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RESILIENCE

Background

- Stress and mental health disorders are associated with decreased flexibility in learning, reflected in a diminished reliance on model-based behaviour¹.
- The impulse to approach reward-predictive cues and avoid punishment-predictive cues (Pavlovian bias) positively links to stress and psychopathology².
- Research has highlighted the importance of situation-specific shifting between habitual and more cognitively demanding modes of learning³.
- Under controllable situations in which actions can bring about desired outcomes a more flexible learning strategy may be called for, but in uncontrollable environments, less flexibility might become the more cost-effective tactic as one's actions are inconsequential in obtaining a goal⁴.

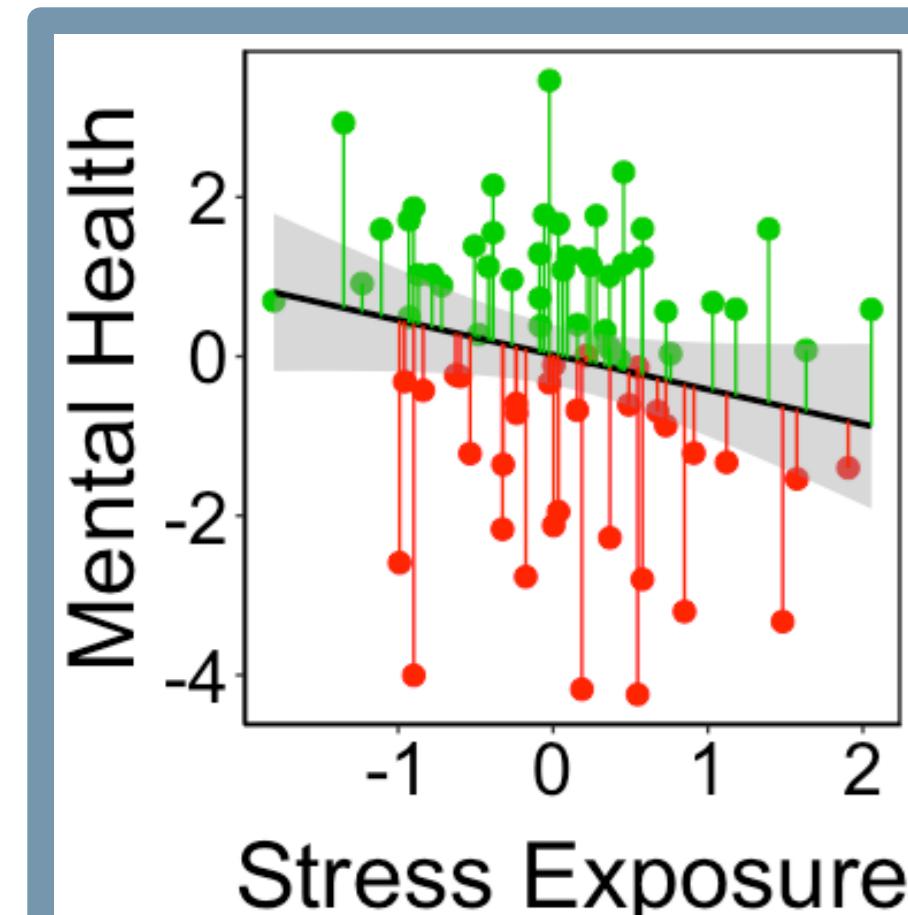
Question

Are both the tendency to use a more flexible strategy and the ability to flexibly shift between strategies, depending on the controllability of the environment, positively related to resilience?

Methods

76 participants ages 18-24 (68% female, $M_{age} = 19$ years)

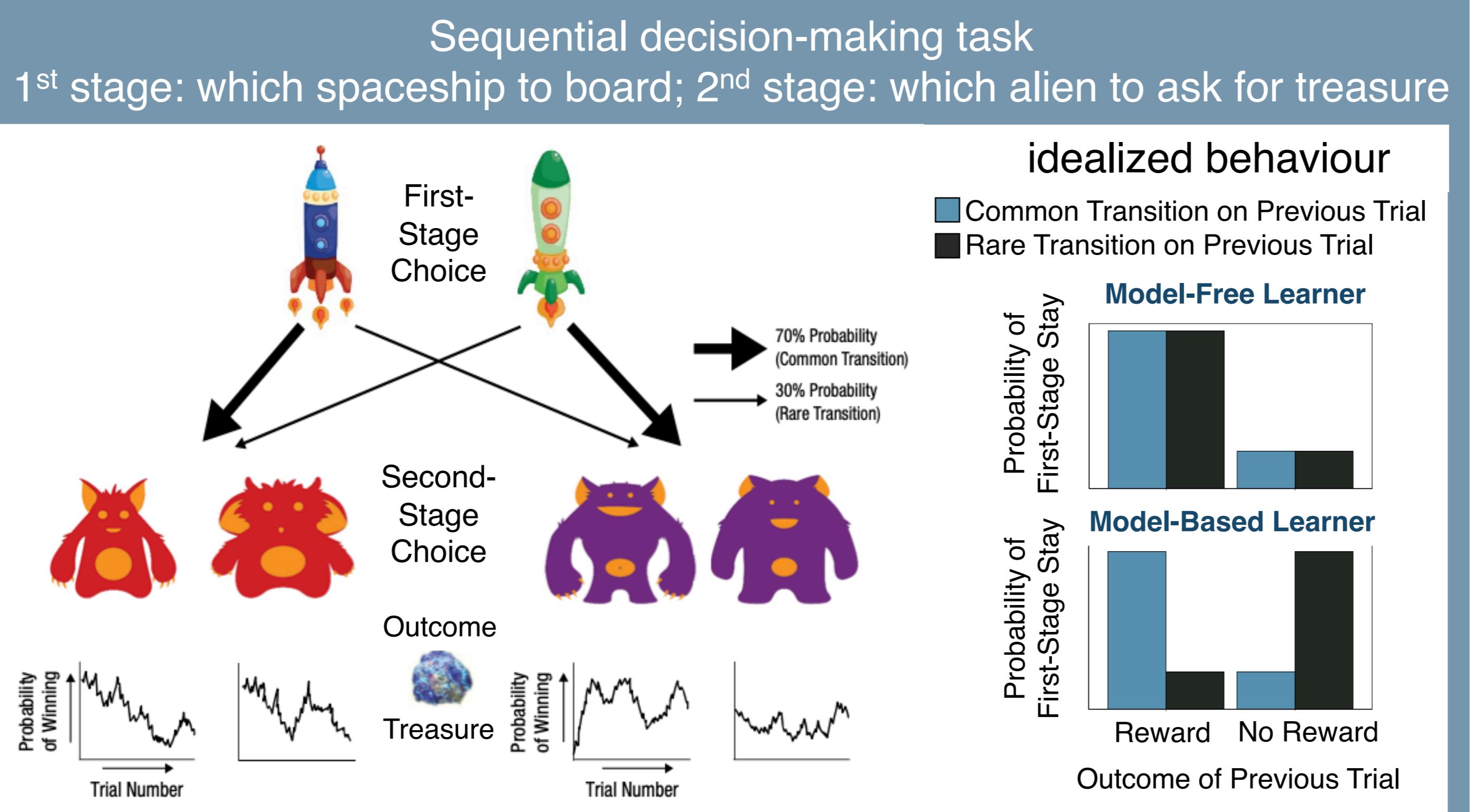
Resilience⁵



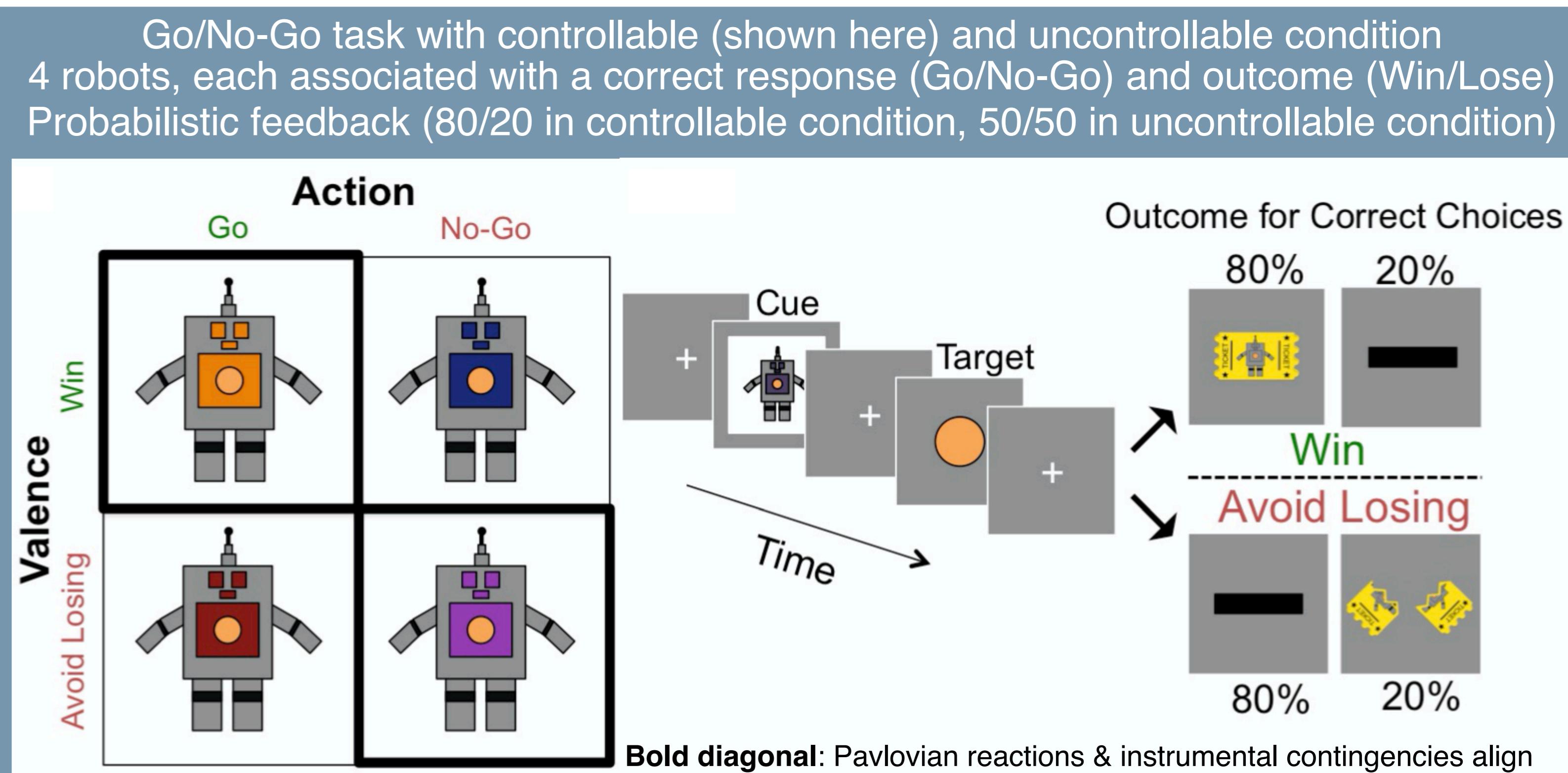
- Stress Exposure: Daily Stress Inventory & Life Experiences Survey
- Mental Health: WHO-5 Well-Being Index & General Health Questionnaire-28

- PCA to obtain principal stress and mental health components
- Regressed 1st mental health component on 1st stress component
- Residuals denote resilient functioning, i.e. how much better or worse than predicted an individual is functioning

Model-based and Model-free Learning⁶

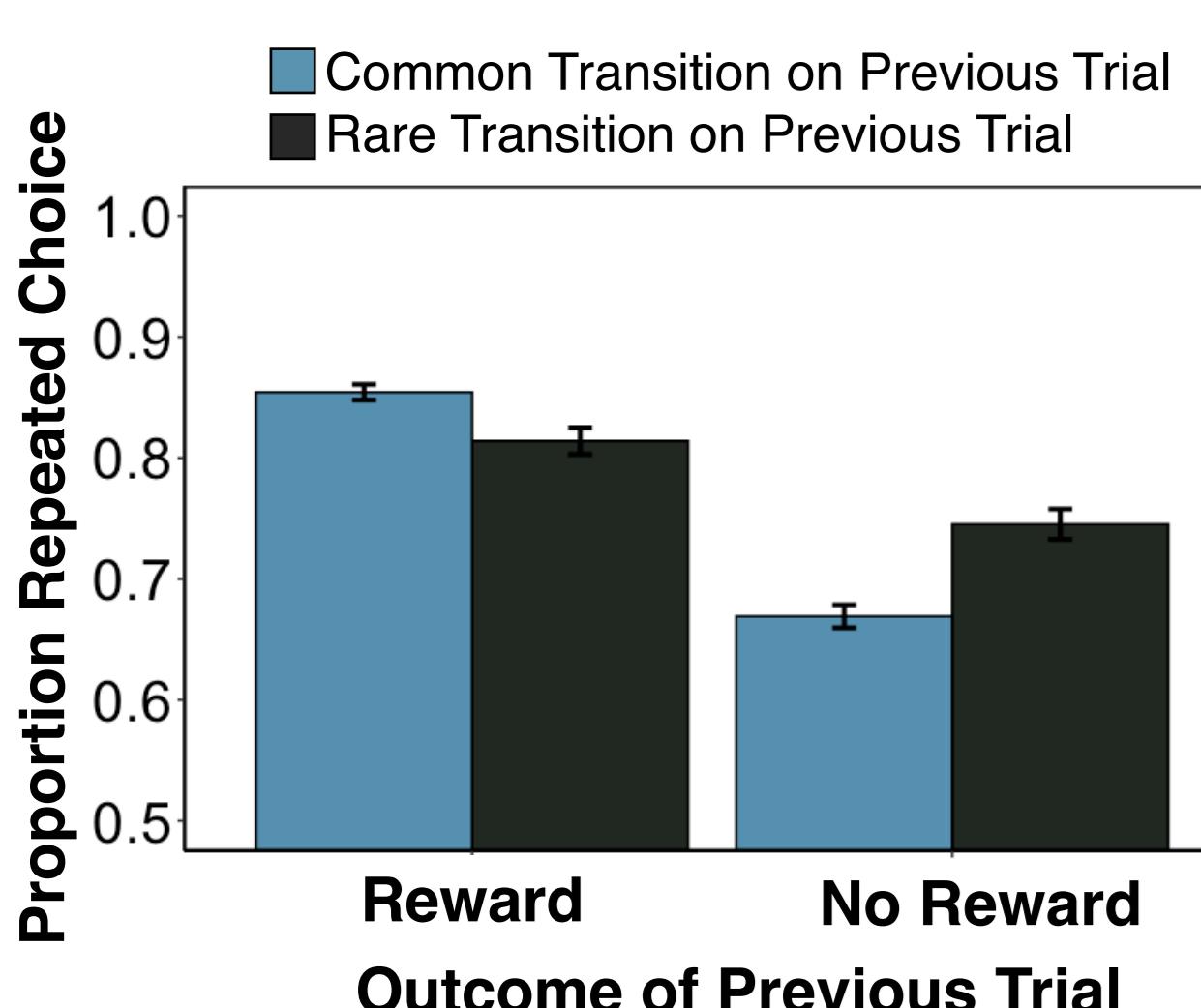


Pavlovian Bias⁷



Results

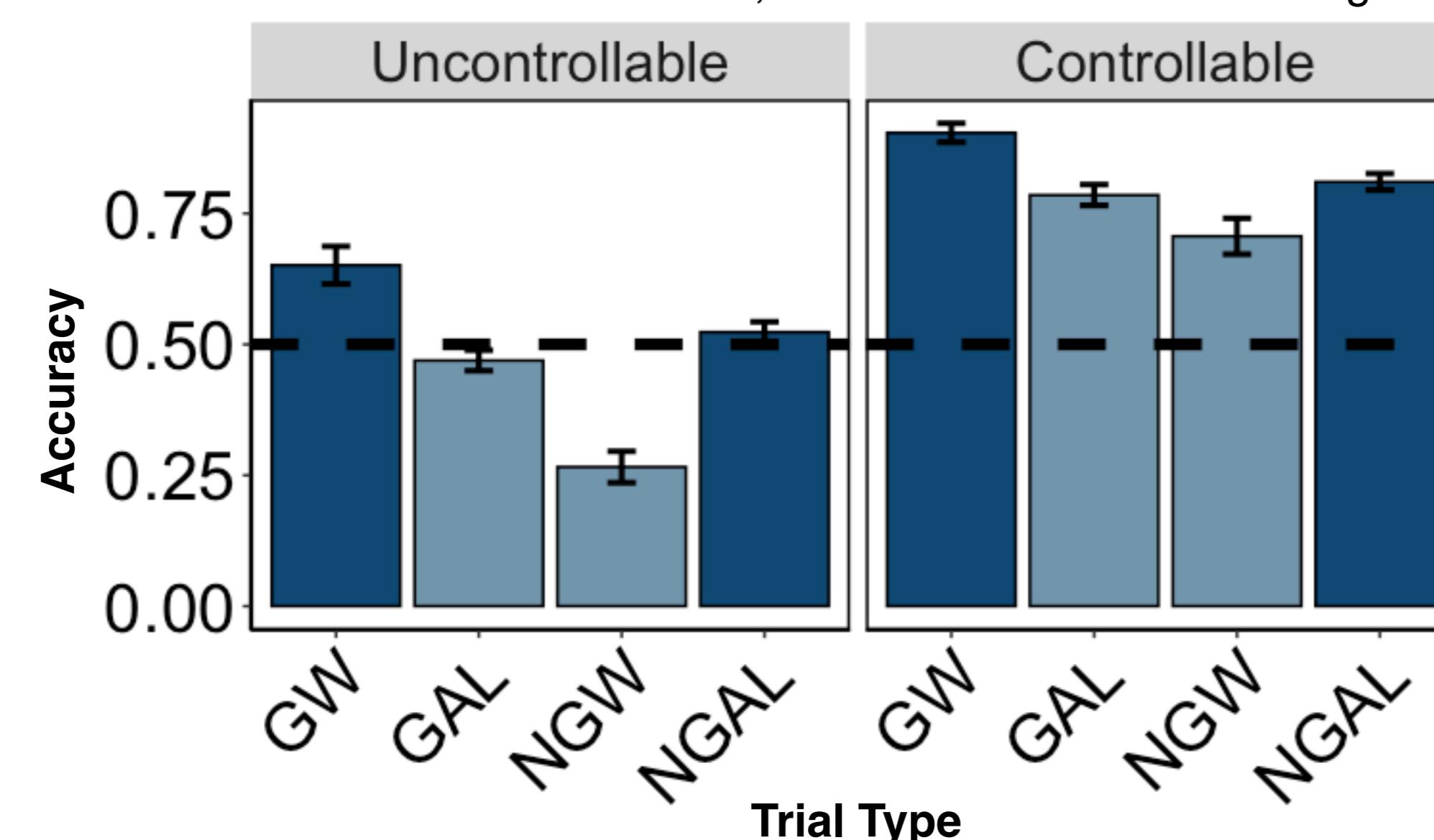
Model-based and Model-free Learning



Participants employed a mixture of model-free and model-based choice strategies.

Pavlovian Bias

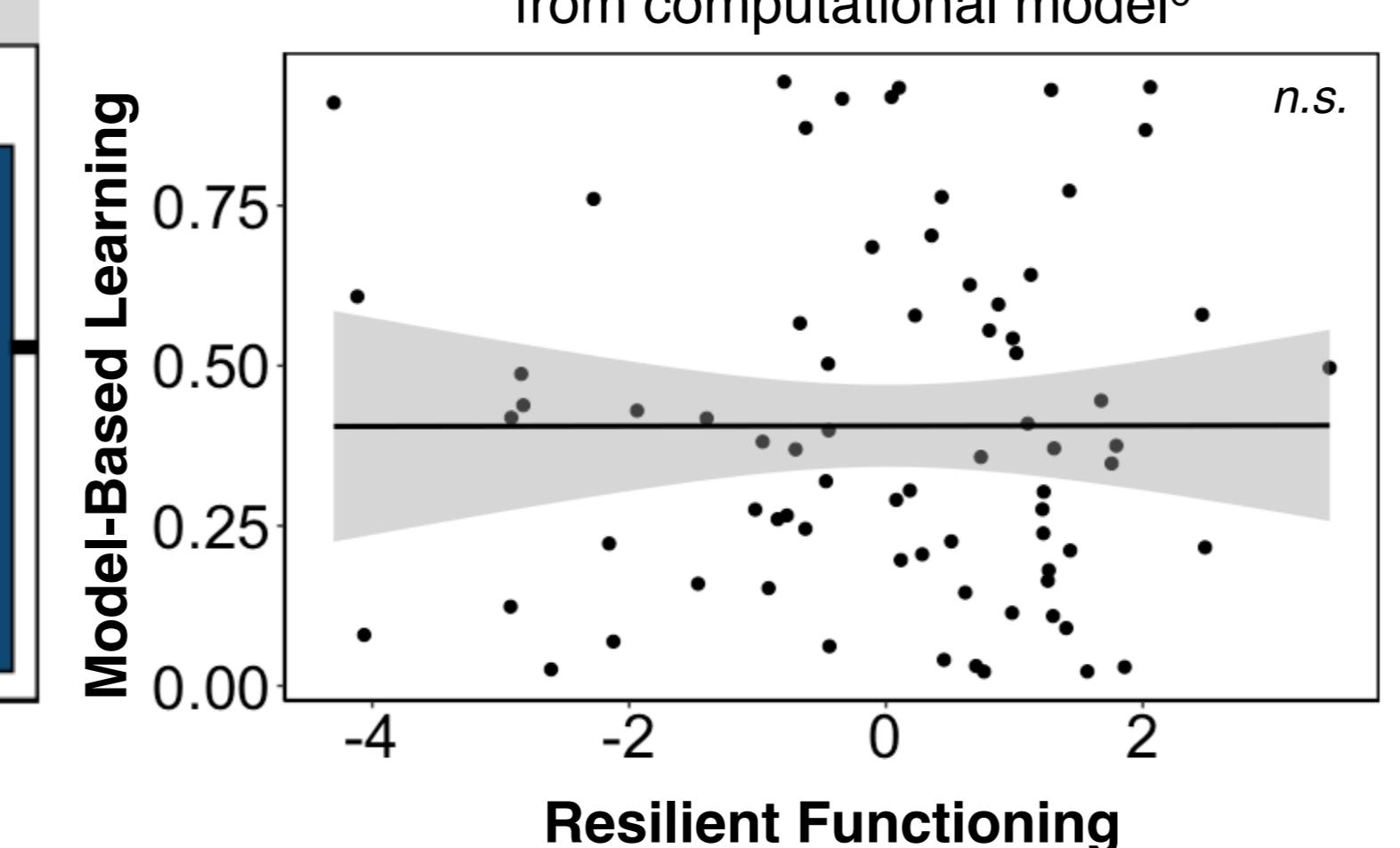
GW: Go to win; GAL: Go to avoid losing; NGW: No-Go to win; NGAL: No-Go to avoid losing



Accuracy was reduced when Pavlovian tendencies conflicted with optimal instrumental response, demonstrating Pavlovian bias. Under lack of control, bias was enhanced.

... Model-based Learning

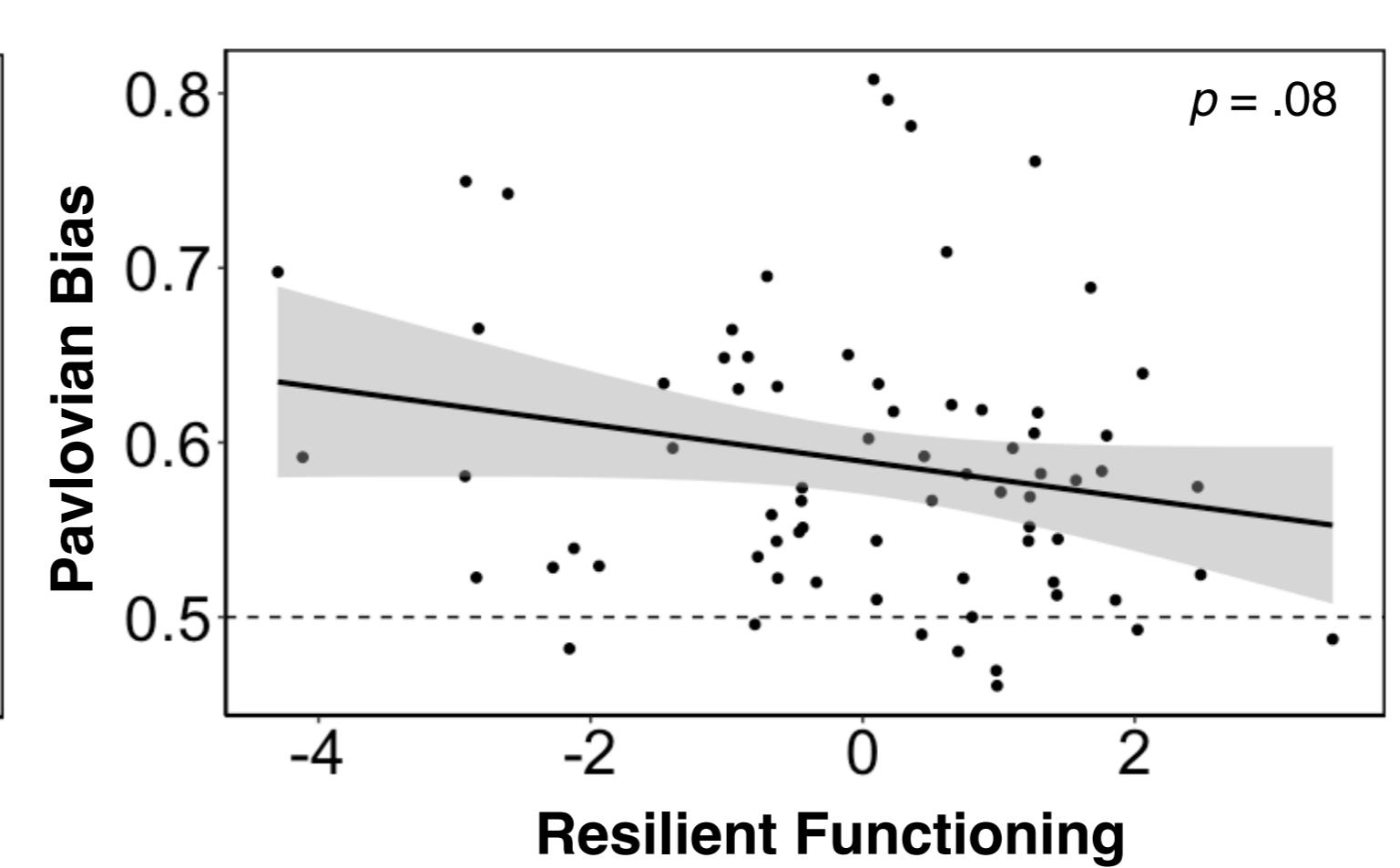
Model-based learning score derived from computational model⁸



Model-based learning was not related to resilient functioning scores.

Relating Resilience to ...

... Pavlovian Bias



Lower resilient functioning was associated with overall greater Pavlovian bias, albeit not statistically significant. The difference in Pavlovian bias between conditions was not significantly moderated by resilient functioning scores.

Discussion

- In line with prior research, participants displayed a mixture of model-based and model-free learning as well as greater Pavlovian bias under lack of control.
- Neither the degree of model-based learning, nor differences in Pavlovian bias were robustly related to resilient functioning in this sample.
- Limitation: stress exposure in this sample was moderate overall.

Future Directions: computational modelling of Pavlovian and instrumental learning; investigate associations with locus of control