

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

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Potential competing interests: No potential competing interests to declare.

The Case for Conscious Experience Being in Individual Neurons – Review and Commentary by Ronald L. Zukauskis

Edwards and Somov (2023) propose that “all the human conscious experiences that we talk about are events in individual neurons, not global to the brain or organism.” They conclude that “cellular consciousness is the only plausible way to explain ‘our’ experiences within current physics and biology, however implausible it might at first seem.” I believe this may be so within the widely accepted physics and biology they mention. However, current physics and biology include quantum theories not found or discussed in their article. Edwards and Somov do assert: “Any theory that deals with *individual indivisibles*, which human subjects seem to be, really has to operate at the level of such indivisibles in physics — the quantum level.”

Susskind (2008) asserts, “The three-dimensional world of ordinary experience—the universe filled with galaxies, stars, planets, houses, boulders, and people—is a hologram, an image of reality coded on a distant two-dimensional surface.” According to the “holographic principle” (Bousso, 2003), nothing that is experienced as three-dimensional could have been processed in a three-dimensional brain. Everything we would experience at a quantum two-dimensional level would appear as a three-dimensional holographic representation, including the architecture of our brains. Thus, whether or not consciousness is cellular or global may not be relevant in a two-dimensional quantum plane.

Edwards and Somov refer to Pribham (1991) using “the idea that in holograms *all input information can be found at every place sampled*.” By his use of inverse Fourier transforms, Pribham unknowingly and unintentionally supported the holographic principle as well as his own research; all input information was found at every place in the brain he sampled. Pribham hypothesized the *brain* holographically processes perceptual input, which is opposite to the holographic principle whereby brain structure is entirely holographic (like everything else that is 3-D) and thus would process nothing three-dimensionally.

Using a three-dimensional perspective, instead of a quantum two-dimensional one, Edwards and Somov’s individual neuron hypothesis seems more plausible to me than the other global alternatives (besides Pribham) they comment on. This is because any intersensory organization capable of producing concurrent multimodal perceptual information about the same spatial event, presumes separate underlying neurophysiologic mechanisms temporally synchronized in a precise correspondence. To accomplish this, neurons within different brain regions (that store specialized knowledge such as the occipital, parietal, and motor areas) may operate in parallel with neurons in other specialized regions to process the

same total (conscious) experience for each individual neuron, as Edwards and Somov hypothesize. Cortical processing of non-visual with visual information would seem exceedingly efficient for temporal synchronization in this way. Furthermore, because all input information would be found within every neuron, despite operating in different brain regions, there may be a holographic quantum connection here.

References

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