

Observing Mouse Behavior During Photostimulation of the MPA-vPAG Circuit

OLIVER CHANG

SUMMER PROJECT 2019



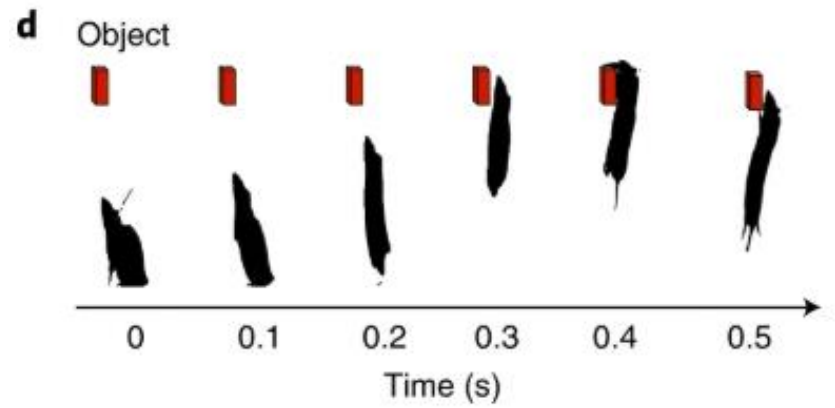
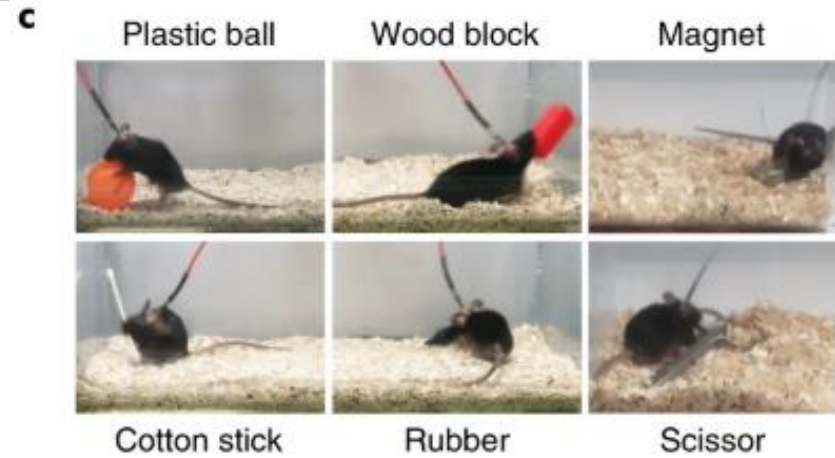
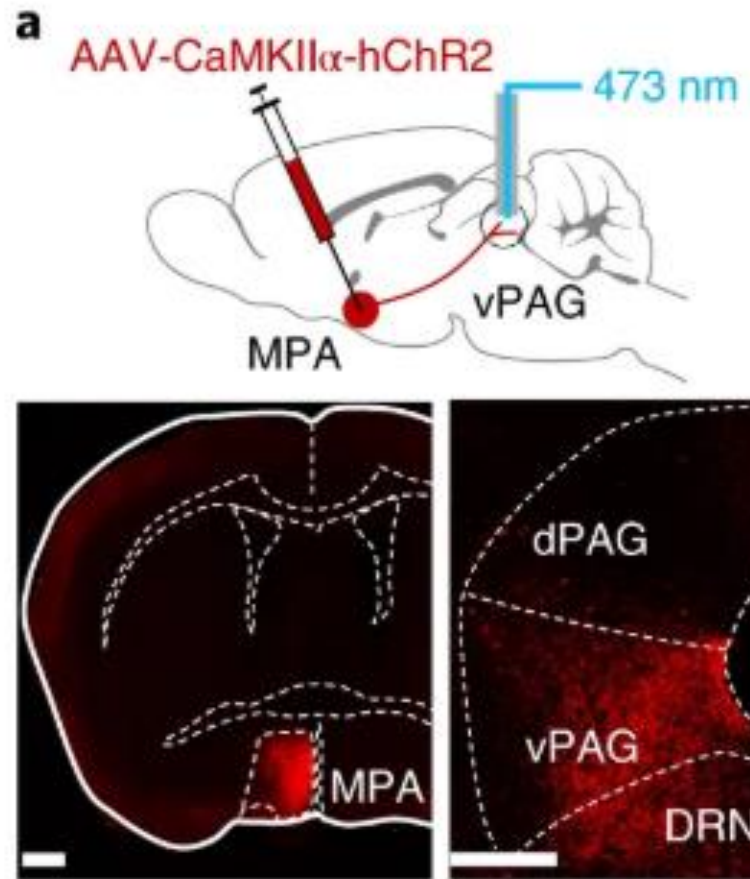
Introduction

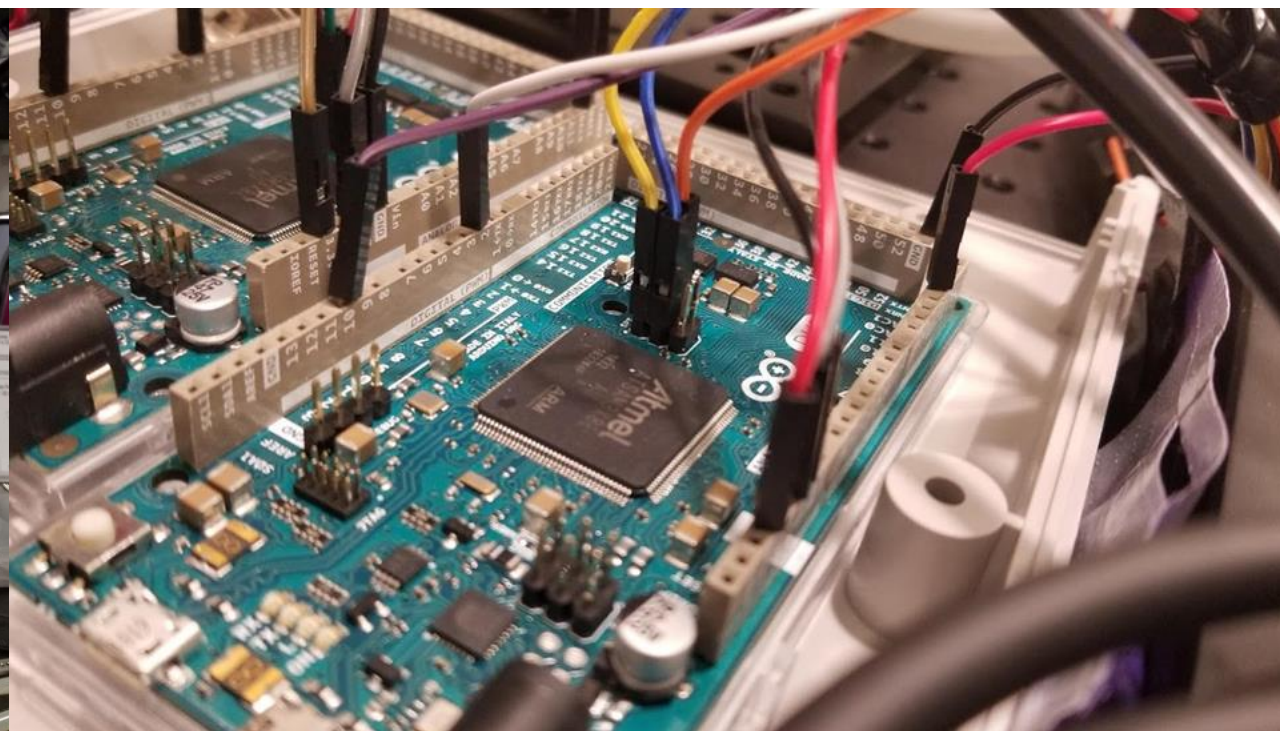
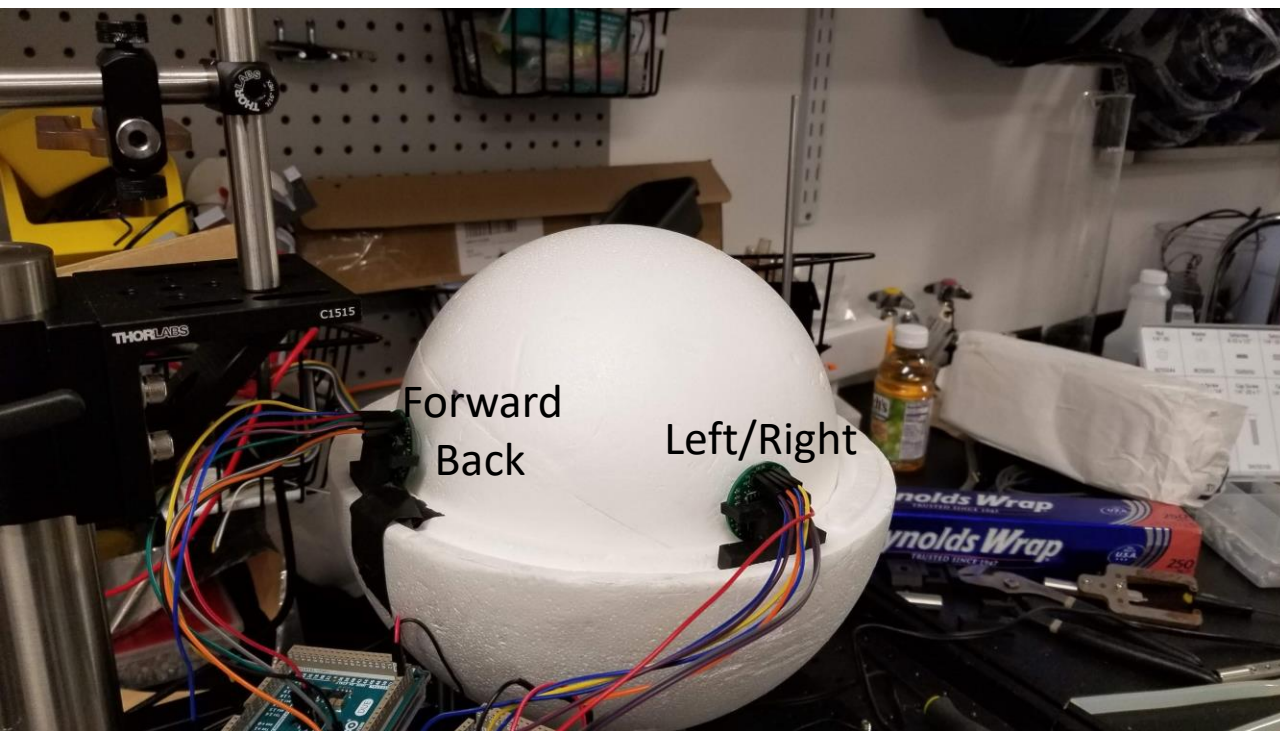


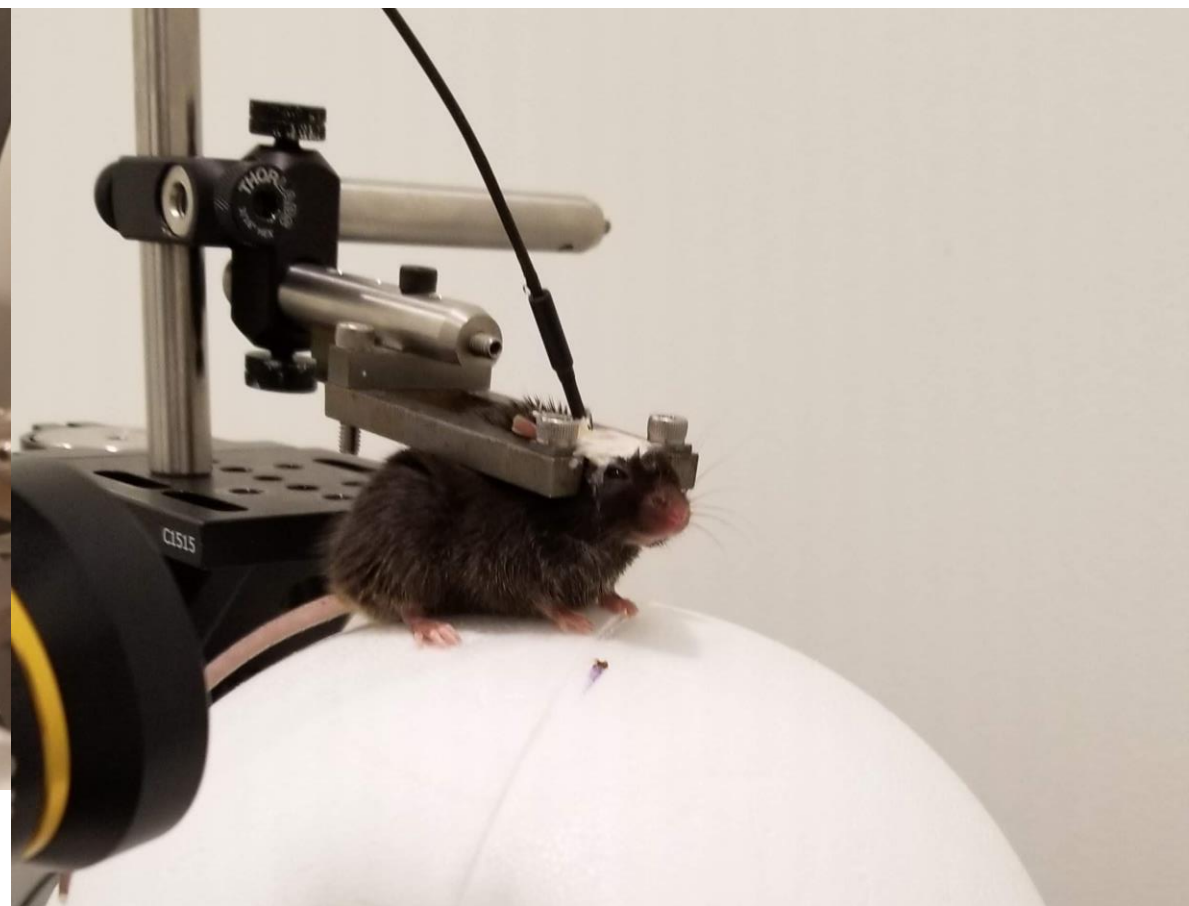
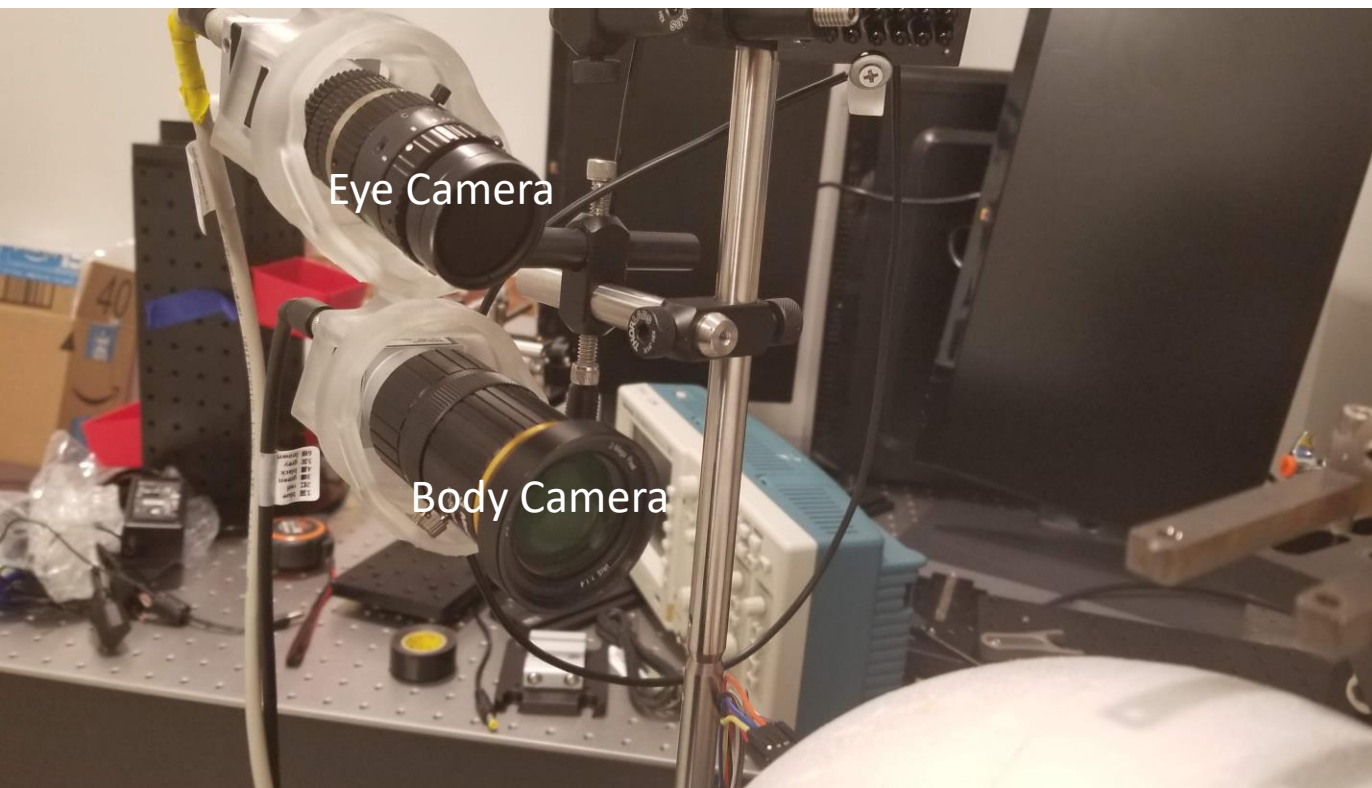
Vision = Important = Survival

How do mice sense objects in the world?

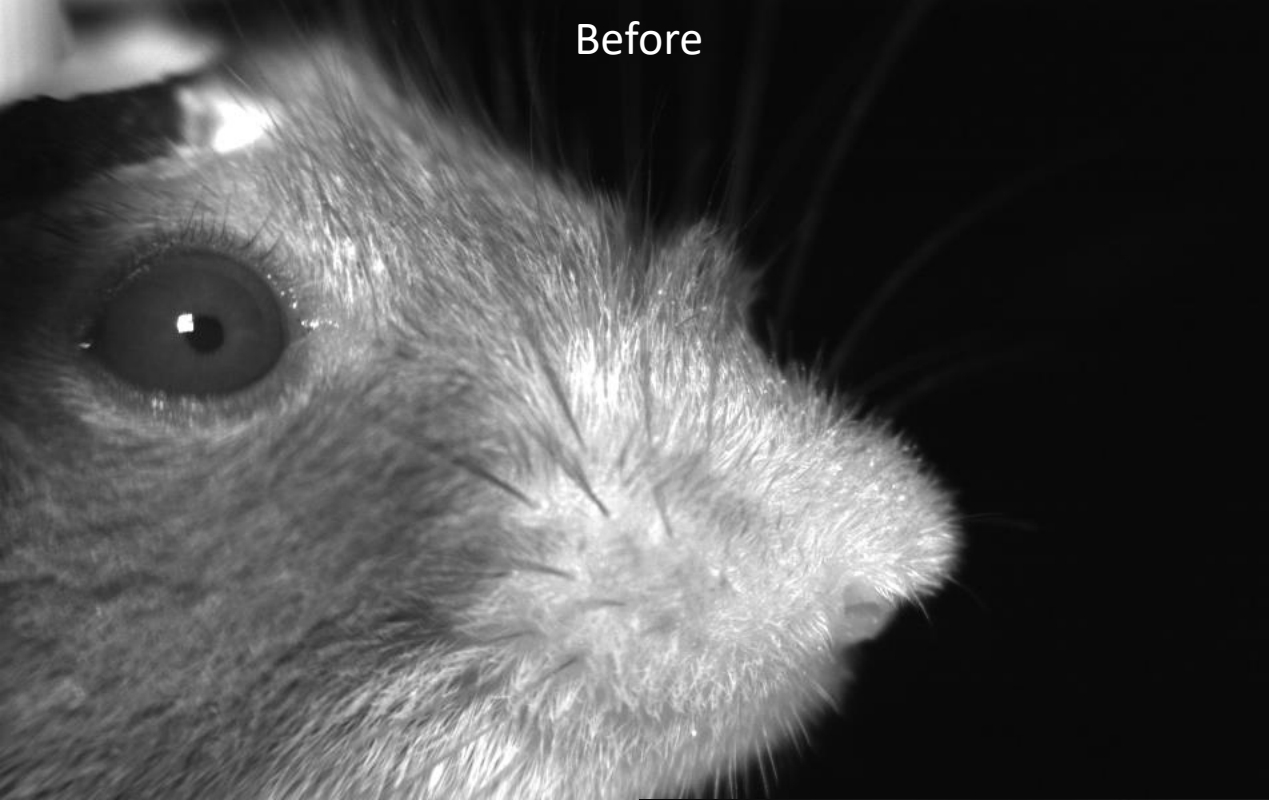
Methods



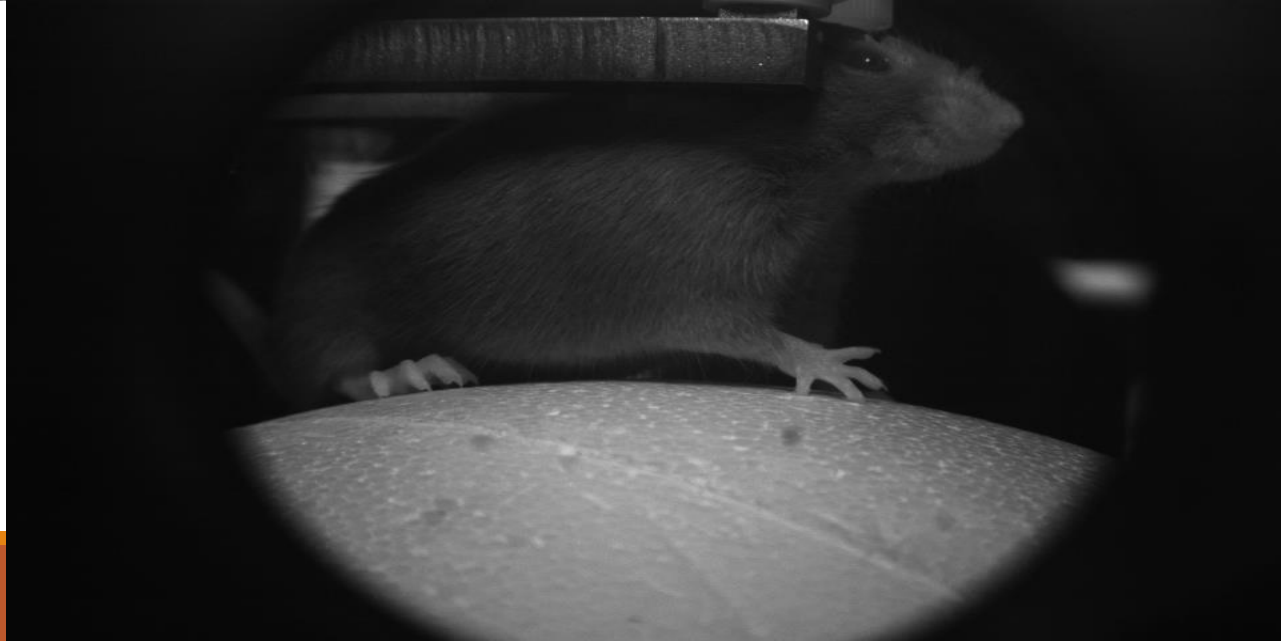




Before



After



Results

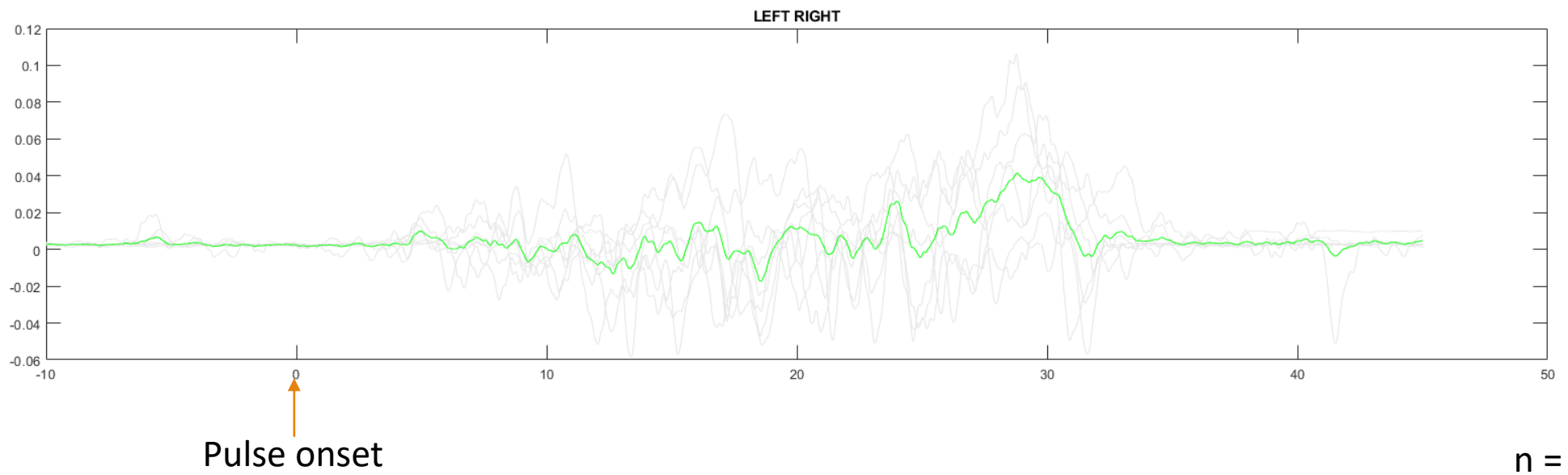
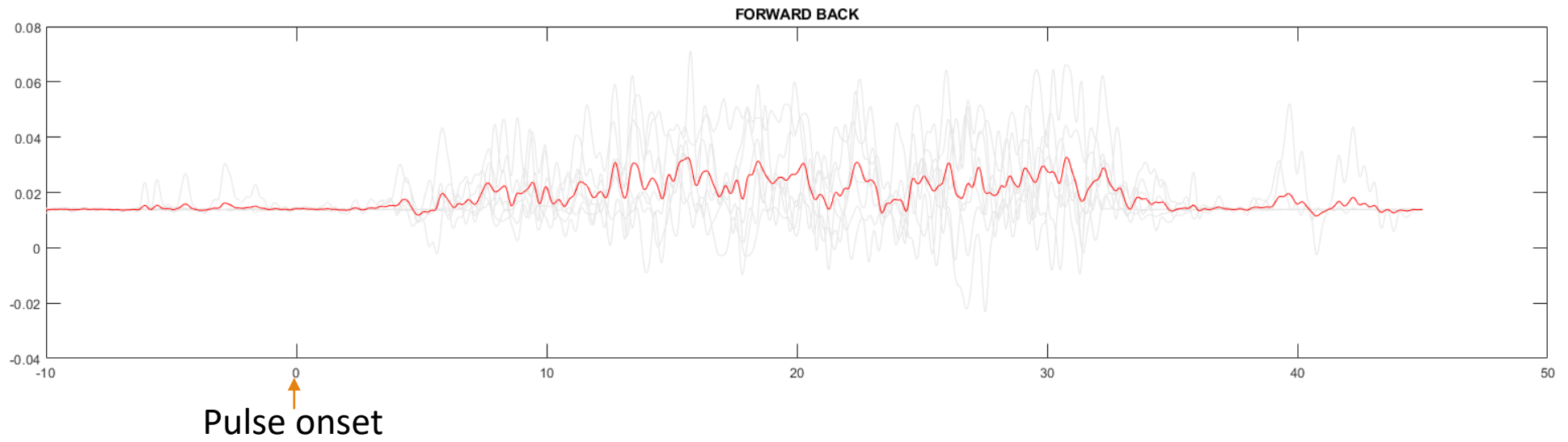
Experiment One

7 TRIALS, 1 TYPE OF TEST

PURPOSE: DETERMINE IF SHAPE/COLOR INFLUENCES OBJECT-CRAVING

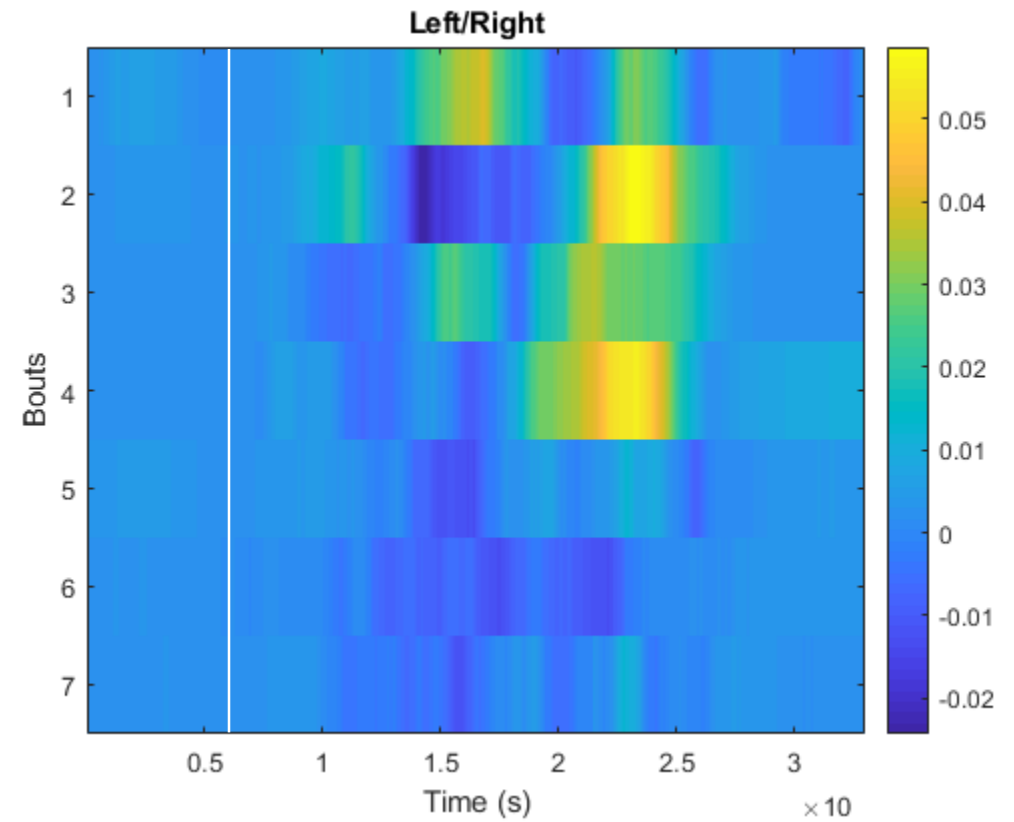
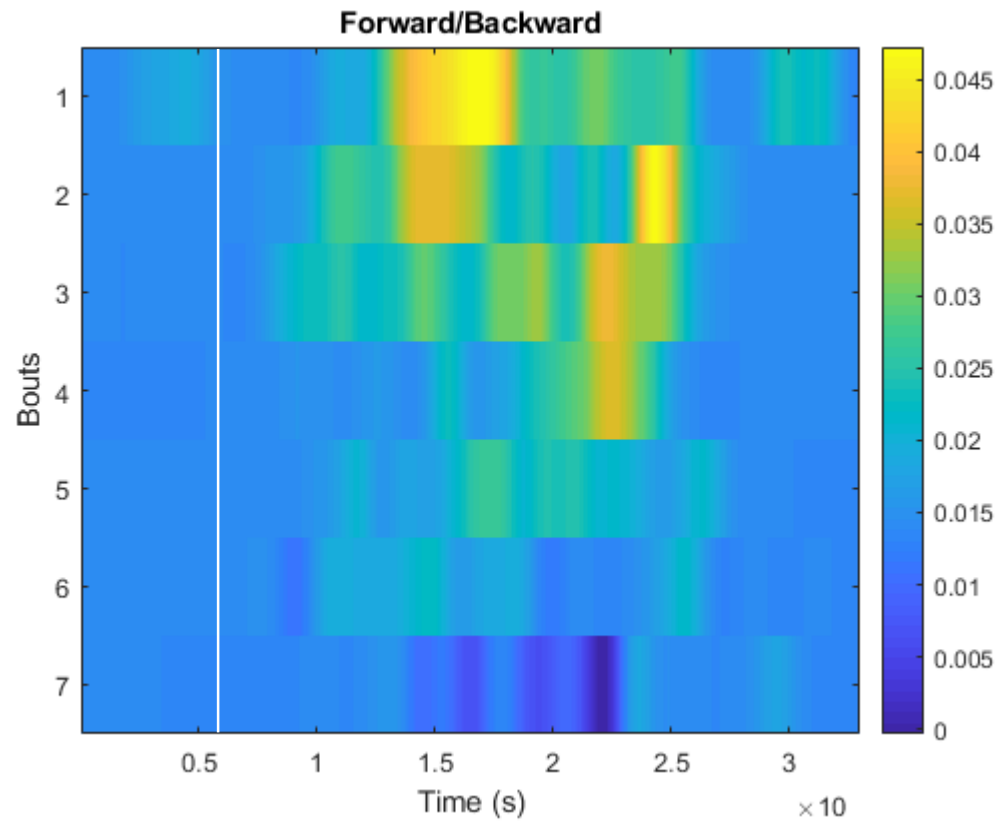
What happens when we stimulate an animal in a head-fixed paradigm?

No object



n = 7

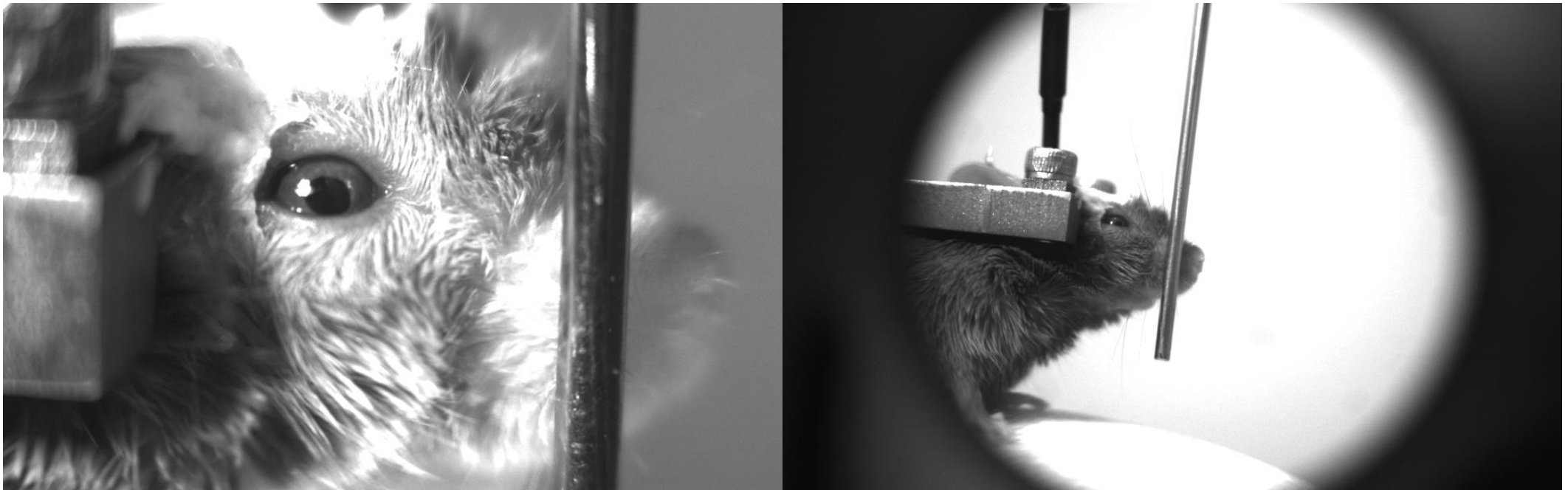
Bout Heat Maps

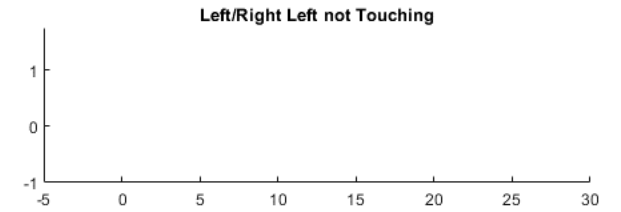
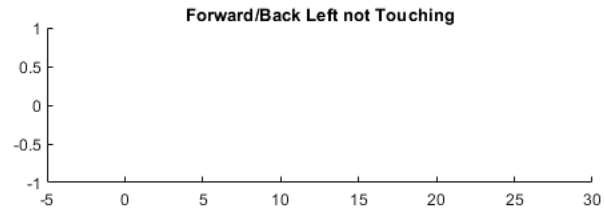
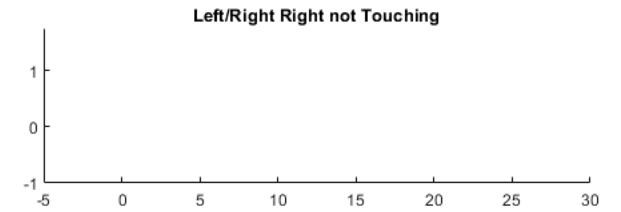
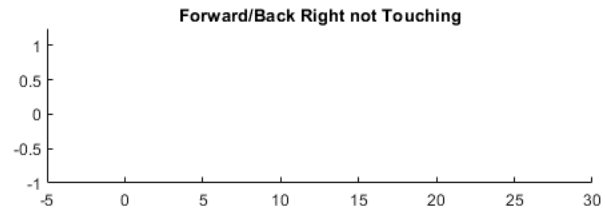
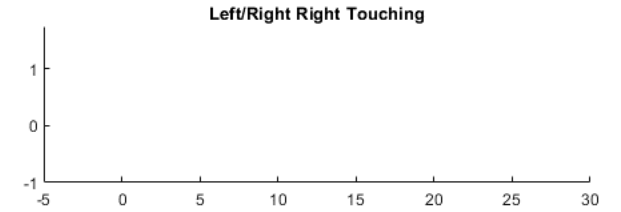
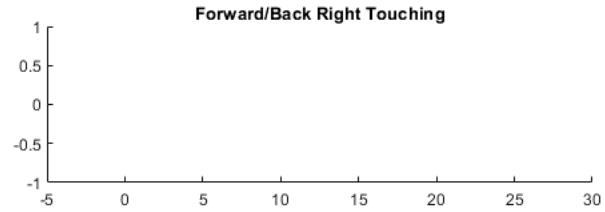
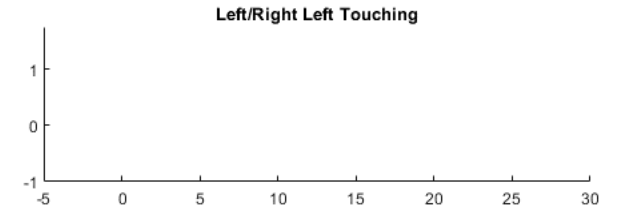
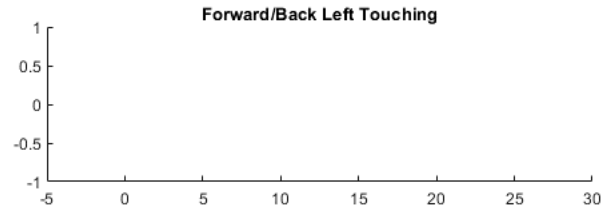
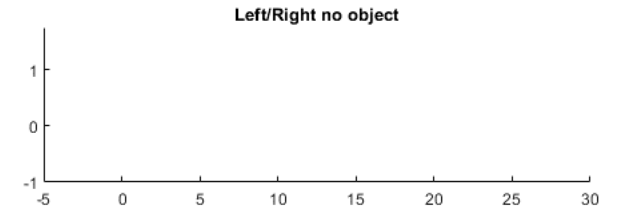
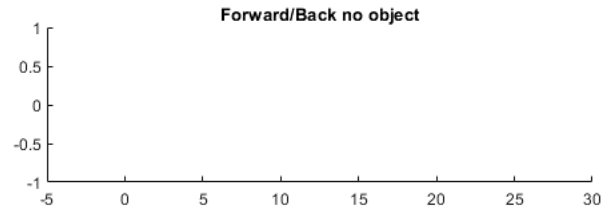
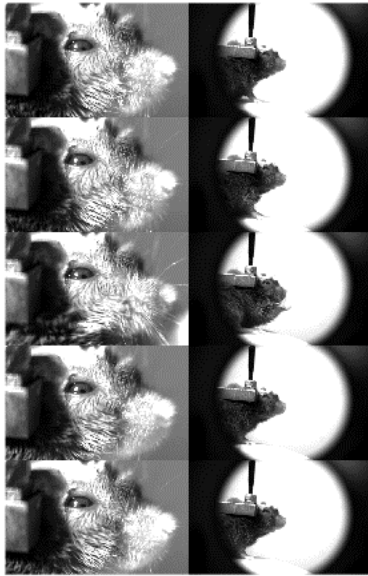


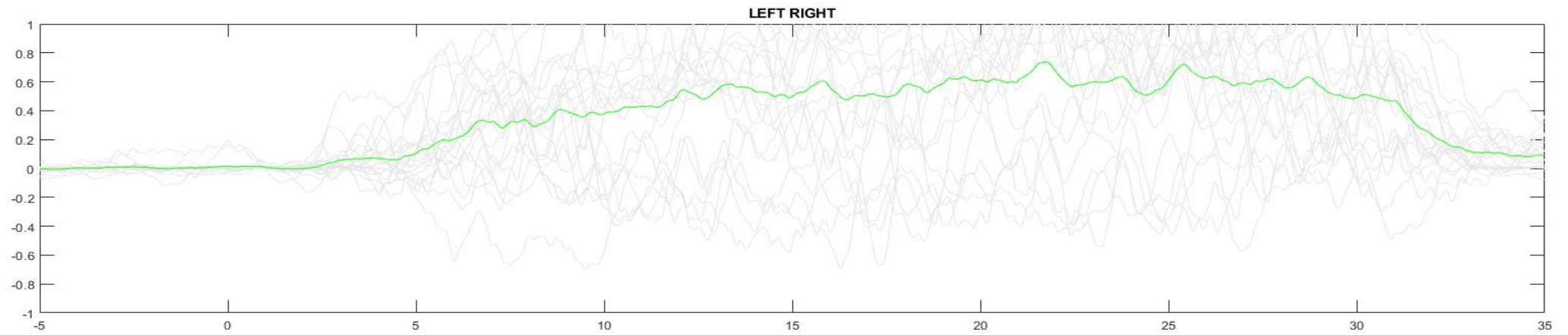
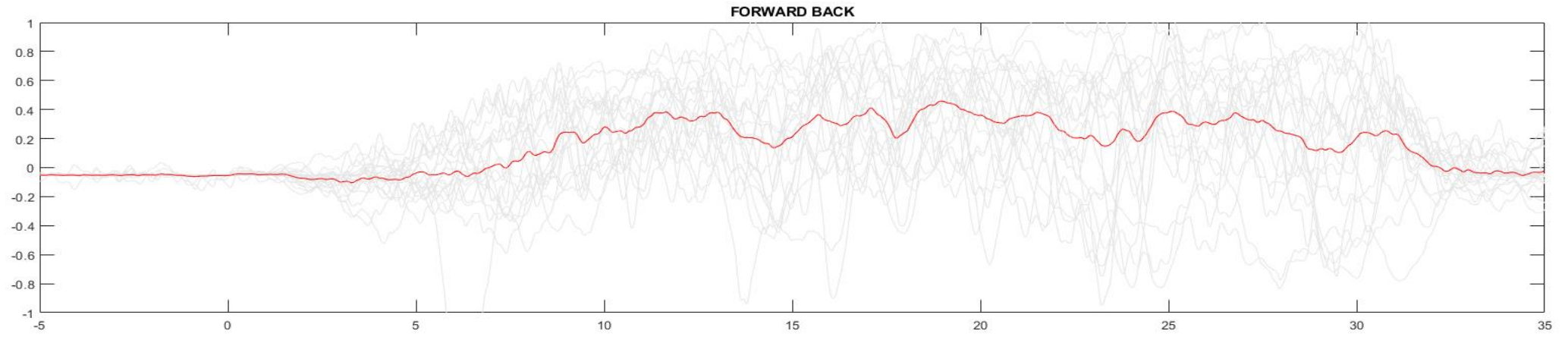
Experiment two

20 trials, 5 types of tests, 4 iterations

Purpose: observe if the animal will turn towards the object based on its location.

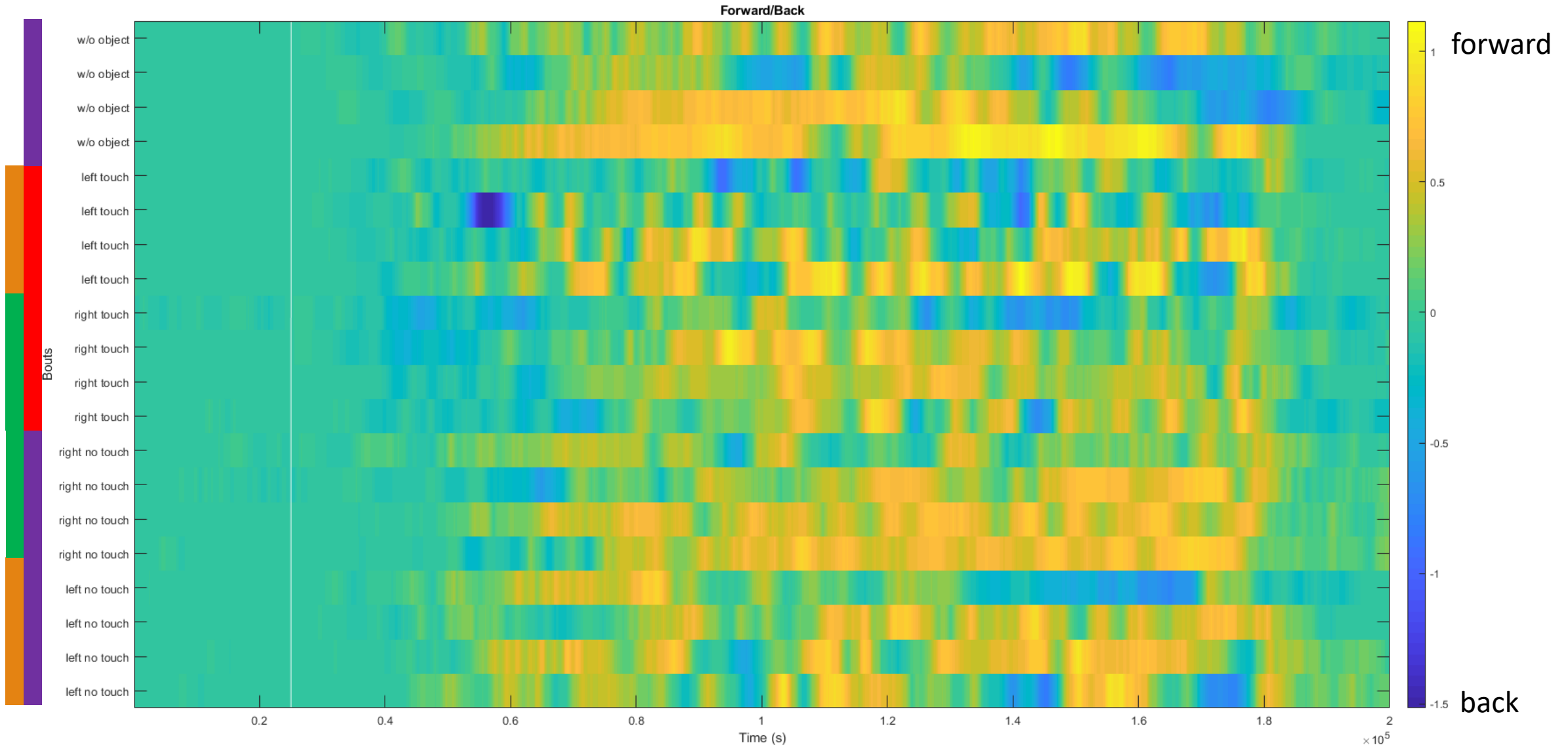






PSTHs for the Morning Experiment
Averages across the first dimension of the 20-trial data matrix

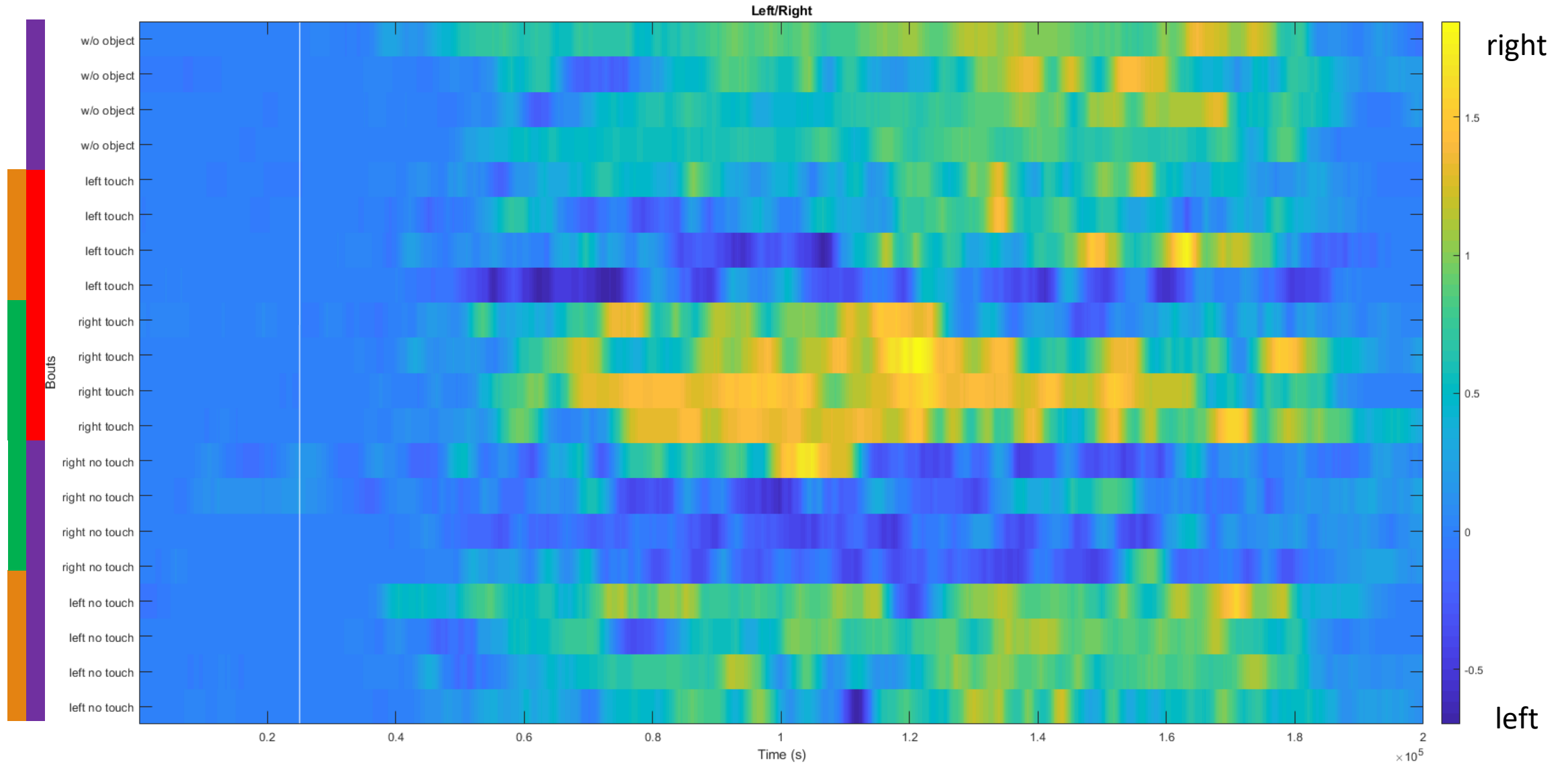
Left Right touch no touching



Heatmap with different types of test grouped together.

White line indicates bout onset.

Left Right touch no touching



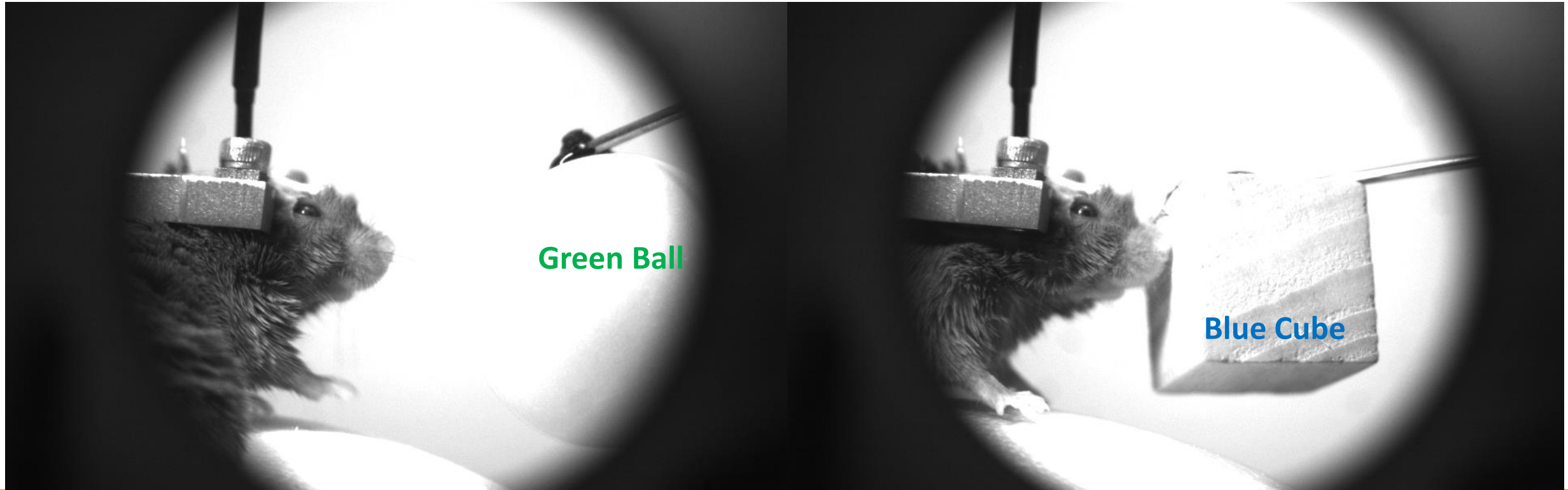
Heatmap with different types of test grouped together.

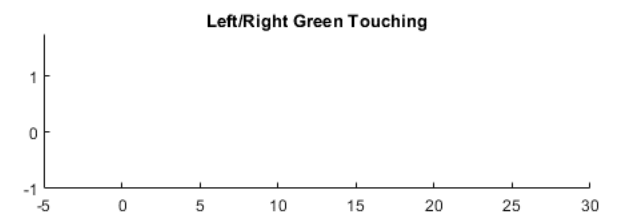
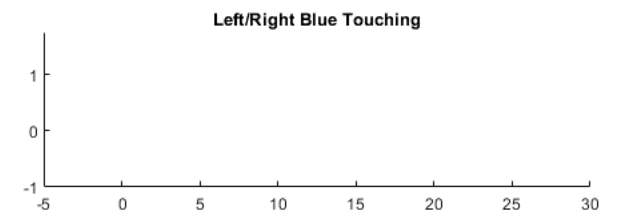
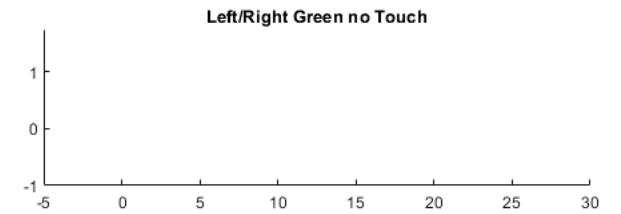
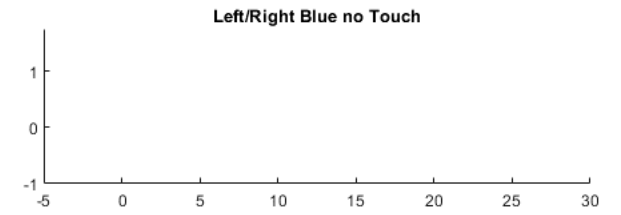
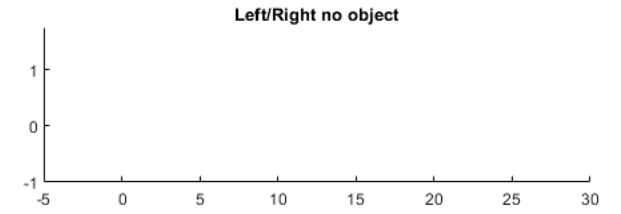
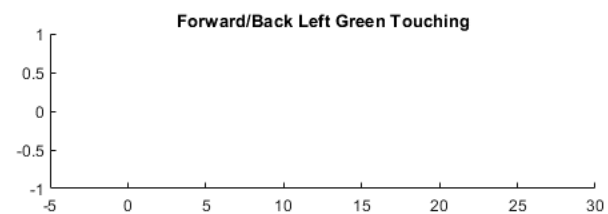
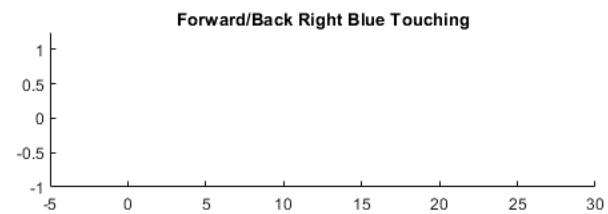
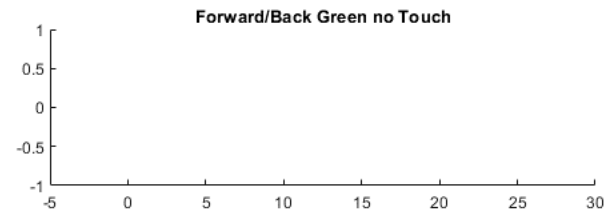
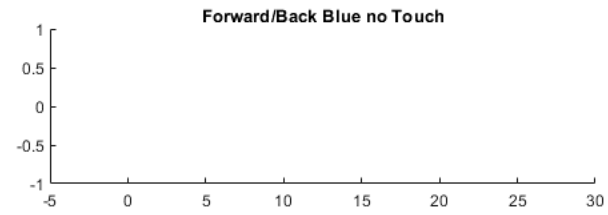
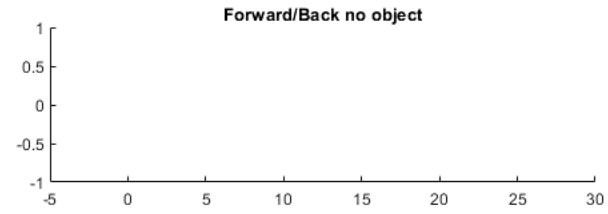
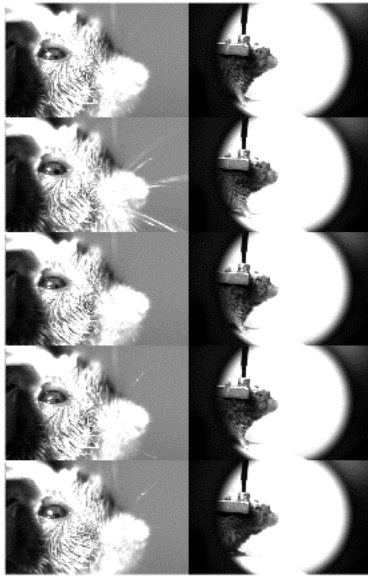
White line indicates bout onset.

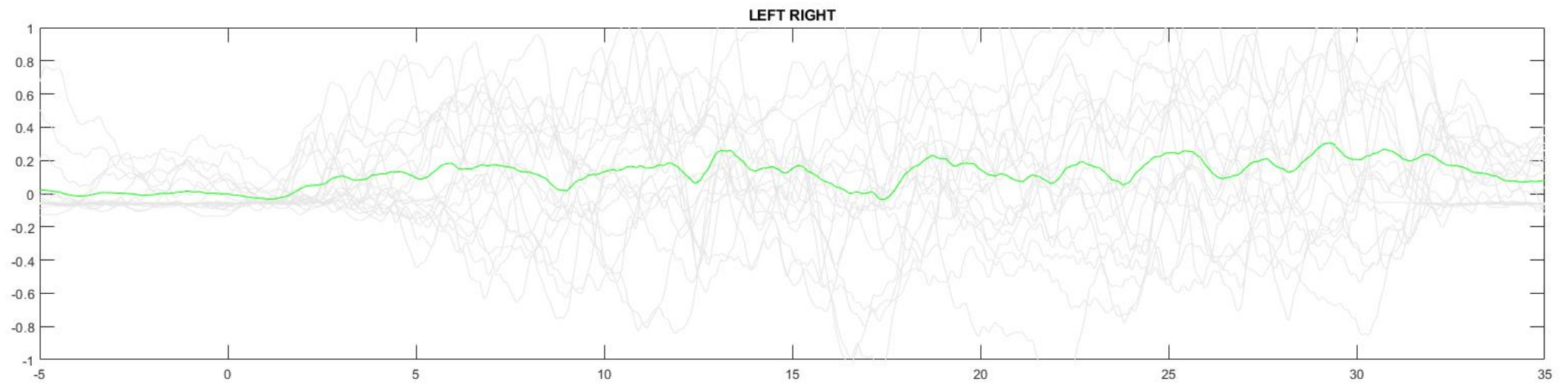
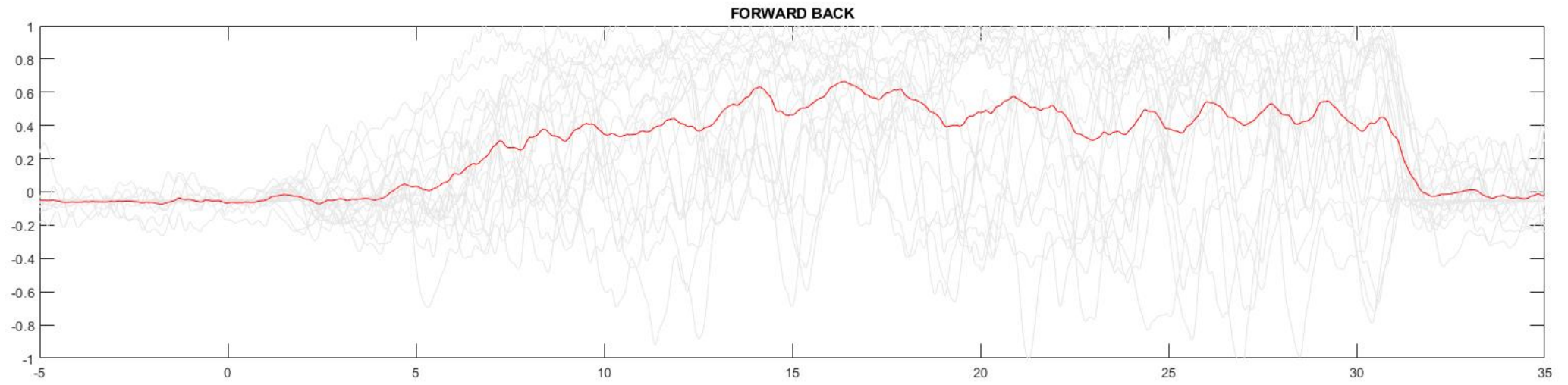
Experiment two: 07/17/2019

20 trials, 5 types of tests, 4 iterations

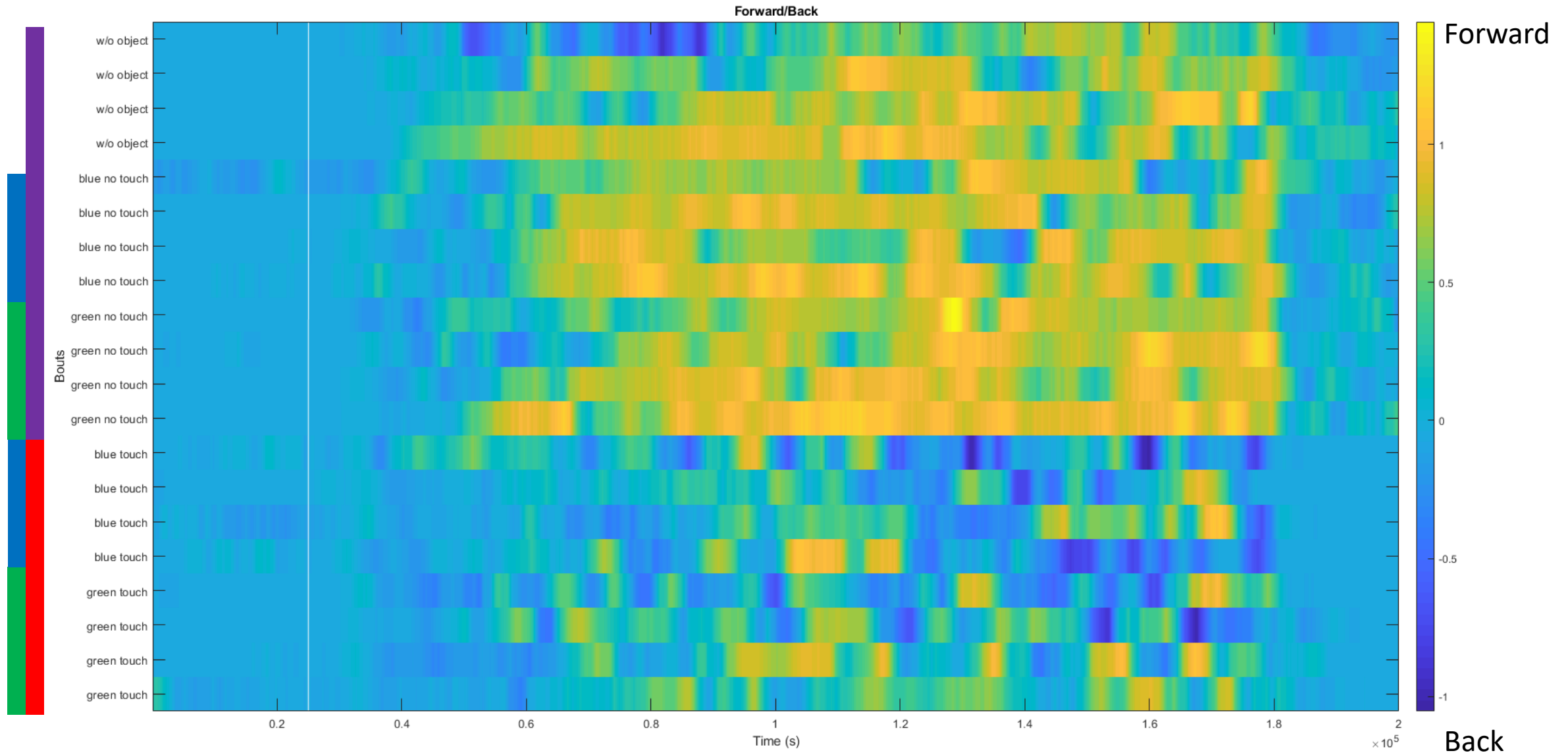
Purpose: determine if shape/color influences object-craving







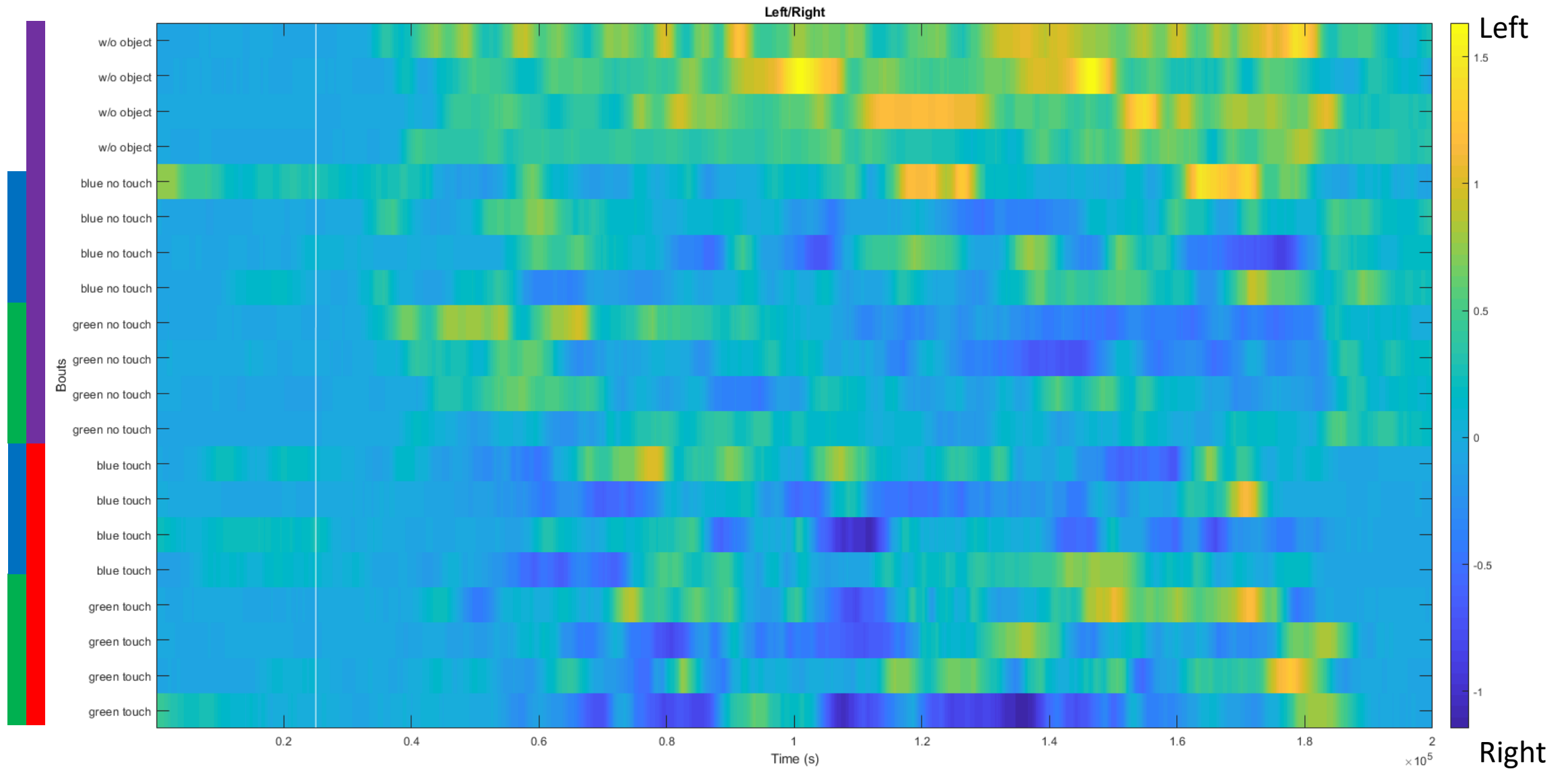
Blue Green touch no touching



Heatmap with different types of test grouped together.

White line indicates bout onset.

Blue Green touch no touching



Heatmap with different types of test grouped together.

White line indicates bout onset.

Experiment 3

PHOTOSTIMULATION IN AN OPEN ENVIRONMENT WITH A DANGLING
OBJECT

(REPLICATION OF PARK ET AL. WITHOUT A MOTOR)

Purpose: see how the animal would react in an open environment





Conclusion

- The animal will run when photostimulated, showing the strength of the stimulated MPA-vPAG circuit.
- When head-fixed, the animal only shows some object-craving behavior when the object touches its nose.
 - This suggests that the animal struggled to keep balance.
 - The video shows the animal grasping the object when touching it.
 - However, no concrete direction turning was displayed when the object did not touch it
- The mouse showed object-craving responses, when it was in an open environment.
 - In the video, the mouse only made left turns, indicating that is desired the object, which was placed on the left side of its head.

Thank You
