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### Enriching radically enactive cognitive science

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## Enriching radically enactive cognitive science

### Abstract

The sciences of mind have taken a decisively embodied, enactive turn, exploring the possibility that thinking may occur in action and not only in the head or the brain. The embodied cognition movement, which first established itself in the early 1990s, has matured into a flourishing research program with many branches. Embodied cognition has come of age. Even traditionalists who view this program with skepticism admit embodied cognitive science is now a force to be reckoned with, one that: "is sweeping the planet" [1, p. 619] and "has become an industry" [2, p. 1]. The main driver of its growth is a continuous stream of empirical findings that provide "substantial evidence in support of the pervasive occurrence of embodied cognition" [3, p. 80]. It is now beyond serious dispute that cognition is embodied in important and surprising ways.

### Keywords

radically, enriching, cognitive, science, enactive

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# Enriching Radically Enactive Cognitive Science

Daniel D. Hutto<sup>1</sup>

The sciences of mind have taken a decisively embodied, enactive turn, exploring the possibility that thinking may occur in action and not only in the head or the brain.

The embodied cognition movement, which first established itself in the early 1990s, has matured into a flourishing research program with many branches. Embodied cognition has come of age. Even traditionalists who view this program with skepticism admit embodied cognitive science is now a force to be reckoned with, one that: “is sweeping the planet” [1, p. 619] and “has become an industry” [2, p. 1]. The main driver of its growth is a continuous stream of empirical findings that provide “substantial evidence in support of the pervasive occurrence of embodied cognition” [3, p. 80]. It is now beyond serious dispute that cognition is embodied in important and surprising ways.

It is agreed *that* the mind is embodied. But there is philosophical work to be done. Despite the consensus that embodied cognition must be taken seriously, there is continued disagreement about its nature. Three main frameworks have emerged. At one extreme are ‘replacement’ views of embodied cognition [4]. Replacement accounts characterize cognition as essentially a kind of solicited organismic activity that occurs in the form of sensitive interactions stretching across the brain, body and environment [5-9]. Originally inspired by scientific developments in robotics [10], dynamical systems theory [11] and ecological psychology [12, 13], the basic idea of cognition as embodied activity finds philosophical support from the phenomenological, American naturalist and Buddhist traditions of thought. The distinguishing feature of all replacement approaches is their opposition to the mainstream view that cognition essentially involves the collection and transformation of information in order to represent the world; fundamentally they challenge accounts of cognition that “take representation as their central notion” [14, p. 172], seeking to move away from the idea that the primary and defining work of minds is always that of representing and computing.

At the opposite end of the spectrum there are ‘conservative’ accounts of embodied cognition that see no need for any major revisions in our thinking about cognition. These accounts attempt to accommodate recent findings about the role of embodiment in cognition while still conceiving of cognition as wholly representational and entirely brainbound. They do so by positing representations with special formats that represent features of the body, these types of representation play a much larger and more fundamental role in cognition that was previously supposed [15, 2, 3]. Importantly, embodied cognition theorists of this stripe assume that the real work of cognition is to manipulate representations in the brain, and that it is only such manipulation which cognitively informs and guides what is done or experienced. In direct contrast to replacement theories, these conservative views of embodied cognition leave the mainstream representationalist framework entirely intact.

Between these two extremes are ‘hybrid’ accounts. Hybrid accounts are unlike replacement accounts in positing sparse inner models in the brain that, for example, do predictive coding work. They assume that special kinds of minimal, action-oriented, representations play a part in this modeling activity, helping to drive and steer dynamic and extended cognitive processes [16, 17, 18]. Action-oriented representations are hypothesized to be content-bearing states or processes whose functional role is to indicate the presence of, and to sometimes ‘stand in’ for, states of affairs in order to guide and direct specific kinds of action. Action-oriented representations are interestingly different from standard representations is that their vehicles need not be wholly neural and brainbound. This gives hybrid accounts scope to assume that cognitive vehicles and processes reach across brain, body and environment [19, 20, 21, 22]. In this respect, unlike conservative accounts, hybrid accounts can put appropriate emphasis on “the profound contributions that embodiment and embedding make” [20, p. 45]: they seemingly offer the best of both worlds.

This presentation will prepare the ground for an enriched understanding of embodied cognition: one that will reveal just *how embodied it is* and just *how it is* embodied. Ultimately, I will argue that once unified replacement approaches, despite some familiar objections, have all that is needed to do the necessary enriching work.

In making my case I will highlight a recognized danger – call it the Retention Worry – that many applications of embodied, enactive cognition, (with headline cases in psychology, psychiatry and sports science) are ‘missing the point’ [23, p. 1]. The Retention Worry arises for any account of embodied cognition that retains too much traditional thinking about the role of mental representations in cognition, for such accounts “fail to successfully motivate any role for the body or environment, let alone the one identified in the research” [23, p. 2].

The Retention Worry clearly applies to conservative accounts. This is because those accounts regard representations as taking up the entire explanatory burden, of playing the Complete role, in cognition. By focusing wholly on the manipulation of internal representations in the brain such accounts unnecessarily complicate our understanding of how agents actively solve problems in real time without providing any explanatory gain. Worse still, such accounts obscure the ways in which agents apparently actively and directly marshal bodily and environmental resources in completing cognitive tasks.

It may look as if hybrid accounts can easily address the Retention Worry. But that will be so only if such accounts are right in assuming representations do play an important if limited role in embodied cognition. Replacement theorists give reason to doubt this, observing that: “despite the fact that one can cook up a representational story ... the representational gloss does not predict anything about the system’s behaviour that could not be predicted by dynamical explanation alone” [8, p. 77].

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Although the replacement views completely escape the Retention Worry, they face a counter concern – namely, that they mistakenly fail to acknowledge the need for mental representations. Hybrid theorists argue that in denying any explanatory role for mental representations replacement accounts are “unworkable” [24, p. 36]. Against this backdrop it is clear that today’s most promising accounts of enactive, embodied cognition pull in opposite directions over the issue of mental representations. This topic is the central focus of this presentation. Only by clarifying what, if any, role representations play in cognitive science explanations will we gain a deeper, enrich understanding of the nature of embodied cognition.

The Retention Worry raises burning questions: How much representing is too much? Do representations play an explanatory role in embodied cognition? And, if so, how much of a role and what kind of a role? This presentation will examine three possible answers: No role; Limited role; or Complete role. Against the backdrop of the Hard Problem of Content, it will also consider two different kinds of explanatory roles talk of mental representations might play [25]. Mental representations might be understood literally or fictionally [26]. On the first view representations exist and play a part in causally explaining behavior. On the second view, mental representations do not literally exist but positing them may still play some other crucial explanatory role.

## REFERENCES

- [1] Adams F. (2010) Embodied cognition. *Phenomenology and the Cognitive Sciences*. 9: 619-628.
- [2] Alsmith, A.J.T. & de Vignemont, F. (2012), Embodying the mind and representing the body. *Review of Philosophy and Psychology*. 3:1, 1-13.
- [3] Goldman A.I. (2012). A moderate approach to embodied cognitive science. *Review of Philosophy and Psychology* 3:1, 71-88.
- [4] Shapiro L. (2011). *Embodied cognition*. London, Routledge.
- [5] Dreyfus, H. (2002). Intelligence without representation: the relevance of phenomenology to scientific explanation. *Phenomenology and the Cognitive Sciences* 1:4. 367–83.
- [6] Gallagher, S. (2005). *How the body shapes the mind*. Oxford: Oxford University Press.
- [7] Thompson E. (2007). *Mind in life*. Cambridge, MA: Harvard University Press
- [8] Chemero A. (2009). *Radical embodied cognitive science*. Cambridge, MA: MIT Press.
- [9] Keijzer, F.A., Van Duijn, M. & Lyon, P. (2013). What nervous systems do: Early evolution, input-output, and the Skin Brain Thesis. *Adaptive Behavior*, 21(2), 67-85.
- [10] Brooks R. (1991). Intelligence without representation. *Artificial intelligence* 47: 139-159.
- [11] Beer R. (1998). Framing the debate between computational and dynamical approaches to cognitive science. *Behavioral and Brain Sciences* 21: 630.
- [12] Gibson, J.J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.
- [13] Charles, E.P. (2013). Unifying approaches to psychology. *Review of General Psychology*. 17(2).
- [14] Varela F, Thompson E, Rosch E. (1991). *The embodied mind*. Cambridge, MA: MIT Press.
- [15] Gallese, V. & Sinigaglia, C. (2011). What is so special about embodied simulation? *Trends in Cognitive Sciences*, 15(11), 512-519.
- [16] Wheeler M. (2005). *Reconstructing the cognitive world*. Cambridge, MA: MIT Press.
- [17] Wheeler M. (2008). Minimal representing: A response to Gallagher. *International Journal of Philosophical Studies* 16(3): 371-376.
- [18] Clark, A. (unpublished manuscript) *Surfing uncertainty: Prediction, action, and the embodied mind*.
- [19] Clark, A. (1997). *Being there: Putting brain, body and world together again*. Cambridge, MA: MIT Press.
- [20] Clark A. (2008). Pressing the flesh: A tension in the study of the embodied, embedded mind? *Philosophy and Phenomenological Research* 76:37-59.
- [21] Clark A. (2008). *Supersizing the mind: Embodiment, action, and cognitive extension*. New York: Oxford University Press.
- [22] Colling, L.J, Thompson, W.F., & Sutton, J. (2013). Motor experience interacts with effector information during action prediction. *Proceedings of the 35<sup>th</sup> annual conference of the cognitive science society*. 2082-2087.
- [23] Wilson, A.D. & Golonka, S. (2013). Embodied cognition is not what you think it is. *Frontiers in Psychology*. 4:58. 1.
- [24] Foglia, L., & Grush, R. (2011). The limitations of a purely enactive (nonrepresentational) account of imagery. *Journal of Consciousness Studies*, 18(5-6). 35-43.
- [25] Hutto, D. D., & Myin, E. (2013). *Radicalizing enactivism: Basic minds without content*. Cambridge, M.A: MIT Press.
- [26] Sprevak, M. (2013). Fictionalism about neural representations. *The Monist*. 96:4. 539-560.