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## A nonlinear neural population coding theory of quantum cognition and decision making

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### ABSTRACT

Mathematical frameworks of quantum theory have recently been adopted in cognitive and behavioral sciences, to explain the violations of normative decision theory and anomalies in cognition. However, to date, no study has attempted to explore neural implementations of such "quantum-like" information processing in the brain. This study demonstrates that neural population coding of information with nonlinear neural response functions can account for such "quantum" information processing in decision-making and cognition. It is also shown that quantum decision theory is a special case of more general population vector coding theory. Future applications of the present theory in the rapidly evolving field of "psychophysical neuroeconomics" are also discussed.

### KEYWORDS

Quantum Probability; Psychophysics; Neuroeconomics; Population Coding

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