

Review of: "The Case for Conscious Experience Being in Individual Neurons"

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Potential competing interests: No potential competing interests to declare.

As a neuroscientist, one problem with the single-neuron consciousness hypothesis is how does it reconcile neurodegenerative diseases drastic decay. For example, an Alzheimer's patient may show no symptoms until a critical brain mass has been affected, (i.e. 45% of brain mass has been destroyed by the disease), or the variability of brain functions that brain infarction survivors range (i.e. some survivors remain in vegetative state, while others partially lose their cognitive abilities, while others are able to recuperate and live normal lives).

I am a computational neuroscientist, I have published over 4 papers in theoretical and experimental dynamical mechanisms supporting neuron function as single neurons and as populations of neurons. I agreed to review this article to assess the scientific soundness of the claims of the paper.

I found the whole paper hard to follow because it's written in a dialogue-like fashion similar to ancient philosophical manuscripts. Beyond the form, I found the introduction rather biased since no alternative hypothesis were discussed and all the citations referenced previous works from the same authors of the manuscript.

The rationale of the main claim is not thoroughly explained. In their dialogue, the authors ponder questions, and respond with a stereotypical wording: "the answer must be" - I can think of several other configurations. There are no experimental or theoretical evidence that support their claim.

In the section of the fallacy of the control agent, the problem with the argument is that the author takes a single-neuron vs. all-brain approach, while conventional neuroscience widely accepts the importance of ensembles of neurons; so there's at least a third option, in which ensembles of neurons integrate the "who" as the authors word it. The authors tried to validate this claim with notions from quantum physics, these claims were not referenced and also did not thoroughly explain how the experimental evidence is relevant to the single-neuron-consciousness argument. Authors, please reference your citations and expand the quantum theory rationale with appropriate experimental evidence.