

# Motivated behaviors in chronically stressed and unstressed mice

Madeline Rahilly<sup>1,2</sup>, Arianna Gordon<sup>1,2</sup>, Francesca Schaub<sup>1,2</sup>, Ryan J. Post<sup>1,2</sup>

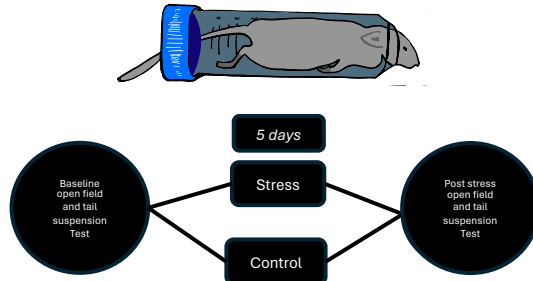
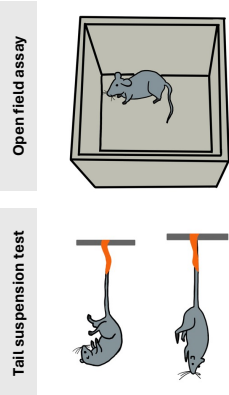
<sup>1</sup>Department of Psychology & <sup>2</sup>Neuroscience Program, Providence College



## Introduction

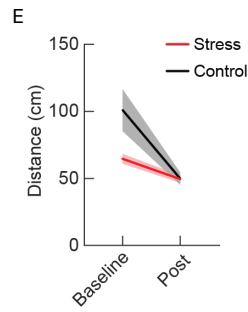
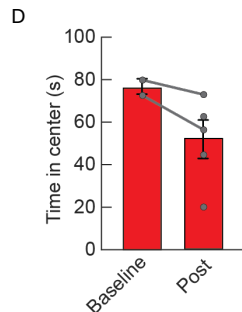
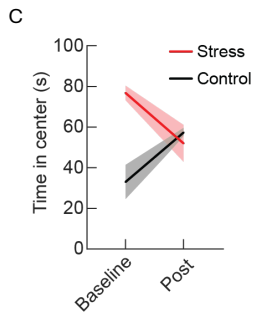
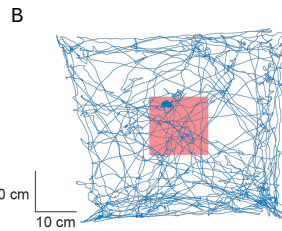
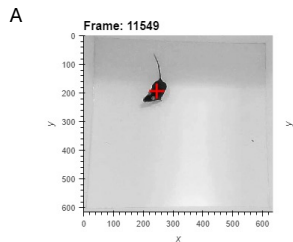
How does chronic stress impact motivated and anxiety-like behavior?

Mice are run on the tail suspension and open field tests before and after a 5-day restraint stress protocol. Control mice are gently handled each day.



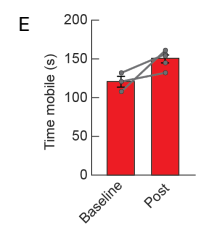
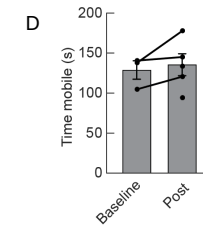
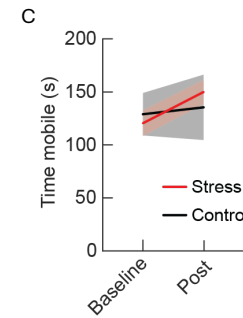
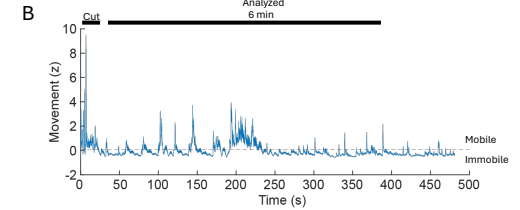
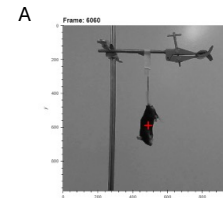
Hypothesized results: Chronically stressed mice will demonstrate less mobility on the tail suspension test and will spend less time in the center of the open field than unstressed mice.

## Open Field Assay



A) Image of software used to track mouse B) Example trajectory of mouse movement in open field C) Graph of time spent in center for stress group mice pre- and post-stress D) Graph demonstrating time spent in center for only stress group mice pre and post-stress E) Graph demonstrating the distance each group of mice traveled pre- and post-stress

## Tail Suspension Test

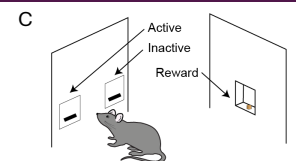
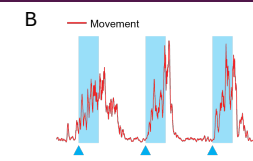
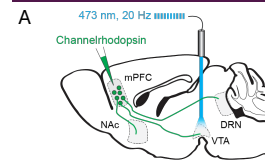


A) Image of software used to track mouse movement during the tail suspension test B) Graph demonstrating spikes of movement and periods of immobility C) Graph demonstrating the amount of time both groups of mice spent mobile pre- and post-stress D) Graph demonstrating the amount of time stressed mice were mobile pre- and post-stress E) Graph demonstrating the amount of time unstressed mice were mobile pre- and post-stress

## Conclusions

Our results from this study suggest that rather than creating a helpless phenotype in the mice, we may have instead created a resilient one. Our tail suspension data show, against our hypothesis, that mice who experienced stress increased their mobility relative to baseline. We believe this could be due to the fact that a few of the mice were able to escape the restraint tube, creating a resilient phenotype. Due to the small sample size of this pilot project, all statistical comparisons were non-significant and some measures (particularly time spent in the center of the open field) were particularly noisy.

## Future Directions



A) Optogenetic stimulation of the medial prefrontal cortex B) Hypothesized TST results C) Operant motivated behavior set up

Going forward, we will use optogenetic stimulation to ask if different populations of the medial prefrontal cortex drive motivated behaviors. We will also implement an 8-week chronic stress schedule and ask if such mPFC activity can recover the stress-induced diminished motivated behavior.

## Acknowledgments

We thank Providence College Academic Affairs, the Department of Psychology, the Neuroscience Program, and the Center for Engaged Learning for funding. Future directions of this project are supported by the Rhode Island Foundations and RI-INBRE.