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The Effects of Amphetamine on Rats from Varying Rearing Conditions

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Introduction

- Differential rearing is an animal model used to understand the role of the early environment on drug use and abuse in adulthood
 - Rats reared in an isolated environment self-administer more drugs than rats raised in a standard environment
 - Neurobiological basis behind drug use is studied through rats
 - One hour self-administration testing is a commonly used model for drug use
 - Six hour testing model is newer and results in an increase in drug use over time
 - N-Acetylcysteine (NAC) has been found to reduce drug craving and may reduce relapse
- Hypothesis:** Escalation in drug use will be seen in all groups, and the NAC treatment will decrease relapse.

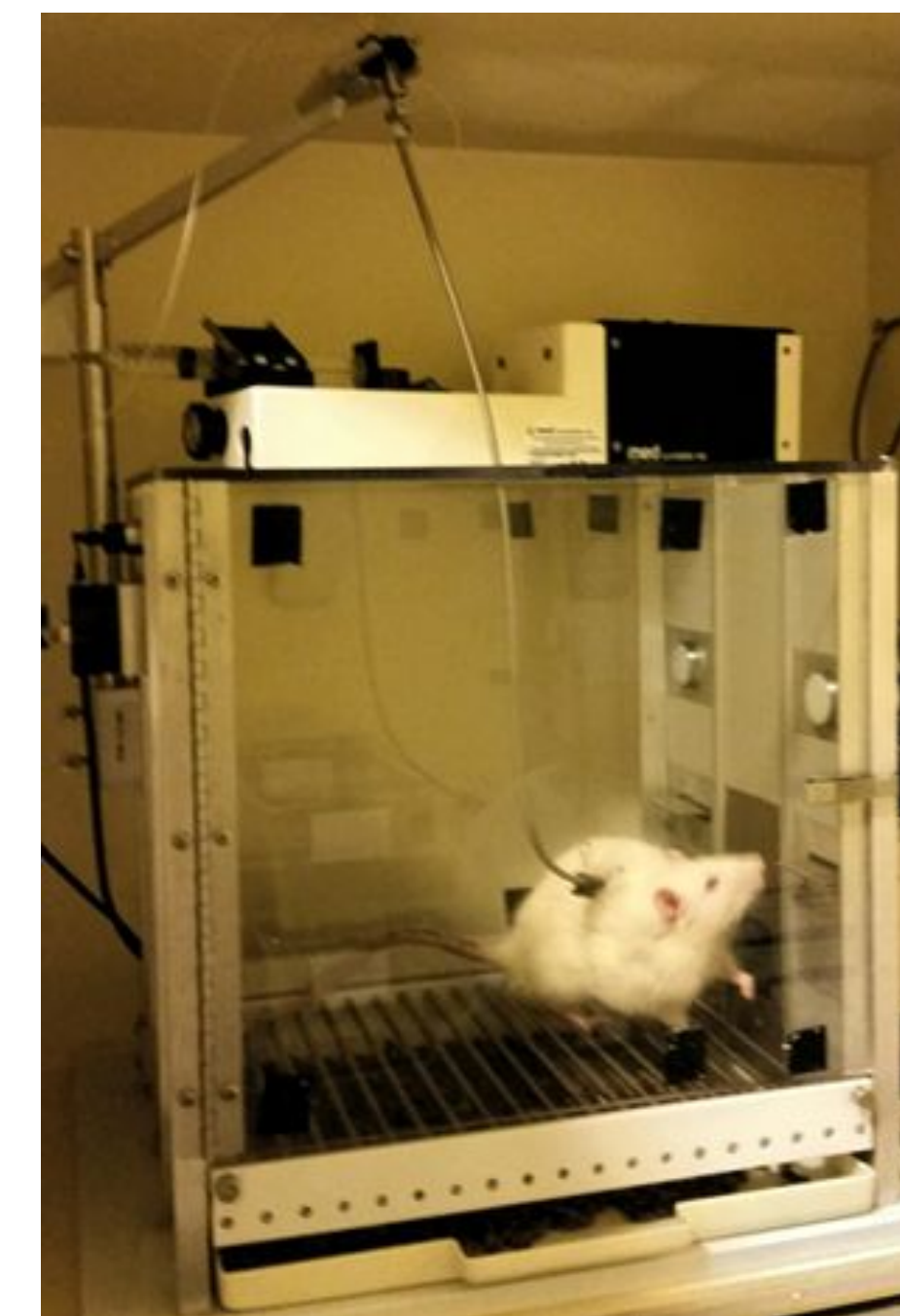
Methods



Fourteen rats, six isolated condition and eight standard condition, half of each sex in each group, arrive in the lab and become acclimated to conditions



Rats begin intravenous self-administration testing with amphetamine (AMP). They run for 12 sessions in two weeks. Each session lasts six hours.



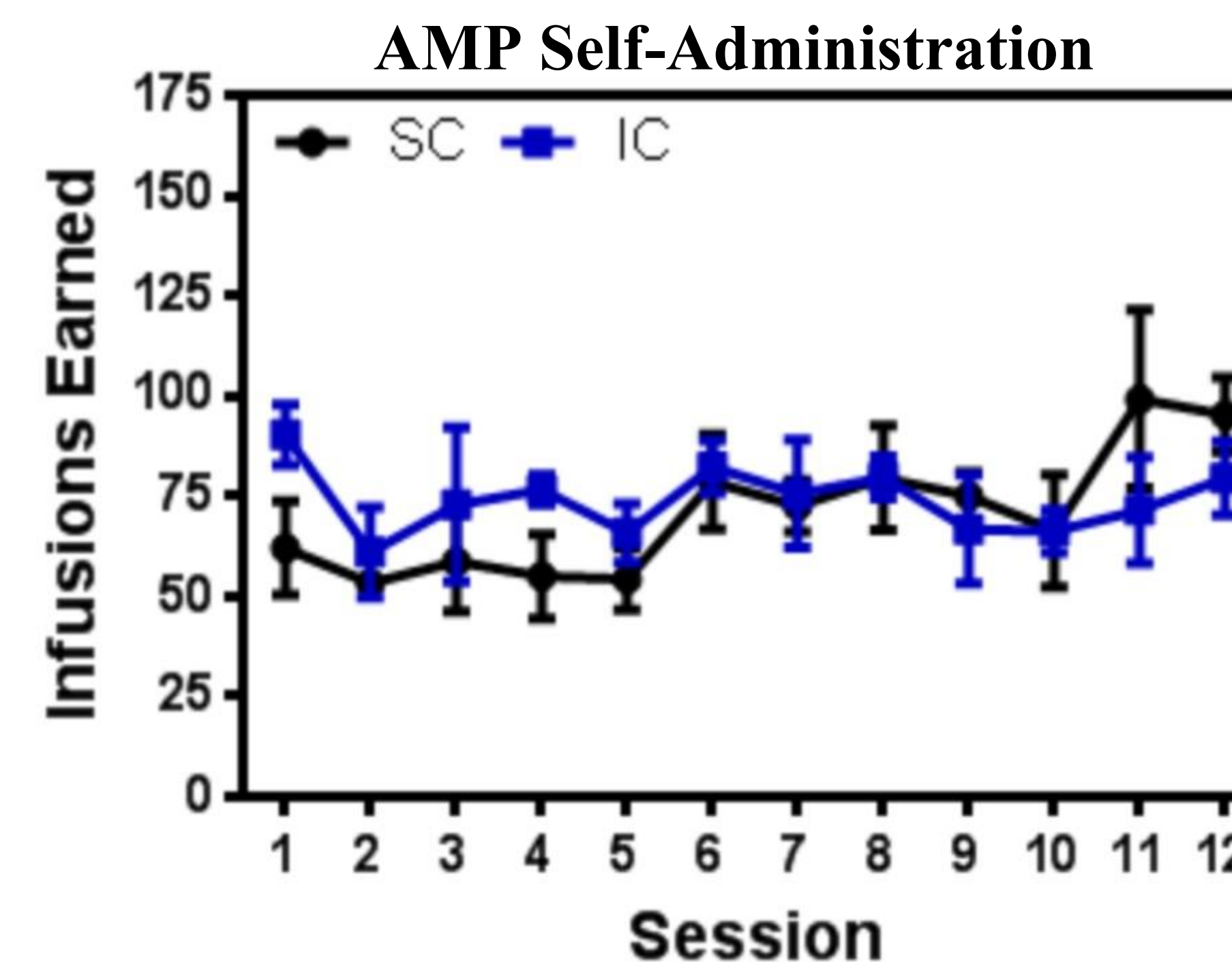
Rats are placed back in self-admin testing chambers for a final test without any drug administration.

Rats undergo jugular catheter surgery, implanting a back mount for testing.

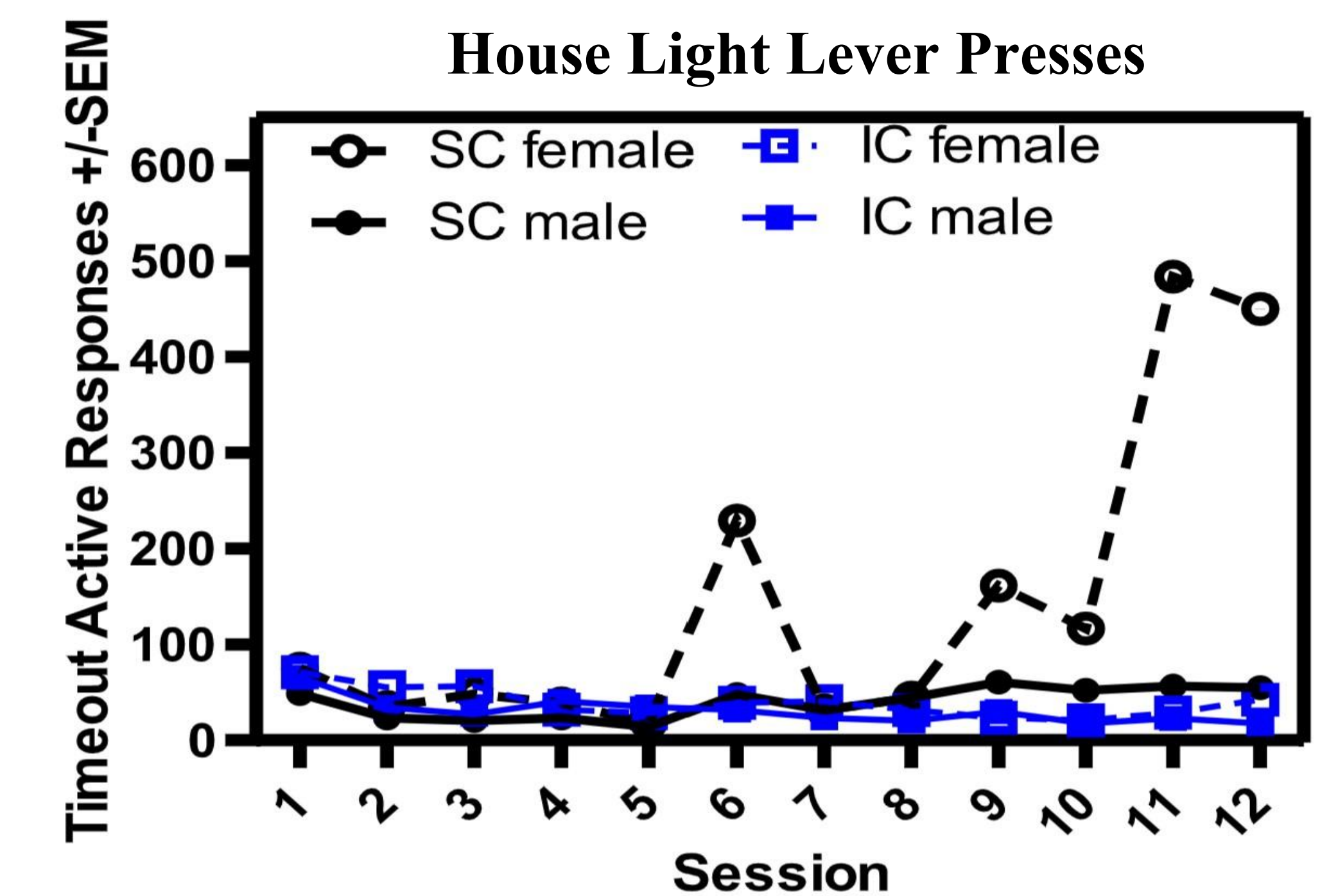
Rats enter a two week resting period. Half of each group is administered NAC, while the other half is administered saline (a control).



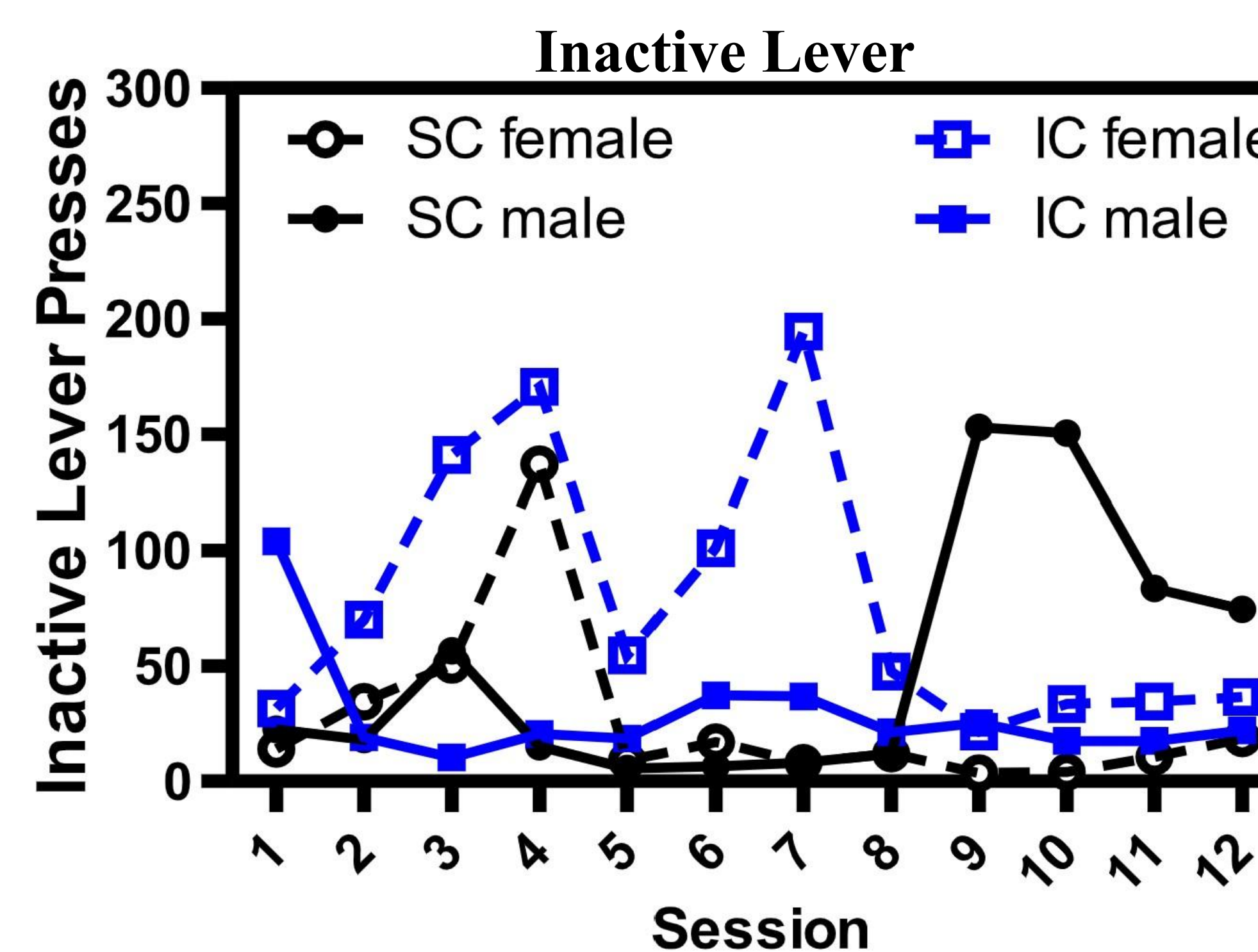
Data



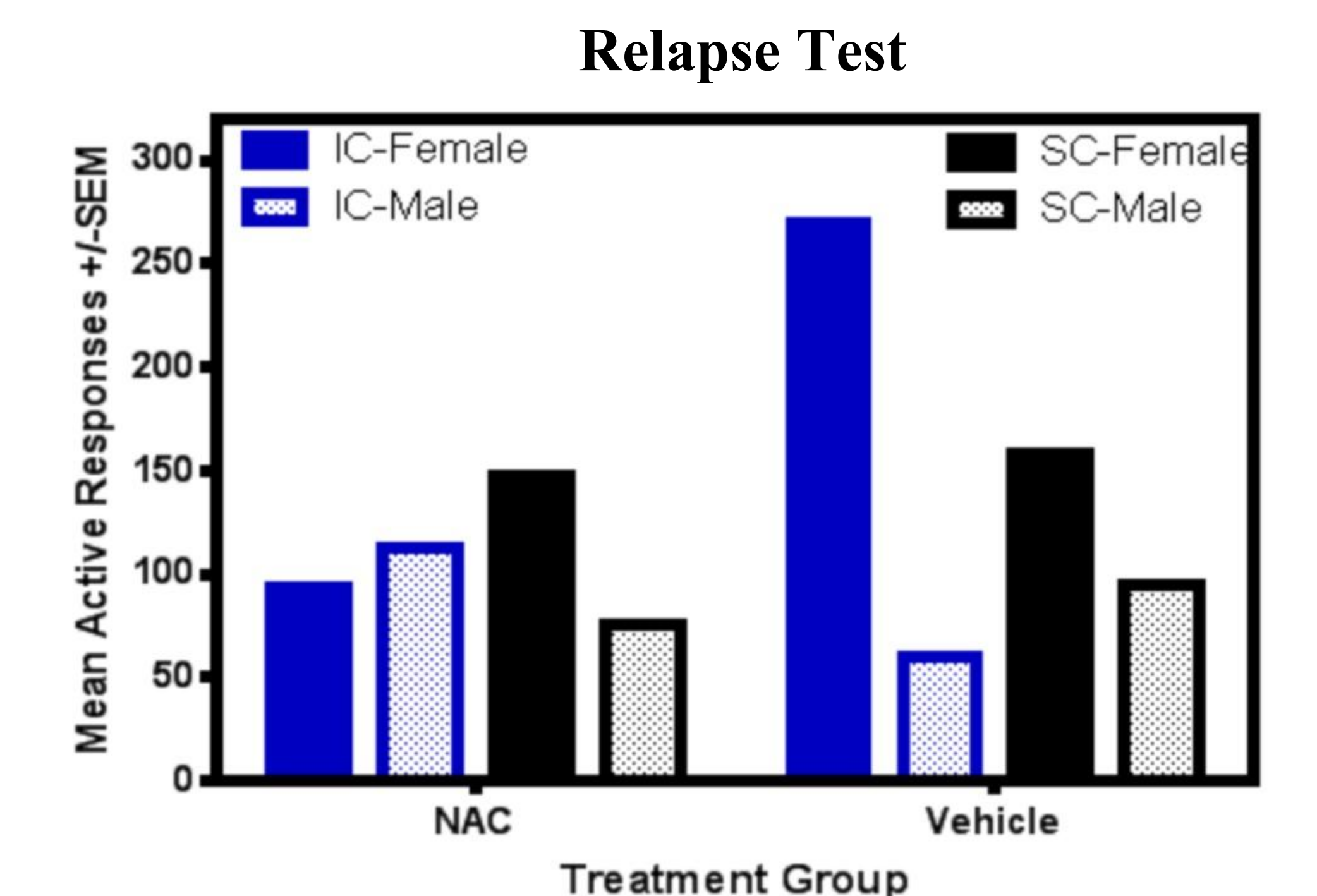
A



B



C



D

Results

Escalation in infusions was seen among all groups with no difference between sex (A). Outliers were seen in B and C, but we are unable to determine if these data are outliers or not. In all but IC males, lever presses decreased in the final testing period with NAC individuals (D). These findings solidify the idea of drug escalation and corroborate ideas that NAC can be used to reduce the chance of relapse and drug craving. We are now conducting tests with enriched environments and afterwards will add more rats into each group.

Conclusion

- Escalation can be seen in all rats, regardless of sex or rearing condition
- The six hour model better reflects a human drug user's time with access to their drug of choice
- Results solidified our knowledge of tolerance building after drug taking
- N-Acetylcysteine was effective in all groups except IC males

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