

An Enactive Cognition Primer

(the way things are)

The basic principles of enactive cognitive science as described by Francisco Varela, et. al., in *The Embodied Mind*:

Question 1: What is cognition?

Answer: Enaction: A history of structural coupling that brings forth a world.

Question 2: How does it work?

Answer: Through a network consisting of multiple levels of interconnected, sensorimotor subnetworks.

Question 3: How do I know when a cognitive system is functioning adequately?

Answer: When it becomes part of an ongoing existing world (as the young of every species do) or shapes a new one (as happens in evolutionary history).

Much that appears in these answers has hitherto been absent from cognitive science -- not just from cognitivism but from present-day, state-of-the-art connectionism. The most significant innovation is that since representations no longer play a central role, the role of the environment as a source of input recedes into the background. It now enters in explanations only on those occasions when systems undergo breakdowns or suffer events that cannot be satisfied by their structures. Accordingly, intelligence shifts from being the capacity to solve a problem to the capacity to enter into a shared world of significance.

"Structural coupling" is sensorimotor activity, which results in physical changes on both sides of the interaction. In the brain for instance, our sensory activity actually produces physical changes from which our perceptions are assembled. At the same time, we have acted (sensed) in our environmental realm and changed it.

This is what drives evolution (autopoiesis -- self-organizing systems).

To take this to the next step. Our concept of "reality" is constructed from our "perceptions" (themselves constructed from physical changes in the brain). And further, our sensorimotor activity is akin to a quantum measurement, in that we have evolved the means to "sense" some aspects of this latent reality, but not others. In fact, the very act of sensing one aspect can preclude the possibility of sensing another (much as the Heisenberg uncertainty principle, easily demonstrable in the way "vision" has evolved in such different ways species to species).

The first reaction encountered when we start speaking of "reality" as enacted in this way, is to be

accused of Kantian "idealism". But enactive cognition could be said to be very materialist in orientation (as I hope the above shows) if we use the more modern scientific understanding of what it means to be "material".

The primary conceptual hurdle is placing what we normally call "reality" at the other end of the sensory processes and then recognizing that the same "reality-as-experienced" is shared -- within a species -- because as individuals we couple in essentially identical ways with the same "latent" reality.

This "latent" reality could be thought of as what's on the other side of the quantum barrier conceptually -- that is, the pre-measured quanta -- where everything (including ourselves) has some indefinable common existence as a single process.

The "latent" reality is inherently indefinable for the obvious reason that it is pre-experience (pre-measurement).

We "enact" a shared reality -- create it through (sensorimotor) action.

The "constructor" in this process is what we've come to call reflexive consciousness.

There is no need, in fact it seems counterintuitive, to make distinctions between a "conscious" and "unconscious". Instead, I posit a seamless variation in the complexity of cognitive activity, a "thickness" of consciousness if you will, which emerges from the physical changes this "structural coupling" produces.

In my view, the imagination is the most complex of cognitive activities, our most evolved sense, distinguishable but not distinct from other functioning. If we think of the senses as coupling with the latent physical reality to produce an enacted experiential reality, we might think of the imagination as coupling with latent brain activity to produce an enhanced poetic reality.

So the call for the "liberation of the imagination" is really a call to acknowledge and support its critical role at the leading edge of our evolutionary development.

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