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# Laboratory Mice Burrowing Responses to Predator Calls

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# Laboratory Mice Burrowing Responses to Predator Calls

Brianna Graber, Molly Seeberger, Katie Vonderembse

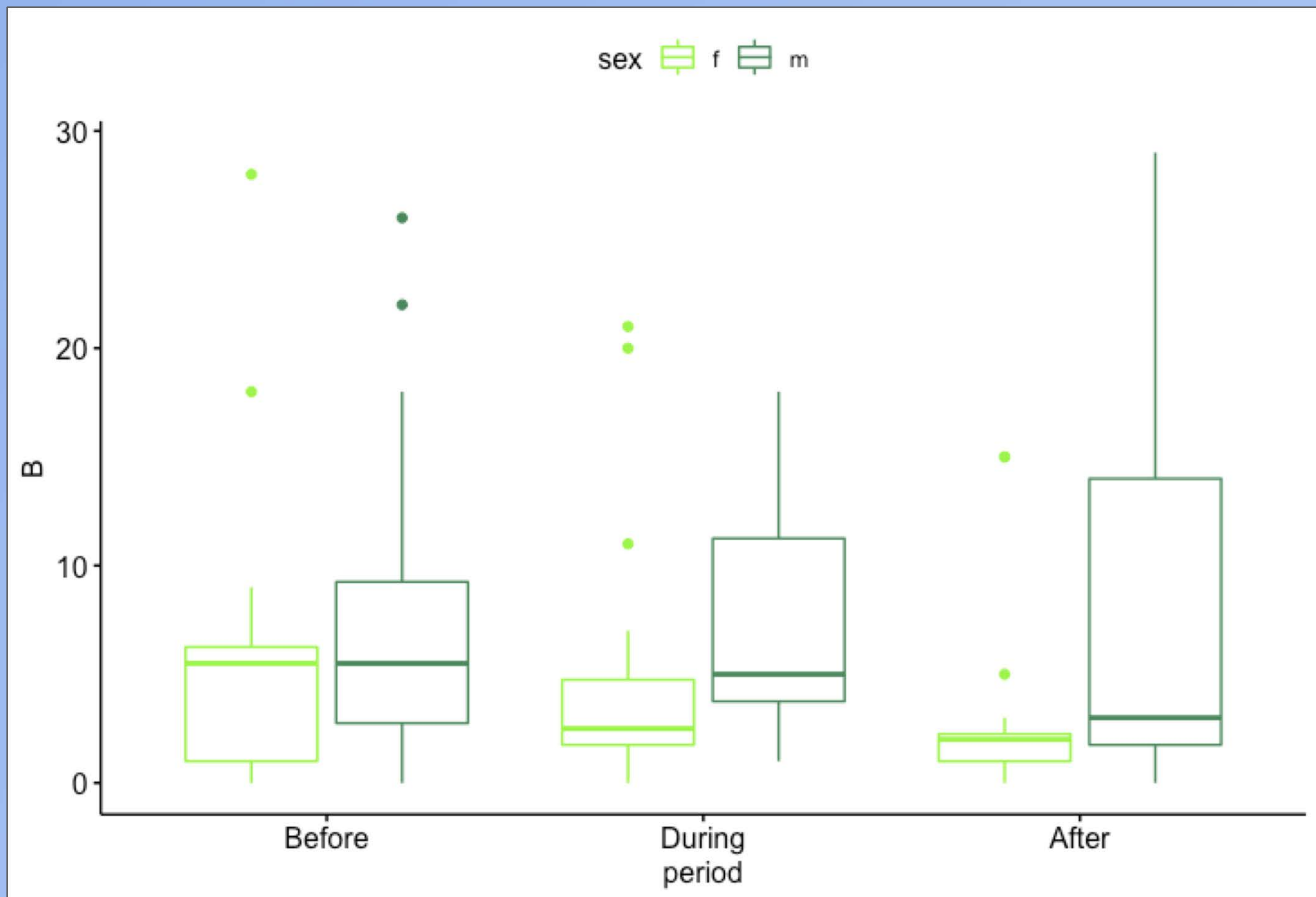
Ohio Wesleyan University, Department of Zoology, Spring 2019

## Introduction

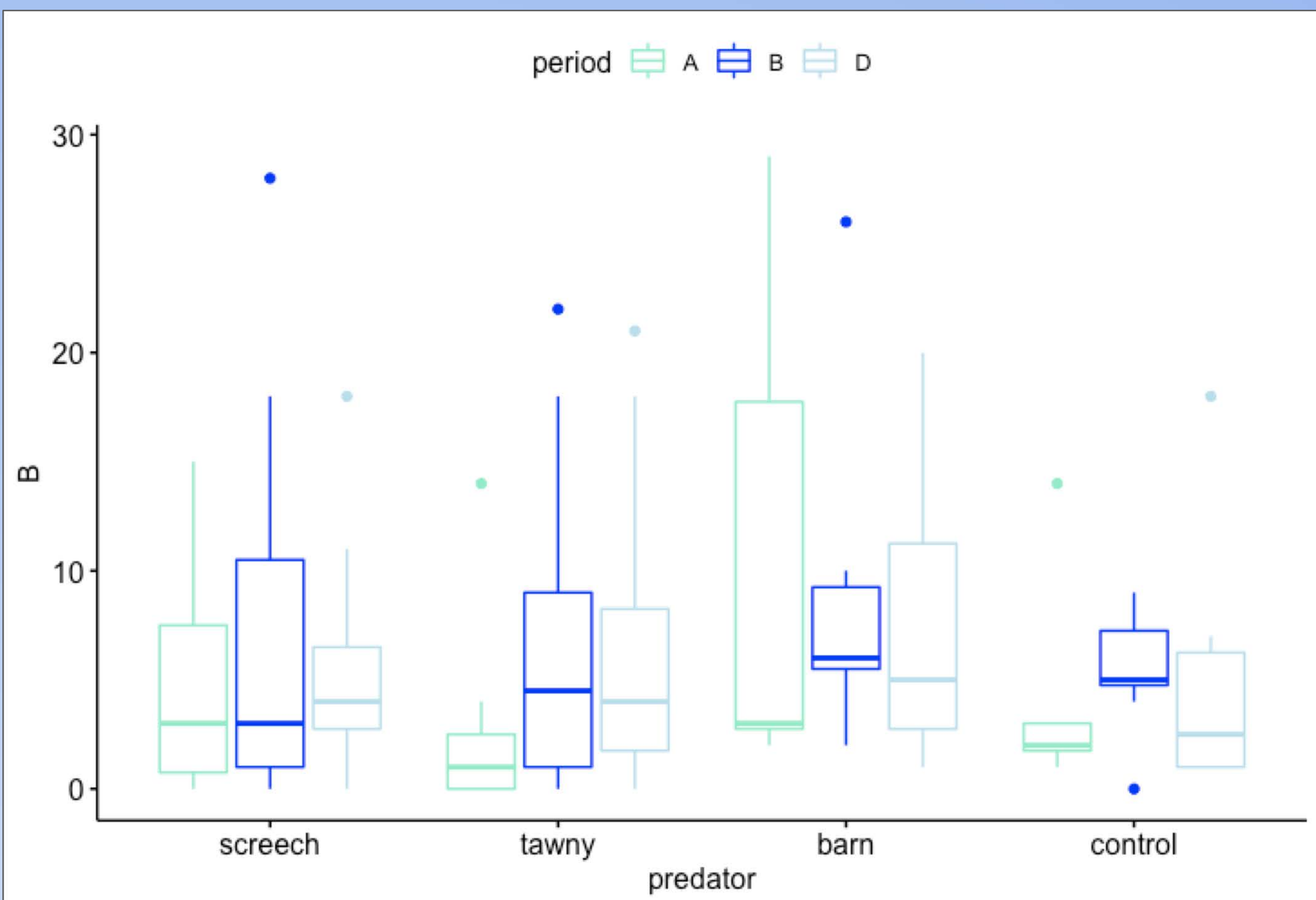
The avoidance of predation is an essential trait in mice and depends on the ability of the mouse to recognize its predators. Laboratory mice have been shown to respond with defensive behaviors when exposed to the calls of their primary predators, owls (1). Our experiment studied behaviors in male and female laboratory mice before, during, and after owl calls were played to individual mice in a tank. Important defensive behaviors include burrowing and sniffing. Control tests of human voices reading a book were also performed with all males and females.

## Methods

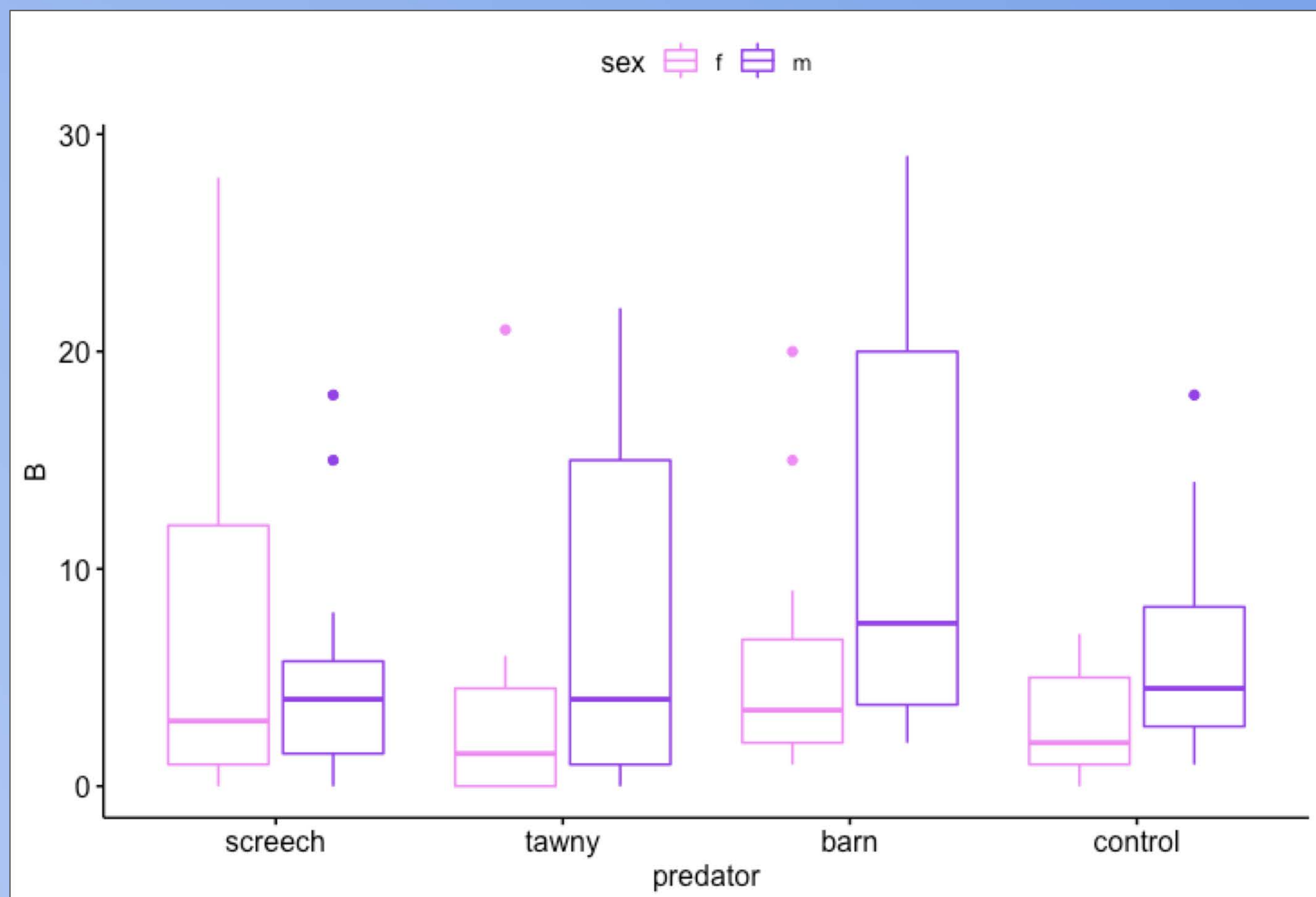
- Used 3 home tanks of laboratory mice, *Mus musculus*: 1 tank males mice and 2 tanks females (Fig. 4)
- Experiment tank was filled with bedding and a plastic tube
- 3 predator calls were played to mice: Eastern Screech Owl (*Megascops asio*), Tawny Owl (*Strix aluco*), and American Barn Owl (*Tyto furcata*)
- Periods included:
  - 2 minute "before" period for the mouse to get used to its environment
  - 1 minute "during" period in which the predator call was played
  - 5 minute "after" period to record behaviors following a predator call
- During each period, behaviors were recorded using tallies for how many times each behavior occurred (Table 1)
- This process was repeated 6 more times for each predator call



**Figure 1.** The relationship between period, sex, and burrowing behavior (B).



**Figure 2.** The relationships between predator call, period, and burrowing behavior (B).



**Figure 3.** The relationship between predator call, sex, and burrowing behavior (B).



**Figure 4.** Three main home tanks of the mice. From left to right: Tank 1 Female, Tank 2 Female, Tank 3 Male.

## Results

There was no significance in the difference between burrowing behavior, sex, predator call and period.

- Period/sex:  $\text{Pr}( > F ) 0.7605$  (Fig. 1)
- Predator/period:  $\text{Pr}( > F ) 0.8969$  (Fig. 2)
- Predator/sex:  $\text{Pr}( > F ) 0.2821$  (Fig. 3)

## Conclusion

Overall, our findings were insignificant. There was no significant differences between predator, sex, period, and burrowing behavior. The variable closest to being significant was sex with a p value of 0.0714.

A reasoning behind the non-significant differences could be that the mice react to all predator calls the same, regardless of species. For next time, adding different stimuli, other than just the playback sound, such as visual and olfactory cues could produce more significant results. In past research, it has been discovered that mice use olfactory cues the most to detect potential predators, so perhaps the added stimulus of the predators' scent would make the mice act differently (2).

In conclusion, there was not enough significant data to show that our hypothesis was correct. Though there was enough raw data, it was proven to be insignificant.

**Table 1.** Ethogram behaviors

Behavior and Picture Number	Code	Description
Investigating Tunnel (1)	IT	Standing on top of tunnel, looking through entrance of tunnel
Inside Tunnel (2)	TB	Mouse's full body inside the tunnel
Natural Burrowing (3)	NB	Digging and moving bedding
Vocalizing (Not Pictured)	V	Vocalizations or squeaks from the mouse
Sniffing (4)	S	Sniffing upwards in the air or bedding near it
Running (5)	R	Mouse moving quickly for some distance
Freezing (6)	F	Mouse not moving for a few seconds
Grooming (7, 8)	G	Mouse participating in any sort of bodily cleaning

## Literature Cited

- (1) Hendrie CA, Neill JC. 1991. Exposure to the calls of predators of mice activates defensive mechanisms and inhibits consummatory behavior in an inbred mouse strain. *Neuroscience & Behavioral Reviews* 15: 479-482.
- (2) Arakawa, Hiroyuki, D. Caroline Blanchard, Keiko Arakawa, Christopher Dunlap, and Robert J. Blanchard. "Scent marking behavior as an odorant communication in mice." *Neuroscience & Biobehavioral Reviews* 32, no. 7 (2008): 1236-1248.

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