The Symbolic Distinction Hypothesis of Consciousness

by Sven Nilsen, 2021

In this paper I present a hypothesis that consciousness is grounded in symbolic distinction.

In the paper "Avatar Hypergraph Rewriting"[1], I presented an extension of hypergraph rewriting with symbolic distinction. One of the motivations was to find an Avatar Extension[2] of Wolfram models that satisfies the assumptions in the paper "Consciousness in Wolfram Models"[3].

From these two papers combined, it is natural to make the following hypothesis:

> Consciousness is grounded in symbolic distinction

This does not imply that consciousness as we know it is understood. However, it makes it possible to imagine making small steps in that direction.

Symbolic distinction is not necessarily in the form of Avatar Hypergraph Rewriting, where rules do not match unless the avatars are distinct. On the other hand, symbolic distinction is always present in hypergraph rewriting.

This means that symbolic distinction can inform reasoning about consciousness in Wolfram models, without needing to extend them. The argument for Avatar Hypergraph Rewriting is to illustrate what rewriting conditioned on symbolic distinction means.

In Wolfram models, all rules which allow symbolic distinction must bind to different local variables. For example, with two variables `a, b` and two nodes `1, 2`, there are 4 possibilities:

	a = 1	a = 2
b = 1	indistinct	distinct
b = 2	distinct	indistinct

The indistinct possibilities can be covered using a simpler rule that binds to only one variable.

Therefore, the distinct possibilities in some sense refers to rules which can not be reduced. Symbolic distinction is some sort of proof that the computation is irreducible.

Computational irreducibility is an important property of Wolfram models. However, this does not imply that consciousness requires computational irreducibility. It could mean that computational irreducibility is more likely seen from the perspective of observers. Computational irreducibility could be a probabilistic property of consciousness as grounded in symbolic distinction.

Wolfram models support symbolic distinction implicitly by allowing hypergraph rewriting to evolve in multiple ways. One branch of the multiway-hypergraph can be a rule applied with symbolic distinction, while another branch can be a rule applied with symbolic indistinction. Assuming this is the only difference between two branches, then the potential for consciousness, and thus observer selection bias, should be greater in the branch with symbolic distinction.

References:

[1]   "Avatar Hypergraph Rewriting"
        Sven Nilsen, 2021
        https://github.com/advancedresearch/path_semantics/blob/master/papers-wip2/avatar-hypergraph-rewriting.pdf

[2]   "Avatar Extensions"
        AdvancedResearch – Summary Page on Avatar Extensions
        https://advancedresearch.github.io/avatar-extensions/summary.html

[3]   "Consciousness in Wolfram Models"
        Sven Nilsen, 2021
        https://github.com/advancedresearch/path_semantics/blob/master/papers-wip2/consciousness-in-wolfram-models.pdf