Review of: "Neural Quantum Superposition and the Change of Mind"

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The paper “Neural Quantum Superposition and the Change of Mind” introduce the great idea to describe brain processes using quantum mechanics.

Although the idea is brillant, i think it is important to consider some biological aspect along the description of pattern similarities between quantum laws and decision processes.

The author refers only to the conscious sphere of the functioning of the mind but still it is important to link the quantum description to some biological and neuropsychological processes.

Moreover learning occurs only when nonlinearity is present. At page 5 the author states that the presence of the interference term (gamma) opens for the nonlinearity but this is not true. The presence of interference is still linked to linear operations and thus it cannot describe any decision or learning phenomenon.

At page 7, the coefficient alpha and beta are considered real, why? It should be explained. The states can change over time: for simplicity of reasoning, let's consider two colors that are very close to each other which can create confusion. The subject can change his "opinion" about what he is seeing, thus moving from one state to another.

At page 7 again, the author says “if two similar objects A and B are perceived by M and he must choose one of them, a mental state of entanglement, or interference, is automatically present in his mind”

This is still true even for not similar objects: by virtue of Hebbs' postulate if multiple groups of neurons are co-active over time then their ability to designate precise information paths progressively increases. Therefore they don't have to be similar but at least connected (we don't know the physical reasons of these connections yet).

The idea to link energy of states to decision options is brillant and I think can open a new road into the exploration of unconscious choices.