



# The Involvement of PTSD Arousal Symptoms in Declarative and Non-Declarative Memory



Carina Alessandro, Victoria Templer

Department of Psychology, Providence College, 1 Cunningham Sq. Providence, RI, 02918

## Do anxiety-like arousal symptoms play a role in the memory deficits observed in PTSD patients?

Post-traumatic stress disorder (PTSD) is a debilitating disorder that is associated with pervasive anxiety-like arousal symptoms that result from the over-activation of the body's stress response. In human studies, there is evidence that the presence of anxiety-like arousal symptoms may play a role in memory deficits, but this has not been investigated in a valid rodent model. The aim of this study was to investigate the effects of PTSD anxiety-like arousal symptoms on declarative memory (DM) and non-declarative memory (NDM) in a rodent model of PTSD.

Subjects were 44 adult male Long-Evans rats:

- 22 healthy controls
- 22 PTSD-like



## Single-Prolonged Stress Model of PTSD (Liberzon et al. 1997)

### Psychological

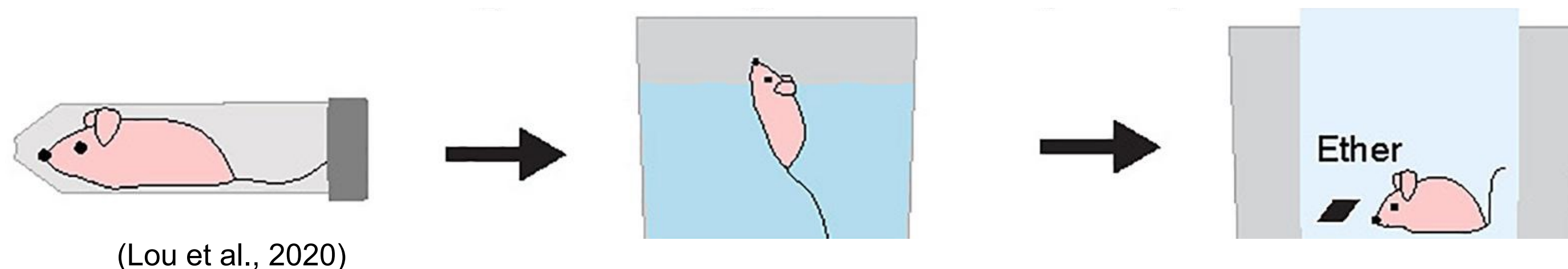
- 2-hour restraint

### Physiological

- 20-minute forced swim

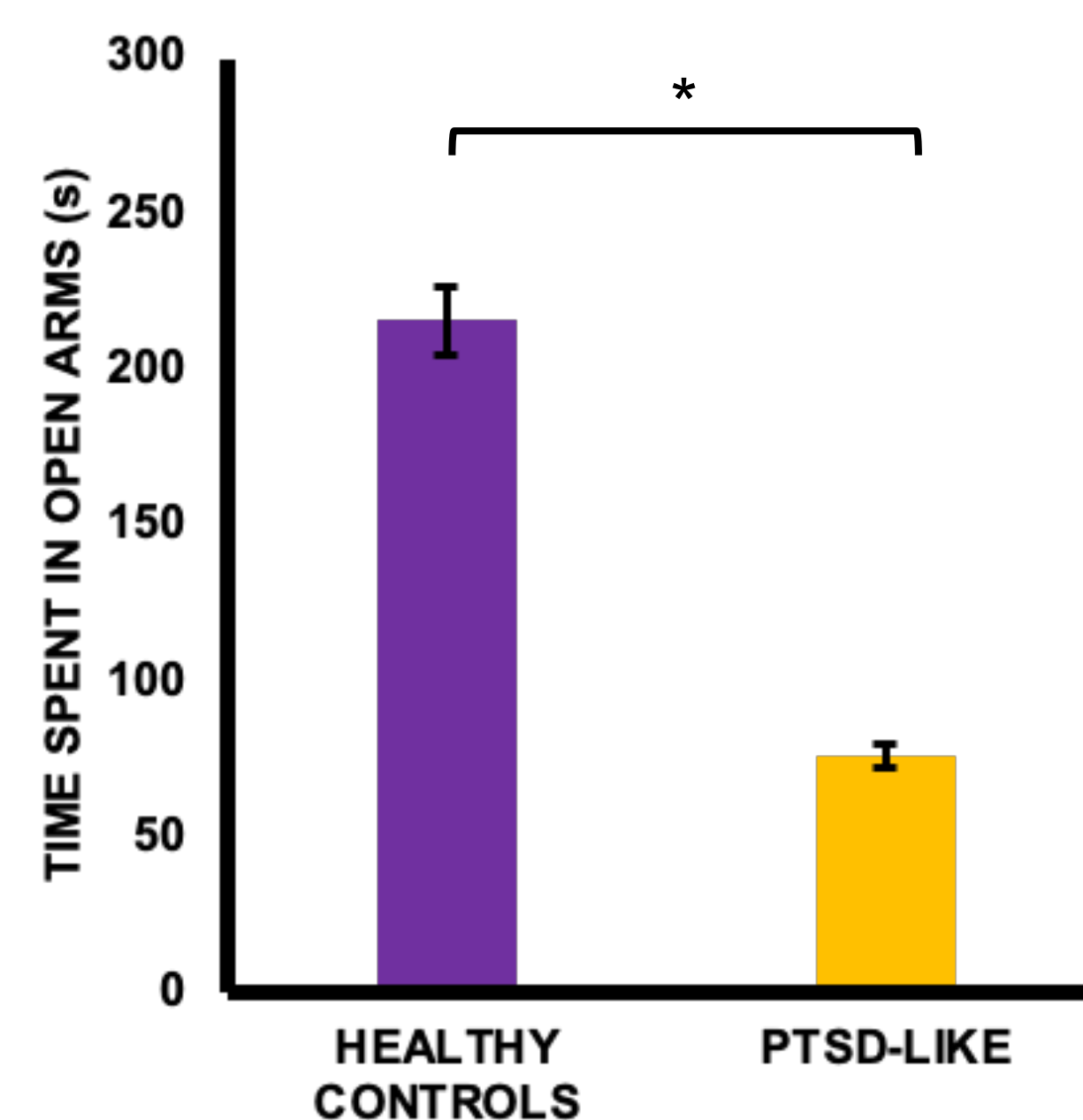
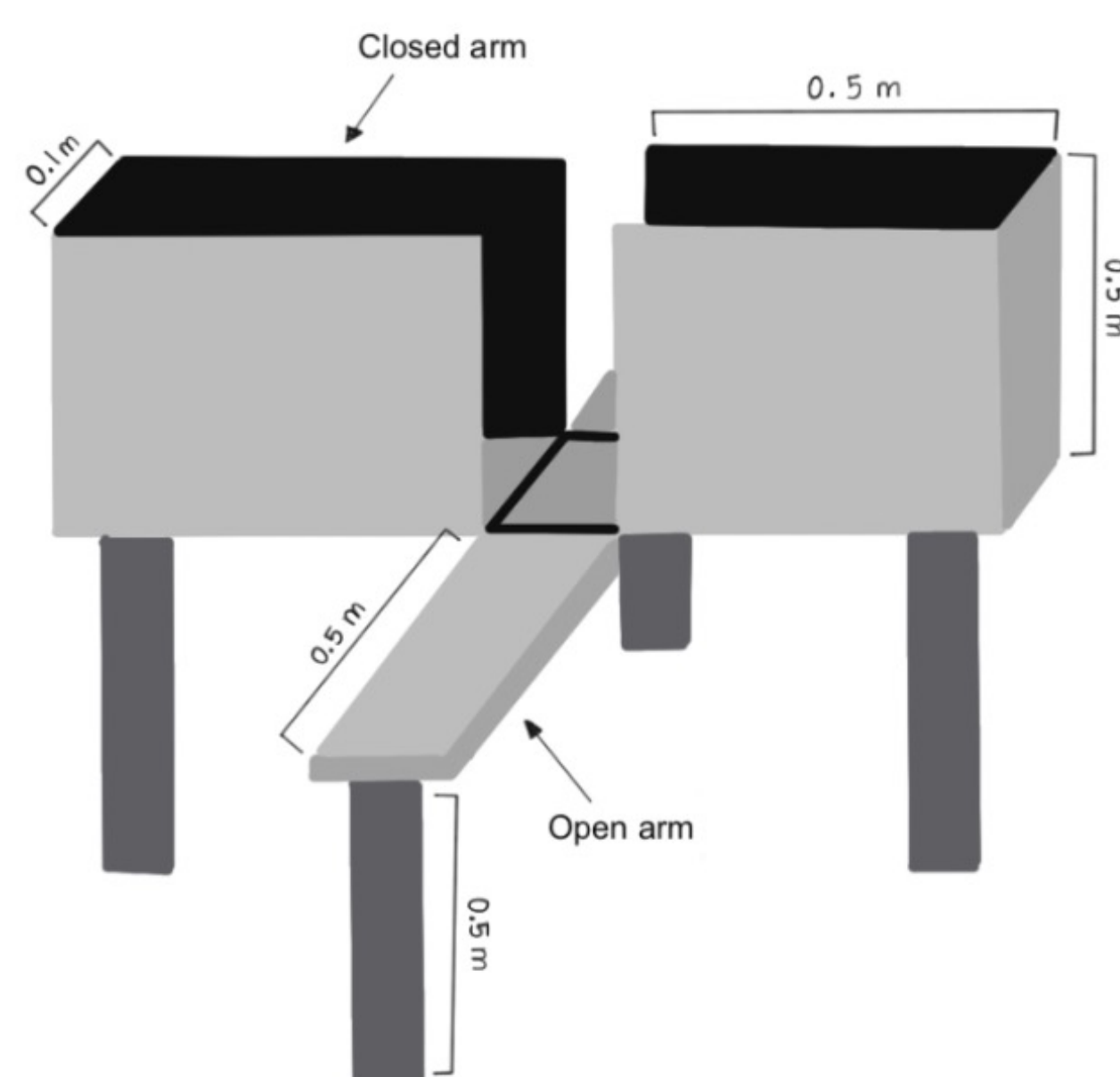
### Pharmacological

- Exposure to ether until loss of consciousness



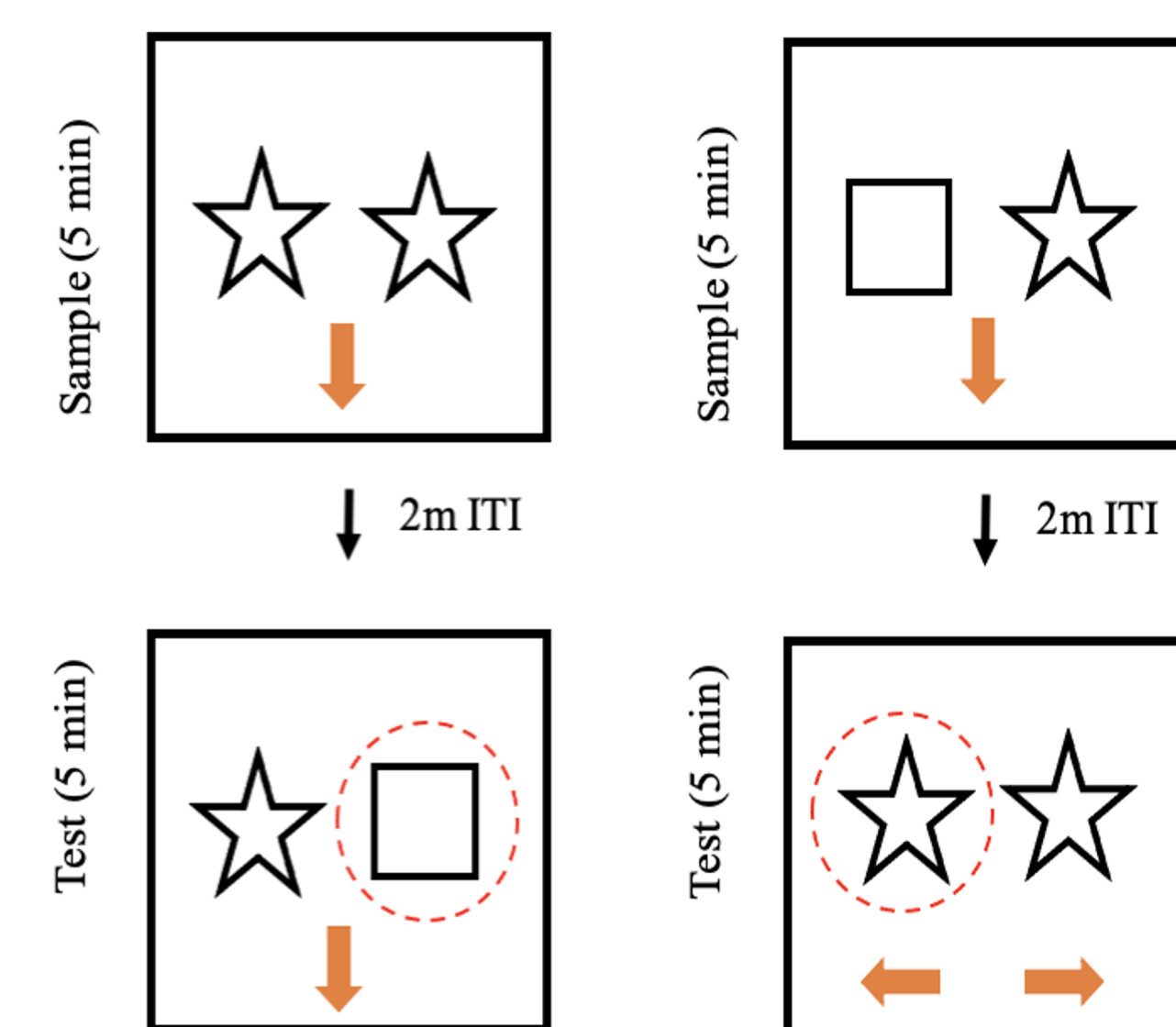
(Lou et al., 2020)

## Assessment of the anxiety-like arousal symptoms of PTSD via elevated plus maze

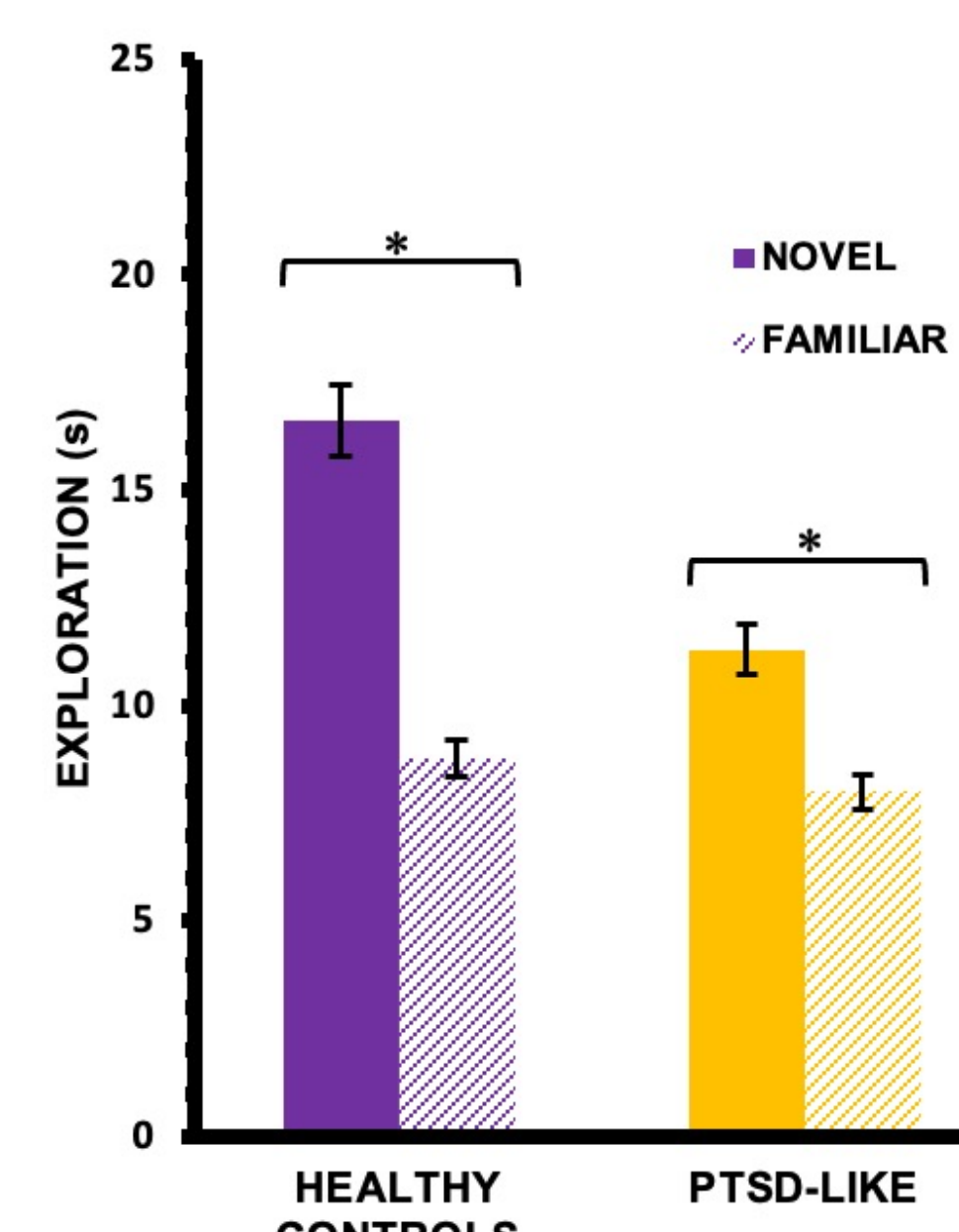


## Assessment of declarative and non-declarative memory via NOR, AOR, and Skinner's Box tasks

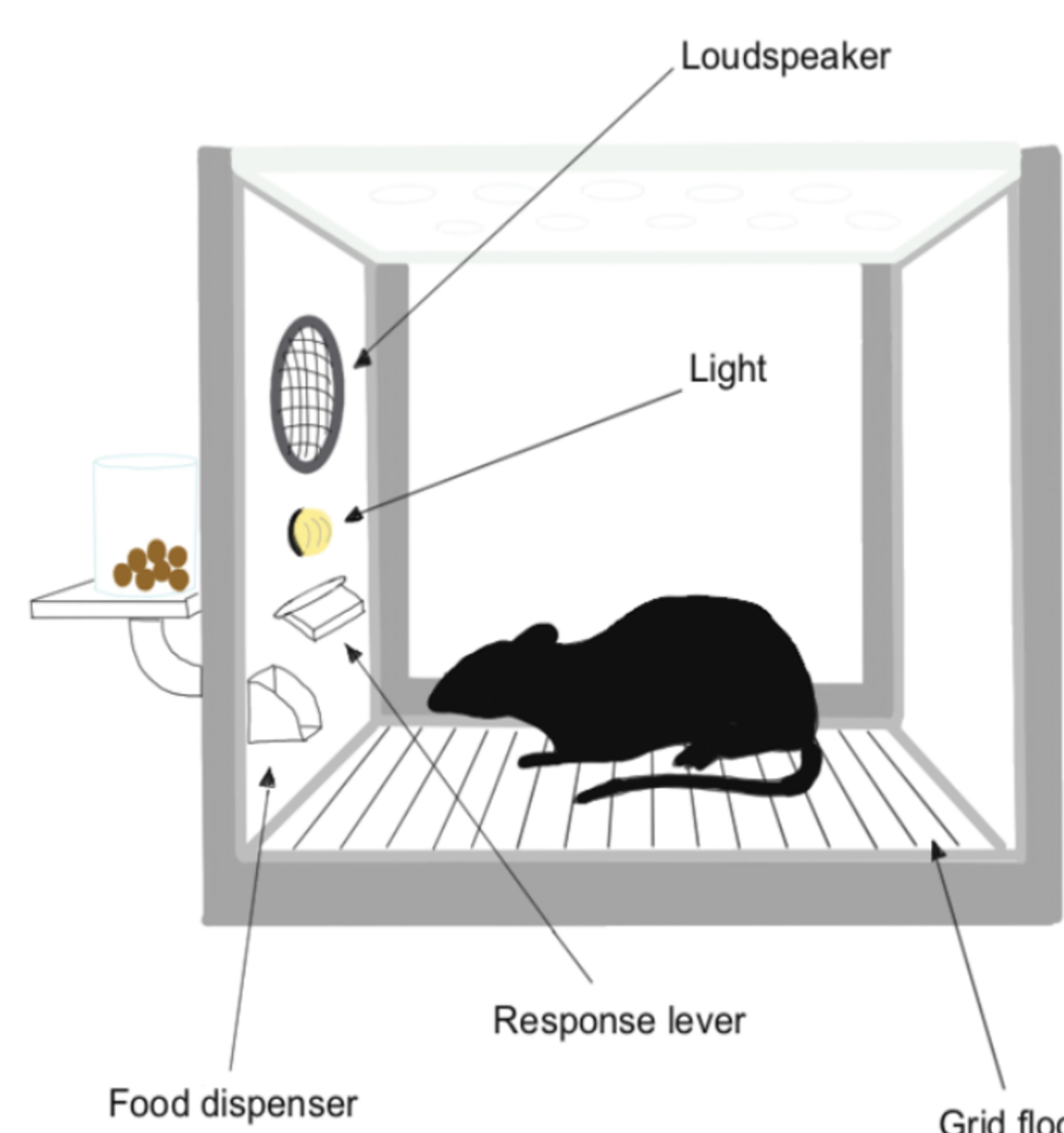
DM tasks: novel (NOR) & allocentric (AOR) object recognition tasks



N vs. F Exploration for AOR



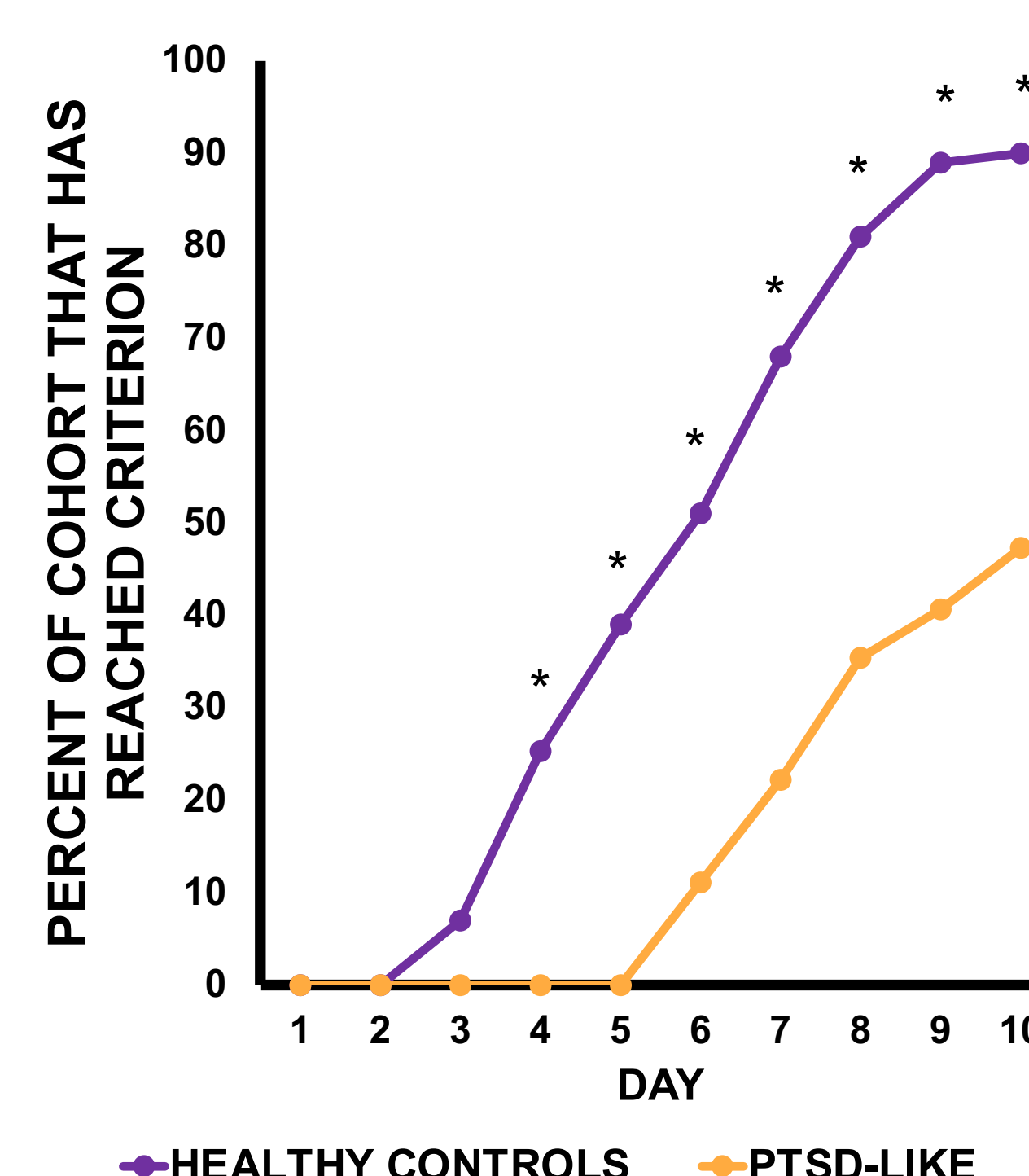
NDM task: lever press learning behavior on Skinner's box



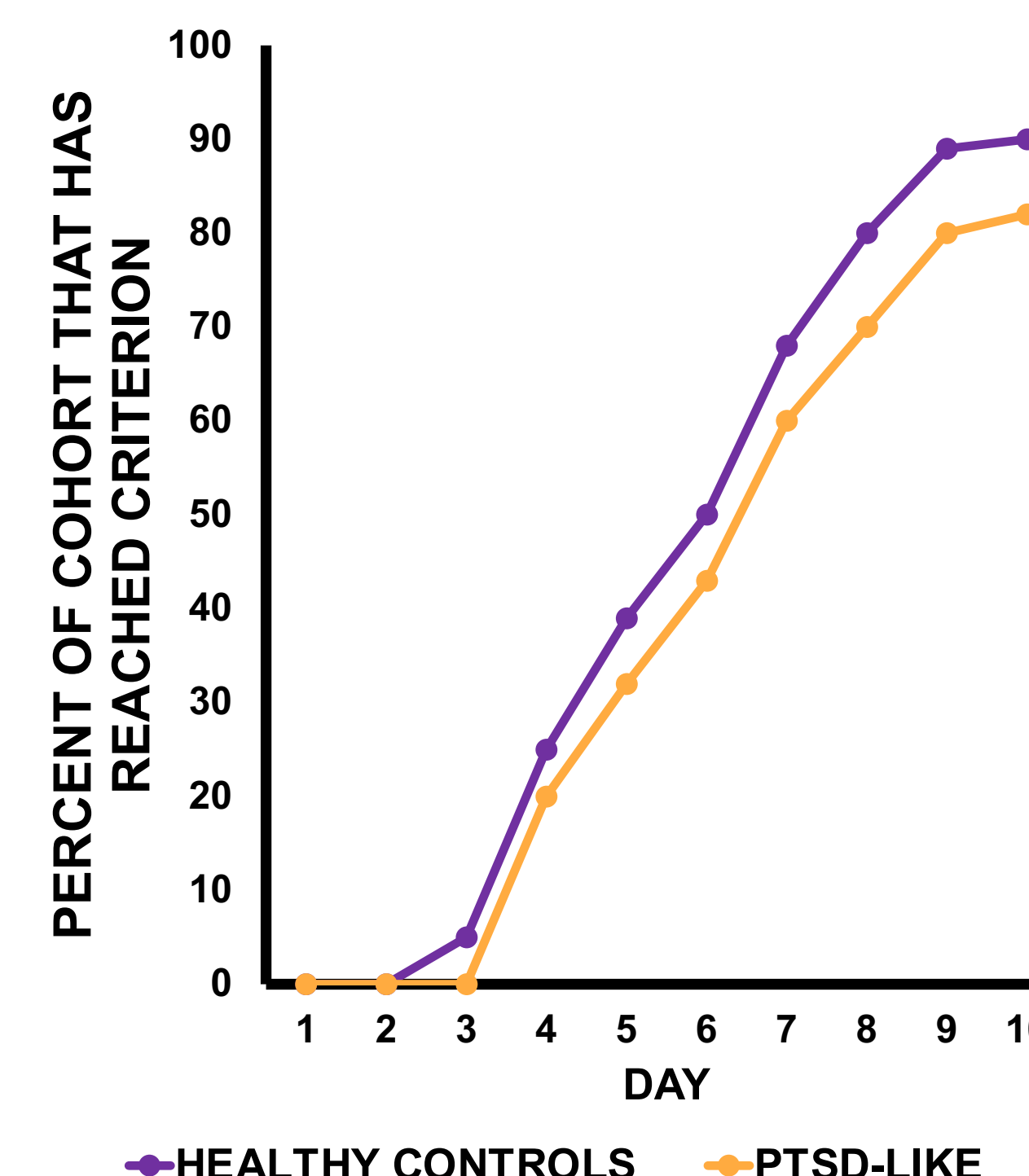
- NDM difficult to recognize and trace (Danckwerts & Leathem, 2003).
- Difficulty distinguishing between multiple forms of memory in a rodent model (Squire, 1992; Dudchenko, 2004).

Percent of cohort that has reached criterion for fixed-ratio paradigm

Alternative outcome

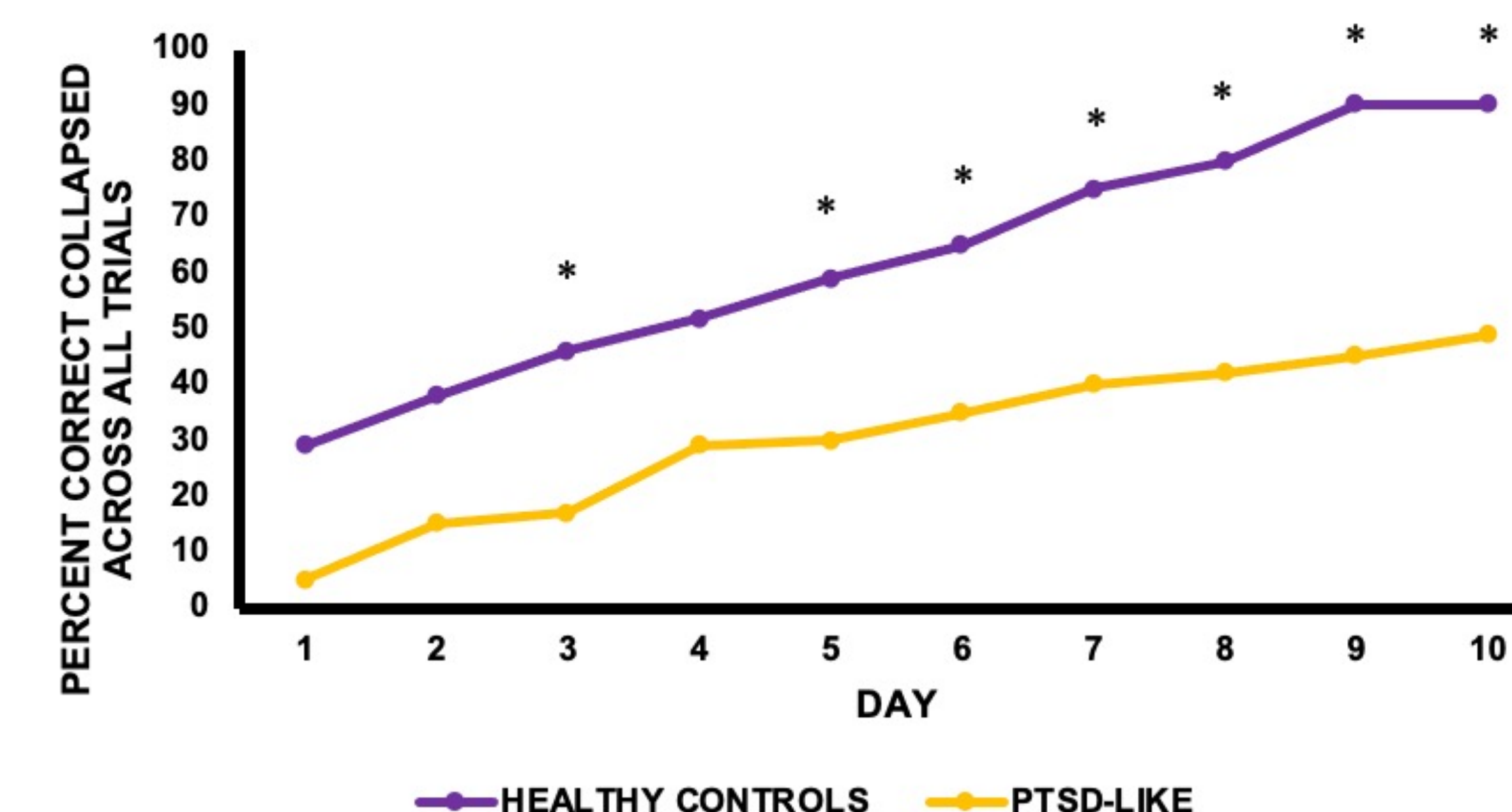


Null outcome

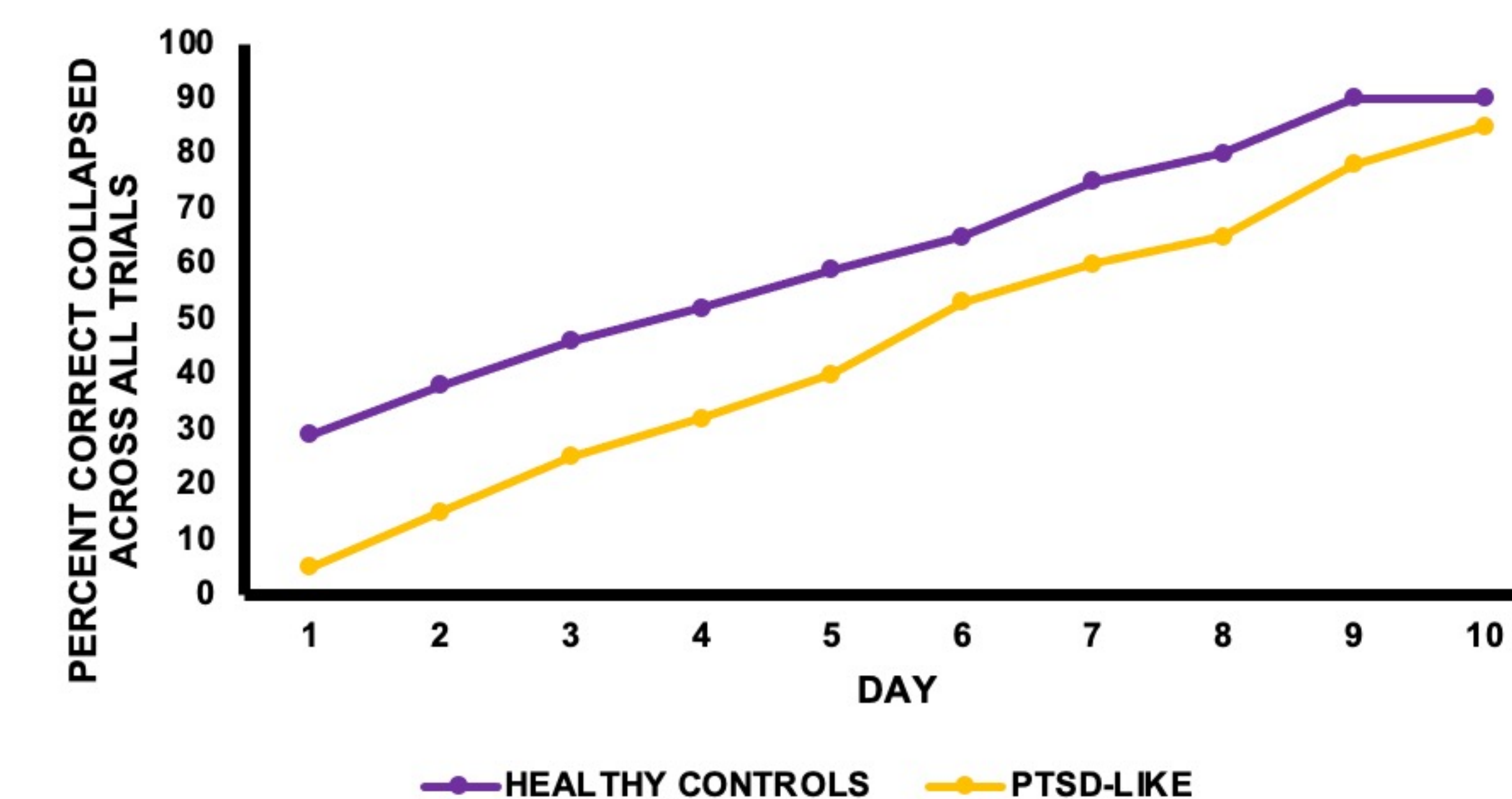


Percentage correct collapsed across all trials for fixed-ratio paradigm

Alternative outcome



Null outcome



## Expected Conclusions

- PTSD-like rats had higher levels of anxiety-like behaviors than healthy controls, suggesting arousal symptoms of PTSD (less time spent in open arms)
- PTSD-like rats performed poorer on both DM and NDM tasks (lower exploration, more task errors)
- Presence of arousal symptoms could evidence poor performance on both DM and NDM tasks
- Need for a task that properly measures NDM in a rodent model other than operant conditioning

## Acknowledgements

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