

Book Review
Cognitive Systems and the Extended Mind*

Robert D. Rupert
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Cognitive Systems and the Extended Mind defends an embedded view of cognition according to which cognitive processes can causally depend on environmental resources in hitherto unexpected ways but cognitive systems are located inside the heads of biological organisms. Rupert firmly rejects the thesis of the extended mind (EMT) according to which cognitive processes can sometimes spread across brain, body and world. In *Cognitive Systems* he surveys most of the arguments that have been offered in defense of EMT and makes a valiant (but ultimately unsuccessful) attempt at refuting them one by one. The volume however isn't entirely negative. Part three of the book develops in detail Rupert's alternative somewhat conservative view of cognitive systems as computational systems located inside the heads of organisms, and of cognitive processes as the manipulation and transformation of internal mental representations.

The volume is organized around three main parts. Part one of the book is mostly methodological and largely devoted to the investigation of how to demarcate cognitive processes from non-cognitive background conditions. In chapter two, in the attempt to delineate cognition, Rupert introduces three desiderata (conservatism, simplicity and scientific feasibility or empirical progress) that are used as theoretical virtues to set up grounds for distinguishing a causal contribution from a cognitive one. Rupert deploys these three desiderata against EMT. Particularly, he asserts that all the criteria EMT enthusiasts have put forward for determining the boundaries of a cognitive system fail to meet his three theoretical virtues. The only account of

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the cognitive, he thinks, that satisfies his theoretical virtues is an embedded one, which takes cognitive systems to be characterized as an integrated set of internal, biological mechanisms interacting with an ever-changing cast of external materials to produce intelligent behavior.

Part two of the book looks at the arguments for EMT and attacks them with a view to defending a system-based approach. More specifically, Rupert calls into question the functionalist credentials of EMT defending the view that the causal roles which are definitive of our mental states should be individuated using the fine-grained details of human psychology as described by cognitive psychology as our benchmark. Chapter five assesses a number of empirical studies that have been used to motivate EMT and shows how these studies can be reinterpreted so as to support an embedded account of cognition. Rupert further emphasizes the virtues of his system-based approach and argues that «the acceptance of the embedded alternative encourages researchers to keep clearly in mind the important asymmetries (between the organism and the external resources), while in no way encouraging them to neglect the interface with or heavy dependence on the environment»(p.107). Rupert takes such asymmetries to count against EMT. He reasons that internal biological processes make a causal contribution to cognition that is very different from anything located in the external environment. These differences (between the biological and the external), he continues, preclude the causal contribution of the external environment from counting as cognitive. However according to some proponents of EMT, it is precisely these differences in causal contribution that motivate EMT. The external makes a causal contribution that is different from but complementary to the contributions of processes taking place inside the head. The complementarity of the inner and outer enables us to cognize in new ways that go beyond what we could achieve on the basis of the bare biological processes taken in isolation. I shall tackle this point in greater detail later in this review. For now, let me add that Sprevak (2009) has also noticed a potential stand-off in Rupert's argument. We can redescribe the empirical evidence for EMT in ways that favors an embedded view but all this shows is that the empirical evidence doesn't decide between extended or embedded. It doesn't support EMT but nor does it favor an embedded view.

Part three develops the system-based approach in much more detail focusing on representation and computation. In this section of the book Rupert aims to develop a positive account according to which cognition is located inside the boundaries of the organism. He does so on the basis of the

arguments from empirical success proposed in chapters two and three. These arguments largely rely on methodological considerations, which favor an organismically bounded perspective that seems to provide the best account of explanation in cognitive psychology. Rupert also attempts to demonstrate how his embedded account can accommodate everything that EMT wants to say without abandoning the traditional computational framework. It should be noted that many proponents of EMT such as Clark, Wheeler and Wilson also accept the computational framework. They argue for what Robert Wilson (1994) has dubbed “wide computationalism”. The book finishes up with a chapter on embodied cognition and with some work in cognitive linguistics. Rupert carefully distinguishes embodied from extended approaches. The volume centers around two themes. One is the notion of integration, the second is the need for a mark of the cognitive. In the rest of this review, I intend to attack Rupert’s account of integration from a complementarity standpoint (Menary 2007, 2010; Sutton 2010; Rowlands 2010) and cast some doubts upon those views that take the mark of the cognitive to be necessary for cognitive science.

Rupert defines a cognitive system «as an integrated set of stable and persisting mechanisms that contribute distinctively to the production of cognitive science’s explananda» (Rupert 2010, p. 344). On his account, a mechanism counts as cognitive and therefore becomes a part of an integrated cognitive system, when it contributes to the production of a wide range of cognitive phenomena across a variety of conditions. The organism is taken as an integrated physical entity whose persistence and relative durability explains the persistent appearance of the integrated set of cognitive capacities realized by the organism itself. But there are other ways of thinking about integration that are consistent with the soft-assembly of cognitive systems on the fly, and that therefore call into question Rupert’s persistence and durability requirement.¹ Different components of a soft-assembled system can play quite different roles and have different properties while nevertheless combining to make complementary contributions that enable flexible thinking and acting. A biological cognizer tight coupled with the right kinds of environmental resources, can permit the organism to perform cognitive functions that it wouldn’t be able to accomplish in the absence of such external resources. This tight coupling can provide the right kind of temporary integration of the

¹ See Clark 2001, 2003; Sutton 2010; Menary 2007.

internal and external for the organism to accomplish its goals. There is no need for the integration to last beyond the organism's successful performance of a task. The asymmetry point aforementioned becomes particularly relevant here. Extended cognition doesn't require a fine-grained functional isomorphism between inner and outer processes. We get something new by working in mutual partnership with the external environment, something that we wouldn't get from the biological taken on its own. The complementarity between the internal and external therefore «directs our attention to rich, full, and often idiosyncratic cognitive ecologies in which the computational power and expertise is spread across a heterogeneous assembly of brains, bodies, artifacts, and other external structure» (Sutton *et al.* 2010, p. 6).² This is why, I think, the human biological cognizer and the environment need to be taken as a complementarily integrated system of cognitive analysis, with neural, bodily and environmental components making equal contributions in the performance of cognitive tasks.

The second central theme of the book is the mark of the cognitive. The need for a mark of the cognitive has been famously promoted by Adams and Aizawa (2008), Rupert (2004) and more recently endorsed by Weiskopf (2010a, 2010b). Its necessity has been postulated, even if with dissimilar goals, by some friends of EMT.³ However, Clark (2008, 2010a, 2010b) and Sutton (2010) have resisted this claim on the grounds that it unnecessarily complicates EMT. Let me dig a bit more into this. According to Rupert, EMT needs a mark of the cognitive if it is to succeed in arguing that the environment is playing a constitutive role in the emergence of a cognitive process. The need for such a mark follows from the necessity to distinguish factors that are genuinely parts of a cognitive system from factors that only causally contribute and don't have any constitutive involvement. Rupert individuates the locus of such a mark in the organism and his view of cognitive systems, discussed above, is taken as a measure to distinguish what is cognitive from what is not. Particularly, Rupert believes that what happens within the biological cognizer (the set of mutual interrelations between body and brain) can entirely account for cognition. What is external to the bio-physical architecture of the organism can only ever make a causal contribution. The debate around the mark of the cognitive famously emerged from the discussion of the causal-constititional

² Also see Hutchins 2010, Tribble and Keene 2010 for similar arguments.

³ See Rowlands 2008, and particularly Wheeler 2005 and forthcoming.

conflation. Some people assume (and Rupert certainly stands among them) that this conflation entails the need for a mark of the cognitive. Rupert provides one that entails that an external resource can make a cognitive contribution to behavior only if it corresponds in a fine-grained way with the causal contribution of our inner states. There are specific psychological effects for instance (e.g., negative transfer, primacy and chunking effects) that we do not find in cases of extended memory. Because of this failure of fine-grained correspondence we shouldn't treat use of external resources in memory tasks as cognitive uses. We should say instead that the external resource is only making a causal contribution.

Now, as I stated above, Clark (2008, 2010a, 2010b) believes that the attempt to identify a mark of the cognitive is unlikely to bear fruit.⁴ First of all Clark denies that the differences in fine-grained functional role of the external and internal matter, arguing instead that the sort of functional equivalence that counts for the parity argument is determined at a fairly coarse-grained level. If the cognitive were marked out by a fine-grained correspondence, this would prevent us from attributing cognition to creatures that are appreciably different (either biologically or psychologically) from us. The demand for a fine-grained correspondence requires us to scale new heights of neurocentrism and anthropocentrism. Cognition, as far as Clark is concerned, does not necessarily necessitate minds that work in the same fine-grained ways as human minds work. Additionally, since the differences between «external-looping (putatively cognitive) processes and purely inner ones will be *no greater than those between the inner ones themselves*» (Clark 2010a, p. 51), it is likely that the inner goings-on, postulated by opponents of EMT, will turn out to be a motley crew. Clark has in fact brilliantly noticed, that we already possess a practical grasp on the kinds of coarse-grained behavior patterns that we presume to be characteristic of key cognitive processes, such as the holding of a standing (dispositional) belief (Clark 2010b). A very basic and relatively liberal appeal to folk psychology would therefore suffice to guide us in working out what counts as cognitive and what does not. Wheeler has recently disagreed arguing that EMT needs «a scientifically informed, theory-loaded, locationally uncommitted account of the cognitive» (Wheeler 2010). Clark has responded that such a quest is unnecessary and unlikely to succeed. The shape and the contour of any such a theory will always and ultimately be determined

⁴ Also see Sutton 2010 and Menary 2007 for similar arguments.

by what one takes as central examples of real-world realizers of cognitive processes (Clark 2010b).

To conclude: *Cognitive System and the Extended Mind* raises some significant challenges for EMT and provides powerful support for a more traditional orthodox approach to cognitive science. The book is not for everyone: it is densely written and some of its arguments remained cryptic at least to this reader. It nevertheless succeeds in making a strong case for an embedded perspective even if Rupert's opponents are unlikely to be convinced. Rupert's arguments remain undecided. He fails to point to any way-out from the impasse in which the debate between embedded and extended has fallen that favors Rupert's embedded conservatism over the more radical ideas of friends of the extended mind.

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