

# Sex Differences in a Rat Model of Post-Traumatic Stress Disorder

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### INTRODUCTION

 Post-traumatic stress disorder (PTSD) is an anxiety disorder characterized by symptoms that include vivid nightmares, emotional and social withdrawal and

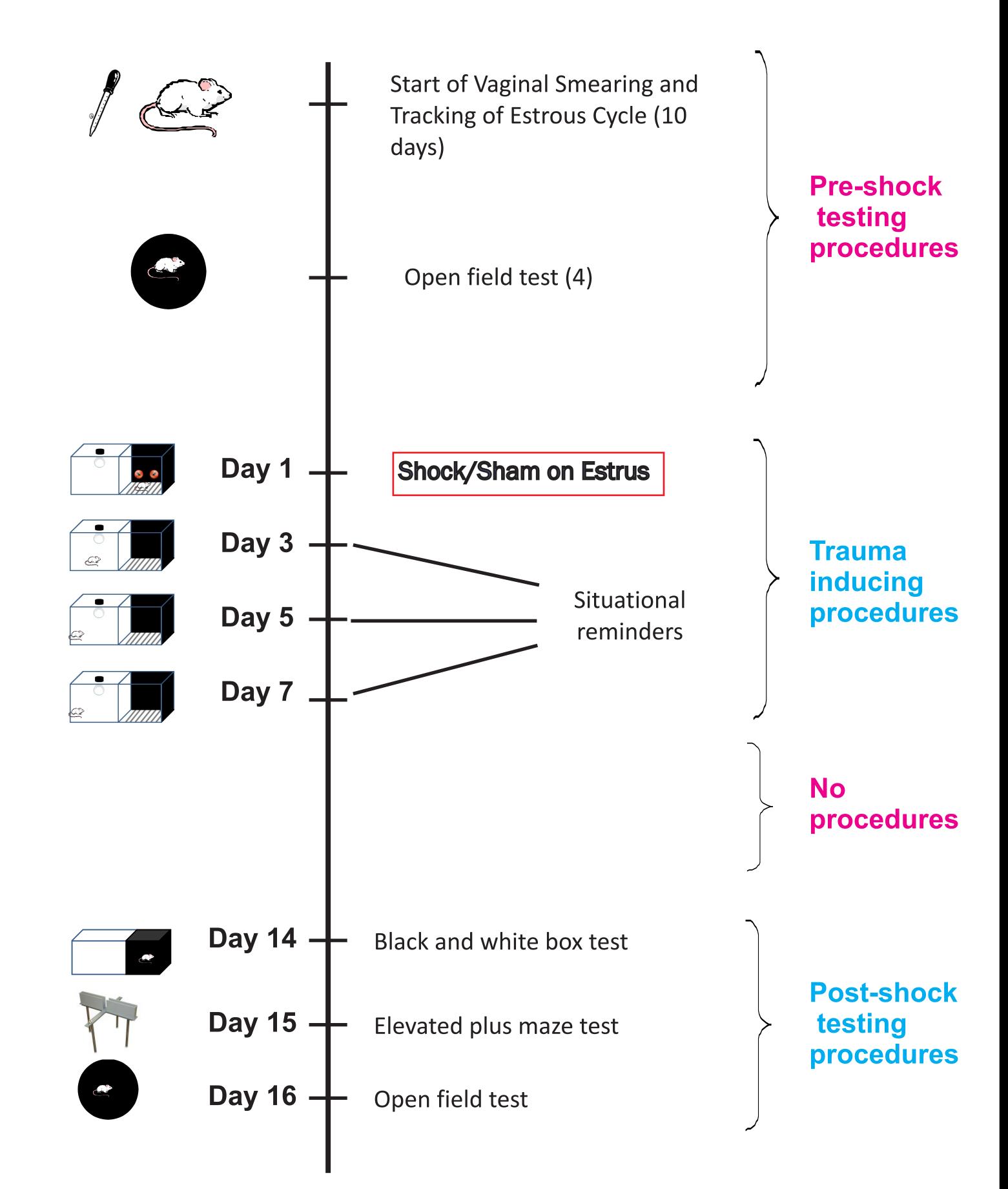
 About 60% of Americans have experienced a traumatic event in their life, and of these about 13.9 % will eventually suffer from this disorder.<sup>1</sup>

Trauma

PTSD

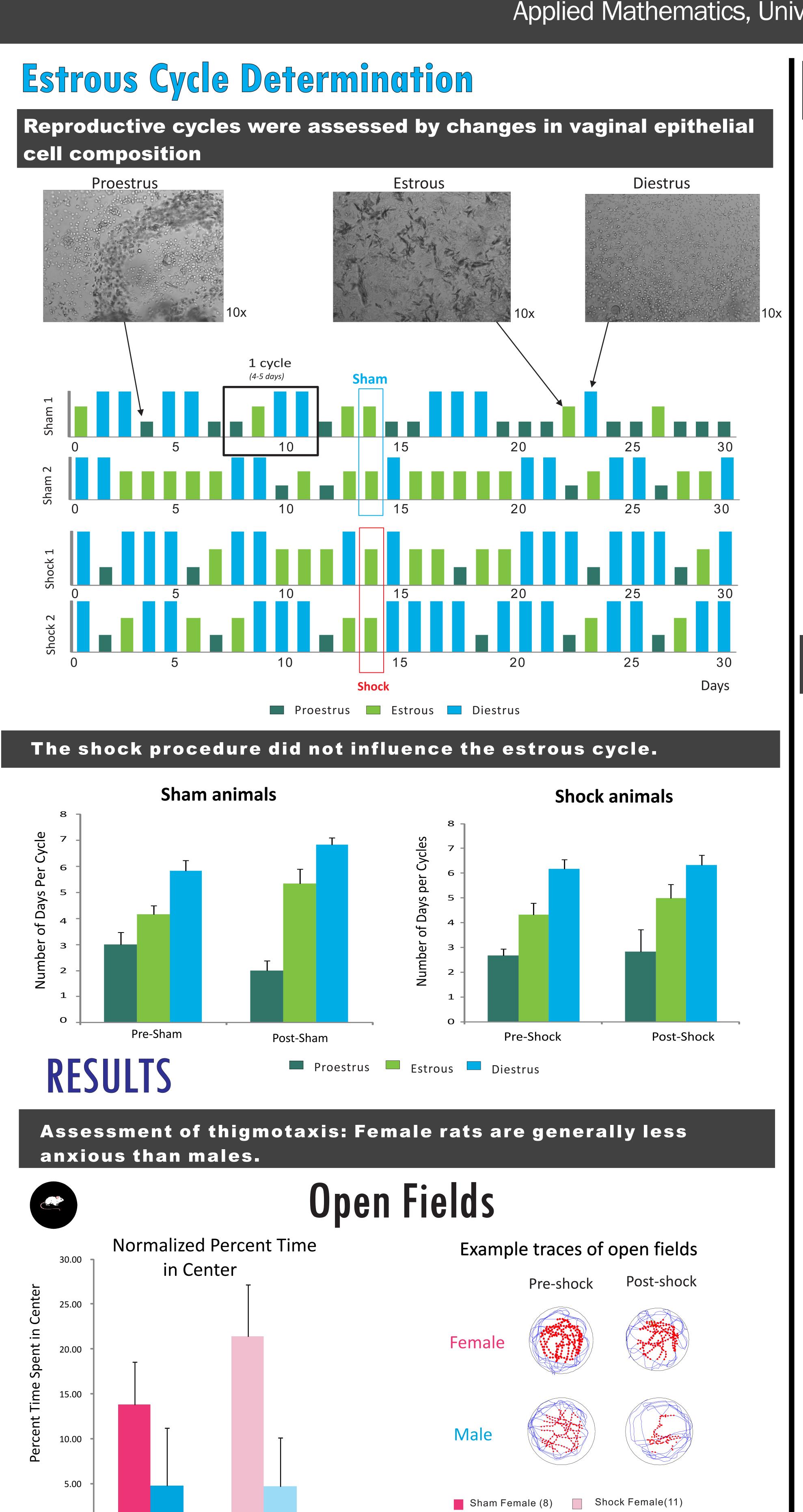
- Women have a higher likelihood of developing PTSD than men even though men are exposed to trauma more often.
- To further understand the discrepancy between the rate of developing PTSD in men and women, we use a previously
- validated rodent model of PTSD and compare the behavior of male and female rats in various anxiety tests.

### **METHODS** Behavior



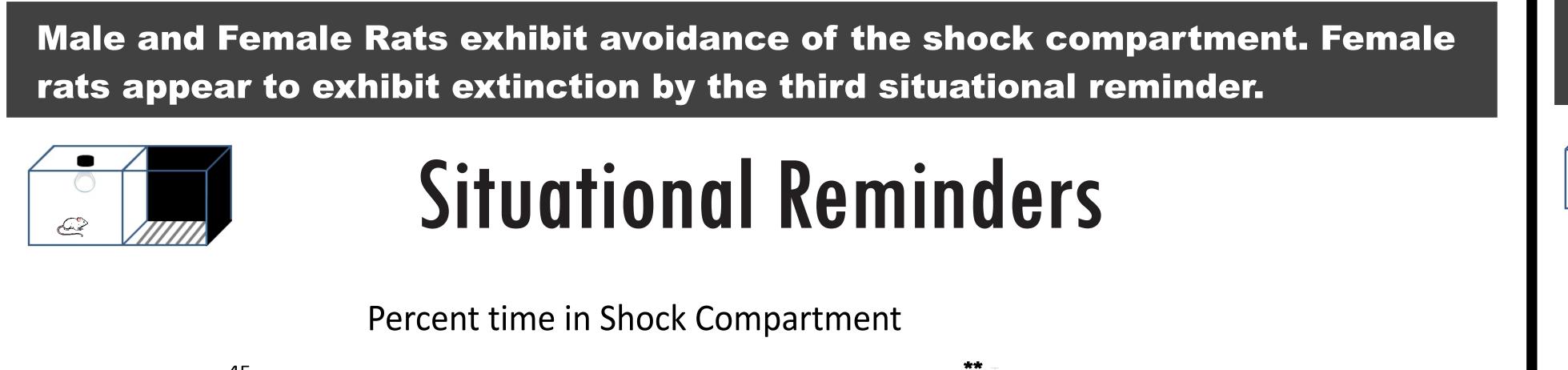
### Data Analysis and Statistics

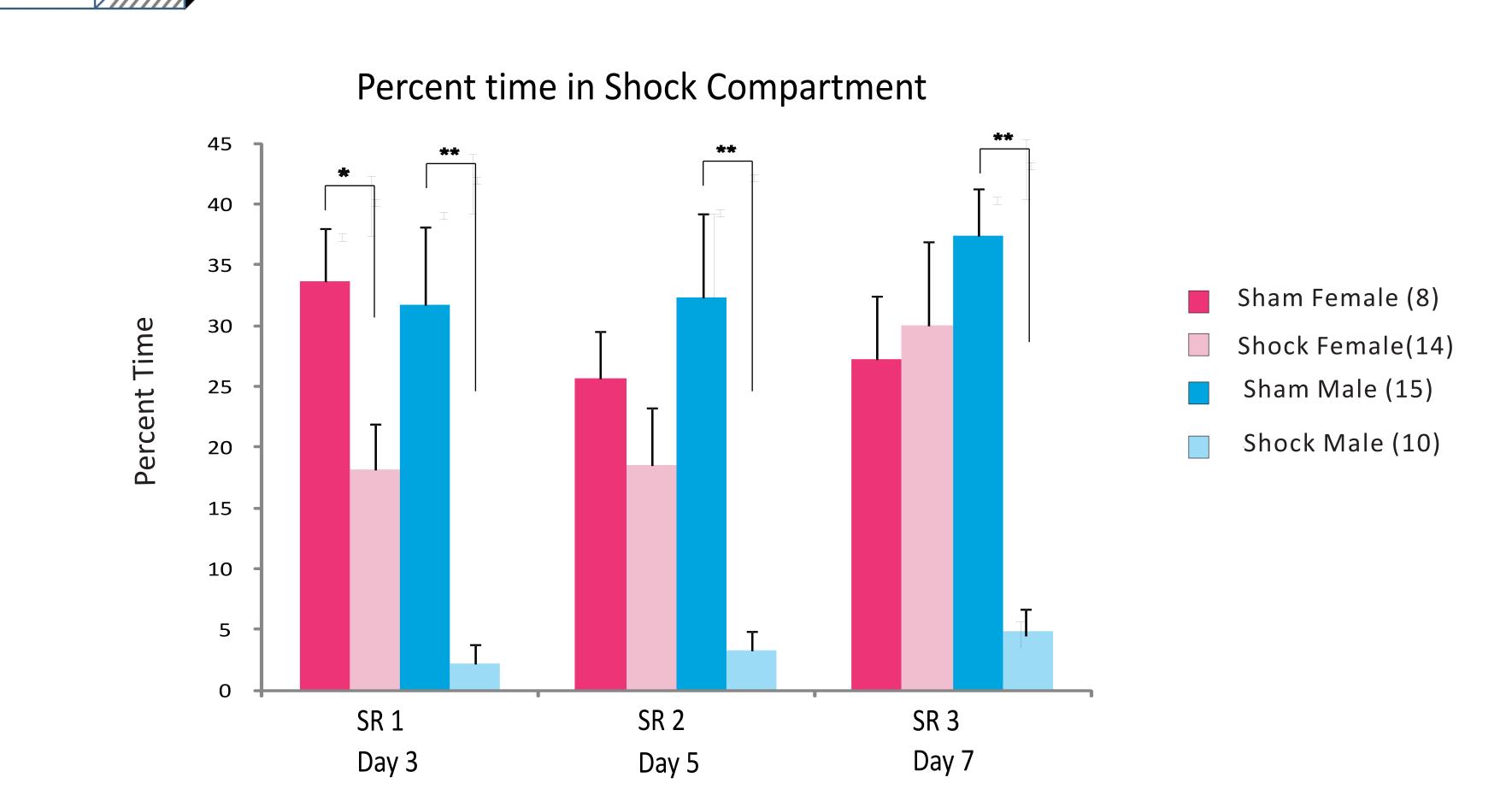
 Data analyses were performed using Excel and Matlab (Mathworks). Statistical analysis were done with SigmaStat EYSTAT, San Jose. Error bars represent standard errors. All statistical analyses were t-test or Mann-Whitney Rank Sum test: \*p<0.05, \*\*p<0.01



shock

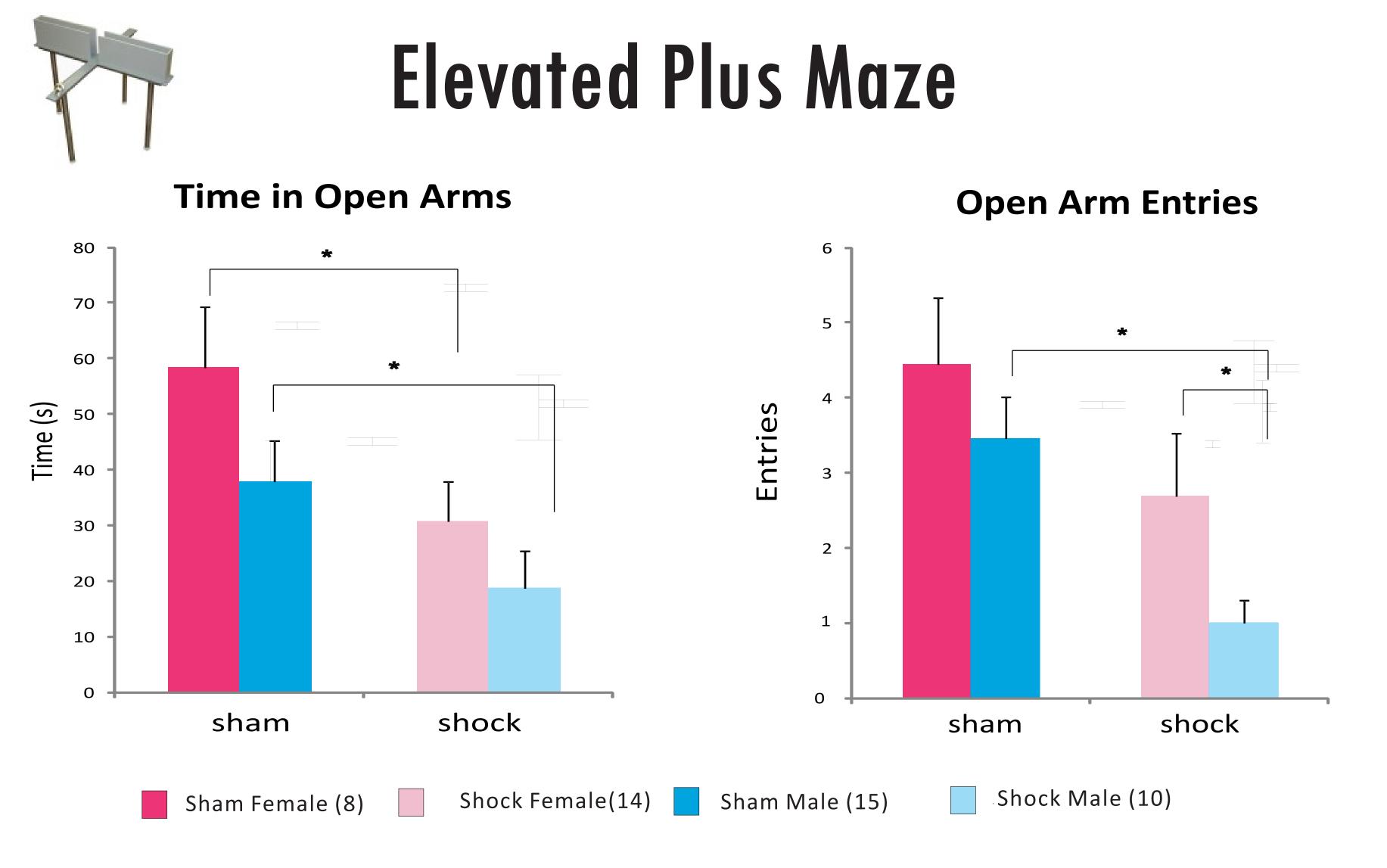
Sham Male (12) Shock Male (10)



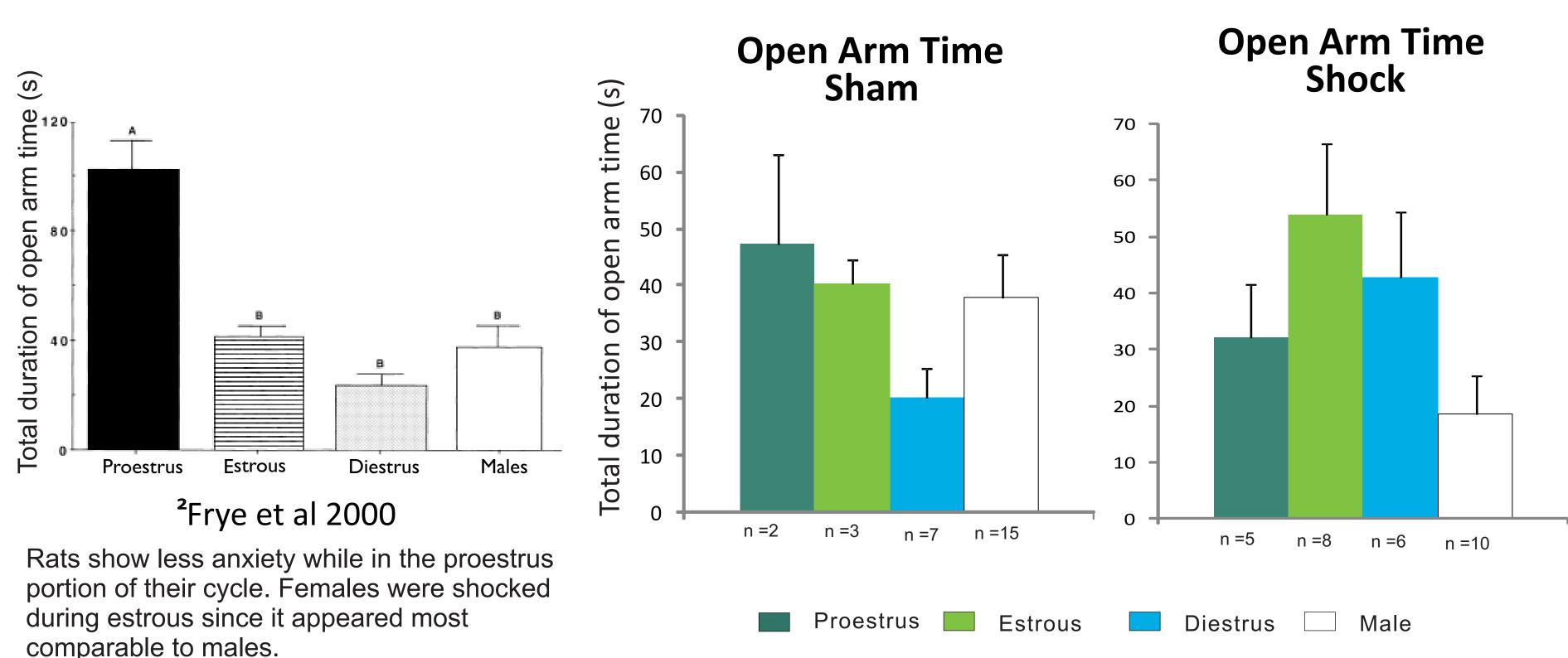


### Anxiety Tests

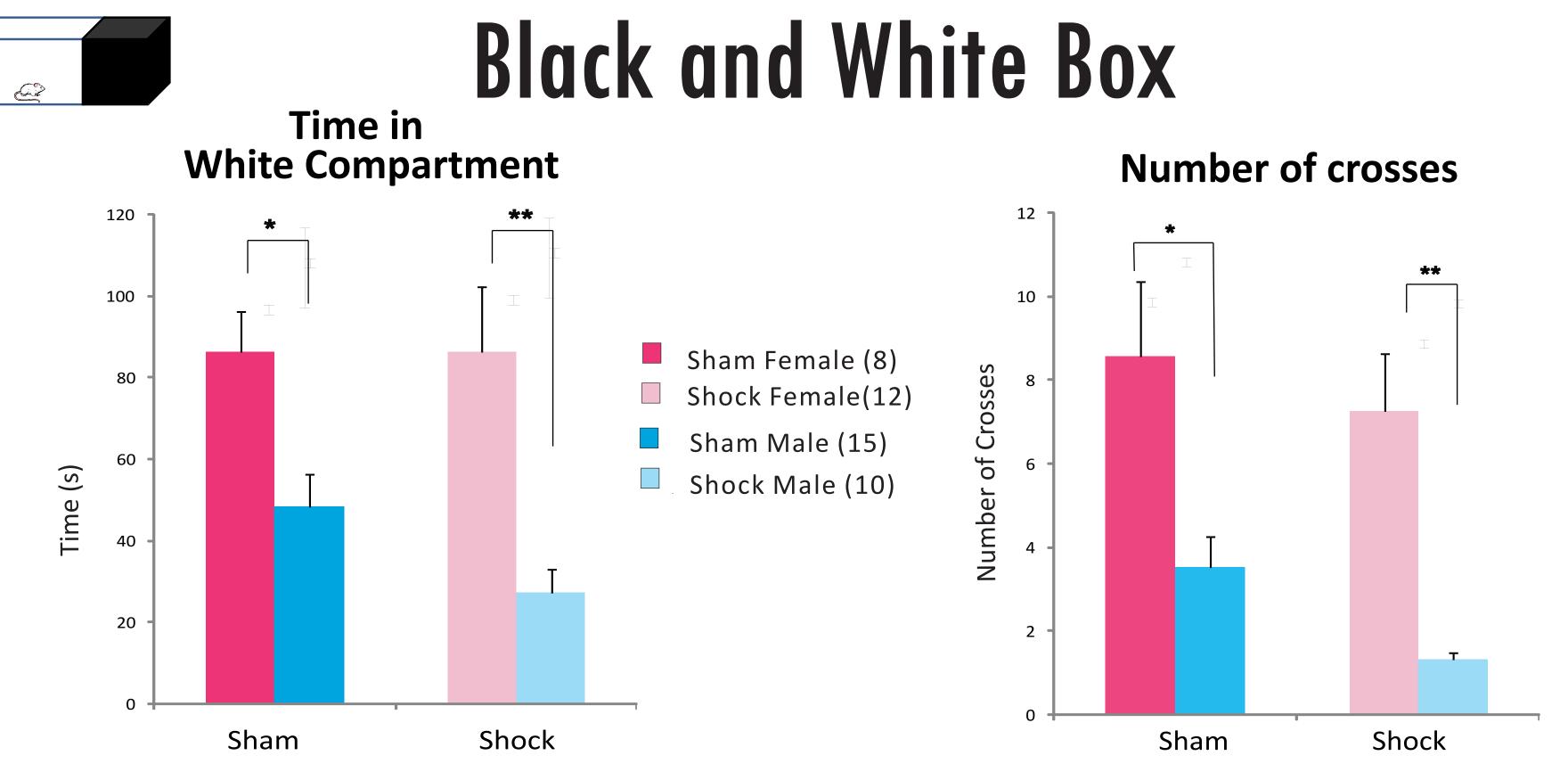
Shocked females and males exhibit increased anxiety compared to the sham group.



#### Dependence of long term anxiety on the phase of the estrous cycle.

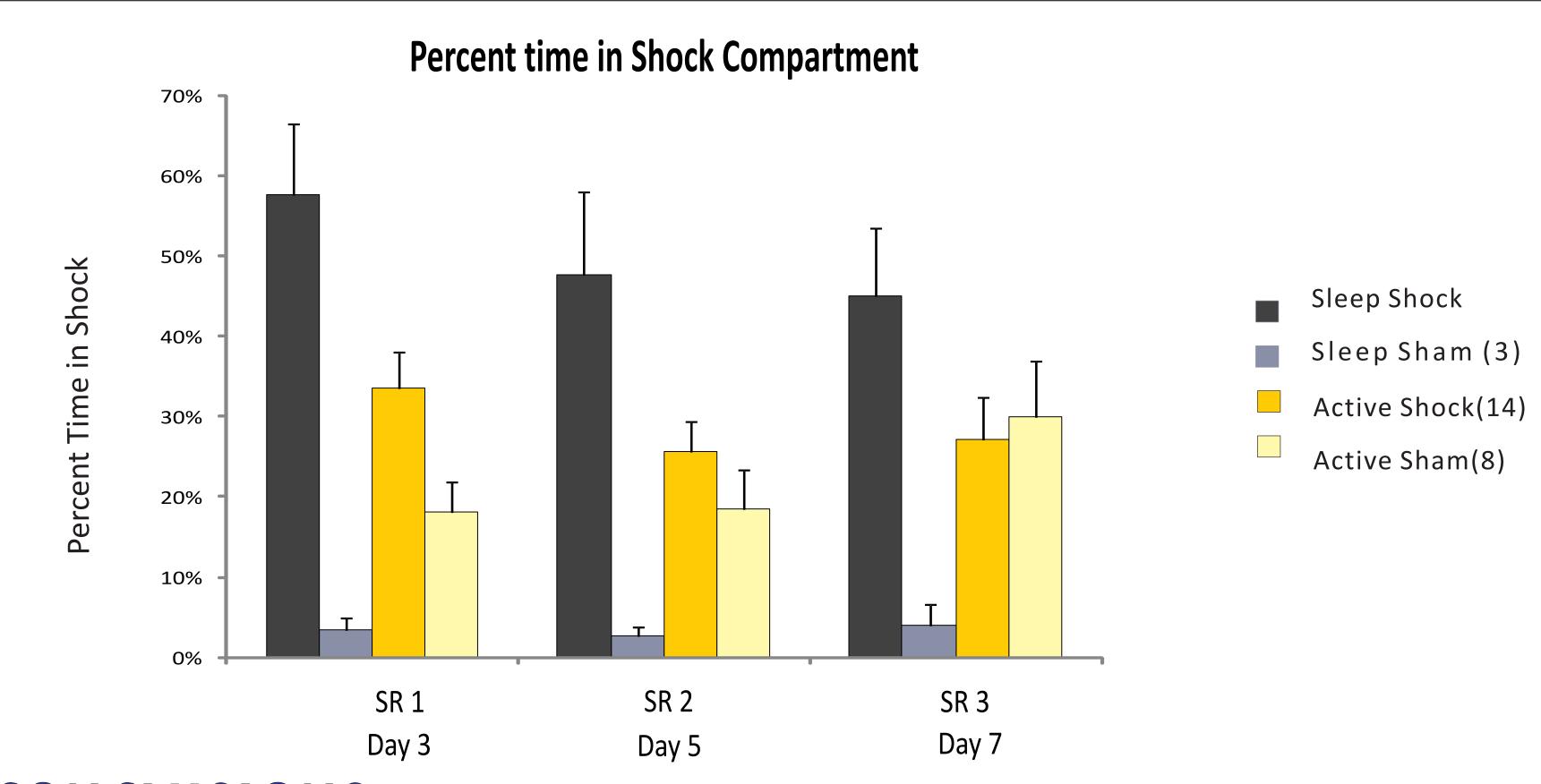


Male rats exhibit increased anxiety in the black and white box. However, females do not experience a change in anxiety.



### Day-Time vs Night-Time Trauma

Preliminary data suggest that female rats shocked during the sleep part of their daily cycle exhibit higher levels of avoidance compared to female rats shocked during their active cycle.



### CONCLUSIONS

- In the shock condition, female rats, like males, avoid the shock compartment (trauma context) of the shock box. Compared to the male group, the female shock group exhibit extinction of the traumatic event by the third situational reminder.
- •The foot shock does not disrupt the regularity of the rats estrous cycle.
- Male and female rats have higher anxiety levels in the shock group compared to the sham in the EPM test. The black and white box also indicates higher anxiety levels in the male shock group compared to the sham, with no change between the shock and sham females. This suggest that this test, unlike the EPM, may not measure the type of trauma-induced anxiety of interest here.
- Preliminary data comparing trauma that occurs during day-time versus night-time, suggest that rats shocked during their night-time exhibit higher avoidance of the shock compartment. It is hypothesized that this might be due to sleep consolidation immediately after the traumatic event.
- Most human data focuses on prevalence not on severity. Our results suggest that in addition to prevalence, differences may be found in the severity of the symptoms between men and women.

#### REFERENCES

1. Kessler et al (1995) Posttraumatic Stress Disorder in the National Comorbidity Survey Arch Gen Psychiatry 52:1048-1060 2. Frye et. al (2000) Estrous cycle and sex differences in performance on anxiety tasks coincide with increase in hippocampal progestarone and 3alpha,5alpha-THP. Pharmacology and Biochemistry and Behavior 67.3:587-596.

### ACKNOWLEDGMENTS

Brian Gereke as well as all of Dr. Fellous's lab for help running experiments and comments. Funded in part by the Honors Undergraduate Research Grant and a grant to the University of Arizona from the Howard Hughes Medical Institute (52002889) to KEEV.