state with confidence that cognition doesn't extend. Perhaps on the right theory some extended cognition will have states with original content. Or, perhaps the right theory will show that the distinction between derived and underived content is one of degree rather than kind. In this case, cognition may extend, although there may be reason to think of extended cognitive systems as the poorer cousins.

Second, perhaps there is no right theory of content. In this event, Adams and Aizawa would have to defend why a theory of content that excludes extended cognition (albeit on a contingent basis) is better than a theory that makes room for extended cognition. Whatever the plausibility of this scenario, its possibility reveals something about the nature of the debate over extended cognition. When Adams and Aizawa say that they "want to advance the further empirical hypothesis that, as a matter of contingent empirical fact, non-derived representations happen to occur these days only in nervous systems," and that there is thus "some non-question begging, defeasible reason to think that, contrary to what the advocates of extended cognition propose, cognitive processing

is by and large to be found within the brain," (p. 55), one must wonder whether the hypothesis they want to advance really is empirical; one must wonder whether the hypothesis really is non-question begging.

Pretty clearly, the discovery of a theory of content falls within the province of philosophers. At any rate, scientists appear uninterested in pursuing the project. This suggests that a theory of content, however it turns out, is going to have largely conceptual portions, unlike, say, the theory of natural selection, which Darwin developed and defended on the basis of heaps of physical evidence.[2] But if a theory of content is largely non-empirical, and a mark of the mental depends on this theory, why does it become a matter of contingent empirical fact that cognition takes place only in nervous systems? Likewise, why is the choice of a theory that makes it turn out that cognition takes place only in nervous systems (as a matter of fact) not question begging?

These last considerations place into relief a discomfiting feature of the debate over extended cognition. Some proponents of extended cognition seem to hold a conception of cognition so different from that found within traditional cognitive science that one might reasonably wonder whether the disputants ever really make contact with each other. Thus, for instance, Menary (2007: 63) responds to Adams and Aizawa's point about a constitution/causation confusion, saying "[i]f we accept the picture of a cognitive agent as implementing a discrete cognitive system, before they [*sic*] ever encounter an external vehicle, then we will have accepted the very picture of cognition we set out to reject". For Menary, the supposition of a cognitive agent that exists independently of extra-cranial cognitive components already begs the question against extended cognition. Granting this, there seems hardly enough common ground between extended cognitivists like Menary and critics like Adams and Aizawa to support a debate of much interest. But this, as Adams and Aizawa recognize (p. 84), only heightens the need for continued discussion of the marks of cognition.[3]

The Bounds of Cognition is without question a worthy and timely challenge to extended cognition, as well as to areas in related enterprises such as embodied cognition, situated cognition, dynamical systems theory, and artificial life. Adams and Aizawa deserve credit for drawing attention to issues that require further treatment from advocates of extended cognition, and for isolating many of the deeper issues that lie beneath the surface in the debate between extended cognitivists and traditional cognitivists. I recommend the book highly to anyone interested in these issues.

[2] I'm not terribly comfortable with this distinction between "largely conceptual" and empirical theories. But there are theories that seem more empirical – they depend on evidence for their support, can be tested against observations, and so on – than others. My hunch is that theories of content fall on the less-empirical end of what might be a spectrum rather than a division.

[3] For Menary (2007: 15), cognition is the completion of a cognitive task by the manipulation of representations. Of course, this definition would seem to require some further account of which tasks count as cognitive. This aside, clearly this definition of cognition might be more friendly to the possibility of extended cognition than Adams and Aizawa's.

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