Biological Naturalism Without the Primacy of Prediction

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Commentary on Anil Seth's "Conscious artificial intelligence and biological naturalism," *Behavioral and Brain Sciences*, 2025. This commentary is also 2025, in press.

ABSTRACT:
Seth's defence of biological naturalism is valuable and timely. But his endorsement of the predictive processing framework, in an ambitious form that aims to cover more than perception itself, is probably a wrong turn.

MAIN TEXT (941 words)
Seth's elucidation and defence of biological naturalism is entirely welcome. Once we look beyond computational functionalism, what shape might a more biological view take? Seth endorses the predictive processing framework and "free energy principle." I doubt that this is a promising way to develop biological naturalism, and this commentary will be focused on reasons for doubt.

The predictive processing framework can be endorsed in more and less ambitious forms. Ambitious forms include claims like this: "all facets of behavior and cognition in living organisms follow a unique imperative: *minimizing the surprise of their sensory observations*" (Parr, Pezzulo, and Friston 2022, p. 6). Alternatively, the framework might be seen just as offering a theory about perception in complex animals. Perhaps perception in many animals works through the ongoing interaction of the animal's "best guess" about the state of the environment with error messages contributed by the senses. If this is true, it probably makes difference to the perceptual side of subjective experience, and could be important in our understanding of some kinds of consciousness.

Seth wants to endorse a more ambitious version of the predictive processing framework than one restricted to animals and perception. I am not sure whether he would endorse a version as strong as one I quoted earlier, but he does seem tempted by such views (section 4.2). I'll argue that Seth, and other biological naturalists, should not be tempted.

Action is central to animal life, especially in the most likely candidates for consciousness. The predictive processing framework, in ambitious forms, tries to bring the function of action under the umbrella of perception. Action helps animals to reduce surprises in the stream of input they receive. Cognition and action selection are functionally subservient to perception, and in particular to successful prediction of the ongoing sensory flow.

Action, though, is for *getting things done,* whether the results are surprising to the organism or not, and whether or not the organism registers the consequences of its action much at all. Sometimes effective action will reduce surprises in ongoing sensory feedback, and sometimes it won't. A pair of stark cases can be used to illustrate this point. A familiar objection to the predictive processing framework is the "dark room" argument. If the task of action selection really was to render sensory input predictable, a good option for an animal would be staying inside a dark room, and emerging as rarely as possible. The dark room argument can be presented in an overtly Darwinian, and biologically realistic, form (Godfrey-Smith 2024). A male funnel-web spider (*Atrax*) will spend almost all his life in a den, ambushing passing prey. He can go on for decades doing this, but if he wants to mate, he will have to leave the den and face the many uncertainties of life outside. Staying home for another day, and then one more, will reduce surprises, but this choice is a poor one in Darwinian terms, as there is no chance of a female coming to him. If a spider population contains some males who always make choices that reduce surprise and others who are willing to take some chances, we know which kind will prevail.

Seth replies to dark room arguments in *Being You* (2020, p. 209) by noting that "Complex systems like living organisms need to allow some things to change in order for other things to stay the same," and this will require leaving the dark room. But reproduction, with all its biological importance, is not a matter of keeping some things

"the same." Homeostatically, the spider in the den is fine; in Darwinian terms, it's a dead end.

Other scenarios complement the Darwinian dark room. Some marine animals such as corals engage in "broadcast spawning," emitting their gametes in large numbers into the sea suddenly, in response to environmental cues. If the release is synchronized with others of the same species, the gametes will be able to find partners and fertilization can occur. A coral may or may not release its gametes at the right time – the behavior can be done well or badly – but the coral will never know how things went. A better action will not lead to a smoother sensory flow in the future.

It might be replied that the "registration" of the consequences of action occurs in this case at the level of the population, not the individual; genes that foster well-timed gamete release increase in frequency. This change in the unit of the analysis would greatly change the character of the view – the idea of "prediction" becomes metaphorical, and (as Paul Griffiths has argued in discussion), it leaves the behavior of individuals entirely unconstrained. It is true that a variety of evolutionary models have shown that genes or strategies can be favored under selection if they are associated with low variance, across their instances, in reproductive success (Gillespie 1977, Seger and Brockman 1987). But this will not salvage an imperative to "minimize surprise," as the advantage of low variance can easily be outweighed. A high-variance strategy can do well if its high-success outcomes are high enough. Ask any funnel-web spider.

I have used extreme cases here – the spider who minimizes surprise but forgoes reproduction by never going outside, and the coral for whom the difference between effective and ineffective action will never be registered in the smoothing of the sensory flow. Other cases have similar characteristics in less stark form. Effective action can reduce uncertainty in some cases, but can also embrace it, and the sensory feedback accompanying action is sometimes of relatively minor importance. Action does not serve prediction and perception; the functional relationship runs in the other direction.

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