Review of: "On the foundation of quantum decision theory"

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This article introduces a new perspective on quantum decision theory, laying the foundation for a new paradigm in understanding decision-making processes. The theoretical framework delves into the realm of variables, categorising them into accessible and inaccessible domains. Significantly, the article posits that each accessible variable can be conceptualised as a function of a specific inaccessible variable.To illustrate this complex theory, the authors provide a compelling medical example, demonstrating its real-world applicability. What sets this theory apart is that it underscores the fundamental connection between learning and decision-making. The argument posits that comprehending decisions necessitates an exploration of the antecedent processes of learning and knowledge acquisition, coupled with the subsequent feedback loop. A fundamental tenet of the theory is the assertion that knowledge acquisition invariably precedes any mature decision.

The article reformulates the basic concepts of quantum probability theory like Born rule, Hilbert space formalism. Although this reformulation is similar to preceding works on Quantum Cognition, the articles places them in light of a person's decision making processes using accessible and inaccessible variables. Before this there is a strong mathematical foundation laid for such a decision making scenario, regarding properties of accessible variables and relationship between them.

The core assumption of the theory according to me is the connection of these variables with a person's decision. If a person is able to make a decision, then the associated variable with the decision is an accessible variable, otherwise it is an inaccessible variable. This is also extended to the concept of a maximal decision problem where the decision can be made, but if the problem is slightly more complicated a decision can't be made. I would suggest the author to define what is meant by the expression ‘slightly more complicated’. This is a very subjective expression. Perhaps an example would be helpful.

Lastly, the author gives an example of a medical decision making problem and apply the proposed theory to arrive at law of total probability violation. I would suggest to give a more concrete example to demonstrate the theory, as the violation is a consequence of using quantum probability theory to model the decisions. Specifically if there could be some actual data collected or simulated to model such medical decisions, it would go a long way to establish the theory.