

# State anxiety worsens performance in the absence of cognitive anchors in moderate and severe traumatic brain injury

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## INTRODUCTION

- Elevated anxiety is often associated with decreased performance on cognitive testing (Buckelew & Hannay, 1986).
- Individuals who have sustained traumatic brain injury (TBI) often report high levels of anxiety (Hibbard, Uysal, Kepler, Bogdany, & Silver, 1998).
- However, little is known about whether the effect of anxiety on cognitive performance interacts with level of difficulty, and whether this effect is stronger in individuals with TBI compared to controls.

## HYPOTHESES

- Elevated state and trait anxiety will be associated with worse performance on modified Matrix Reasoning, but will have a stronger negative relationship with performance on the randomly ordered trial than the trial administered in order of level difficulty (least to most difficult).
- Simple effects testing will reveal that anxiety is more strongly associated with outcome in individuals who have sustained moderate and severe TBI.

## METHODOLOGY

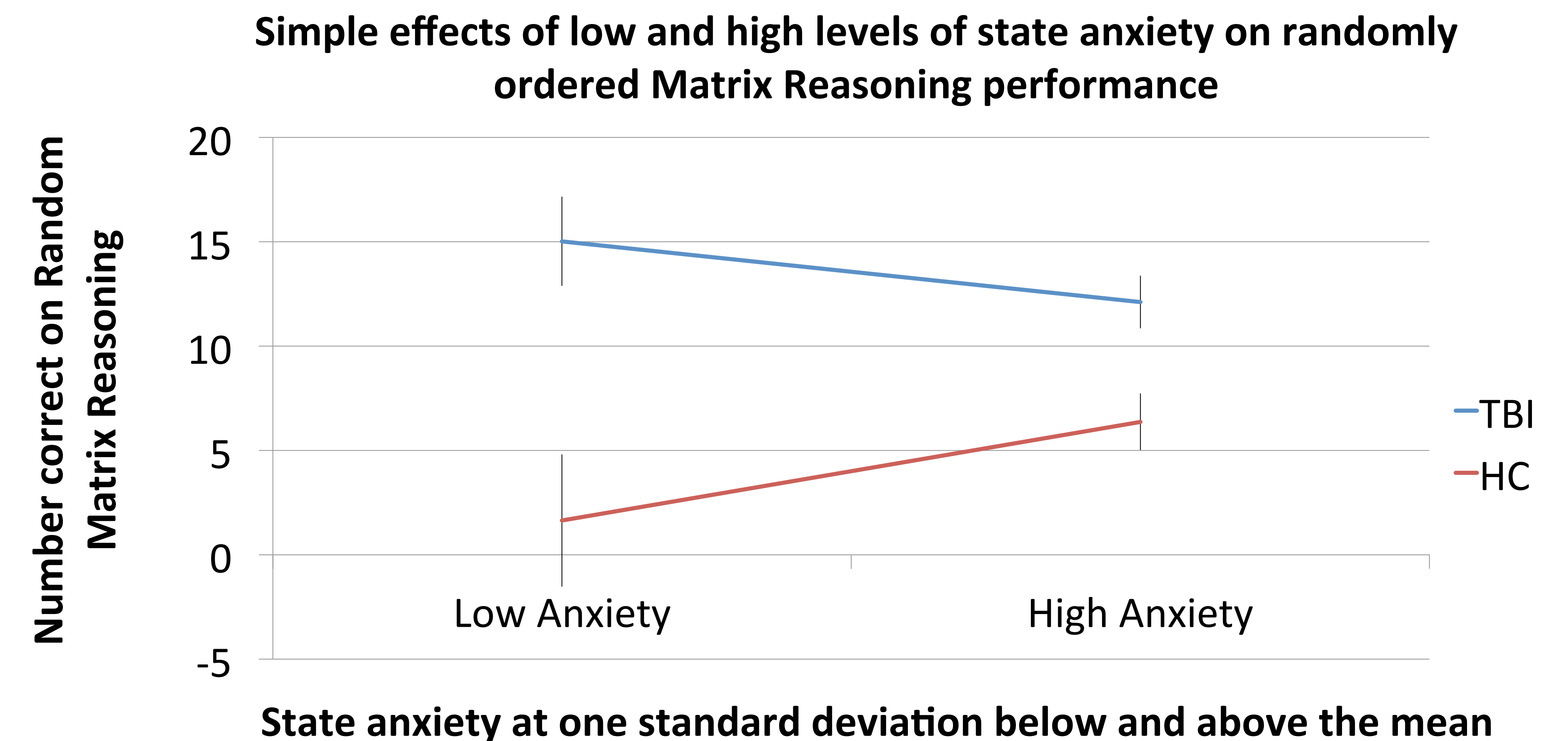
- Participants included 16 individuals with moderate and severe TBI (GCS<13 or positive neuroimaging findings) and 14 healthy control participants (HCs).
- As part of a larger study, participants were administered the State-Trait Anxiety Inventory (STAI) and a modified version of WAIS-III Matrix Reasoning containing two trials: one with items administered sequentially (Ordered) and one randomly (Random) in terms of level of difficulty.
- Order of administration of Matrix Reasoning trials was counter-balanced across participants.
- The manipulation of the progressive nature of task difficulty allowed for the testing of differences in performance based not just on level of difficulty of the task, but on the degree to which cognitive “anchors,” or cues, are present.

## RESULTS

	TBI	HC
Mean age (sd)	33.37 (14.16)	29.07 (10.88)
Gender	5 women, 11 men	7 women, 7 men
Mean performance on Random Matrix Reasoning (sd)	8.13 (2.63)	9.64 (1.69)
Mean performance on Ordered Matrix Reasoning (sd)	9.18 (2.34)	10.36 (1.65)
Mean state anxiety (sd)	40.5 (11.96)	27.57 (6.31)
Mean trait anxiety (sd)	44.13 (14.9)	27.57 (4.54)

## RESULTS CONTINUED

Random			
	All (r <sup>2</sup> )	TBI only (r)	HC only (r)
State anxiety	0.15*	-0.53*	0.63*
Trait anxiety	0.09	-0.24	0.53
Ordered			
	All (r <sup>2</sup> )	TBI only (r)	HC only (r)
State anxiety	0.01	0.16	0.41
Trait anxiety	0.00	0.04	0.30
* denotes significance			



## CONCLUSIONS

- State anxiety was not significantly associated with performance on the Ordered trial in controls or individuals with TBI, and trait anxiety did not predict performance on Ordered or Random trials in either group.
- State anxiety is associated with decreased performance on tasks without cognitive “anchors,” though it is associated with increased performance in controls.
- Thus, targeting state anxiety during cognitive activities, particularly those without cognitive anchors (e.g., WCST), in individuals with TBI could be an important consideration for assessment and day-to-day functioning.

## REFERENCES

- Hibbard, M. R., Uysal, S., Kepler, K., Bogdany, J., & Silver, J. (1998). Axis I psychopathology in individuals with traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, 13(4), 24–39.
- Buckelew, S. P., & Hannay, H. J. (1986). Relationships among anxiety, defensiveness, sex, task difficulty, and performance on various neuropsychological tasks.