

# Review of: "Growing Confidence and Remaining Uncertainty About Animal Consciousness"

Robert A. Stickgold<sup>1</sup>

<sup>1</sup> Harvard University

**Potential competing interests:** No potential competing interests to declare.

This article is a review of the current state of affairs in consciousness research. It summarizes current “consensus” views on what consciousness is, how it is implemented in the brain, its evolutionary path, and remaining questions. Although not well-read in this field, it seems to me to be a reasonably well-thought-out consideration of these issues. My main criticism, as detailed below, is that what seems to me to be unproven conclusions are frequently taken as fact. Distinguishing between what is scientifically proven, what is a reasonable correlation, and what is simple conjecture is critical if this is to be a useful and valuable review.

pp 3-4 The section on Phenomenal Features of Subjective Experience is where these issues begin. The author states that, “numerous authors have assembled a short list of the essential features of consciousness.” These may or may not be essential features. As an extreme, one could choose to define consciousness as just minimal awareness. If a gecko *feels* cool in the shade, it would be conscious; there would be something that it is like to be a gecko. In principle, the gecko would not need to be aware that *it* is cool (no sense of self), and the feeling need not motivate behavior (moving into the sun).

I am aware that this would be a starkly minimalist definition that others might believe either was below the bar for consciousness or unable to exist without other features, such as a sense of self, but I think it would be a defensible definition. I put this out there only to say that I would like the statement about how numerous authors have assembled a short list to at least note that, while generally agreed to (by some ill-defined set of scientists/philosophers), there is no hard scientific data to support this list and it is not the only conceivable list.

The discussion of these features then has the same problem.

1. It seems to me that focused attention is a *product* of consciousness, and thus cannot be core to its existence. James’ reference to the “taking possession by the mind of one object or train of thought” would seem to imply that there must first be a mind (*i.e.*, consciousness) to take possession of what would become its object of focused attention.
2. Mental unity might, in fact, be clearly *not* required for consciousness. When under the influence of psychedelics such as LSD or psilocybin, such unity of mind appears to be absent, without any loss of consciousness. There certainly is no “coherent perception of reality.”
3. Mental causation has similar problems. The ability to initiate volitional activity would seem to require the existence of free will. I don’t know if this is an assumption embedded in the author’s definition of consciousness, but if so, it should

be explicitly stated. It seems to me to be an entirely different question.

I don't understand why "the parallel evolution of imaginative consciousness among different vertebrates seems evident." While I would agree that the fact that motile organisms show goal-directed behavior could reflect the action of consciousness, it certainly doesn't require it, unless one assumes that the single-celled paramecium, which carries out such behaviors, is conscious.

Indeed, by its standard definition, "intentionality" seems to imply both consciousness and free will. But one could also say that my iPhone "intentionally" reduces energy consumption when its battery gets low; it certainly doesn't do it randomly. So, going back to the original statement, perhaps one should say that this parallel evolution "seems evident to many in the field."

1. I don't have a problem with the assumption of a need for a sense of self (although I'm struck that Damasio is left out of the list of those supporting this view). But again, this might be a definitional problem. Damasio would certainly say that if an organism doesn't have a sense of self, then *by his definition of consciousness*, it is not conscious. That's very different from saying that no definition of consciousness could be implemented that does not have this feature.
2. Finally, for the other phenomenal features discussed, it seems to me that Referral is the only one that requires consciousness. In fact, all the others appear to be implemented and active without any requirement for consciousness. Certainly, those who research these phenomena do not take their existence as demonstrating the presence of consciousness.

Taken as a whole, this section is actually fascinating and thought-provoking. But it is short on data of any kind to support it, and this needs to be clear to the reader.

pp 4-6 The discussion of requisite biological substrates suffers much less from these issues. The explicit limitation of the discussion to neurally based consciousness, and the discussion of the reticular formation and its connections to the forebrain, is well written. And the discussion of the importance of three- or four-layered hierarchies is both well explained and appropriately described as a view "promoted" by Feinberg and Mallat. So, there is no suggestion that this is a factual requirement for consciousness. The only place I'd note is at the end of the section, where reference is made to "the apparent ancient origins of at least sensory consciousness." Again, I don't know who this is apparent to, and the author doesn't offer the rationale that is used to support the belief.

pp 6-7 The Evolutionary Imperative section starts out with two unsubstantiated statements, although the first is strange. It states that, "Given the need to integrate multiple sensory inputs with ongoing motor responses in a unified and coherent manner, some level of consciousness must have arisen "when simple reflexives evolved into a unified 'inner world,' or 'qualia,' or the subjective feeling of things." Given that a "unified inner world," "qualia," and "the subjective feeling of things" all can only occur within the context of consciousness, the statement is probably tautological. Still, the claim that, "Given the need to integrate multiple sensory inputs with ongoing motor responses in a unified and coherent manner, some level of consciousness must have arisen," is anything but a necessity or proven fact.

The second claim, that "consciousness became necessary especially once animals started moving about, in order to

solve the logistical problems of decision making while in motion,” is clearly not true. It is, at best, a hunch. Self-driving cars do this just fine, thank you, and are hopefully not conscious.

And the leap from a nervous system that met some unproven minimal hierarchical organization required to produce consciousness to the obligate existence of said consciousness is, at best, bad logic.

And so on and so on. The section ends with the statement that, “In two major clades (arthropods and vertebrates) and at least one subclass of mollusks (coleoids), arguments for the capacity for consciousness are widely accepted,” leading me to ask “widely accepted” among whom?

When the author finally turns to Remaining Uncertainties, the entire feel of the paper changes. Scientific evidence is presented, and claims are stated as possibilities, not “widely accepted” ideas or facts. It is well written and was a pleasure to read.