

DEWEY ON EXTENDED COGNITION AND EPISTEMOLOGY

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Abstract

There is a surge of attempts to draw out the epistemological consequences of views according to which cognition is deeply embedded, embodied and/or extended (e-cog). The principal machinery used for doing so is that of analytic epistemology. Here I argue that Dewey's pragmatic epistemology may be better fit to the task. I start by pointing out the profound similarities between Dewey's view on cognition and that emerging from literature of more recent date. Crucially, the benefit of looking at Dewey is that Dewey, unlike contemporary writers, also devises a corresponding epistemology. I then identify two senses in which contemporary analytic epistemology conflicts with e-cog—concluding from that the superiority of the Deweyian framework, at least as it concerns accommodating e-cog.

1. Introduction

Over the last couple of decades, the view that cognition spans body, brain and world—more vernacularly, that cognition is embedded, embodied and/or extended—has attained high visibility. Philosophers and cognitive scientists like Andy Clark and Chalmers (1998); Clark (2008), Susan Hurley (1998), Tim van Gelder (1995), John Haugeland (1995), Mark Rowlands (1999, 2010), and others have done much to promote the idea that human thought is to a high degree subserved by extracranial processes. They have done so with the explicit purpose of offering an alternative to the more traditional viewpoint, according to which cognition is strictly brain-bound and according to which the brain is a disengaged, abstract information processor, receiving inputs from the senses and issuing outputs to the body, as if sandwiched between perception and action.

Contemporary epistemology has been fairly slow in assimilating these ideas, notwithstanding the fact that it is concerned with perhaps one of the most remarkable products of human cognition—viz. knowledge (Clark et al., 2012). But, very recently things appear to be changing. In the span of no more than three years, mainstream philosophy journals have published a substantial amount of papers on the ways in which the theses of embedded, embodied and/or extended cognition may or may not intersect with contemporary analytic epistemology (Pritchard, 2010; Vaesen, 2011, 2013; Palermos, 2011; Adams, 2012; Aizawa, 2012; Butts, 2012; Giere, 2012; Goldberg, 2012; Green, 2012, 2014; Hetherington, 2012; Kirchhoff and Newsome, 2012; Loader, 2012; Menary, 2012; Roberts, 2012; Kelp, 2013, 2014; Carter, 2013).

Yet, strikingly, none of these papers (including my own) refers to an epistemological project of the first half of the 20th century, launched precisely in order to accommodate a vision of cognition which we would now dub embedded, embodied and/or extended. I have in mind the work of early pragmatists, especially the work of Dewey, who was arguably most explicit in rejecting the Cartesian mind-body distinction and in developing a corresponding epistemology.

My aim in this paper is to rectify this, what I have come to see as an unfortunate, omission. In particular, I intend: to highlight the sense in which Dewey anticipated much of what is currently widely discussed under the banner of embedded, embodied and extended cognition (or e-cog for short; Section 2); to review what Dewey considered to be the implications for epistemology (Section 3); to point out why Dewey's epistemology may be a much more natural fit to e-cog than contemporary analytic epistemology (Section 4). I conclude (Section 5) that Dewey deserves renewed interest from all those who wish to articulate the ramifications of e-cog to theorizing about knowledge (including me, whose interest in Dewey is fairly recent).

2. Dewey's View on Cognition

Dewey was heavily influenced by William James. For one, he inherited from James an appreciation for the body as crucial for our understanding of the mind, but rejected the Cartesian body-mind dualism more consistently than his mentor, in that he, unlike James, also thought of the will as embodied rather than purely mental (Shusterman, 2008). Below, I summarize Dewey's philosophy of mind(-body) by means of four claims, which also serve to bring out the similarities with recent work on e-cog.

2.1. *Claim 1: Cognition should be studied in the light of the evolutionary processes that shaped it*

Dewey wholeheartedly embraced James' naturalism. More particularly, according to Dewey, if one wishes to understand the mind(-body), what one must do is to consider it in light of the evolutionary processes which shaped it:¹

The significance of the evolutionary method in biology and social history is that every distinct organ [including the organs of thought], structure, or formation, every grouping of cells or elements, is to be treated as an instrument of adjustment or adaptation to a particular environing situation. Its meaning, its character, its force, is known when, and only when, it is considered as an arrangement for meeting the conditions involved in some specific situation. (Dewey, 1916, p. 94)

It is no secret, I guess, that contemporary research on e-cog betrays similar commitments, as is for instance evidenced in statements to the effect that cognitive science should focus on cognition in the wild (Hutchins, 1995); that *biological* brains are primarily tuned to control *biological* bodies, and thus should be studied as such (Clark, 1998b); that cognitive processes should be considered in terms of their adaptive activity or in terms of the purposes for which they evolved (Franklin, 1995; Menary, 2007; Rowlands, 2010).

2.2. *Claim 2: Cognition is embodied, and extends into the world*

Deploring the habit of philosophers to set up all sorts of dichotomies (Shusterman, 2008), Dewey finds one dichotomy particularly harmful, namely Cartesian mind-body dualism, which he holds responsible for several evils of his time:

I do not know of anything so disastrously affected by the tradition of separation and isolation as this particular theme of body-mind. In its discussion are reflected the splitting off from each other of religion, morals and science; the divorce of philosophy from science and of both from the arts of conduct. The evils which we suffer in education, in religion [. . .], in the materialism of business and the aloofness of "intellectuals" from life, the whole separation of knowledge and practice—all testify to the necessity of *seeing mind-body as an integral whole*. (Dewey, LW Vol. 3, p. 27; italics added)

The last few words in italics demonstrate that for Dewey mind-body forms an inseparable unit. Correspondingly, he conceives of thought as not just an activity of the mind, but as one which involves brain and body, but also environment:

Thinking, or knowledge-getting, is far from being the armchair thing it is often supposed to be. The reason it is not an armchair thing is that it is *not an event going on exclusively within the cortex or the cortex and vocal organs*. It involves the explorations by which relevant data are procured and the physical analyses by which they are refined and made precise; it comprises the readings by which information is got hold of, the words which are experimented with, and the calculations by which the significance of entertained conceptions or hypotheses is elaborated. *Hands and feet, apparatus and appliances of all kinds are as much a part of it as changes in the brain.* (Dewey, 1916, p. 14, italics added)

Cognition is portrayed here as not being brain-bound (not “an event going on exclusively within the cortex”), but being embodied (it involves “hands and feet”) and extended (it involves “apparatus and appliances”). Note that for Dewey said extracranial resources do not just support thinking but are really part of it; and that this idea is also at stake in contemporary discussions over the exact extent to which cognition is extended (external resources being constituents of cognition) versus merely embedded (external resources scaffolding cognition). Interestingly, the few lines following the quote above express a kind of functionalism that also underlies—what e-cog theorists call—the parity principle (after Clark and Chalmers, 1998).

Since these physical operations (including the cerebral events) and equipments are a part of thinking, thinking is mental, not because of a peculiar stuff which enters into it or of peculiar non-natural activities which constitute it, but because of what physical acts and appliances *do*: the distinctive purpose for which they are employed and the distinctive results which they accomplish. (Dewey, 1916, p. 14, italics in the original; also used as opening quote in Clark’s *Supersizing the Mind*, 2008)²

Dewey here endorses a functional approach to determining what counts as mental: to qualify as being part of thinking, it is not material implementation but rather functional role that matters. Compare this now with how Wheeler formulates the parity principle:

In broad terms, then, the parity principle states that if there is *functional equality* with respect to governing behaviour, between the causal contribution of certain internal elements and the causal contribution of certain external elements, and if the internal elements concerned qualify as the proper parts of a cognitive trait, then there is no good reason to deny equivalent status—that is, cognitive status—to the relevant external elements. Parity of causal contribution mandates parity of status with respect to inclusion in the domain of the cognitive. (Wheeler, 2010, p. 248, italics added)³

Put differently, an item deserves cognitive status not in virtue of the stuff it is made of, nor in virtue of its location, but rather in virtue of its having the

appropriate functional profile; or to paraphrase Dewey, in virtue of what it *does*.

2.3. *Claim 3: Cognition is active and practical, rather than passive and theoretical*

Vehicles of thought are identified and evaluated in light of, as already quoted, “the distinctive *purpose* for which they are employed and the distinctive results which they accomplish” (italics added). This scales up to thinking in general:

[...] thinking [doesn't] start from the fact that in each human being is a “mind” whose business it is just to “know”—to theorize in the Aristotelian sense; but, rather, that it starts from an effort to get out of some trouble, actual or menacing. (Dewey, 1916, p. 23)

In line with his naturalism (see especially the quote under Claim 1), Dewey claims here that thinking's primary aim is practical rather than theoretical, that it relates “to things to do or be done” (ibid. p. 335). Further, thinking is a research *activity*, the measure of success of which is not accuracy of representation, but efficacy in disposing of difficulties. Rather than being an “armchair thing”, it involves active engagement with indeterminate situations in an attempt to infer determinate problem(s), testing hypothesized solutions to those and, when successful, modifying previous beliefs or habits (of thought). Dewey thus models the process of thinking, including everyday thinking, on the *modus operandi* of the experimental scientist (Putnam, 2010).

The practical nature of cognition also permeates recent work on e-cog. Recall, for example, the widespread assumption that cognition is first and foremost geared to control biological bodies; or recall the interest e-cog theorists take in determining the ways in which cognition subserves *adaptive* behaviour (see again Claim 1). Common too is the idea of cognition as activity. Research of Kirsh & Maglio on Scrabble and Tetris playing, for instance, serves as a sort of exemplar for the field (Kirsh and Maglio, 1994; Kirsh, 1995). Experienced players of these games perform local experiments (in case of Scrabble: physically ordering and reordering tiles as a means of exploring the range of available words; in case of Tetris: rotating zoids on-screen as a test of fit) rather than internally imagining opportunities and solutions. Long multiplication/division is another popular example: also here agents seem to reason towards a solution by acting on the world (viz. pen and paper) (Clark, 1998a).

2.4. Claim 4: Cognition is situated

The claim that cognition is situated implies for Dewey that thought in action cannot be properly understood if cut off from the environment in which it takes place:

The stimulus-response theory, as usually held, cuts off the environment from behavior. It treats environment simply as an external occasion from which behavior proceeds. [...] In reality, the environment is as much compromised within behavior as are organic processes [...] To describe the action of a part of the nervous system, or of the entire nervous system, or of the entire organism in isolation from the environment included within behavior is like thinking that we can understand a machine, say a loom, if we omit the material, the yarn, upon which it works and the transformation of the material into cloth wrought in the operation. (Dewey, LW Vol. 3, p. 35–36)

It is as if Dewey here formulates the key assumption of what later would be called Dynamical Systems Theory (for a discussion of DST, see e.g., Clark, 1998a), namely the fact that in order to capture the dynamics of, say, organism-environment interactions, it is insufficient to study organism and environment in isolation from one another; that instead organism and relevant environmental features must be treated and studied as one dynamical system, and this to not miss out on properties emerging from the interaction.

Further, if thinking is situation-specific, it implies one needs to take seriously situation-specific constraints. Dewey remarks:

They [practical deliberation and scientific research] both assume that every reflective problem and operation arises with reference to some *specific* situation, and has to subservise a *specific* purpose dependent upon its own occasion. They assume and observe distinct limits—limits from which and to which. There is the limit of origin in the needs of the particular situation which evokes reflection. There is the limit of terminus in successful dealing with the particular problem presented—or in retiring, baffled, to take up some other question. (Dewey, 1916, p. 80, italics in the original)

Situated agents experience limitations, and these cannot be abstracted away from in any theory of thought which aspires to be meaningful (ibid., p. 85). So, for instance, rather than being preoccupied with rationality or thought at large, Dewey asks us to focus on how these categories apply to the *here and now* or to the *there and then*. Once again, Dewey here anticipates an assumption which would become common currency quite some decades later, also among e-cog theorists, namely the notion of bounded rationality.

3. Dewey's Epistemology

If cognition is embedded in particular situations, if it is embodied, extended, active and practical, what kind of epistemology would suggest itself? Below I summarize Dewey's answer by means of three claims. For the purpose of contrasting Dewey's position to analytic epistemology in Section 4, these are formulated as rejections of particular epistemological viewpoints. But, as will become apparent, Dewey certainly also has something positive to tell.

3.1. *Rejection 1: Rejection of the spectator theory of knowledge*

Dewey presents his epistemology as an alternative to the traditional spectator theory of knowledge, according to which knowledge is produced (i) by passive observation, resulting (ii) in an accurate representation of a mind-independent reality. As already intimated, Dewey strongly opposes (i). Tellingly, as Brinkmann and Tanggaard (2010) observe, in the *Essays in experimental logic* Dewey speaks of "takens" rather than of "data", stressing that what we commonly call data is in fact something which we actively *select* for the purpose of problem articulation and resolution. As regards (ii), since for Dewey the aim of thinking is practical, the products of thought ought to be judged in these terms rather than representationally, i.e., in terms of correspondence to extra-mental fact. Hence, his operationalist understanding of correspondence, i.e. agreement "between purpose, plan, and its own execution, fulfillment" (Dewey, 1916, p. 240). To illustrate his position, Dewey invites us to consider a man lost in the woods (the example is also described in Putnam, 2010), who faces the task of finding a correct idea of the way home. How then, asks Dewey, should we think of the correspondence between such an idea and the environment? To start, it would be superfluous for the man to form a detailed representation of the visible environment, of the trees, and rocks, and leaves on the soil. The environment he needs to imagine needs to include unperceived elements; in particular, he needs to construct a plan of action, a map with himself lost and himself found. To what would this idea correspond? Not to the reality of being lost, nor to the reality of having found himself at home. So, Dewey concludes, the only way to make sense of correspondence in this case is to think of it as agreement between the plan of action and, when acted upon, successful completion; the plan would correspond to the problem, like a key would correspond to a lock.⁴

3.2. *Rejection 2: Rejection of knowing/knowledge as a mental state*

Dewey has, at least for contemporary ears, a peculiar conception of the relationship between knowing and knowledge. For Dewey, knowing isn't

the same as having knowledge, but rather an activity, namely the activity of inquiring, of applying one's intelligence with the aim of solving problems; whereas knowledge is the stable outcome of specific successful inquiries (Burke, 1994). Two things deserve attention here. The first is that for Dewey neither knowing nor knowledge should be conceived in terms of mental states, in terms of having beliefs with such-and-such qualities.⁵ For knowing is, as said, an activity; and a body of knowledge is a set of judgments, which has the function to recommend conduct worth assimilating in one's store of habits (*ibid.*). Importantly, these judgments may very well be impersonal, and thus resist reformulation in terms of mental states such as belief. After all, as Kitcher (2012) points out, Dewey's interest lies not so much in the conditions for individual knowledge as in the conditions for *human* knowledge. Second, knowing as inquiry (rather than knowledge *per se*) may be said to be at the heart of Dewey's epistemology, and this has to do with a third rejection, to which I turn now.

3.3. Rejection 3: Rejection of epistemology for its own sake

Dewey's entire work is characterized by a deep wish to bridge the gap, inherited from Plato, between theory and practice, to make science and philosophy relevant for human flourishing again (Putnam, 2010). Accordingly, he strongly objects to epistemology for its own sake, to the idea that "the problem of knowledge is [...] a problem that has its origin, its value, or its destiny within itself". Rather than engaging in "seemingly technical and abstruse discussion", epistemology ought to be concerned with the problem of knowledge as one that "social life, the organized practice of mankind, has had to face" (Dewey, 1910, p. 273). More in particular, for Dewey epistemology is a meliorative project, standing at the service of the construction of a general theory of education (Kitcher, 2012).

This explains why, as said, knowing as inquiry takes center stage in Dewey's epistemology. For if improvement is to be achieved, cognitive practices (rather than their outcomes) should be our primary concern. Hence, in Dewey one will not find technical analyses of our (ordinary) notion of knowledge (an outcome), since these would be largely inconsequential. On the contrary, Dewey's work on what good inquiry amounts to (e.g., that it is active, fallibilist, and inherently social) resonates in his philosophy of education, in the idea that education ought to be inquiry enhancing rather than producing minds passively absorbing indubitable facts "already is incorporated in books and in the heads of the elders" (Dewey, 1938, p. 19).

4. Deweyian or Analytic Epistemology?

Let me now turn to the task of arguing that the fit between Dewey's epistemology and e-cog is snugger than the fit between contemporary

analytic epistemology and e-cog. To that end, I pursue the following strategy. I approach the same putative case of e-cog from both epistemological perspectives, and then argue that one of them (c.q. analytic epistemology) can handle the case only by giving up some of the key commitments of e-cog. That finding, I conclude, suggests the superiority of Dewey's framework, at least in the respect of accommodating e-cog.

The case I have in mind is Clark and Chalmers' (1998) famous case of Otto and his notebook. Otto is an Alzheimer patient, who uses a notebook as a substitute for his failing memory. Otto relies on his notebook in the same way as a healthy person relies on her internal memory. Suppose for instance that Otto would need to go to the MoMA. He would consult his notebook, find that the MoMA is on 53rd street, and make his way to 53rd street and into the museum. This would be very much like what healthy Inga would do; only instead of consulting a notebook, she would be consulting her biological memory. Given that the information in Otto's notebook and Inga's non-occurrent belief are functionally on a par, Clark and Chalmers see no principled reason to deny the former cognitive status.

What has contemporary analytic epistemology said about this case? Both Pritchard (2010) and Kelp (2013) agree that, insofar as one accepts that beliefs can be extended, Otto's belief that "MoMA is at 53rd street" (for instance) would qualify as knowledge—and I take this to be an intuition which most contemporary analytic epistemologists would share (see also Carter, 2013). After all, Otto's belief is true (or so it is stipulated), reliably produced (or so it is stipulated), and the truth of the belief is due to cognitive ability rather than to luck (or so would argue Pritchard and Kelp). Pritchard and Kelp disagree about how the cognitive ability condition should be construed, but that is irrelevant for present purposes.

From a Deweyian perspective, we would reach a different verdict. To see why Otto's belief that "MoMA is at 53rd street" would fall short as a case of knowledge, it is instructive to return to Dewey's example of the man lost in the woods. Suppose the man were to believe truly that his home is at 4th street. That belief would hardly be a key fitting the lock of finding his way home. For the man definitely would also need to imagine his current situation as well as unperceived elements in between that situation and the final situation of finding himself at 4th street. Only such an inclusive map or plan of action—which while acting on it may need constant monitoring and updating—is a candidate solution answering the requirements of the specific problem the man is facing. And only in case the map or plan would actually guide the man to familiar ground, the man could be said to have knowledge. Now, in a similar vein, Otto's belief (and Inga's "biological" belief, for that matter) that "MoMA is at 53rd street" in and of itself isn't a key fitting the lock of getting to the MoMA, and hence doesn't deserve the title of knowledge.

Further, on a Deweyian perspective, Otto may fail to have knowledge while at the same time be knowing. That would happen just in case Otto were using his intelligence in the specific inquiry of finding his way to the MoMA. Clark & Chalmers' description of the case as well as Pritchard's and Kelp's construal suggest that Otto is knowing in this sense. For instance, Otto exploits his intelligent habit to write down important information in his notebook and to always have it readily at his disposal.

We thus appear to have two different verdicts on the same case, at least when it concerns knowledge. Otto's belief that "the MoMA is at 53rd street" satisfies the requirements of knowledge according to contemporary analytic epistemology, but doesn't according to Dewey's pragmatic theory of knowledge. I know of no way of determining which of these two frameworks delivers the correct verdict. But, fortunately, that doesn't matter in the present context. For to show that one framework is a more natural complement to e-cog than the other, it suffices to show that one framework, but not the other, violates the spirit of e-cog. This implies that, in light of my earlier arguments about the snug fit between Dewey's epistemology and e-cog, my task is just to identify tensions between contemporary analytic epistemology and e-cog.⁶

So, in what sense is analytic epistemology's construal of Otto's case in tension with e-cog? I think it is hard to make fit with Claims 3 and 4 in particular. As regards Claim 3, Pritchard and Kelp clearly assess Otto's belief independently from purpose. That is, for the belief to count as knowledge, the belief must be reliably produced, attest to cognitive ability, and be true in the sense of aptly representing the extra-mental fact that the MoMA is located at 53rd street; the question as to the belief's efficacy in steering Otto is deemed irrelevant. Stated otherwise, analytic epistemology, even in a very practical case like this, focuses on theoretical belief, ignoring the belief's supposedly primary function, namely controlling a biological body.

At this point, one may think that by addressing the truth of Otto's belief, one automatically addresses the belief's efficacy. However, this response is problematic in two respects. First, as Stich (1990) observes, false beliefs may very well serve practical goals better than true ones.⁷ For instance, it may be better to believe all snakes to be poisonous than to risk a bite while working on a more accurate, but highly time-consuming classification. Hence if, following e-cog, our primary focus is on practical aims, effective belief may be more desirable than true belief. Second, there is the more fundamental worry that individual beliefs, true or not, are *generally* impotent. That is, if one buys into Claim 4, in particular the idea that the behaviour of a system exhibiting complex and dense inter-element interaction cannot be properly understood from examination of a single element within the system, focus on a single belief, such as the belief that the MoMA is at 53rd street, seems utterly misplaced. For, as the example of the man lost in the woods was supposed to illustrate, in order to be effective, Otto's belief ought to interact

with various other beliefs (about where he is now, about where he started, about places in between that may or may not turn out to be located in accordance with his original plan or updates thereof) as well as with various other resources (mental, bodily, environmental). It seems that the only way to save the efficacy of the individual belief is to espouse a static model of cognition; Otto's individual belief about the location of the MoMA, together with a desire to get there, would then prompt behaviour that may or may not bring about the desired end state. However, such a reconstruction would again be in conflict with the dynamic account of cognition described under Claim 4.

5. Conclusion

Pragmatism, to put it mildly, isn't exactly thriving within mainstream contemporary epistemology. Yet, what I hope to have shown is that *if* one is won over by the idea that cognition is embedded, embodied and/or extended, a pragmatic approach, like that pursued by Dewey, recommends itself. In general, such an approach is much easier to put in accordance with e-cog's insistence on the practical and dynamical nature of cognition than is contemporary analytic epistemology. To achieve alignment with e-cog, the latter needs to justify its preoccupation with truth and its focus on (individual) belief.

But even if my argument fails to convince, my paper can still be read as a reminder of e-cog's fairly long ancestry. In *Being There* (1998a), Andy Clark credits Heidegger (1927) and Merleau-Ponty (1942) for introducing the image of mind as inextricably interwoven with body, world and action. However, these ideas go back at least to Dewey (1896, 1916); and he was already building further on James' (1890) work on embodiment and cognition.⁸ Perhaps my small reminder can contribute to their work getting the acknowledgement it deserves.

Notes

1. Here and in the remainder of this section, I quote Dewey at great length, in order to forestall the criticism that I am reading e-cog into rather than simply reading Dewey.
2. The fact that Clark also uses the quote may give the impression that e-cog theorists generally recognize Dewey as their intellectual forebear. However, the quote, which Clark says his friend Pierre Steiner to have passed on to him, really seems to be the exception that confirms the rule, for Dewey isn't discussed in the rest of *Supersizing the Mind*; nor is Dewey mentioned in other seminal work on e-cog, such as Clark (1998a); Wheeler (2005); Rowlands (2010); Menary (2010).
3. Although Wheeler here formulates the principle in terms of cognitive processes, his argument just as much applies to mental states.

4. See again, Putnam, 2010. The metaphor of the key and the lock comes from (Dewey, 1941, p. 178; italics in the original): “my own view takes correspondence in the operational sense [...] [bearing] the meaning, namely, of *answering*, as a key answers to conditions imposed by a lock, or as two correspondents “answer” each other; or, in general, as a reply is an adequate answer to a question or a criticism—as, in short, a *solution* answers the requirements of a *problem*.”
5. For an early expression of the idea that knowing is a state, see Mourelatos (1978).
6. Ken Aizawa (2012) argues that the affinities Pritchard sees between his virtue epistemology and e-cog are misleading, because largely the product of Pritchard’s idiosyncratic formulation of both positions. Aizawa thus doesn’t do what I do here: point out *conflicts* between said positions.
7. Or they may be empirically adequate, see van Fraassen (1980).
8. Talk about ancestry may a bit misleading in this context, in the sense that James and Dewey hardly influenced Heidegger. So e-cog would potentially have two ancestral lines leading to it.

References

- Adams, F. (2012). Extended cognition meets epistemology. *Philosophical Explorations*, 15:107–120.
- Aizawa, K. (2012). Distinguishing virtue epistemology and extended cognition. *Philosophical Explorations*, 15(2):91–106.
- Brinkmann, S. and Tanggaard, L. (2010). Toward an epistemology of the hand. *Studies in Philosophy and Education*, 29:243–257.
- Burke, T. (1994). *Dewey’s New Logic: A Reply to Russell*. Chicago University Press.
- Butts, E. (2012). Mentalism is not ur-internalism. *Philosophical Explorations*, 15:233–250.
- Carter, A. (2013). Extended cognition and epistemic luck. *Synthese*, 190:4201–4214.
- Clark, A. (1998a). *Being There: Putting Brain, Body, and World Together Again*. MIT Press.
- Clark, A. (1998b). Embodied, situated and distributed cognition. In Bechtel, W. and Graham, G., editors, *A Companion to Cognitive Science*, pages 506–517. Wiley-Blackwell.
- Clark, A. (2008). *Supersizing the Mind: Embodiment, Action and Cognitive Extension*. Oxford University Press.
- Clark, A. and Chalmers, D. (1998). The extended mind. *Analysis*, 1:7–19.
- Clark, A., Pritchard, D., and Vaesen, K. (2012). Introduction to special issue on “Extended cognition and epistemic action”. *Philosophical Explorations*, 15:87–90.
- Dewey, J. (1896). The reflex arc concept in psychology. *Psychological Review*, 3:357–370.
- Dewey, J. (1910). *The Influence of Darwin on Philosophy and Other Essays in Contemporary Thought*. Henry Holt & Company.
- Dewey, J. (1916). *Essays in Experimental Logic*. University of Chicago Press.
- Dewey, J. (1938). *Experience and Education*. Macmillan.
- Dewey, J. (1941). Propositions, warranted assertibility, and truth. *Journal of Philosophy*, 38:169–186.
- Dewey, J. (1981). *The Later Works: 1925–1953*. Southern Illinois University Press.
- Franklin, S. (1995). *Artificial minds*. MIT Press.
- Giere, R.N. (2012). Scientific cognition: Human centered but not human bound. *Philosophical Explorations*, 15:199–206.
- Goldberg, S. (2012). Epistemic extendedness, testimony, and the epistemology of instrument-based belief. *Philosophical Explorations*, 15:181–198.
- Green, A. (2012). Extending the credit theory of knowledge. *Philosophical Explorations*, 15:121–132.

- Green, A. (2014). Evaluating Distributed Cognition. *Synthese*, 191 (1):79–95.
- Haugeland, J. (1995). *Having Thought: Essays in the Metaphysics of Mind*. Harvard University Press.
- Heidegger, M. (1927). *Sein und Zeit*. Niemeyer Verlag.
- Hetherington, S. (2012). The extended knower. *Philosophical Explorations*, 15:207–218.
- Hurlley, S.L. (1998). *Consciousness in Action*. Harvard University Press.
- Hutchins, E.L. (1995). *Cognition in the Wild*. MIT Press.
- James, W. (1890). *The Principles of Psychology*. Dover Publishers.
- Kelp, C. (2013). Extended cognition and robust virtue epistemology. *Erkenntnis*, 78:245–252.
- Kelp, C. (2014). Extended Cognition and Robust Virtue Epistemology: Response to Vaesen. *Erkenntnis*, 79: 729–32.
- Kirchhoff, M.D. and Newsome, W. (2012). Distributed cognitive agency in virtue epistemology. *Philosophical Explorations*, 15:165–180.
- Kirsh, D. (1995). The intelligent use of space. *Artificial Intelligence*, 73(1–2):31–68.
- Kirsh, D. and Maglio, P.P. (1994). On distinguishing epistemic from pragmatic action. *Cognitive Science*, 18(4):513–549.
- Kitcher, P. (2012). *Preludes to Pragmatism*. Oxford University Press.
- Loader, P. (2012). The epistemic pragmatic dichotomy. *Philosophical Explorations*, 15:219–232.
- Menary, R. (2007). *Cognitive Integration: Mind and Cognition Unbounded*. Palgrave Macmillan.
- Menary, R., editor (2010). *The Extended Mind*. Bradford MIT Press.
- Menary, R. (2012). Cognitive practices and cognitive character. *Philosophical Explorations*, 15(2):147–164.
- Merleau-Ponty, M. (1942). *La Structure Du Comportement*. Presses Universitaires de France.
- Mourelatos, A. (1978). Events, processes, and states. *Linguistics and Philosophy*, 2:415–434.
- Palermos, S. (2011). Belief-forming processes, extended. *Review of Philosophy and Psychology*, 2:741–765.
- Pritchard, D. (2010). Cognitive ability and the extended cognition thesis. *Synthese*, 175:133–51.
- Putnam, R. (2010). Dewey's epistemology. In Cochran, M., editor, *The Cambridge Companion to Dewey*, pages 34–53. Cambridge University Press.
- Roberts, T. (2012). You do the maths: rules, extension, and cognitive responsibility. *Philosophical Explorations*, 15:133–146.
- Rowlands, M. (1999). *The Body in Mind: Understanding Cognitive Processes*. Cambridge University Press.
- Rowlands, M. (2010). *The New Science of the Mind*. MIT Press.
- Shusterman, R. (2008). *Body Consciousness*. Cambridge University Press.
- Stich, S. (1990). *The Fragmentation of Reason: Preface to a Pragmatic Theory of Cognitive Evaluation*. MIT Press.
- Vaesen, K. (2011). Knowledge without credit, exhibit 4: Extended cognition. *Synthese*, 181:515–29.
- Vaesen, K. (2013). Critical discussion: Virtue epistemology and extended cognition: A reply to Kelp and Greco. *Erkenntnis*, 78:963–970.
- van Fraassen, B. (1980). *The Scientific Image*. Oxford Clarendon Press.
- van Gelder, T. (1995). What might cognition be, if not computation? *Journal of Philosophy*, XCI:345–381.
- Wheeler, M. (2005). *Reconstructing the Cognitive World: The Next Step*. MIT Press.
- Wheeler, M. (2010). In defense of extended functionalism. In Menary, R., editor, *The Extended Mind*. MIT Press.