

# Review of: "Metacognitive Agents for Ethical Decision Support: Conceptual Model and Research Roadmap"

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The author suggests that human decision making may be modeled computationally and/or a recommender system may augment human decision making in areas which are prone to biases such as employment decisions by managers and sustainability decisions by consumers.

I disagree with the previous reviewer and conclude that the author sets forth a framework of suggestions for other researchers in computational modeling, machine learning/AI, and experimental psychology to pursue. I understand why the author would post this article here as it would be difficult to find a home for such a broad work that suggests an important research agenda.

A few comments to help the conversation and inspire others to continue on this path. First, the literature in human decision making is vast but separated into several themes: normative decision making, expertise, naturalistic decision making, probability and judgment. In general, readers should know that the more that we know about decision making, the complexity in human information processing is revealed.

Let me give a short brief on each theme with a few citations of suggested works for further reading. **Normative decision making;** Kahneman and Tversky revealed in normative decision making that when people are presented with a cost/benefit analysis of their decision options they will not make the optimal choice. Kahneman goes on to describe how this may interact with cognitive biases as this author describes. **Expertise;** A person's previous experience with similar situations will shape their agility, speed, and efficacy in decision making. Ericsson and Charness are well published in this area as in Moxley et al. (2012). **Naturalistic Decision Making;** Decision making in experts, particularly in time sensitive and high stress environments is different from day to day decision making. Klein is well published as in Zsombok and Klein (2014). **Team Decision Making:** There are conditions where a team of people share a mental model of the contingencies, costs, dependencies, benefits, and other attributes of a decision. When this occurs, the team decision can be influenced by many factors (Converse, Cannon-Bowers, and Salas, 1993). **Probability and numeracy:** People are poor at judging the likelihood of an outcome which changes their decision making ability. This is associated with other information processing skills (Cokely and Kelley, 2009). **Judgment:** The judgments of the salience of a cue, the weight of different cues, and the probabilities of different outcomes can be considered a type of information processing separate from decision making. There is an entire journal and conference devoted to judgment and decision making (Meinert & Krämer 2022 and Niu & Harvey 2022).

While I appreciate the author's brevity and focus on a single decision making theory and mentioning several cognitive models, there are factors such as personality to be considered as well as social and environmental factors (Chhatwani, 2022).

While the author discusses metacognition, situation awareness is a better construct which has been used in technological environments (Endsley, 2015). Situation awareness encompasses what has happened previously, what is currently happening, and what may happen in the future and includes metacognition. While Endsley discusses the theory in light of human error, this citation includes many important publications that have led to the widespread adoption of the work in human computer interaction.

Overall, I found the article to be aspirational and inspiring. I applaud the author for sharing it with the world and inviting researchers to pursue an important path.

## References

- Chhatwani, M. (2022). Personal control and financial well-being among the elderly: Moderating role of the big five. *Personality and Individual Differences*, 184, 111-171.
- Cokely, E. T., & Kelley, C. M. (2009). Cognitive abilities and superior decision making under risk: A protocol analysis and process model evaluation.
- Converse, S., Cannon-Bowers, J. A., & Salas, E. (1993). Shared mental models in expert team decision making. *Individual and group decision making: Current issues*, 221, 221-46.
- Endsley, M. R. (2015). Situation awareness: operationally necessary and scientifically grounded. *Cognition, Technology & Work*, 17(2), 163-167.
- Meinert, J., & Krämer, N. C. (2022). How the expertise heuristic accelerates decision-making and credibility judgments in social media by means of effort reduction. *Plos one*, 17(3), e0264428.
- Moxley, J. H., Ericsson, K. A., Charness, N., & Krampe, R. T. (2012). The role of intuition and deliberative thinking in experts' superior tactical decision-making. *Cognition*, 124(1), 72-78.
- Niu, X., & Harvey, N. (2022). Outcome feedback reduces over-forecasting of inflation and overconfidence in forecasts. *Judgment and Decision Making*, 17(1), 124-163.
- Zsombok, C. E., & Klein, G. (Eds.). (2014). *Naturalistic decision making*. Psychology Press.