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

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I had the opportunity to review the manuscript titled Neural Quantum Superposition and the Change of Mind ". The paper presents a novel approach, referred to as the Neural Quantum Superposition (NQS) framework, to understanding decision-making processes in the human nervous system. I appreciate the authors' efforts in proposing an innovative perspective on this complex topic. However, there are several aspects that require further consideration and refinement to align the paper with the existing theories of decision-making and enhance its overall quality.

The paper introduces the NQS framework, which draws an intriguing parallel between quantum mechanics and human psychological behavior during decision-making. While the idea of establishing a connection between quantum phenomena and cognitive processes is fascinating, the manuscript lacks a comprehensive comparison and contextualization with established decision-making theories.

The NQS framework could be strengthened by acknowledging and relating its concepts to prominent decision-making theories. For instance, **neurophysiological models**, which delve into the neural underpinnings of decision processes, offer a foundation for understanding the biological aspects of decision-making. **Reinforcement learning**, a fundamental concept in machine learning and cognitive psychology, provides insights into how individuals learn to make choices based on rewards and punishments. **Bayesian decision theories**, which are rooted in probability theory, can offer a quantitative framework for understanding how individuals update their beliefs during decision-making.

Furthermore, the manuscript should explicitly address the relationship between the NQS framework and established cognitive models such as **neural network models**, which simulate decision-making processes using artificial neural networks, and **connectionist theories**, which emphasize the interconnectedness of cognitive processes.

Additionally, **dual-process theories**, which propose that decision-making involves both intuitive and deliberative processes, could be integrated into the discussion to highlight how the NQS framework aligns with or differs from these theories. Lastly, the manuscript should acknowledge **neurophilosophical perspectives**, which explore the philosophical implications of neuroscientific findings, and consider how the NQS framework might contribute to the ongoing philosophical discourse surrounding decision processes in neuroscience.

To enhance the paper's scientific rigor and provide readers with a more robust foundation, the authors should explicitly relate their framework to these established theories. Such a comparison would not only help readers better grasp the novelty of the NQS framework but also highlight its unique contributions to the field.

Moreover, the paper would benefit from a more polished presentation and organization. The current structure, divided into sections and subsections, occasionally impedes the flow of the narrative. To enhance clarity, the authors might consider reorganizing the content into a more coherent and reader-friendly structure, such as a unified narrative flow. This would help ensure that the manuscript effectively conveys the significance and implications of the NQS framework to a broader scientific audience.

Additionally, it is essential to address certain ambiguities and complexities within the paper's terminology and concepts. For instance, the relationship between the "entanglement term" and the simultaneous awareness of decision options should be further elucidated to clarify how the NQS framework relates to the coexistence of multiple possibilities in decision-making. Additionally, the paper should offer a more comprehensive explanation of the potential empirical implications and testable hypotheses arising from the NQS framework. Providing concrete examples or case studies that illustrate how the NQS framework might be applied in practical research contexts would enhance the manuscript's accessibility and practical relevance.

In conclusion, the paper's exploration of decision-making within the context of the Neural Quantum Superposition framework presents a promising avenue for further research and discussion. However, to ensure its impact and relevance to the broader scientific community, the authors should conduct a thorough comparison with existing decision-making theories, enhance the manuscript's structural organization, and address terminological ambiguities. With these improvements, the paper has the potential to offer valuable insights into the field of decision-making in neuroscience.

Thank you for considering these suggestions. I look forward to seeing the revised manuscript and believe that, with these enhancements, it has the potential to make a more significant contribution to our understanding of decision processes in the nervous system.

Sincerely,

Hamed Tari