

Long-term Effects of Binge Drinking During Adolescence on Memory and Anxiety in Adult Male Rats

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(Shannon Harding, Alexis Khursigara, Nicole Mollé)

Why is the Research Important?

- Binge drinking is popular among high school students
 - 72% of high school students report binge drinking before graduation (www.nih.gov)



Why is the Research Important?

- Adolescence is a critical period of development for the brain
 - Can be disrupted even with small amounts of alcohol (Roskam et. Al., 2009)



What Have Other Studies Found?

- **Memory**

- Even small amounts of alcohol during adolescence can impair memory (Ryabinin et. al., 2002)

- **Anxiety**

- Alcohol influences chemical messengers in the brain important in controlling fear and anxiety (Wallner et. al., 2003)

Our Research Question:

- How does binge drinking during adolescence affect memory and anxiety in adult male rats?



Methods and Materials

- **11 male rats:** 5 given alcohol and 6 given water at 41 days old (P41) for 8 weeks



Methods and Materials

- Rats handled and marked daily
- Behavior tests were done in adulthood to determine long-term effects



Novel Object Task: This is a test for memory.

- **TRAINING**



Rats put in arena with an object for 5 minutes.

Novel Object Task: This is a test for memory.

- **TESTING**



After 1 hour delay, rats put in arena with familiar and novel (new) object for 5 minutes.

Anymaze program tracked the rats.

Elevated Plus Maze:

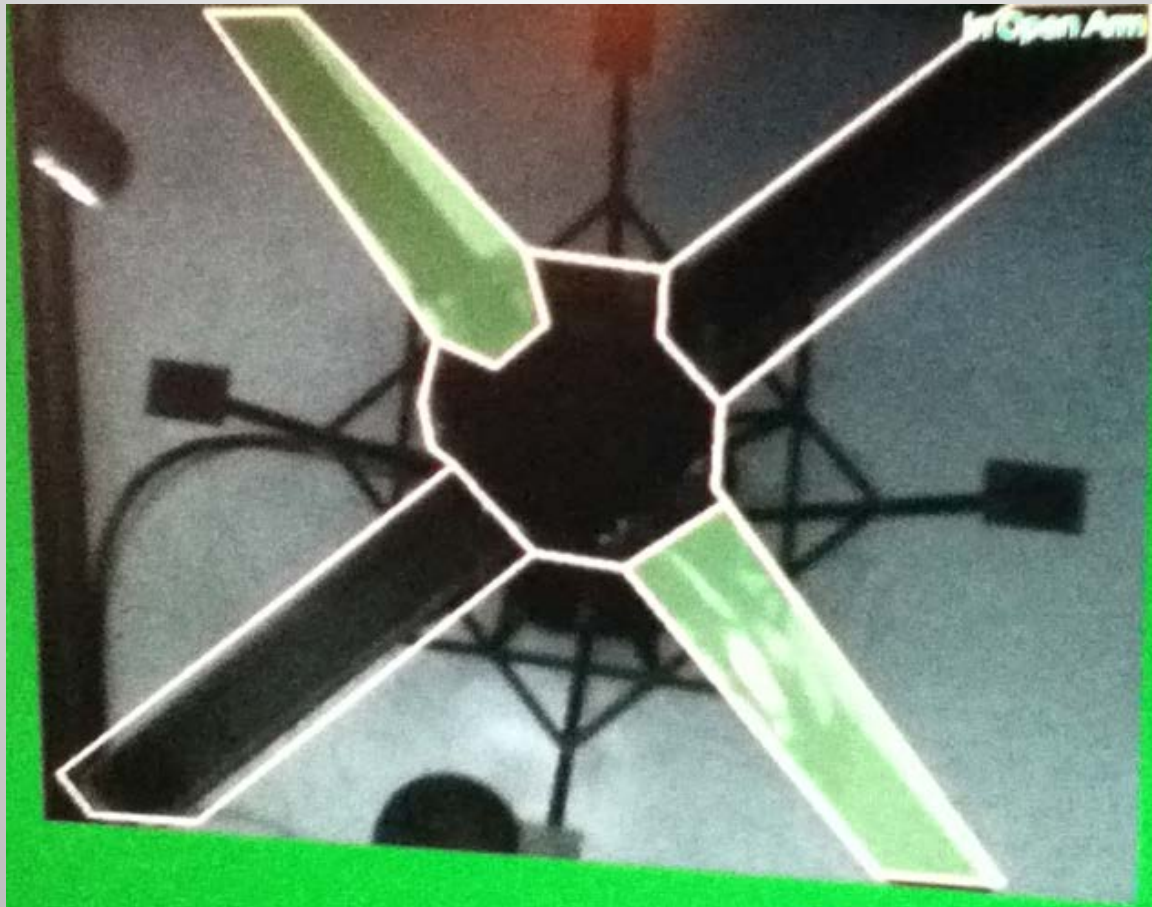
This is a test for anxiety.

- Maze with 4 arms; 2 open, 2 closed.
- **Anxiety** = less time in open arms; more in closed
- 10 minute test



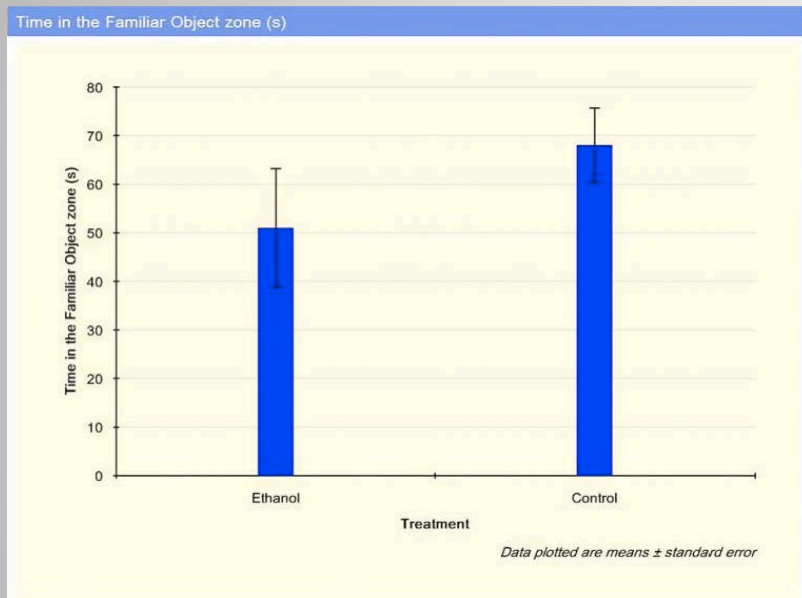
Elevated Plus Maze: This is a test for anxiety.

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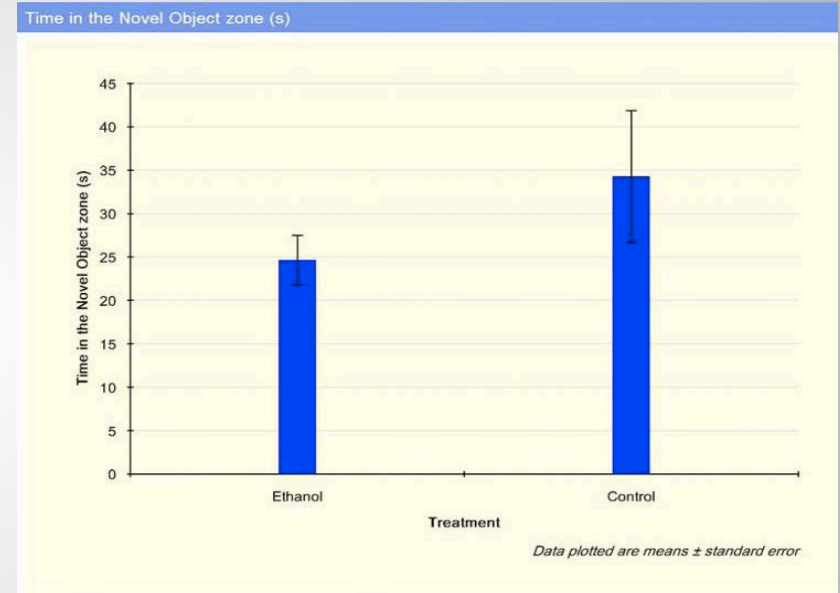
Results of NO Task

Time with FAMILIAR OBJECT



P= 0.247

Time with NOVEL OBJECT



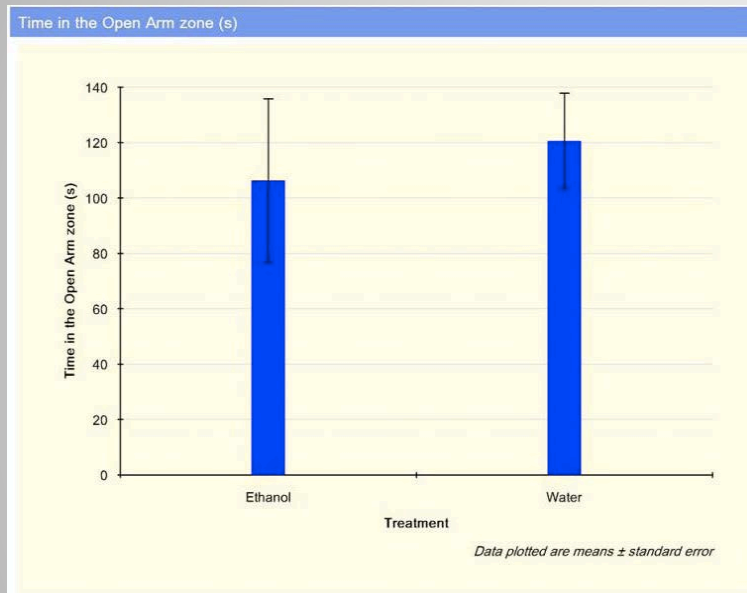
P=0.302

FOUND: No differences between the groups.

SUGGESTS: No long-term effects of drinking on memory.

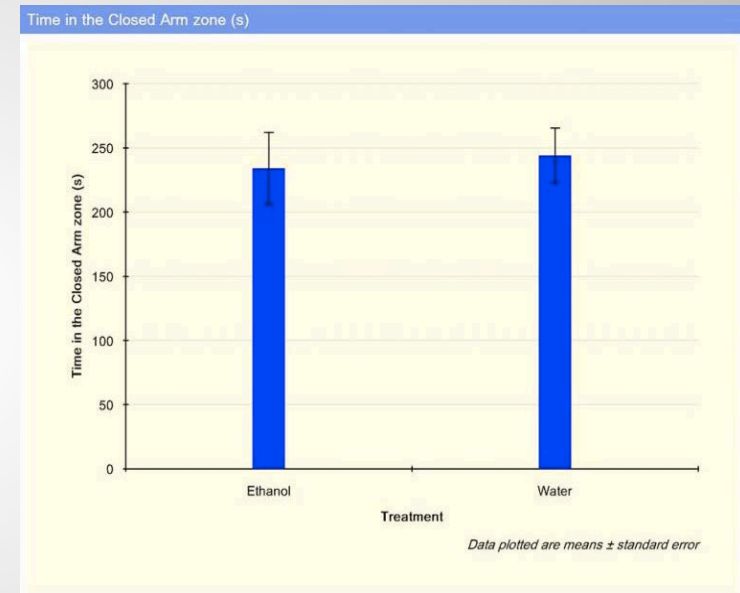
Results of EPM Test

Time in OPEN ARMS



P=0.672

Time in CLOSED ARMS



P=0.778

FOUND: No differences between the groups.

SUGGESTS: No long-term effects of drinking on anxiety.

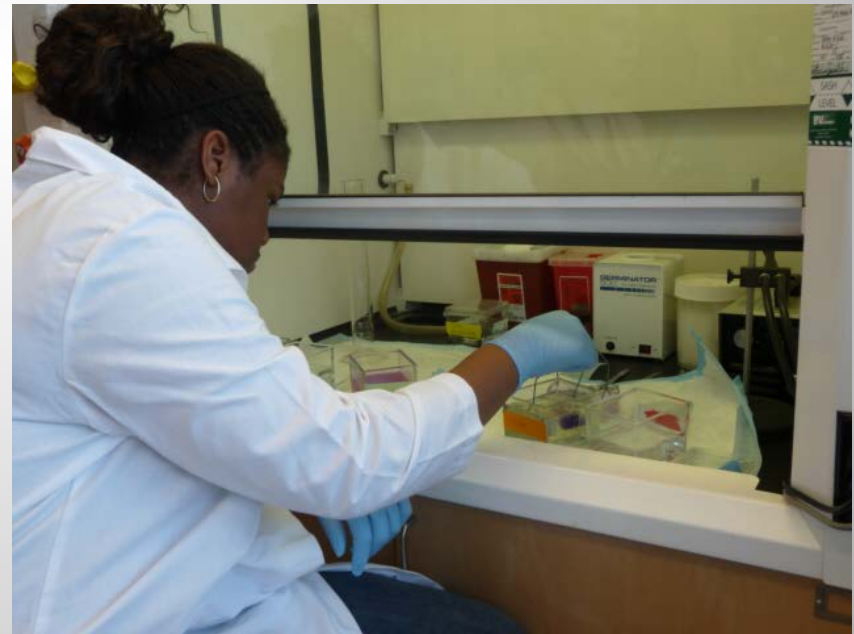
Discussion

- There were no long term effects of binge drinking on memory and anxiety during adolescence in adulthood.
- Our study was consistent with other studies in the elevated plus maze.

(Roskam et. Al., 2009)

Future Studies

- Dr. Harding and Nicole Mollé will be looking at the amygdala and hippocampus for differences.



Future Studies

- We would like to test female rats
- Avoid a big arena
- Test more subjects
- More tests (Mazes)



