Rethinking Rumination: A Decision-Theoretic Approach Without Negativity Bias

Michael Payton
University of Wisconsin Madison, Madison, Wisconsin, United States

Mary Vitello
UCLA, Los Angeles, California, United States

Joseph Austerweil
University of Wisconsin - Madison, Madison, Wisconsin, United States

Abstract

Prior work by Bedder et al. (2023, 2024) modeled rumination as a negativity-biased decision process under uncertainty in a POMDP framework, where excessive sampling results from pessimistic priors and uncertainty about negative experiences. While these models provide valuable insight, they assume that excessive information-seeking is driven primarily by negative affect. We explore an alternative hypothesis: excessive information-seeking may result from optimal inference due to uncertainty and planning depth, independent of negativity bias. Using a POMDP solver with recursive value iteration, we find horizon length and uncertainty influence the persistence of sampling actions without a negative reward bias. This shifts rumination from an affect-driven process to a more generalized preoccupation mechanism consistent with the ICD-11's transdiagnostic conceptualization of preoccupation (Eberle & Maercker, 2022). Unlike prior models with fixed stopping thresholds, our approach may allow preoccupation to emerge dynamically from decision parameters without explicit negativity bias.

In D. Barner, N.R. Bramley, A. Ruggeri and C.M. Walker (Eds.), *Proceedings of the 47th Annual Conference of the Cognitive Science Society*