

Radicalizing Enactivism: Basic Minds without Content. Daniel D. Hutto and Erik Myin. Cambridge, Massachusetts: MIT Press, 2013, 206 pages, \$ 35.00 hardcover.

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Increasing numbers of philosophers of mind and cognitive scientists are jumping on the embodied cognition bandwagon. Accordingly, mind is no longer viewed as locked away in some Platonic realm of pure logic, as the computational theory of mind has traditionally proposed. Instead, mind has become identified with purposeful activity in the world, an activity that is realized by the body, extended by usage of tools, and scaffolded by a sociocultural environment.

The enactive approach initiated by Varela, Thompson, and Rosch (1991) has done much to develop this new perspective, especially by replacing the traditional emphasis on speculation about supposed subpersonal mental representations with a phenomenological analysis of actual first-person lived experience. More recent efforts in the enactive tradition have given the computational theory of mind, according to which humans are nothing but sophisticated robots, another severe blow. The rejection of representationalism now explicitly goes hand in hand with an acceptance of the living, and therefore mortal, material body as the original foundation of mind and its sense-making activities (Thompson, 2011). On this view, mind is embodied in a living body that is said to be autopoietic, i.e., a materially self-producing network of processes that is self-maintaining under far-from-equilibrium conditions, and organisms therefore lead an existence that is both autonomous and precarious (Froese and Stewart, 2010). This return to the concrete phenomena of life and mind leaves no room for representationalism or for functionalism, either (Di Paolo, 2009a).

It is hardly surprising, then, that this enactive approach is hard to accept for the majority of researchers. What is needed is a careful philosophical account that shows that these conclusions do not entail a rejection of cognitive science as such, but rather that they offer solutions to persistent problems that are inherent in its traditional framework. Hutto and Myin's proposal of a "Radical Enactive (or Embodied) Cognition" (REC), which they defend at length in the 2013 book *Radicalizing Enactivism: Basic Minds without Content*, makes an important step in this direction. The remarkable virtue of Hutto and Myin's proposal is that they are familiar with, and sympathetic to, the aims of traditional cognitive science of providing a naturalized theory of intentionality

and meaning. This starting point allows them to invite everyone working in traditional cognitive science onboard the embodied cognition bandwagon, while nevertheless firmly insisting that all of their baggage with representational content must be left behind. They do this effectively and with style. However, it seems that that they neglected to plan the next steps on their radical journey. The concept of mental representation fulfills a psychological need of scientists more than doing any real explanatory work in science, so demonstrating its philosophical uselessness will not simply lead to its abandonment — unless another framework that can account for lived meaning in a material world is on offer.

Hutto and Myin repeatedly suggest that a basic mind consists in an organism's interest-driven ways of skillfully interacting with the world, but they remain vague about the details of this alternative. What constitutes an organism? An interest? A skill? An interaction? No answers are provided. Instead Hutto and Myin distance their REC approach from autopoietic enactivism, i.e., precisely the framework that systematically addresses these kinds of questions. A united front is mutually desirable: to clear autopoietic enactivism of its occasionally careless assertions, and to ground contentless basic minds in biological embodiment.

Summary of the Arguments

Hutto and Myin's book is a manual for radicalizing enactivism by getting rid of the last vestiges of representationalism that afflict embodied, extended, and enactive cognitive science. The stakes are high. If they are right, "basic cognition is not contentful; basic minds are fundamentally, constitutively already world-involving. They are, as we say, extensive" (p. 137). Hutto and Myin thereby turn the extended mind hypothesis, namely that cognition (only sometimes) becomes extended into the world during certain actions, on its head: "coupled activities are the ultimate basis of the decoupled ones, not the other way around" (p. 153). Hutto and Myin also invert the classic cognitivist idea that some kind of language of thought is the basis of cognition. Instead they assign the primary origin of abstract cognition to the skillful use of external symbol systems: "the capacity to engage in decoupled contentful activities is derived, in both a logical and a developmental sense, from activities that involve the manipulation of external vehicles. Scaffolded activities involving external symbols undoubtedly transform and augment cognition" (p. 153).

Related claims are familiar from other varieties of enactive cognition, which also argue for a distributed foundation of life and mind and a socio-cultural basis for detached forms of cognition (Froese and Di Paolo, 2011). But there is always room for improvement and clarification. Hutto and Myin convincingly demonstrate that other enactivisms still have to fully clean up their act: a consistent non-representationalism requires that we give up all talk of a "content" of perceptual experience. These are already useful clarifications. However, Hutto and Myin have a much bigger target in sight. They aim to do nothing less than to dismantle the very foundations of orthodox philosophy of mind and cognitive science by demonstrating that naturalized information does not entail naturalized meaning. The central idea of this move is familiar from the roots of autopoietic enactivism (e.g., Maturana, 1974; Maturana and Varela, 1987; von Foerster, 1980), but Hutto and Myin give it an additional twist. They aim to put an end to representationalism once and for all by robbing it of all plausibility, namely by — and this is where things get interesting — deconstructing it from within, on its own terms.

This is an eminently valuable contribution. Other enactivisms have been too busy developing an alternative framework such that, apart from brash dismissals of representationalism scattered throughout the literature, they have not to given much attention to devising an attentive and sustained critique of the representationalist status quo.¹ Moreover, Hutto and Myin should be commended for devising a jujitsu strategy: rather than directly opposing representationalism, they derive the force of their arguments by taking the goals of representationalism seriously and then turning these goals against representationalism by showing that, time and time again, its appeals to content are doomed to failure. The inevitable conclusion: content is a hindrance, rather than an aid, for naturalizing the mind. How so?

Elsewhere Hutto (2013b) has argued against the possibility of a retreat to action-oriented representations. In addition, Hutto and Myin (in press) focus on putting an end to neural representations. But these cases are mere sideshows compared to the “masterstroke” (Hutto, 2013b, p. 146) attempted in the current book. In a nutshell, Hutto and Myin agree with mainstream consensus that the most worthy attempt to naturalize semantic content is to appeal to principles of information theory, such as Dretske’s (1988) teleofunctional account of representation. Indeed, the concept of information is already well established throughout the natural sciences and it can be well defined in a purely objective manner as the lawful covariance of two phenomena. For instance, a relationship of covariance holds between the rings in a tree’s trunk and that tree’s age. This entails that the rings are informative about the tree’s age for those who know about the covariance relationship.

And here lies the root of the problem, for the covariance relationship does not contain any semantic content by itself. One of Hutto and Myin’s key arguments is that “there is no naturally occurring contentful information that can be ‘used and fused’ to form inner representations” (p. 70). To be informative or meaningful, the covariance relationship first requires an act of interpretation by someone. Moreover, since no pre-packaged content exists in the natural environment, this interpretive act does not consist in information processing, at least not if this processing is understood as the receiving of external informational contents as *in-put*, which are transformed into other mental content as *out-put*. The popular metaphor that there are bits of information in the world that must be transferred into mind-as-container via perception-as-information-processing is misleading (for a similar epistemological critique by one of the forefathers of enactivism, see von Foerster, 1980).

By arguing that a naturalized concept of information is not contentful, Hutto and Myin force representationalism to focus on the active role of the interpreter. For example, Millikan’s (2005) theory of teleosemantics, which appeals to evolution by natural selection so as to account for semantic content, is modified such that cognitive agents are better conceived of as “content-creating systems” and not as “content-consuming systems” (p. 76). They note that this already comes closer to existing enactive notions of “sense-making” and “meaning generation” (see also Hutto, 2011). But it is not enough. Hutto and Myin’s final push is to get rid of the metaphor of the production of semantic content altogether, and thus to settle on a suitably modified theory of “teleosemiotics” (p. 78) that aims to explain why basic minds exhibit a directedness toward certain aspects of the environment.

¹Of course there are exceptions. For example, enactivism draws inspiration from Dreyfus’ (1992) systematic critique of the computational theory of mind. For more recent critical assessments we can refer to Harvey (2008) and Gallagher (2008).

With important adjustments, much can be salvaged from attempts to naturalize representational content. For example, although teleosemantic accounts fail to provide an adequate basis for naturalizing intensional content, they provide adequate tools for making sense of something more modest — i.e., responses involving only intentionality. (p. 80)

In the rest of the book Hutto and Myin explore the implications of their rejection of theories of semantic content in favor of what they call a teleosemiotic theory of life and mind. For instance, they assess what radical enactivism implies for our understanding of perceptual experience and illusions (Chapters 5 and 6), the extended mind hypothesis (Chapter 7), and consciousness (Chapter 8). In what follows I will not go through these remaining chapters one by one. A lot of the book speaks to current debates in analytic philosophy and orthodox cognitive science, and others will be better qualified to review those arguments. Instead I will touch on some of the topics that are geared toward other enactivisms, and I will do so from the perspective of someone who is already convinced by non-representationalism. In particular, I will review Hutto and Myin's REC from the perspective they refer to as "autopoietic enactivism" (e.g., Di Paolo, Rohde, and De Jaegher, 2010; Froese, 2012; Thompson, 2007, 2011).

A Dialogue between Radical and Autopoietic Enactivism

Hutto and Myin discuss two misgivings that they have with regard to autopoietic enactivism (pp. 32–36). The first has to do with how the perceiver's relationship to the world is conceived. If the world as perceived does not represent reality as it is, what is the alternative? Enactive approaches to perception sometimes speak as if the world as perceived is constructed by the perceiver's embodied action. However, it is not clear what this constructive relationship consists in if there is no perceptual content. The second misgiving is related to the vocabulary used by autopoietic enactivism to describe basic minds. Hutto and Myin concur that the doings of creatures with basic minds are to be situated somewhere in between mindless mechanism and full-blown planned action, but where exactly should we draw the lines? And how are we supposed to describe such intermediary forms of life without falling into one or the other extreme? In what follows I intend to address these questions by putting radical and autopoietic enactivism into a mutually beneficial dialogue.

The perceived world is neither represented nor constructed. Hutto and Myin are in agreement with Varela, Thompson, and Rosch's (1991) rejection of theories of mind that posit mental representations as fundamental to mentality. But they remain neutral with regard to some of the other claims by Varela and colleagues, for example that we "enact," "constitute," or "bring forth" the world as we perceive it. This neutral stance is understandable, because there exists considerable ambiguity in the primary literature about what is precisely meant by these phrases. This may have to do with a lingering internalism when it comes to thinking about perceivers. Indeed, there is a growing realization that the pioneering work in enactivism, despite overt claims to the contrary, failed to fully overcome the internalism of mainstream theories of mind. For example, in Maturana and Varela's (1987) biology of cognition, which was one of the most important precursors to Varela's enactivism (Froese, 2010), we find a comparison of the brain with a submarine navigator.

All that exists for the man inside the submarine are indicator readings, their transitions, and ways of obtaining specific relations between them. [. . .] The dynamics of the submarine's different states, with its navigator who does not know the outside world, never

occurs in an operation with representations of the world that the outside observer sees [. . .]. Entities such as beaches, reefs, or surface are valid only for an outside observer, not for the submarine or for the navigator who functions as a component of it. What is valid for the submarine in this analogy is valid also for all living systems [. . .]. (Maturana and Varela, 1987, p. 137)

It is worthwhile dwelling on this rather strange analogy for a moment because in Varela's afterword to this book he explicitly emphasizes its continuity with his "enactive" approach (p. 255)², which is there expressed in one of its earliest formulations. Ironically, Maturana and Varela made use of the classic homunculus inside a black box in order to argue against the notion of internal mental representations. To be sure, their motivations are different from traditional cognitive science, since this brain-centered internalism derives from their desire to emphasize the autonomy of the organism. But it is an internalism nonetheless. And this insight provides us with the key for unlocking the meaning of the obscure phrase "bringing forth a world," since an internalism that rejects representationalism must by default become some kind of constructivism. This is not to deny the essential differences between Maturana and Varela's biology of cognition and, for example, von Glasersfeld's (1995) radical constructivism (see, e.g., Proulx, 2008). But suspicions that Maturana and Varela's autopoietic theory of life is internalist (Wheeler, 2010), and that Varela's neurophenomenology has a lingering internalism (Beaton, 2013) and an idealist streak (Pascal and O'Regan, 2008), are not entirely unfounded.

And yet at the same time we find that Maturana and Varela refer to an "outside observer" who sees the submarine in its reef environment — so, is our conscious mind situated directly in the world after all? This possibility is indicated by our pre-reflective experience of being-in-the-world, which became a cornerstone of Varela's enactive turn (Froese, 2011). Maturana and Varela's submarine analogy is an illustration of their doctrine of non-intersecting domains, which is intended to ensure both the autonomy of the organism and the relational perspective of the observer. But in this operationalized mind–body dualism we find the origins of a tension that is only now starting to be overcome by autopoietic enactivism (Di Paolo, 2009a, 2009b). For without a complete rejection of internalism, even if it is just a part of the operational story, there will always be a temptation to fall back on a radical constructivism, or even representationalism, to somehow fill in for the absence of the world itself.

Perception is constitutively world-involving. Putting enactivism on more stable middle ground requires rejecting even the last hidden remnants of internalism (Beaton, 2013). In this regard Hutto and Myin's insistence that basic minds are extensive by nature (and not just contingently extended) is a step in the right direction. But if basic minds are extensive, how shall we conceive of perception? Hutto and Myin promote the idea that "minds, quite generally, are best understood in terms of capacities" (p. 151). This stance is reminiscent of sensorimotor enactivism (e.g., Noë, 2004; O'Regan and Noë, 2001). However, they disagree with the way in which proponents of the sensorimotor approach cash out the idea of mastery of sensorimotor contingencies.

Although they insist that perception and its experience is based on a kind of know how, they tend to fall into unguarded talk of perceivers' (or their brains') making assumptions,

²As far as I know, Maturana has never used the term "enactive" to describe his approach. See Froese (2011) and Froese and Stewart (2010) for a more detailed discussion of the similarities and differences of their approaches.

predictions, and judgments in ways that look decidedly as if the view is committed to the existence of propositional rather than essentially practical knowledge. (p. 26)

I am in full agreement with this assessment. We may speculate that this implicit affinity between sensorimotor theory and cognitivism has helped to turn O'Regan and Noë's sensorimotor approach into one of the most popular variants of enactivism. This lingering cognitivism is also what has facilitated the wide adoption of the sensorimotor approach to robotics, thus prompting Dreyfus (2007) to launch another updated version of his famous critiques of AI. Indeed, one of the hottest new theoretical developments in cognitivism, so-called predictive processing, is triumphantly formalizing sensorimotor theory in terms of its classic internalist–representationalist framework (Clark, 2012, 2013; Seth, in press). Hutto and Myin are therefore right to be wary of associating REC with standard versions of sensorimotor theory. In order to avoid sensorimotor contingencies becoming a Trojan horse for enactivism they first have to be freed of their implicit cognitive baggage, for example, in terms of a dynamical systems account (Buhrmann, Di Paolo, and Barandiaran, 2013).

What does the rejection of content tell us about the perceiver's relationship to the world? Unfortunately, Hutto and Myin do not make their epistemology of perception sufficiently explicit. But given that (i) they reject representationalist theories of perception, (ii) they reject constructivist claims that embodied action literally brings forth the world as perceived, and (iii) they argue that basic minds are essentially extensive, this leaves only the radical conclusion: veridical perception is constitutively world-involving. Moreover, no appeal to content is necessary to account for the existence of non-veridical experiences.

Dreaming, visual imagery and experience in paralysis, then, are cases in which the explanatory balance tips more fully in the direction of past sensorimotor contingencies. What one experiences under such circumstances is dictated almost exclusively by one's attunement to previous interactive regularities, rather than by one's current stimulation. (Myin and Degenaar, 2014, pp. 96–97)

Hutto and Myin's REC thus seems to be consistent with a disjunctivist theory of enactive perception (e.g., Beaton, 2013), although any appeals to counterfactual interactions would need to be cashed out in contentless terms, for example in terms of attunement.

The limits of brain–body–environment equality. Normal perceptual experience consists of both mind-dependent as well as mind-independent aspects, i.e., both a subjective perspective and the objective world. However, Hutto and Myin do not account for the constitution of an organism's own perspective on the world. In their eagerness to clear basic minds from all remnants of internalism, Hutto and Myin fall into the opposite extreme, namely the eradication of any difference between the body and the environment.

To suppose that what is constitutive of mentality must reside in organisms or their brains alone is to endorse a Senior Partner Principle, holding that [. . .] only brains bring mentality to the party. In the place of this, we promote the more even-handed Equal Partner Principle as the right way to understand basic mental activity. Accordingly, contributions of the brain are not prioritized over those of the environment. (p. 137)

However, this assumed absolute equality is not supported by the evidence of our embodiment or of our lived experience. Our living body (including the brain) is more

complex than our immediate environment, and from our first-person perspective we always perceive the world from the point of view of our bodies, and not the other way around. How shall we account for this complexity asymmetry and experiential perspectivalness if there is supposed to be nothing that distinguishes the living body from its environment? This unexplored tension may be one reason why Hutto and Myin do not apply their Equal Partner Principle consistently to all aspects of mentality. At least when it comes to basic minds they are committed to the “strongest reading of the Embodiment Thesis” which leads them to assert:

If mentality is not at root content involving, there is no reason to suppose, even in principle, that it is possible to individuate and isolate some portion of organismic activity — a portion that falls short of an organism’s total way of responding to some worldly offering — that can be identified with properly cognitive activity. (pp. 11–12)

And yet Hutto and Myin back down when it comes to explaining the phenomenal aspects of consciousness. For example, they allow that the “minimal supervenience basis for phenomenality might be narrow” (p. 8). More specifically, they encourage us to “take phenomenality to be nothing but forms of activities — *perhaps only neural* — that are associated with environment-involving interactions” (p. 169; emphasis added). Hutto and Myin thereby abstain from choosing between either aligning their REC approach with more conservative embodied approaches (e.g., Clark, 2009, 2012), or with other enactivisms that apply the Embodiment Thesis in a more consistent manner (e.g., Noë, 2009; Ward, 2012). This lack of commitment to the latter, more radical option is especially puzzling given that Hutto and Myin want to dissolve the hard problem of consciousness precisely by appealing to environment-involving interactions, such as feeling the softness of a sponge by squishing it (p. 177).

Hutto and Myin also remain conservative in allowing that there are basic minds without any phenomenality. They accept that the doings of basic minds exhibits a minimal intentional directedness, but insist that this is not yet sense-making and not yet necessarily accompanied by any phenomenality.

The more modest claim, which we endorse, is that basic interest-driven ways of responding provide the right platform for understanding how mentality can be intentionally directed yet also wholly embodied and enactive. Certain organisms are not only set up so that they are intentionally directed at situations that can bear on their interests; *in some cases*, their ways of responding are also phenomenally charged. (p. 36; emphasis added)

But this proposal immediately raises a host of difficult questions. What defines a living system’s interest? How does its interest-driven responding account for its intentional directedness? How is it possible for a basic mind to pursue interests without any kind of phenomenality, not even a basic sense of concern? A first step toward addressing these issues is to recognize that extensiveness does not necessarily entail equality.

Hutto and Myin proposes “there is no way to isolate properly mentality-constituting ‘inner’ organismic responses from ‘outer’ ones that allegedly stand over and against the former as mere causal contributions from the environment” (p. 6). This is in line with autopoietic enactivism, which has also started to argue that organismic activity is not confined within the body (Di Paolo, 2009a; Virgo, Egbert, and Froese, 2011). But autopoietic enactivism is striving for a middle way between the Senior Partner Principle and the Equal Partner Principle. The key idea here is that there is an essential asymmetry between the living body and the environment, because the living body’s metabolic

self-construction (autopoiesis) has the active role in bringing about the existence of an individual with world-involving relationships in the first place (Barandiaran, Di Paolo, and Rohde, 2009; Di Paolo, 2005). This relational asymmetry is inherent in biological embodiment; it constitutes an organism's perspective and directs it toward relevant aspects of its environment (Varela, 1997).

Di Paolo (2009a) has pointed out that the circularity of the living, i.e., the fact that an organism's being is its own doing, is at odds with the functionalist aim of providing a substrate-independent account of its operation. The substrate-dependence of the living also constitutes their precariousness, which can be understood as their inevitable mortality and therefore as their original source of concern and care in the world (Weber and Varela, 2002). But mortality has no place in cognitivism, as can be seen from the quasi-religious theories some technology multimillionaires have about immortalizing themselves in a future computer. Enactivists, on the other hand, cannot let themselves be deluded by such functionalist fantasies: "Precariousness does not refer to a positive material property that could be captured functionally, but to the impermanence of any relevant positive property of the substrate" (Di Paolo, 2009a, p. 16). Enactivism speaks to the core of human existence: our time here is limited, but that is precisely what makes each moment meaningful.

Debating the scope and limits of basic minds. This finally brings us to Hutto and Myin's second misgiving about autopoietic enactivism. They are concerned about the facility with which properties of the human mind are generalized to basic minds.³ For example, they hold that it is not plausible that the simplest living systems are capable of sense-making, which is one of the key tenets of autopoietic enactivism (Di Paolo et al., 2010). Hutto and Myin "prefer the more austere talk of informationally sensitive responses to natural signs" (p. 78). They reject the idea that basic minds are capable of sense-making partly because, for them, talk of creating, generating, or making meaning is closely associated with traditional theories of semantic content. However, even if autopoietic enactivism is cleared of this charge, which may have more to do with its careless language than a commitment to content, there still remains a deeper difference at play. Hutto and Myin disagree that basic minds have a capacity for interpretation (p. 36), a capacity that is presupposed by sense-making.

We can understand the origin of Hutto and Myin's conservatism regarding basic minds in terms of their theory of teleosemiotics, i.e., a combination of Dretske's teleofunctionalism and Millikan's teleosemantics freed from appeals to semantic content. They aim to use this theory to assert that "experiencing organisms are set up to be set off by certain worldly offerings — that they respond to such offerings in distinctive sensorimotor ways that exhibit a certain minimal kind of directedness and phenomenality" (p. 19). Hutto and Myin are also confident that REC can explain how it is that most animal doings consist in "motivated" and "skillful" dealings with the world (p. 50). They therefore suggest that "if REC has the right resources for explaining the wide class of such doings, then it has the potential to explain quite a lot of what matters to us when it comes to understanding mind and cognition" (p. 50). However, it is not clear how their teleosemiotics is supposed to live up to this formidable task.

Hutto and Myin partially go along with Dretske so as to characterize the activity of basic minds as informationally sensitive responding. This allows them to talk about the movements of behavior-based robots and the doings of insects in an essentially interchangeable way (pp. 41–43). This equivalence between robotic systems and living systems further helps to explain why they disagree that basic minds are capable of sense-

³See Wheeler (2011) for an extended discussion of related worries.

making: they disagree because they set the bar for basic minds much lower, even including basic mechanical systems. For autopoietic enactivism, talk about basic minds is only applicable to living beings: it does not matter how intelligent the behavior-based robot appears to be, nor does it matter, in direct contrast to a Millikanian theory of intentionality, whether its behavior has been selected by artificial evolution (Froese and Ziemke, 2009).

To be sure, an organism's natural history can provide useful guidance when we want to understand the processes that make the organism responsive to aspects of the environment. But we should not conflate such functional accounts with operational accounts (Varela, 1979). The fact that natural selection played a role in the past cannot explain how an organism's responsiveness is actually realized. Ultimately, only the organism's processes in the present are responsible for its responsiveness. Yet Hutto and Myin fail to offer any account of what constitutes individuality, agency, motivations, and skills, or how it is possible that something matters with respect to an organism's interests.

Autopoietic enactivism has the framework to explain the directed and interest-driven nature of basic minds, and it does so in an operational manner without appealing to semantic content. As mentioned before, this framework is based on autopoiesis as the source of an organism's mortality and its concerned doings (Weber and Varela, 2002). Beginning with Varela's (1992) biology of intentionality, and continuing with Di Paolo's (2005) biology of normativity, there is a tradition that addresses the missing pieces of REC head on (Thompson, 2007, 2011). Motivation and skills are also key themes of autopoietic enactivism (McGann, De Jaegher, and Di Paolo, 2013). Moreover, the foundations of autopoietic enactivism are being put to the practical test in the field of artificial life, for example in studies of the emergence of self-driven adaptive behavior (Froese, Virgo, and Ikegami, 2014) and normativity (Barandiaran and Egbert, 2014).

The extent of the challenge posed by autopoietic enactivism to the traditional foundations of cognitive science can be gauged by the practical difficulties faced by a biologically grounded enactive AI (Froese and Ziemke, 2009). For instance, it is not even clear if the circularity of autopoiesis is computable by a Turing machine, in principle (Letelier, Marín, and Mpodozis, 2003). Similarly, if it is accepted that autopoiesis is constitutive of life and mind, then its precariousness rules out functionalism (Di Paolo, 2009a). Conversely, if this precariousness is constitutive of a meaningful perspective, then functionalism rules out embodied sense-making. The implications are that the bar for basic minds should be set much higher than mere informationally sensitive responsiveness, and that a full rejection of representationalism must be accompanied by a full rejection of functionalism in order to avoid falling into nihilistic behaviorism.

Overcoming the cognitive gap of enactivism. Where does the story go from here? Hutto and Myin face a major challenge that is shared by all enactivism: how to bridge the "cognitive gap" which separates the activity of basic minds from the abstract cognition that is achieved by adult human minds (Froese and Di Paolo, 2009). As Hutto and Myin put it: "The ultimate task is to explain how basic minds make the development of contentful forms of cognition possible when the right supports, such as shared social practices, are in place" (p. 36). However, the viability of such an explanation should not be judged by its success of rehabilitating representationalism at the level of specifically human cognition (Hutto, 2013a). The general idea is to appeal to development in a culturally enriched environment: "The capacity to think using contentful representations is an example of a late-developing, scaffolded, and socially supported achievement. It originates from and exists, in part, in virtue of social practices

that make use of external public resources, such as pen, paper, signs and symbols” (p. 152). Importantly, this capacity to think using contentful representations is not explained in terms of acquiring a capacity to manipulate bona fide internal symbols: “rather, what is gained is an ability to perform operations that previously required the manipulation of external symbols but have now become possible in the absence of external symbols.” In other words, scaffolded cognition “becomes (up to a certain degree) independent of context” (p. 152). It seems that explaining higher-level cognition in terms of context-independence is becoming a major theme of enactivism, and I look forward to seeing how Hutto and Myin will develop this aspect in future work.

Conclusions

Hutto and Myin have provided a useful service for cognitive science, and especially for all varieties of enactivism, by deconstructing the foundations of representationalism. They do an admirable job of undermining all attempts of naturalizing representationalism that are based on information theory. They systematically demonstrate that information does not have content and that information processing does not explain semantics. Along the way they also clear up ambiguities in the enactive literature by highlighting the nature of extensive minds without content.

And yet despite Hutto and Myin’s apparent radicalness, the dialogue with autopoietic enactivism has also revealed a number of conservative choices. It is interesting to note that Hutto and Myin refer to their approach as “Radical Enactive (or *Embodied*) Cognition,” and it often makes sense to see their proposal more as a radicalization of embodied cognition, while retaining its functionalism. Elsewhere Hutto and Myin write:

There is another possible move that must be avoided [by representationalism]. It is the extreme deflationary maneuver of holding that the representational story is only committed to organismic responses to covariant information. [. . .] to go this way would make representationalism indistinguishable from non-representationalism: the two positions would collapse into the same proposal and they would no longer be rivals. (Hutto and Myin, in press)

This is where Hutto and Myin’s REC and autopoietic enactivism part ways. The latter rejects functionalism, and thus breaks with cognitivism altogether. To be sure, this move was not easy even for the other varieties of enactivism. Autopoiesis was largely absent from the first book on the enactive approach to cognitive science (Varela et al., 1991) and was only incorporated later on (Thompson, 2007). Similarly, the first account of sensorimotor enactivism was not specifically restricted to living beings (O’Regan and Noë, 2001), but Noë (2009) now recognizes that “the problem of mind is that of the problem of life” and, even more provocatively, that “the problem of consciousness, then, is none other than the problem of life. What we need to understand is how life emerges in the natural world” (p. 41). Hutto and Myin are clearly hesitant to become a part of this more radical enactive trend. To be sure, neither was it necessary for them to have committed themselves to this deep life-mind continuity in this book, since the book’s strategic objective was largely a critique of representationalism. However, it remains to be seen whether their lingering functionalism will allow them to build up a replacement framework, which can successfully answer such questions as: What defines an individual? What defines agency? What defines meaning?

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