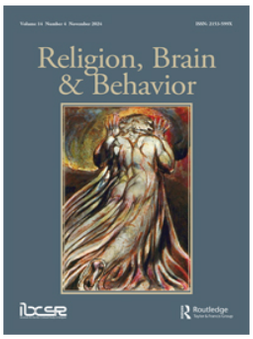

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Keep the black box open: a case for complex and continuous representationalism

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The case for enactive cognition

Before arguing for the advantages of representationalism within CSR, let me be sure that I understand Teehan's position. He is critiquing the standard model that prevails within CSR, primarily because of its commitment to representationalism, which he suggests is unduly constraining. As an alternative, Teehan advocates for an enactive model of cognition, which provides better explanations, considers more empirical content, and is more compatible with evolutionary theory. The argument then, is two-fold: there are some serious problems with representationalism and enactivism is a better option.

Beginning with the critique, Teehan draws from Thomson and Piccinini (2018) to describe representations as having three main characteristics: they are internal states that stand for (i.e., represent) something; they have semantic content; and they are functional in that they guide behavior. Furthermore, Teehan distinguishes between representations that are the product of socio-linguistic practices and others that are taken to be sub-personal or basic. He has no problem with portraying the former as representations, but seems to be primarily critiquing the idea that sub-personal, basic, processes are representational. This distinction is crucial and I return to it below.

Why should we not understand these sub-personal processes as involving representations? The primary critique is philosophical: this form of representationalism assumes that there is a pre-given reality that we perceive through signals that carry information about that world. We then process that information and act accordingly. Teehan and others reject the notion of a pre-given reality. Cognition cannot be a form of information processing because all of the information that would be processed is constructed through interactions between the body and the environment. While I find it pretty plausible that reality exists regardless of what I think about it, this has been a philosophical debate for a long time, so hopefully it does not need to be resolved in order to decide this more specific debate between representationalism and enactivism.

In favor of his position, Teehan offers the example of perceiving smoke and inferring that there is a fire. His presentation of representationalism's account suggests that the organism smells or sees smoke, processes that signal as information about the world, and infers that there is fire somewhere nearby. In contrast, enactivism helps us see how the smell of smoke has come to mean that there is fire only because of repeated past interactions between the organism and the world in which there is both smoke and fire. The crux of the difference seems to come down to this sentence: "the physical stimuli produced by smoke, *in and of itself,* does not *mean* anything to an inexperienced perceptual system".

Notice, however, that the account of representationalism is about cognition as it occurs within a particular moment. It is not a developmental account of how that association came to be. Instead it is an account of how that organism processes the smell of smoke and then makes a reliable inference. The enactivism account, in contrast, is entirely developmental. It is about the way in which

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repeated interactions between an organism with particular sensory capacities comes to associate the smell of smoke with the idea of fire. In order to properly compare these models, we either need to know what representationalism's developmental perspective would be or what the enactive account of cognition within the moment might be. Otherwise we are left comparing two different things.

A case for complex cognitivism

If we bring representationalism's perspective on development into view, then we can see that it offers all of the advantages that Teehan is advocating for, along with a language to talk about the contents of our minds. There are many perspectives on cognitive development, but the roughest sketch would involve something along the lines of learning as a process of updating models. There is not much evidence about how babies come to associate smoke with fire, presumably due to ethical concerns, but there is a wealth of evidence about attentional biases towards faces among infants (e.g., Bastianello et al., 2022; Frank et al., 2014). These studies suggest that among the blooming, buzzing confusion (James, 1890/1981, p. 462), infants are selectively paying attention to stimuli that look like faces. This is a presumably basic cognitive process and it would seem to suggest a rudimentary model that will grow to be a much more complex conception of other people and their internal states. Over time, this model will become differentiated into "mother's face," and "other's face" (Bushneil et al., 1989), and then "angry face," and "happy face" (Walker-Andrews et al., 1997), and so on. These basic models blend visual and auditory cues (Burnham, 1993) and they develop via repeated interactions with stable enough (i.e., nomic) associations in the environment (e.g., mother's voice, & mother's smell, & mother's face, & comfort) to develop reliable internal models of that environment.

The enactivist's account of development offers a similarly rich perspective on motivated associations built over repeated interactions with the environment, but seems to lack a way to talk about what it is that is developed by these repeated interactions. Being able to talk about updating models or representations provides a very useful way to describe what it is that is honed through the developmental process, and it does not rule out a complex variety of stimuli and associations.

Maybe the key advantage of enactivism lies within its account of cognition in the moment. In Teehan's discussion of how to interpret null results in attempts to prime agency detection, he suggests that enactive cognition encourages us to attend to the ecological validity of these experiments. This push comes from the enactivist's recognition that the whole setting is involved in the prime. The enactivist account of perception is that it is not simply a set of discrete signals but the entire setting itself, one might call it a gestalt, that organisms perceive. I agree. Teehan also emphasizes how the organism's physiological state would shape this perceptual experience. Again, I agree. While I find both accounts useful, I fail to see why either is incompatible with representationalism.

If anything, I think representationalism can helpfully add to this picture. Consider Shariff et al.'s (2016) meta-analysis of religious priming experiments, which suggests that such primes had relatively robust effects, but only among religious participants. In addition to perception being shaped by the broader setting and the participants' physiology, we can also include background beliefs, which are likely culturally transmitted. Teehan may admit that these background beliefs are socio-linguistic representations, but argue they are distinct from more basic forms of cognition. I nevertheless fail to see why it is useful to draw such a sharp distinction instead of using the heuristic of a model or representation to talk about how the gestalt and physiology are processed in conjunction with background beliefs.

The other key piece of enactivism's account of cognition is a thick view of action: "cognition is an active exploration of the world in service of effective action; it is a phase of action". Teehan uses this to illustrate how action is inherently purposeful and practical, it is responsive to the challenges and affordances of the environment in which it is embedded. I agree but again do not see why this thick account of action rules out internal representations of those affordances and challenges.

Once more, representationalism can helpfully add to this picture. Teehan imagines the case of an ancestor walking through the woods and encountering a fallen tree, which she then climbs over using her body and its capacities. Curiously absent from this account is a quick mental simulation in which she imagines whether it will be easier to walk around the tree or climb over it. Mental simulation, "the act of imagination and the generation of alternative realities" (Markman et al., 2012, p. 2), is a crucial component of effective action (Tomasello, 2022). Given the non-empirical status of most religious beliefs, one would expect that imagination and mental simulation play a crucial role in the emergence and spread of these beliefs (Leeuwen, 2023). But, how do we conceptualize these models of the world and possible actions within it, without some sort of appeal to representations?

Behaviorism 2.0?

The fully fleshed out account of enactive cognition describes a tight action-perception loop that is dynamically engaged with the environment. The implication seems to be that if we have a thick enough view of both action and perception then the need for a mediating step of information processing will vanish. Despite all that I like about the encouraged thickness given to both perception and action, the insistence on excluding internal models from discussion makes the action-perception loop appear to be an updated version of behaviorism's stimulus and response.

Cognitivism was a direct response to the shortcomings of behaviorism. It helped to open up the black box of the mind, even if in an imperfect way. The fruits of talking about information processing as an intermediary step between perception and action are still driving psychological research today. Maybe I am biased by my philosophical commitments to a fallibly accessible external reality, but I do not see why the account offered by Teehan needs to exclude representations as a crucial part of our cognitive processes.

Teehan may agree. He suggests that part of the thickness we need to afford action and perception includes "action policies" by which an organism anticipates what they might encounter and how to act most effectively. Later on, he suggests that "an organism's engagement with an environment is an ongoing flow of activity to sustain viability, guided by active inference to the best policy selection". These policies sound a lot like representations to me. The key difference for Teehan seems to be that these policies are bodily rather than just in the head. I do not see the need or benefit of drawing such a distinction; my head has always been part of my body. The fruitful way forward seems integrative, acknowledging that the models we have of reality are likely complex and dynamic schemas that include semantic content alongside a wide variety of physiological and non-semantic information.

A case for continuous cognitivism

This distinction between the body and the head parallels Teehan's distinction between basic and more complex forms of cognition: "the enactive approach does not deny that forming representations of our emergent percepts is a legitimate cognitive activity. For humans, it is a significant element of our cognitive repertoire, but one that is scaffolded upon more basic forms of cognition". While this may be meant to preempt retorts that religious beliefs are blatantly representational, it raises more questions than it answers. Most of Teehan's examples of representationalism's supposed shortcomings (e.g., the inference from smoke to fire; navigating a fallen tree; inferring an agent from unexpected rustling) are not definitively basic by his definition (i.e., non-conceptual and non-linguistic). This seems to imply that more of the cognitive terrain is at stake than explicitly targeted.

Similarly, Teehan's central charge against basic cognition being representational (i.e., that there is no pre-given reality that gives us information about itself to process), would seem to apply to complex (i.e., socio-linguistic) cognition as well. Just because information comes from social channels does not make it pre-given. If anything, organisms are more actively engaging with social

reality to construct information by attending to things like uncertainty, effectiveness, and majority norms (Laland, 2004). If this was the primary condition that makes basic cognition non-representational, why does it not rule out representations at the socio-linguistic level as well? And if this process of actively constructing information by engaging with social reality allows for complex representations, then why not representations at the basic level as well?

Granting the possibility that there is a distinction to be made, Teehan is pointing to what can seem like a genuine tension within CSR. For example, dual-process perspectives clearly suggest that religious concepts emerge from our intuitive defaults (McCauley, 2011; cf. Morgan, 2016). Other accounts clearly show that religious beliefs are tightly wedded to socio-linguistic processes, such as morality and group-identification (e.g., Purzycki et al., 2018). Whether or not this tension is real depends, in part, on whether intuitive/reflective processes are analogous to basic/complex cognition as Teehan draws the distinction.

Returning again to my very rough sketch of cognitive development—an infant's attentional bias towards faces must be basic and intuitive. If the cognition of a six-month old is not basic, what is? Over time that basic concept of face is elaborated into an increasingly complex model of other people and their minds, which necessarily involves socio-linguistic elements. Many forms of social cognition, however, are automatic and do not engage mental simulation—the hallmarks of intuitive processes (Lieberman, 2003; Pennycook, 2018). In other words, it is not clear whether the intuitive defaults that appear to be Teehan's target are basic or complex forms of cognition. Rather than search for a basic root cognition that is non-representational, it is more parsimonious to consider the possibility that cognition involves models of reality all the way down, even if some are very rudimentary.

The advantage of a continuous conception of cognition, especially for evolutionary accounts, is apparent in the prevalence of representationalism within studies of animal cognition, where even pigeons are taken to form, presumably non-linguistic, concepts (Herrnstein & Loveland, 1964). For CSR, one advantage of preserving the continuity of cognition as representational is the ability to consider how "deep" socio-linguistic practices might go in shaping our intuitive cognitive processes. For example, Tomasello (2014) makes a compelling case that social processes and our capacity to represent others' minds, play an essential role in both the evolution and development of human cognition. To strip away this type of cognition in the hopes of encountering some basic form that would generate supernatural agents seems unlikely to succeed. Furthermore, it would forestall efforts to consider the interaction of proto-supernatural beliefs with the social cognitive processes that remain fertile ground for CSR (e.g., Caldwell-Harris et al., 2020).

Neurological evidence also supports this point. The empirical evidence that Teehan presents for enactive cognition is circumstantially tied to the amygdala (pp. 38–40) since it plays an essential role in assessing the valence of perceptions and determining the motor response (e.g., Smith & Torregrossa, 2021). Curiously, however, he does not mention the extensive connections between the amygdala and various regions of the prefrontal cortex (PFC) which play a critical role in how we assign value to our perceptions and how we determine our motor response (e.g., Likhtik et al., 2014; Sotres-Bayon & Quirk, 2010). When this network is impaired you do indeed get an uninhibited perception/action loop, but that is generally considered pathological (e.g., Liu et al., 2020). A healthy brain, in contrast, seems built around the functional capacity for information processing in the PFC to mediate this transition from perception to action. Importantly, religious cognition also seems closely tied to these networks between the limbic system and the PFC, among many others (e.g., Grafman et al., 2020).

Conclusion

I imagine that Teehan and I are actually more in agreement than not. I share his concerns about ecological validity within our experiments and agree about the absurdity of mental modules. I also deeply appreciate his emphasis on the ways in which interpretation intersects with both perception and action. To my mind, however, it is much more fruitful to be able to talk about that

process of interpretation in terms of internal representations/models/schemas rather than abstain from such concepts. My sense is that Teehan may agree with this and that his main argument is with a form of naïve representationalism in which cognitive models are uncomplicated semantic simples, like AGENT. But, just as Newton first articulated gravitational force in terms of point mass before that conceptual simplification was elaborated, cognitive science may need the simplistic notion of representations in order to conceptually move to more elaborate models of the mind. Removing them from consideration is more likely to set us back than move us forward.

Disclosure statement

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