

The Enactivist Theory of Cognition and Behaviorism: An Account of the Processes of Individual Sense-Making

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You get triggered by what you CAN get triggered by.

Maturana and Varela's famous maxim "All doing is knowing and all knowing is doing" (1987, p. 27) represents important aspects of an Enactivist theory of cognition. Knowledge is defined as *adequate/viable action in the world* in this theory. Considering knowledge as adequate action implies that knowledge is behavior—a move that might be taken to represent a 'step back' into/toward traditional Behaviorist theories. I explore here why this is not the case.

Distinguishing Enactivism from Behaviorism

Enactivism distinguishes itself from Behaviorism on two accounts: 1) the status of behaviour and 2) relations of causality. Behaviorism is founded on the assumption that it is impossible to see and understand what is 'going on' in the head of individuals. For Behaviorists, behavior represents the only accessible demonstration of knowledge, and so their intention is to study behavior in precise detail, and often to control and modify it. For Enactivists, the emphasis on behavior is not because it is impossible to gain access to mental processes and that behavior represents the only accessible demonstration of them, it is because they start from a conviction that physical and mental processes are one. Knowledge is adequate action in the world: behavior IS knowledge.

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Behaviorism is framed in a language of cause-and-effect, the second account from which Enactivism breaks. Behaviorism implies that a change in behavior is *due to* a change in the environment, and holds that the same change (stimulus) will create the same outcome (response) in the individual. In contrast, Enactivists assert that it is impossible to predict outcomes because the system itself changes through learning. For Enactivists, individuals, or agents, are continuously changing themselves.

The importance of the agent

This notion of *agent* is fundamental in Enactivist theory. Put bluntly, learning is defined as a change in the structure of the agent. The critical point is that it is not the environment stimulus, but precisely one's internal structure that determines the changes that happen. As such, the same stimulus will then not necessarily 'provoke' the same response because the system is continuously changing and so will not be the same. A stimulus does not have an already predetermined response attached to it; its response depends on what it is interacting with.

As Brent Davis said in his presentation at this conference "The way that a complex system responds to a situation is determined by the system itself, not the situation"—which is an acknowledgement of Maturana and Varela's (1987) notion of *structural determinism*. It is then *not* the environment that determines learning, but the agent itself. This is explained by the fact that experiences are understood and interpreted on the basis of the agent's knowledge and prior experiences. This means that it is the agent's knowledge—its structure, its *internal dynamics*—that orients the kind of effect that an experience can have.

Natural Drift: A break from Darwin's Natural Selection

This phenomenon is part of what Maturana and Varela (1987) call *Natural Drift*. Natural Drift breaks from Darwin's Natural Selection¹ around the issue of the location of decisional mechanisms. Whereas in Natural Selection it is understood that it is the environment that provokes changes and by consequence influence species in their evolution (by selecting them), in Natural Drift the changes emerge out of the internal mechanisms of the agent, from its internal dynamics. In other words, whereas in Natural Selection the decisional mechanisms are situated in the environment, in Enactivism they are situated inside the agent. This means that it is the internal dynamics of the agent that enable the changes to occur: it has to 'recognize'² the potentialities of change in the environment from its interaction with it. Simply put, it is the agent's internal dynamics that enables the agent

to 'see' a phenomenon in the environment as a potential trigger of change. It is then the agent's internal dynamics that enable the agent to be 'affected' by the environment (i.e., learn). In other words, we cannot be influenced by phenomenon that we are not able to 'see' (or create).³

The role of the environment

It is important to clarify that the role of the environment is not put aside in Natural Drift. However, the environment does not represent the place where the decisions arise: it is through the agent's interaction with the environment that its internal dynamics can recognize potential triggers in it and get triggered by them⁴. Learning is not determined by the environment, but it depends on it.

As Heinz von Foerster (2003) says: "The environment contains no information, the environment is as it is" (p. 189). The stimulus is not the trigger, it is the perception of the stimulus that is the trigger to the sorts of transformations that are called learning. If something does not get registered on the sensory system, then nothing happens!

In the next section, I will report on five examples that support in some ways my claims.

Examples of human and animal life

Gorillas

In Gabon, researchers have discovered gorillas that have never seen humans before in their lives. As science report, normally, gorillas are afraid of humans. This is a lineage of thinking concerning humans that has been passed phylogenetically from generation to generation so even if young gorillas have never seen humans before, this reaction is triggered. However, for this tribe of gorillas, humans didn't mean a thing. As pointed out in an episode of 60 minutes, "The gorillas that live there are called naïve gorillas because they have never seen people and are not afraid when they do."⁵

This explains that those gorillas' internal dynamics did not enable them to see 'danger' in the humans they interacted with; it was not present for them. In fact, the concept of danger is not inherent in humans, it is present in the internal dynamics of the gorillas that feel it.

Dog scent

Dogs have a capacity to smell things that we humans cannot. Right now, in the place that you are, there are probably many odours that a dog could

recognize and be triggered by—odours that we are not even aware that exist for them. The world of a dog is different from the human world. As humans, we are not able to be triggered by those scent, our internal dynamics do not allow us to be triggered by the scents that the dog feels.

To underscore this point, Varela, Thompson and Rosch (1991) explain:

Even the most hard-nosed biologist, however, would have to admit that there are many ways that the world is—indeed even many different worlds of experience—depending on the structure of the being involved and the kinds of distinctions it is able to make. (Varela, Thomspson & Rosch, 1991, p. 9)

Spicy food

This phenomenon emerged out of a discussion with a friend of East Indian descent where she explained that for her family there are many different ways to recognize and name spices. My response was that for Quebecers, we usually identify three: mild, hot, very hot. My personal internal dynamic does not enable me to be triggered along the same spectrum of subtle possibilities that exist for her⁶ - which is not to say that I could never learn to invent distinctions between spices by myself and with her help, but this is a different matter.

Snow

The same things can be said concerning the different ways that some Inuit groups have to name, differentiate and identify snow. Most of us, in urban areas, mostly have some (powder, wet, slush). Our internal dynamics does not enable us to 'see'—that is, to ascribe meaning to—the differences that are of significance to the Inuit.

Frog experiment

This last example comes from a study conducted in the 1940s by R.W. Sperry (1945). In this experiment, one eye of some tadpoles was cut and rotated by 180°. When these tadpoles became adult frogs, they could easily catch flies with their tongues when those flies were in front of and above them—if the frogs' altered eyes were covered. However, when the 'good' eyes were covered, the frogs threw their tongues backward and downward, instead of forward and upward. They continue to do this despite repeated failures.

What is surprising about this is that we would expect that the frogs *would* adapt to their environment and redirect their tongues. This appears to be an impossibility. These frogs cannot even imagine that the fly is in front and up—nothing in their system can discern this information. It is an impossibility in the same way that you are strongly convince that the paper you are reading is directly in front of you and that there is no possibility for

you, for your system, that it is situated behind you; it represents an impossibility for you right now because this *is* what you see *now*.

Conclusions/Openings

Enactivism breaks from Behaviorism and Natural Selection around the location of decisional mechanisms. For Enactivists they are situated inside the agent in their *internal dynamics*.

As agents, our internal dynamics are construed from our experiences of living (in) the world—that is, of coming from our historicity and personal knowledge out of which everything is construed, interpreted and understood. These internal dynamics, in turn, enable us to perceive in our environment potential triggers. If we do not ‘see’ the triggers in the environment, we cannot be ‘affected’ by them.

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Notes

1. For a concise account of Darwin’s theory, see Jonathan Howard’s (2000) book.
2. The word *recognize* is tricky here because it *could* imply that those potentialities are be present (independently) in the environment. The limitation of our language brings me to use *recognize* in the sense of ‘decides’. This would then mean that the agent’s internal dynamics *decides* what is present or not in the environment—the internal dynamics create itself the potentialities in relation to what it can create. I want to thank my colleague Angus McMurtry for inspiring discussions and interaction on those issues.
3. Worth noticing, in the presentation that I gave, this sentence was written in red (on a green background). After the presentation, a colleague of mine, Khadeeja Ibrahim-Didi, told me that it was a clever move to have written this in red since red is one of the colors that color blind people have difficulties to see. To my biggest regrets, however, I had to confess that this was done in complete unawareness of the fact!
4. In some ways, Natural Selection shares some same sensibilities with Behaviorism in regards to the decisional mechanisms since, for both, they are situated in the environment.

5. This report was aired on CBS 60 Minutes. <http://www.cbsnews.com/stories/2004/02/23/60minutes> .
6. Again, this is not to imply that these different spices exist by themselves independently. They exist in her world, dependent on her.

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