

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

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"Neural Quantum Superposition and the Change of Mind" by Mario Marsili, version 3

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1 Introduction

Professor Marsili proposed an interesting version of the quantum mechanical description of the thought process of the human mind. However, in his article, there are several key points where the quantum descriptions deviated from the acceptable quantum mechanics.

2 Self Contradiction

The scenario of "self-referential statements" described by the author in the introduction as contradictory is unnecessary. The superposition of two spin states, when subjected to a measurement, would have a result of spin up or spin down. In quantum mechanics, the time evolution of the superposition state can be subjected to a quantum measurement that decides one outcome or another. Refer to the book "Quantum Computation and Quantum Information", by Nielsen and Chuang, p.84. It seems to me that such a scenario of a superposition state of the mind may come to a decision by a direct action similar to this quantum measurement. There is no Goedelian incompleteness.

3 Two-slit experiment versus interferometers

It is not clear that the use of the famous two-slit wave experiment leads to a smoother introduction of the two-state system in Eq.(1), et seq. I recommend replacing the two-slit wave with the Mach- Zehnder interferometer. See Schumacher and Westmoreland, "Quantum Processes, Systems and Information", p.16 and 44.

4 Density Function

In Section 3 Neural Quantum State, the quantum part veers off the correct track. The quantum states Ψ_A , Ψ_B should have corresponding conjugate states Ψ^*_A , Ψ^*_B .

B. The density function in the manuscript Eq.[13] should be,

$$\Phi = \Sigma^* \Sigma = |\alpha\Psi_A|^2 + (\alpha\Psi_A)^* (\beta\Psi_B) + (\beta\Psi_B)^* (\alpha\Psi_A) + |\beta\Psi_B|^2.$$

Similarly, the errors in Eq.(6a, 6b) have to be corrected. Ditto for the following equations.

1