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How Otto did *not* extend his mind, but might have: Dynamic systems theory and social-cultural group selection

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Abstract

Proponents of cognitive Situationism argue that the human mind is embodied, embedded in both natural and social-cultural environments and extended creating both extended and distributed cognition. Anti-situationists reject all or some of these claims. I argue that four major objections to extended cognition: (1) the mark of the cognitive, (2) the function-identity fallacy, (3) cognitive bloat, and (4) scientific irrelevance lose much of their sting in the case of distributed cognition, the extension of cognitive agency to a group of cognitive agents, such as a scientific research team. However, I claim that a crucial fifth challenge, that advocates of the extended mind commit the causal-constitution fallacy, has yet to be satisfactorily addressed. I focus on Spyridon Palermos' use of dynamic systems theory to refute this charge and I argue that his appeal to dynamic systems theory as a way of understanding system-constitution fails. Instead, I suggest a social-cultural group selection hypothesis for understanding system-constitution. But, I leave it for another day to elaborate that hypothesis' empirical plausibility.

Keywords: Causal-constitution fallacy; Cultural group selection; Distributed cognition; Dynamical systems theory; Extended cognition: Situated cognition

1. Introduction

Advocates of the extended mind, most prominently Clark (1997, 2007, 2008), have argued that human cognitive and agential capacities are not only *embodied* and move beyond one's skin into the external environment, *embedding* themselves in the natural and social-cultural environments, but also are *extended* into that environment so that a thinking, cognizing entity is constituted not only by the embodied mind but also by an embedding environment.[1] Brain, body and environment form a thinking, cognizing entity. The mind super-sizes itself! Our world appears to be increasingly a world of embodied, embedded, and extended epistemic agential systems (Schmitt, 2003; Tollefsen, 2015).

[1] This way of formulating the phenomenon may seem to prejudice the case against advocates of the extended mind by assuming that proponents of the extended mind must presuppose the existence of some non-extended mind as a prerequisite for any extension. The formulation represents rather the way in which the phenomenon was first addressed and described and the way it is often discussed. From a scientifically informed view, it may turn out that extended minds precede phylogenetically and ontogenetically non-extended minds.

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In this paper, I examine an especially significant version of super-sizing, distributed cognition, the extension of *cognitive* agential agents to form a plural cognitive agent.[2] In doing so, I take scientific knowing and the cognitive processes of scientific research teams as a plausible instance of distributed cognition. I examine five major objections to the extended mind hypothesis that also raise problems for the distributed cognition thesis. I suggest that distributed cognition is best able to avoid four of these five objections, leaving the causal-constitution fallacy as particularly urgent. I focus on a particularly promising attempt to avoid that fallacy using dynamic systems theory (DST). Spyridon Palermos argues (2014, 2015, 2016) that a dynamical systems theory (DST) account of extended cognition shows how to avoid that fallacy by modeling a coupling relation that provides a necessary and sufficient condition for extended cognition, including the distributed cognition involved in scientific knowing.

I argue that Palermos' DST coupling account of the constitution relation is physically implausible requiring superluminal interaction and rests on a misunderstanding of the differential equations used to model extended and distributed cognition. A physically plausible account of the coupling relation makes it a causal, not a constitutive relation. I then make use of William Bechtel's work to show how a DST account of distributed cognition incorporates a representational feature and thus enables Palermos to meet the challenge of proponents of non-representational DST accounts of cognitive extension. These fixes to Palermos' DST account still leave him with the problem that it fails to distinguish cases of scientific knowing in which its success represents the results of individual cooperating scientists and in which its success represents the product of a collective scientific agent, for instance, a scientific research group. While the collection of individually cooperating scientists instantiates a relation between causally interaction cognitive agents, the latter instantiates a constitutive relation that makes the scientists members of a collective entity.

To solve this problem, I propose a social-cultural group selection approach to understanding the constitution relation.[3] The proposal consists of three parts. It's basic hypothesis is that the distributed cognition characteristic of scientific research teams is a trait of a cognitive collective agent whose members are individual scientists who have organized their work in specific ways to accomplish collective goals. Second, I argue that such collectives are the result of social-cultural group selection. Finally, I suggest that the presence of group selection serves as a criterion of the presence of the collective agency that is the source of distributed cognition. Distributed cognition is, on my proposal, the result of a socially-culturally selected for collective agent. That agent is constituted by its members, interacting individual cognitive agents, in particular, individual scientists, who are organized to produce the cognitive products that are characteristic of some large scale scientific research, like, plausibly, those of CERN and the human genome project. To make my case, I make use of the recent work on understanding cultural learning as opposed to individual learning and the cumulative culture that seems distinctive of human cognitive enhancements characteristic of art, technology, and science. I apply multi-level selection theory to understand how a scientific collective can emerge from a collection of scientific agents using criteria developed by biologists to understand how a collection of single-celled organisms can come to be a collective of cells, a multi-celled organism. However, my suggestion that a social-cultural model of group selection provides a way to understand and explain the distributed cognition seemingly manifested in the activity and results of scientific research teams, thus providing a way to understand the constitution relation, remains just that. It awaits both further theoretical elaboration and empirical support. Whether extended cognition exists is, I think, still an open empirical question, but one worthy of both theoretical and empirical pursuit.

In the next section, Section 2 "Setting the Stage", I lay out the Situationist and anti-Situationist positions. Section 3 "The Back- Story on Otto and His Notebook" provides an entry into the issues dividing these positions. These are laid out in Section 4 "Objections to Situated Cognition and Replies" where I argue that the proponents of Situationism in the form of distributed cognition are in the best position to avoid four of the five key objections to their position. That leaves the issue of the so-called causal-constitution fallacy to be addressed. I turn to a prominent way of doing that in Section 5 "A Dynamic Systems Theory Account of Extended and Distributed Cognition" where I present and evaluate Spyridon Palermos' DST coupling account of constitution. Having suggested ways to fix two of the problems facing that account, I turn in Section 6 "A Social-Cultural Group Selection Approach to Constitution," to my own positive proposal for how to understand the constitution relation that is instantiated in distributed cognition in the case of some scientific research teams as a trait of a scientific collective rather than as a set of causal relationships between a collection of scientific agents. Section 7 "A Metaphysical and Biological Challenge" provides replies to those who might find my proposal either metaphysically or biologically problematic. Finally, Section 8 "Conclusion" gives a brief wrap up.

[2] I focus on human cognitive agents, specifically on scientific research groups. Questions about extended and distributed cognition can, of course, be raised about other living and non-living entities.

[3] In advocating a social-cultural selection account of distributed cognition, I do not abandon the DST approach, but rather appeal to resources that proponents, in particular, Palermos, neglect but that are entirely consistent with it, indeed, include it and have been used in DST game theoretic models.