

CONCEPTUALIZING A MINIMAL FRAMEWORK FOR THE IMPLEMENTATION OF BIOSEMIOSIS:



Claudio Julio Rodríguez Higuera

ABSTRACT

The main objective of this paper is two-pronged: First, we will argue that biosemiosis is necessarily *implemented* in organisms; and second, that we can conceptualize this implementation as an abstraction at the minimal level of its expression. The concept of implementation will play a pivotal role in providing the grounds for a concept of minimality with regards to semiosis. The idea is that a sign function can only be implemented within certain physiological constraints in relation to their environment. To this we must add some cohesive propositions for arguing that semiotic relations can hold. Some of these premises include the idea of the potential multiple realizability of semiotic implementation, and the physical instantiation of its conditions.

[...]

INITIAL CONCEPTS

MINIMALITY

IMPLEMENTATION

MODEL ORGANISM

MULTIPLE REALIZABILITY

SEMANTICITY

MODEL ORGANISMS

Semiotics works with modeling in a way that differs from the conceptualization of a model organism.

In order to have a semiotically modeled organism (or simply a model organism for biosemiotics), we need to understand what the requirements for semiosis are there.

This is an important step in theories of biosemiotics because the modeling of semiotic functions/capabilities is exactly what opens the talk on signs we use.

A semiotic model organism is then *“the illustration of functions implemented by an organism in relation to its environment that bring forth the action of signs”*

FUNCTIONS AND IMPLEMENTATION

Functions here can be considered in the same way an Uexküllian functional cycle is defined. These are not singular *entities* that cause behavior, but rather are processes that take part in action (Kull 1998).

Such semiotic functions come to be, or rather, become *implemented*, through physiological constraints in combination with the needs of the organism.

There is no specific transitivity to this sort of implementation, but the “combinatorial” aspect of a semiotic system is accounted for with it insofar as we refer to a *model*.

SEMANTIC CLOSURE AND REDUCTION

Problem of matter-symbol complementarity.

Semantic/Semiotic closure: "An autonomous closure between the dynamics (physical laws) of the material aspects and the constraints (syntactic rules) of the symbolic aspects of a physical organization" (Pattee 2012: 211-212).

Material descriptions are, in this view, unable to give a full account of meaning. Or rather, meaning can't be reduced to its physical description.

Causal overdetermination!

MULTIPLE-REALIZABILITY

Take the concept of 'hunger' and the fact that it happens in different species, but it is *achieved* by different, uncorrelated physical states (Baker 2009: 112).

Semiosis is similar in that in order to have it, we don't need one singular mechanism to achieve a form of relation from the organism towards its environment.

Relations hold *logically* in that an act of cognition depends on somehow attaining an abstract object and producing an abstract representation (note how these concepts are here used as placeholders—we do not want to talk about actual representations as part of representationalist accounts of the mind, for example).

NOT JUST LIFE=SEMIOSIS

We will not be able to tell where the precise boundary between chemistry and biology lies, and as such our accounts of semiosis will always have a problem addressing this stepping stone. Instead, here we just focus on what is *necessary for talking about a sign relation*.

So far, we can say:

- Not a necessary and unique mechanism for relations.

To that we can add:

- Choice (as a mode of selection that depends on a multiplicity of synchronic options which can't be accounted for as a general *if-then* rule that doesn't allow for contradictions) (Kull 2015).

SEMANTICITY

Returning to Pattee's concept of symbolism, we can coin a notion of semanticity to avoid terminological problems re Peircean symbols. But in order to talk about semanticity, we need to have relations within a specific system.

Preconditions:

- Materiality
- Physiological constraints

A PROPOSAL FOR LAYERED SEMANTICITY

Two questions when thinking of elements in a parsimonious hierarchy-type of description:

- Can we live without this element?
- What is the payoff?

Layers:

- Physical
- Implementational
- Enactive

LAYERS

Physical layer: Two options, via *synechism+tychism* or with complementarity as an emergent. For the first option, we may reduce the principles as the contingency of some properties in time. The weaker claim is that while signs cannot be reduced to their physical aspect still depend on it to be instantiated. This argument requires us to keep building up.

Implementational layer: Constraints for informational input and output (*lato sensu*). We differentiate this layer through *non-contiguity* and *specificity*. The first brings about differential structures for relations to obtain—a specific arrangement of sorts.

Enactive layer: We need to join output with behavior. Take cognition as environmental manipulation for the benefit of the organism. The point is that relations, as our theoretical desiderata for biosemiotics, cannot be entailed simply by the existence of the physical world and a sensorimotor structure. We need the combination of both in order to have actual, initial relations.

P-SEMANTICITY

The layers proposed earlier are not sufficient for semiosis, I contend. Complementarity is the odd duck after having a working paradigm of requirements for semiosis.

Semantic closure (P-Semantics): Its realization includes physical, syntactical and pragmatic aspects.

For something to be meaningful at this level, it needs to be mapped to specific instances of behavior.

How do we cash P-Semantics out? Switching the unit of analysis towards an organism-environment unit.

Pattee's semantic closures calls for a sense of *freedom*, which we can define as the *non-deterministic coupling of reception mediated by implementation from the physical to the enactive*.

REFERENCES

Baker, Lynne Rudder 2009. Non-Reductive Materialism. In: McLaughlin, Brian P.; Beckermann, Ansgar; Walter, Sven (eds.), *The Oxford Handbook of Philosophy of Mind*. Oxford: Oxford University Press, 109-127.

Kull, Kalevi 1998. On Semiosis, Umwelt and Semiosphere. *Semiotica* 120 (3): 299-310.

— 2015. Evolution, Choice, and Scaffolding: Semiosis is Changing Its Own Building. *Biosemiotics* 8: 223-234.

Pattee, H. H. 2012 [1995]. Evolving Self-reference: Matter, Symbols, and Semantic Closure. In: Pattee, Howard H.; Rączaszek-Leonardi, Joanna, Laws, *Language and Life*. Dordrecht: Springer, 211-226.