

Deciphering the Neurocomputational Underpinnings of Risk-taking in Women with Bulimia Nervosa: Preliminary Results and Future Directions

Kelsey E. Hagan^{1,2,3}, Alex Rich^{4,5}, Ifat Levy^{4,5}, Anna Konova⁶, & B. Timothy Walsh³



¹Department of Psychiatry and ²Institute for Women's Health, Virginia Commonwealth University; ³Department of Psychiatry, New York State Psychiatric Institute, Columbia University Irving Medical Center; ⁴Department of Comparative Medicine and ⁵Interdepartmental Neuroscience Program, Yale University; ⁶Department of Psychiatry, University Behavioral Health Care, and the Brain Health Institute, Rutgers University

BACKGROUND

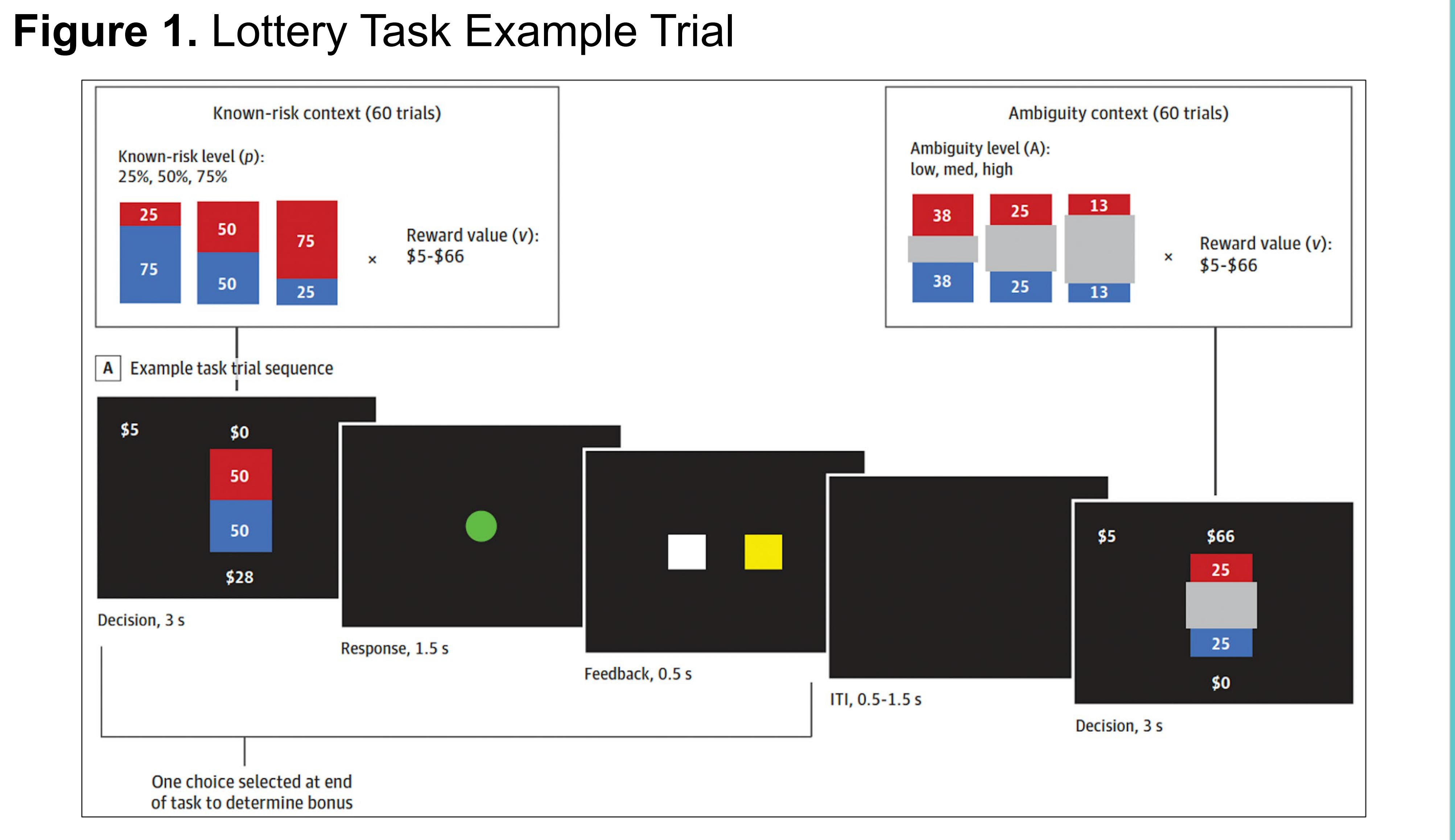
- Bulimia nervosa (BN) is an eating disorder characterized by recurrent binge eating and purging that disproportionately affects women and girls and can have devastating psychosocial and medical consequences
- Recurrent engagement in high-risk eating behaviors is central to the morbidity and mortality of BN, but the mechanisms maintaining the binge-purge cycle remain elusive
- Risk-taking is influenced by two independent computational processes: ambiguity tolerance (a tolerance for consequences with unknown odds) and risk tolerance (a tolerance for consequences with explicit odds)
- Objective: To apply computational models to lottery task data to test whether risk and ambiguity tolerance are altered in BN relative to healthy volunteers and correlated with symptom frequency in BN

METHODS

Participants (see **Table 1**) completed a lottery task in which they chose between a certain gain of \$5 or playing a lottery with varying monetary outcomes when the odds were explicit (risky) or ambiguous over 120 trials (see **Figure 1**).

Table 1. Participant Characteristics

Characteristic	BN (n = 8)	HC (n = 19)
Age	27.88 (10.67)	24.32 (4.77)
Race/ethnicity, n (%)		
Asian	3 (37.5%)	8 (42.1%)
Black	0 (0%)	2 (10.5%)
White	5 (62.5%)	7 (36.8%)
Hispanic/Latine	0 (0%)	2 (10.5%)
Body mass index (kg/m ²)	23.02 (2.93)	21.22 (2.17)
Weekly binge episodes	10.31 (9.22)	-
Weekly purging episodes	24.63 (41.69)	-
Illness duration (in months)	131.81 (151.57)	-



RESULTS

- There were no differences in the proportion of risky versus ambiguous lottery choices between participants with BN and healthy controls
- There were likewise no difference in risk and ambiguity attitudes (derived via computational models) between participants with BN and healthy controls
- However, among participants with BN, greater ambiguity tolerance was associated with more frequent purging ($r = .71, p = .049$)
 - There were no other significant correlations between eating disorder behaviors and risk and ambiguity parameters

CONCLUSION

- These preliminary, cross-sectional results indicate that women with BN may have a high tolerance for potentially harmful outcomes of purging
- My BIRCWH project tests prospective associations between risk and ambiguity tolerance and their neural representations with bulimic behaviors in young women using task-based functional magnetic neuroimaging, computational models, and experience sampling