

Review

Grounding Enactivism

Review of Dan Hutto and Erik Myin, *Evolving Enactivism* (2017, MIT press); Shaun Gallagher, *Enactivist Interventions* (2017, Oxford University Press); Ezequiel Di Paolo, Thomas Buhrmann, and Xabier E. Barandiaran, *Sensorimotor Life* (2017, Oxford University Press)

doi:10.1017/S0031819119000044

Since the 1990s, and especially over the last 15 years or so, there has been a gradual build and proliferation of ‘E’ terms to describe the nature and functioning of the mind: Embodied, Embedded, Enacted, and Extended. Across the humanities, the social, and the cognitive sciences these four ‘E’ have become so hyped that one could wonder whether they have any real, theoretical content, whether enactivism and its E siblings aren’t one big hot air balloon. Three recent books provide each their take on the enactive mind and dismiss the hot air balloon worry, by grounding their theses in a comprehensive and coherent research programme. It is comprehensive insofar as it relies on a large and diverse body of scientific literature, including, but not limited to, phenomenology, pragmatism, Buddhist philosophy,¹ semiotics, developmental psychology, cognitive archaeology, dynamical systems theory, neuroscience, predictive coding, biochemistry, evolutionary biology, and robotics. It is coherent insofar as it synthesizes all these bodies of literature into the same overarching enactive thesis and provides an explanatory framework for the functioning of the mind that is continuous with naturalism. In other words, this most recent generation of enactive thinking provides logical and scientific grounding to enactivism, even if it is yet to provide fully worked out explanations for some mental forms and functions, notably those concerned with abstract thinking.

¹ The work on Buddhist philosophy does not appear in these three books, but is presented primarily by Francisco Varela and Evan Thompson in earlier works on enactivism.

Review

So what are the enactivist theses? In his introduction, Shaun Gallagher neatly sums them up as seven ‘background assumptions’ that he sets out to defend in his *Enactivist Interventions*:

1. Cognition is not simply a brain event. It emerges from processes distributed across brain–body–environment. The mind is embodied...
2. The world (meaning, intentionality) is not pre-given or pre-defined, but is structured by cognition and action...
3. Cognitive processes acquire meaning in part by their role in the context of action, rather than through a representational mapping or replicated internal model of the world...
4. Enactivist approaches have strong links to dynamical systems theory, emphasizing the relevance of dynamical coupling and coordination across brain–body–environment...
5. In contrast to classic cognitive science, which is often characterized by methodological individualism with a focus on internal mechanisms, enactivist approaches emphasize the extended, intersubjective, and socially situated nature of cognitive systems...
6. Enactivism aims to ground higher and more complex cognitive functions not only in sensorimotor coordination, but also in affective and autonomic aspects of the full body...
7. Higher-order cognitive functions, such as reflective thinking or deliberation, are exercises of skilful know-how and are usually coupled with situated and embodied actions’.²

I cannot here elaborate on the details and implications of these theses, which is what the authors of each of the three books take an entire monograph to do. Instead, I will say something about enactivism’s pervasive opposition to the notion and use of ‘representations’ and something about the kind of topics that set the three books apart from one another.

To begin with, here is an intuition pump originally from another enactivist philosopher, Evan Thompson:

‘Saying that cognition is just in the brain is like saying that flight is inside the wings of a bird. Just as flight doesn’t exist if there is only a wing, without the rest of the bird, and without an atmosphere to support the process, and without the precise mode of organism–environment coupling to make it possible (indeed,

² Shaun Gallagher, *Enactivist Interventions* (Oxford: Oxford University Press, 2017, 6).

who would disagree with this?), so cognition doesn't exist if there is just a brain without bodily and worldly factors. The mind is relational. It's a way of being in relation to the world' (Thompson 2014, 1).³

If cognition or consciousness is like the flight of a bird, then representationalism is committing a category mistake in its characterization locating consciousness inside the individual brain. The representational view that all three books confront consists in variations on the following characterization. The brain is inside the skull with no direct access to the external world. It therefore must interpret the signals coming through the various sense organs to construct a model of the world, which it processes, stores, and updates as informational content in its tissue. The representationalist story is often synonymous with the mind-as-computer metaphor, which pervades our modern world. *Prima facie*, this story might seem appealing, but our three books all argue that the more you dig into it, the more underdetermined and incoherent it becomes:

'We have identified a host of theoretical problems with representationalism...: understanding how information could literally be processed by brains; understanding how information could be represented by brains; and understanding how content could be a natural feature of basic cognition. RECers (Radical Enactive Cognitivists) believe that the combined weight of those problems tips the scale in favour of nonrepresentational theories of basic cognition'.⁴

Many scientists using representationalism as a default position apply the notion of representation inconsistently and putatively without awareness of the fundamental problems to which Hutto and Myin point here. We may identify at least two classes of problems with representationalism: A biological problem and a logical problem. When it comes to the biological problem, according to all three books, we still lack a fundamental understanding of how the brain works and no one has yet produced a convincing story of how content and information could possibly be stored inside the electrochemical processes of the brain. In contradistinction, the enactivist story tells us that when we see the world, we're not seeing a series of representations in the brain, but the actual real external world. I found Gallagher's

³ Ibid, 12.

⁴ Dan Hutto and E. Myin, *Evolving Enactivism* (Cambridge: MA: MIT Press, 246).

Review

example of hypoglycaemia to be the most persuasive. Hypoglycaemia refers to low glucose levels in the blood leading to the experience of hunger and fatigue, distorted perception, and in extreme conditions, brain death: 'perception is not modulated because the brain *represents* hunger and fatigue, but because the perceptual system (brain and body) is chemically (materially) affected by the actual hunger and fatigue'.⁵ In other words, hypoglycaemia is not an experience of the brain's representation of hunger and fatigue. Rather, it is an unmediated, non-representational or direct result of an altered chemical state of the brain. Given a commitment to naturalism, our explanations of cognition must be continuous with the physical, chemical and biological mechanisms of living organisms, such as energy-levels and homeostasis, rather than appeal to hard-to-naturalize, representational 'strange power(s) invested in neural activity'.⁶ Besides misrepresenting the basic biology of the brain, representationalism also suffers from the logical inconsistency of homuncularity: 'the need to postulate an internal agent that interprets and uses representations'.⁷ Gallagher uses Peirce's idea of the representational triad to elaborate:

'It [a representation] involves a *vehicle* (sign) mediating between an *object* and an *interpreter*. A neuronal pattern or event might be considered a representational vehicle, but only in connection with an object (some event in the environment, perhaps) and a consumer or interpreter (to produce an interpretant or meaning). The missing element is the consumer (interpreter). The experiencing subject is not an interpreter of its own brain events, but neither is the brain itself... On the Peircean model, if one of the elements is missing, there is no representation'.⁸

The brain consists of neurons affected by various electrochemical processes. Even if it were biologically possible to store representations of the outside world in these neurons, the homuncularity problem still holds: who, or what is supposed to do the representational work? Who is the interpreter? It cannot be us, conscious human agents, as we have no phenomenal access to our own brain chemistry. Hypoglycaemia is exactly experienced as fatigue and altered perception, not as low glucose levels. But it also cannot be the brain

⁵ Gallagher, 39.

⁶ Ezequiel Di Paolo, Buhrmann, T., and Barandiaran, X. E., *Sensorimotor Life*. (Oxford: Oxford University Press, 2017, 24).

⁷ Ibid, 24.

⁸ Gallagher, 101.

interpreting itself: One neuron would have to represent another, which again would demand another interpreter neuron, and so on.

The amount of pages each of the three books spend on spelling out the problems with representations is roughly speaking, inversely proportional to the amount of pages they spend developing their positive enactive proposals. *Sensorimotor Life*, approximately forty per cent longer than its two neighbours, is the most comprehensive and detailed exposition, *Enactivist Interventions* the most concise, and *Evolving Enactivism* the most combative.

Di Paolo and colleagues begin their positive theoretical exposition with sensorimotor contingencies, building on O'Regan and Noë's work, which argues that our bodily capacities determine our perception and that perception is itself as form of action. Building especially on their knowledge of robotics and microbiology, Di Paolo and colleagues show how sophisticated kinds of actions can emerge from very basic sensorimotor capacities. In other words, we need not invoke a central commander, a sophisticated cognitive agent, in order to explain intelligent behaviour. However, like Gallagher, they take note of Thompson's critical assessment of O'Regan and Noë's work: that it cannot explain 'why our activities are accompanied by any experience at all' and that we need a supplementary account of agency and pre-reflective bodily self-consciousness.⁹ In their stimulating fifth chapter, they begin the development of naturalistically viable concepts to give such an account. They provide dynamical systems accounts of terms such as 'act', 'concern', 'agent', and 'environment'¹⁰ and provide definitions of 'self-individuation, interactional asymmetry, and normativity' as necessary and jointly sufficient conditions for the possession of agency. This dynamical systems interpretation construes agency as 'a property of a *relation*' rather than an individual capacity¹¹: on the autopoietic conception developed by Maturana and Varela, an organism needs to both sustain itself as separate from the environment and develop itself by engaging and being open to the environment (for instance to take in nutrition). Its self-preservation or autopoiesis thus depends on the negotiation of openness and closure of the organism's boundaries in its context of interaction with its environment. Agency is this dialectical process of negotiation.¹²

⁹ Di Paolo et al., 37.

¹⁰ Ibid, 111.

¹¹ Ibid, 110.

¹² Ibid, 134–5.

Review

While Di Paolo and colleagues give us the most comprehensive story of the mind building from basic sensorimotor capacities and dynamical system couplings with the environment, Gallagher has a stronger emphasis on how the brain functions and discusses how the most recent brain paradigm, ‘predictive coding’, can be understood representationally vis-à-vis enactively. Besides his focused analyses of intentionality, action, perception and inference, he also manages to establish a wider philosophical context in which enactive questions are ultimately situated. Addressing Libet’s famous ‘free will’ experiments, chapter seven argues that free will cannot be reduced to microscale neuronal processes, but is ‘a structure...of complex relations’.¹³ While enactivism is naturalistically committed and addresses empirical findings, it is more than a biological interpretation of organisms and of the brain. Gallagher conceives of enactivism as a holistic philosophy of life, in which not all of its elements can be experimentally tested. If most or all mental properties are relational and dynamic rather than individual and static, it becomes infinitely complex to maintain invariable parameters in one’s experiments. This is because even a slight change in one dimension of the system or the experimental set-up will have dynamic implications and cause changes in the entire system or set-up.¹⁴ We can further deduce that, if the world in general is characterized by such dynamic and systemic interactions, then many laboratory experiments that remove subjects or organisms from their natural environments ought to be subject to a strong suspicion of ecological invalidity. In other words, with enactivism-as-philosophy-of-nature, Gallagher invites us to start reconceiving how to do science. Another feature setting *Enactivist Interventions* apart from its neighbours is the third chapter devoted to the philosophy of pragmatism. While earlier enactivist work has tended to emphasize the phenomenological thinking behind enactivism, Gallagher manages to portray its pragmatist inheritance. This is exciting because much philosophical discourse regrettably is still haunted by the problematic division between continental and analytic philosophy. Integrating continental (Husserl, Merleau-Ponty etc.) and non-continental (Dewey, James, Peirce etc.) thinkers in the enactive framework marks a promising step out of this division.

Hutto and Myin would traditionally be characterized as analytic thinkers. This is apparent from their bibliography that counts many works by authors such as Millikan, Fodor, Dennett,

¹³ Gallagher, 149.

¹⁴ Ibid, 23.

Davidson, and Currie, but none of the abovementioned phenomenologists. Hutto and Myin follow up on their previous book, *Radicalizing Enactivism*, in which they presented their non-representational, contentless view of basic cognition. Almost the entirety of *Evolving Enactivism* is devoted to fending off criticism raised against *Radicalizing Enactivism*. This is repetitive, but allows anyone invested in the representationalism vs. anti-representationalism debate a peek into the machine-room of argument welding, in which each detail, connotation, and implication of terms such as content and representation are put together. It is encouraging to see ‘phenomenologist’ and ‘analytic’ thinkers pursue the same agenda of bringing out the empirical and conceptual problems associated with representationalism. Hutto and Myin advocate ‘Radical Enactivism’, which is supposed to set them apart from, for instance, Extended mind thinkers, such as Andy Clark, and Gibsonian thinkers of ecological psychology, such as Erik Rietveld. It is not clear, however, who exactly the radicals are beyond Hutto and Myin themselves, and in what the radicality consists: if representationalism is in as dire straits as the three books insist, isn’t it rather representationalism itself which is radical(ly anti-realist)? Besides its overall analytic tenet, what sets *Evolving Enactivism* apart from the two other works topic-wise, is its ninth chapter devoted exclusively to memory. The account of autobiographical memory as enabled by social practices of story telling is both convincing and refreshing.

In conclusion, these three books produce a convincing non-representational and constitutively world-involving picture of cognition. While there are disagreements and discrepancies among the three, they pave different paths toward the same destination. Enactivism is not anti-representational. It acknowledges representations involved in more advanced forms of cognition and it seems to me that much of enactivism’s future success will depend on its ability to fit these representations into the general framework, even if the concluding chapters of all three books take the first baby steps. For any philosopher or scientist (or artist for that manner) who refers to ‘embodied cognition’ or ‘4E cognition’ in her work, at least one of these books are a *must read*, if 4E cognition isn’t to be trivialized and killed-by-inflation. Depending on one’s character and mood, one should read: 1) *Enactivist Interventions* for the concise, yet bountiful in philosophical perspectives, introduction to non-representational thinking; 2) *Sensorimotor Life* for the thorough explanation of basic behavioural mechanisms and their

Review

agential scaling up; and 3) *Evolving Enactivism* for the dogged attack on all things representational.¹⁵

Simon Høffding
simonhof@imv.uio.no

Bibliography

Gallagher, S. (2017). *Enactivist Intentions*. Oxford: Oxford University Press.
Hutto, D. and E. Myin (2017). *Evolving Enactivism*. Cambridge MA: MIT Press.

Di Paolo, E., Buhrmann, T., and Barandiaran, X. E. (2017). *Sensorimotor Life*. Oxford: Oxford University Press.

SIMON HØFFDING (simonhof@imv.uio.no) is a post doctoral researcher at RITMO (the Centre for Interdisciplinary Studies in Rhythm, Time and Motion) in the Department of Musicology, University of Oslo. His interests span phenomenology, philosophy of mind, enactivism, music, expertise, aesthetics and cross-disciplinary methodologies, and have been published in *Phenomenology and the Cognitive Sciences*, *Journal of Consciousness Studies*, *Musicae Scientiae* and *Topoi* as well as in *The Oxford Handbook of Western Music and Philosophy*. His first monograph is *A Phenomenology of Musical Absorption*, published by Palgrave Macmillan.

¹⁵ This work was partially supported by the Research Council of Norway through its Centres of Excellence scheme, project number 262762.