

# Borderline Personality Symptoms Relate to Gambling Under Ambiguous, Not Risky Conditions

M. Parmelee, S. Paolizzi<sup>1</sup>, M. Hallquist, Ph.D<sup>1</sup>

<sup>1</sup>The University of North Carolina at Chapel Hill, Department of Psychology and Neuroscience



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at CHAPEL HILL

## Background

Decisions we make are guided by our expectation of the outcome, **but what if the outcome probabilities are difficult to estimate?** Uncertainty can be divided into that of known probabilities (risk) and unknown (ambiguity)<sup>1</sup>. The way we handle uncertainty has clinical relevance in maladaptive emotional and interpersonal behaviors in borderline personality disorder (BPD) and anxiety.

- BPD is characterized by disadvantageous decision-making. Devaluing delayed rewards<sup>2</sup>, behavioral inconsistency<sup>3</sup>, and overestimating predictive value of stimuli<sup>4</sup> suggest volatile perceptions of future outcomes.
- Anxiety is characterized by harm avoidance and uncertainty intolerance, as well as deficits in adjusting learning rate in unpredictable environments<sup>5</sup>.
- Reaction time relates to characterization of the decision space and evidence accumulation<sup>6</sup>.

### Questions

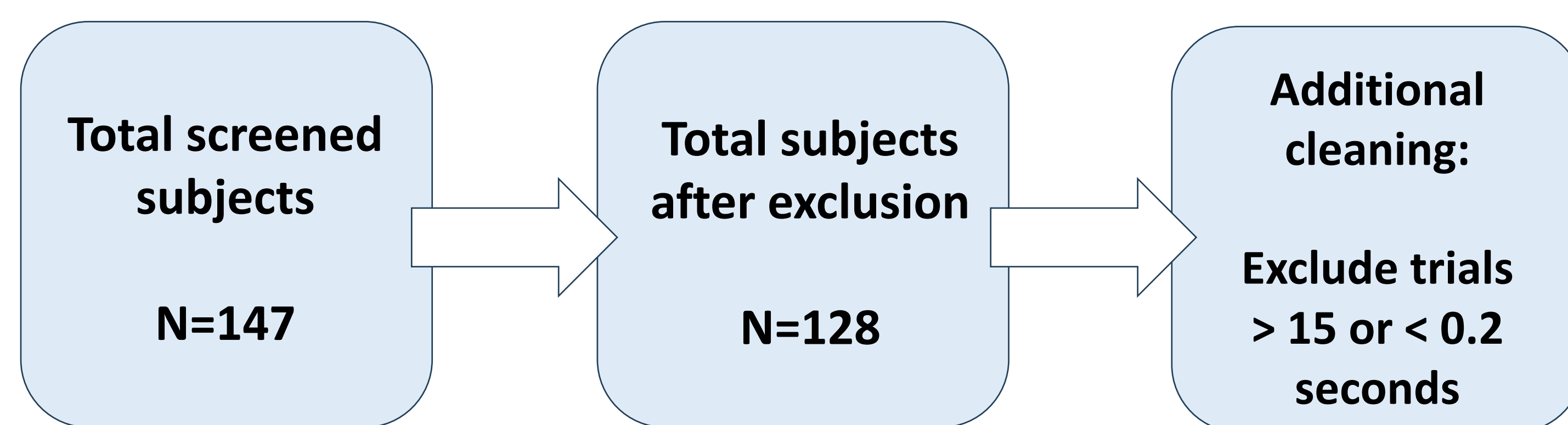
- How will reaction time differ between risky and ambiguous trials with changing contingencies?
- How will reaction time vary across dimensions of self-endorsed BPD and anxiety?

## Methods

147 participants aged 18-45 (m = 34.7) were recruited for a 60-minute series of online questionnaires. 19 were excluded due to flagged response patterns and additional trials were removed based on reaction time.

**Table 1.** Flag checks for exclusion

Flag	Threshold
Number of only F or J	> 49
Short responses	< 0.484 sec
Long responses	> 3.24 sec



**Table 2.** Variable averages and quantile reports

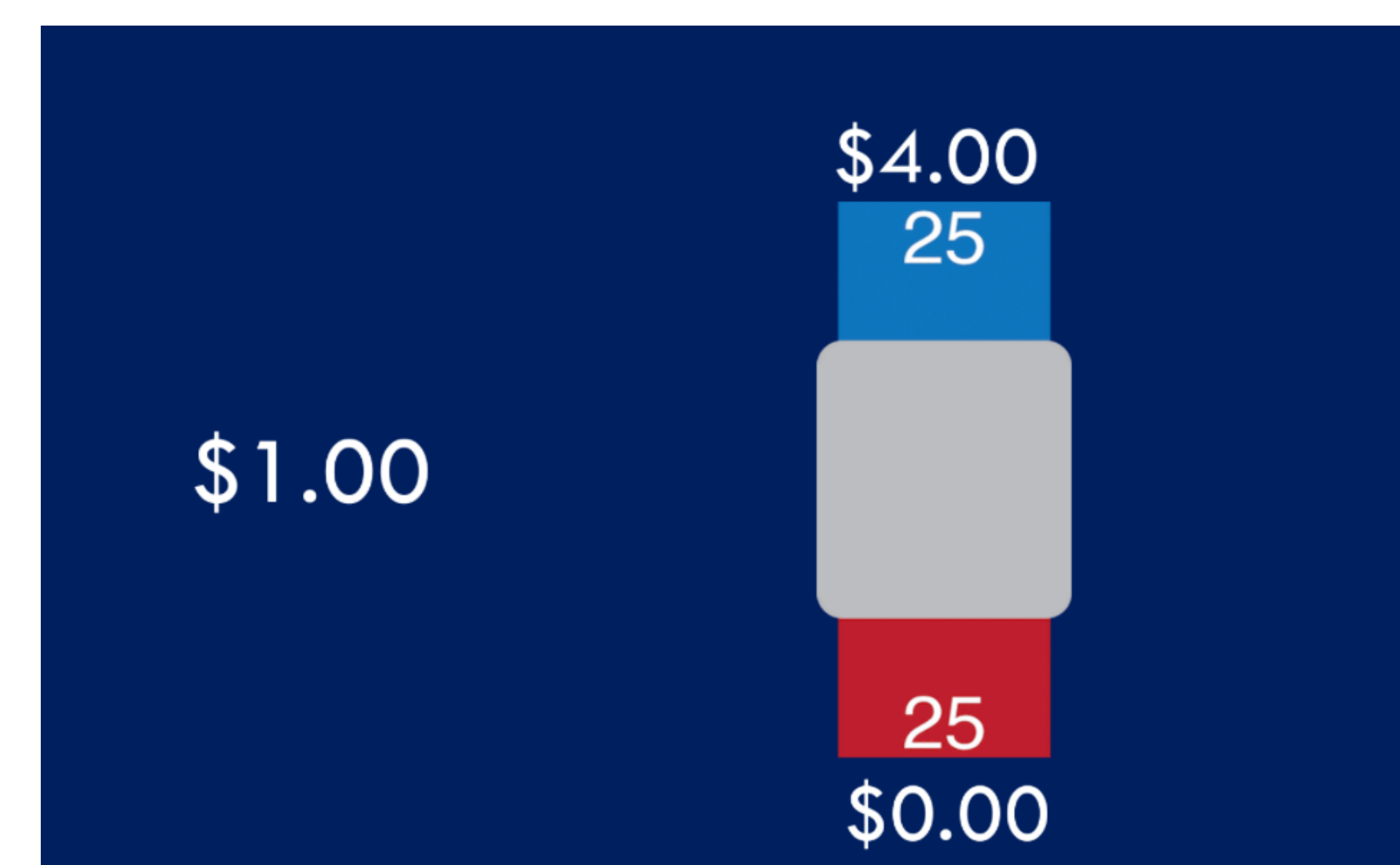
Variable	Average	Quantile Report		
		25	50	75
Average Reaction Time (s)	1.27	0.57	0.88	1.47
Risk Reaction Time (s)	1.22	0.48	0.77	1.33
Ambiguous Reaction Time (s)	1.27	0.49	0.83	1.39
Total Gambles	29.27	28	30	31
Risky Gambles	14.67	14	15	16
Ambiguous Gambles	14.59	14	15	16
PAI-BOR	25.63	13	22	39
PSWQ	53.58	34	59	68

## Methods cont.

### Task

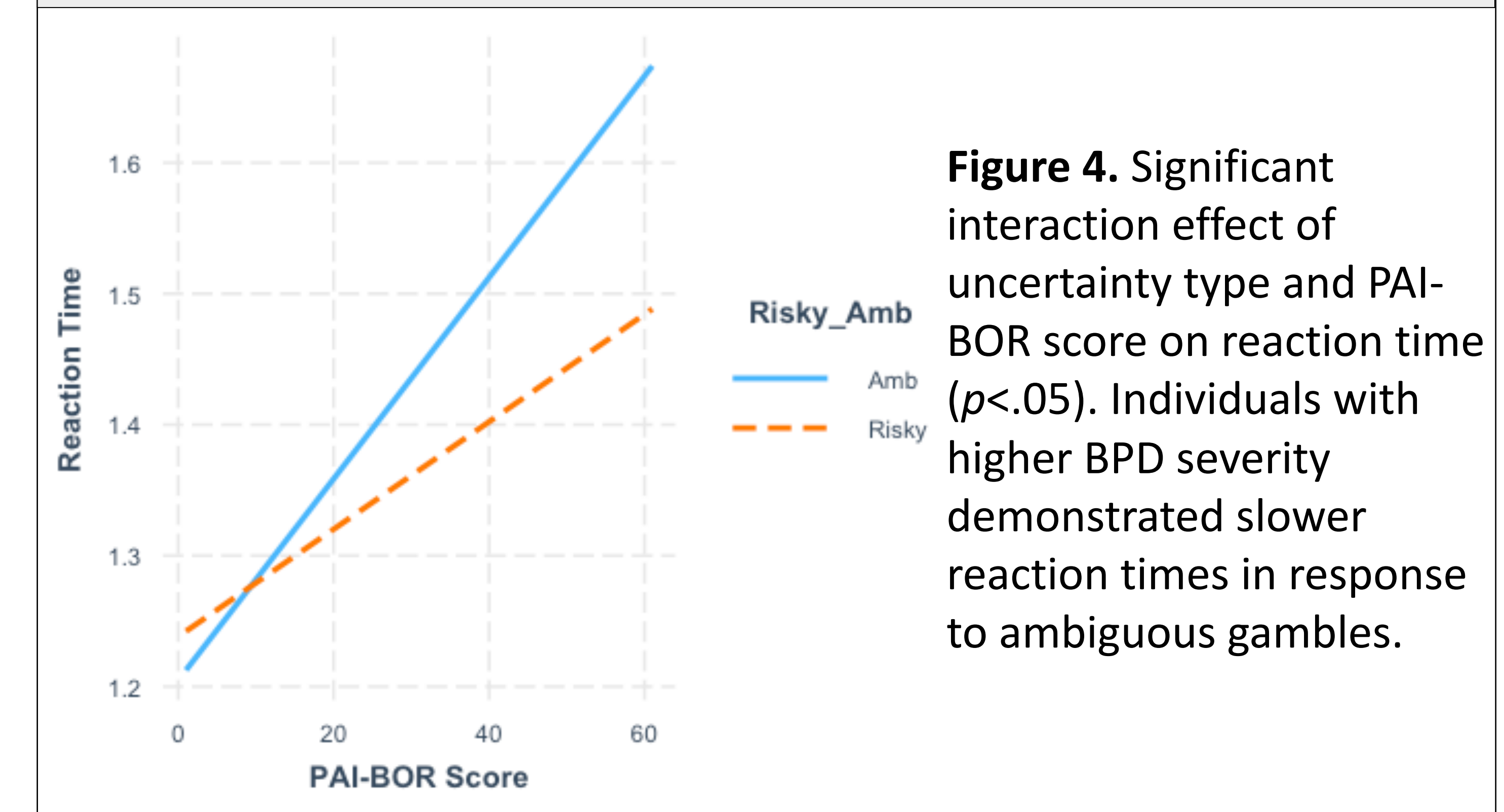


**Figure 1.** Risky trial with 75% contingency and \$10.00 reward



**Figure 2.** Ambiguous trial with 50% contingency and \$4.00 reward

## Results cont.

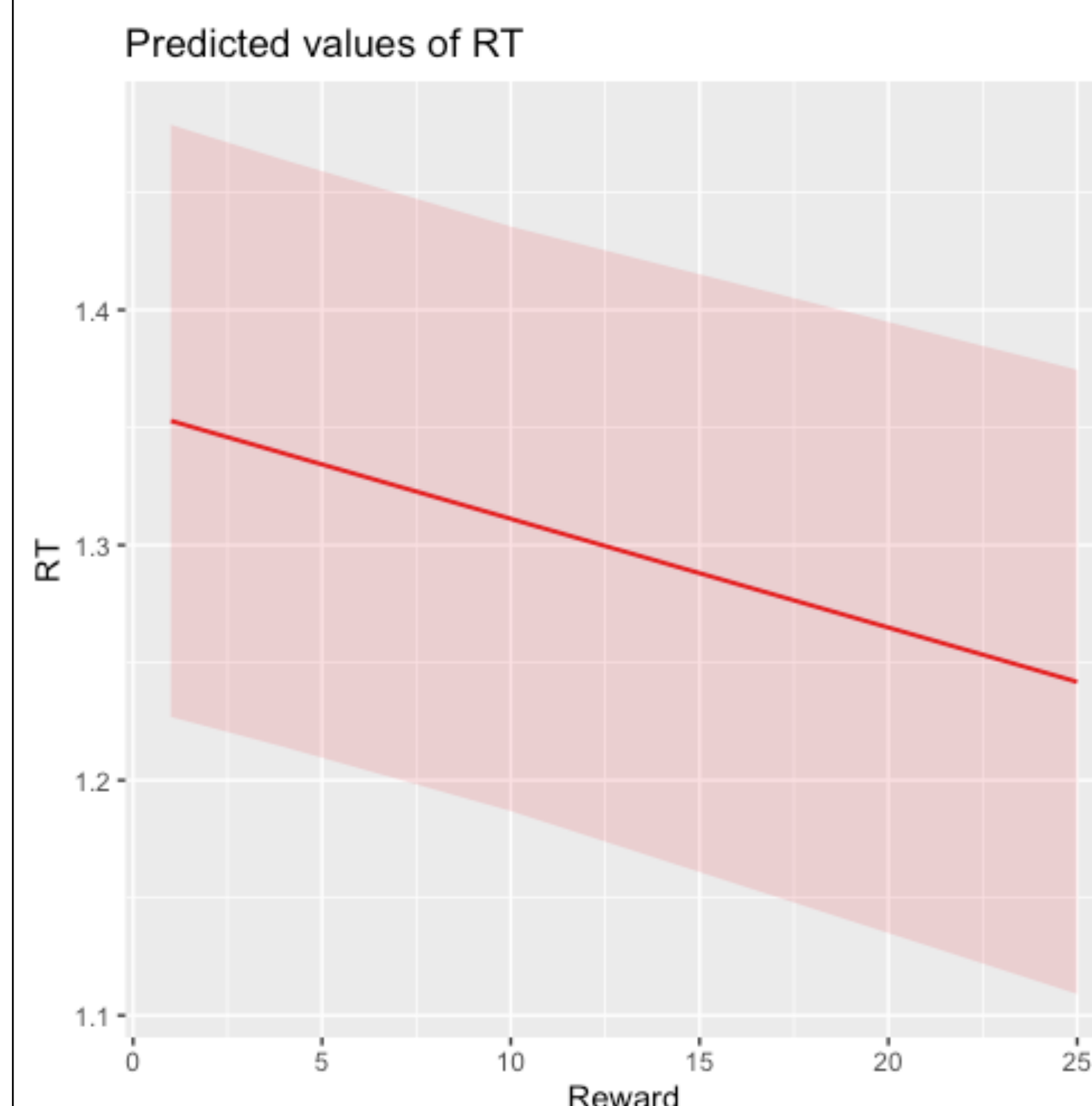


**Figure 4.** Significant interaction effect of uncertainty type and PAI-BOR score on reaction time ( $p < .05$ ). Individuals with higher BPD severity demonstrated slower reaction times in response to ambiguous gambles.

## Results

Multilevel linear regression was used to assess the effect of reward, contingency, gamble choice, uncertainty type, and clinical measures on reaction time.

$$\text{lmer}(\text{RT} \sim \text{Reward} + \text{Contingency} + \text{Gamble} + \text{Risky\_Amb} * \text{PAI-BOR} + \text{PSWQ} + (1 | \text{RandomID}))$$



**Figure 3.** Significant effect of reward on reaction time ( $p < .005$ ). As the size of the potential reward increased, reaction time decreased.

## Key Takeaways

- ❖ Participants had significantly slower reaction times in ambiguous trials compared to risky trials.
- ❖ Reaction time is modulated by reward, where greater rewards predict faster reaction times.
- ❖ There were no significant direct effects of BPD symptoms or worry severity on reaction time.

## Future Directions

- ❖ Model comparison will be used to optimize model fit.
- ❖ Random effects and interactive effects will be explored to predict reaction time and gamble choice.
- ❖ Categorical outcome: **Can we predict gambling behavior based on trial characteristics and individual difference factors?**
- ❖ Drift diffusion and subjective value models will be developed to computationally illustrate decision-making patterns.

### References

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