

Review of: "On the subject part I: what is the subject?"

William Miller¹

¹ Banner Health System

Potential competing interests: No potential competing interests to declare.

This is an excellent article that articulates an aspect in biology that seems to commonly slip under the radar of almost all biologists who dwell in conventional NeoDarwinism in which evolution is subordinate to genes and selection. I approach our living circumstances and evolutionary biology within the less common framework of cellular biology and cognition.

The author skillfully argues the primacy of subjective being in a world that is commonly conceived as an objective one. According to this new argument, that 'experienced subjectivity' follows a 'natural law of emergence' of subjectivity from the physical world. To cope, individual organisms 'scaffold' themselves into structures that emerge into 'super-agents' that entail further subjectivity. Accordingly, this tendency towards increased subjectivity is a natural force that has an 'undeniable real-world impact'. Thus, subjectivity no mere epiphenomenon of existence, but an inherent aspect of life, determined by natural laws. By following this line of reasoning, several conclusions derive. Genes are not in charge. Consciousness does not begin with humans, but is, instead, distributed across life forms. The eukaryotic form embodies this sense of awareness of subjectivity as an amplification of what preceded it. Further then, this same sensibility to subjectivity 'scaffolds' to relationships between humans and other species.

I quite agree, but further argue that the language of the argument which bridges philosophy and biology can be placed into strict cellular terms. Cognition-Based Evolution is a peer-reviewed alternative to conventional NeoDarwinism and permits a further understanding of the author's skillful argument through another lens.

Cognition-Based Evolution recognizes that all cells embody self-referential cognition beginning with their instantiation about 3.8 billion years ago.

In cellular terms, self-referential cognition is the undeniable ability of cells to sense their environment and understand that their available information is imperfect (ambiguous). All the information that any cell has must travel across various types of media and cross essential membranes to be measured for validity by any cell. *This is the essence of subjectivity in biology.* All biological information is ambiguous and all cells know that. Because cells are aware that their information is uncertain, they communicate with one another and measure environmental cues together. The result is multicellularity. The collective form of information measurement and the coordinated deployment of resources permits advantaged responses to ambiguous cellular cues.

Because cells are aware that their information is imperfect, and further, since they collaborate to assess environmental stresses, they emerge into holobionts, which is us. Notably, this corresponds quite nicely with the author's 'super-agents'. We are superorganisms as collaborations among eukaryotic and microbial participants to deal with informational

ambiguity. Each fraction (eukaryotic and microbial) measures uncertain environmental cues along differing patterns. The result is more robust ways to collectively meet environmental challenges.

Why do cells band together? To solve problems. That is 'scaffolding' in action. What is the resulting 'scaffold'. That is us. We are solutions to cellular problems.

Naturally then, we deploy the same impulses as further biological iterations, representing our human-centric control of environmental processes, in which replete subjectivity rules.

I thank the author for a splendid article and hope that by placing it in discrete cellular terms within the new field of Cognition-Based Evolution, we might engage to better explain our natural world.