



## Introduction

- Reinforcer devaluation involves pairing an appetitive stimulus (e.g., food) with an aversive event (e.g., illness) which decreases the likelihood that an organism will perform a behavior for that stimulus. (Adamson and Dickinson, 1981).
- Signaling* and *hedonic shift* accounts make different predictions regarding the reinforcer devaluation learning experience.
  - The effect of reinforcer devaluation could be the result of the stimulus *signaling* the aversive event, and can be demonstrated with only one pairing.
  - Exposure to the stimulus and aversive event together may result in a *hedonic shift*, or change in the value of the stimulus from appetitive to aversive.
- Balleine and Dickinson (1991) found that reexposure to food paired with illness was necessary to observe a devaluation effect (i.e., a *hedonic shift* of the food from yummy to yucky).
- While the hedonic shift account has been studied in the context of food and illness, could it also apply to other aversive events? If a child is given a shot from a doctor, does he avoid doctors in the future because doctors predict pain (*signaling*), or does he realize that doctors are “bad” the next time he sees a doctor (*hedonic shift*)?

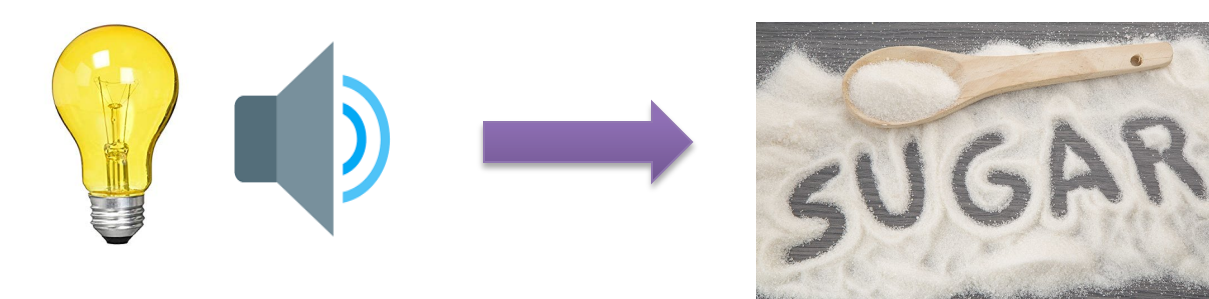
## Aim of Study

The current study investigated the devaluation of a conditioned reinforcer. Rats were initially trained to lever press for an audiovisual stimulus (conditioned reinforcer). If one pairing of the conditioned reinforced and a shock diminishes lever pressing, then the *signaling* account is more accurate. If reexposure to the conditioned reinforcer is required to decrease lever pressing, then the *hedonic shift* account is more accurate.

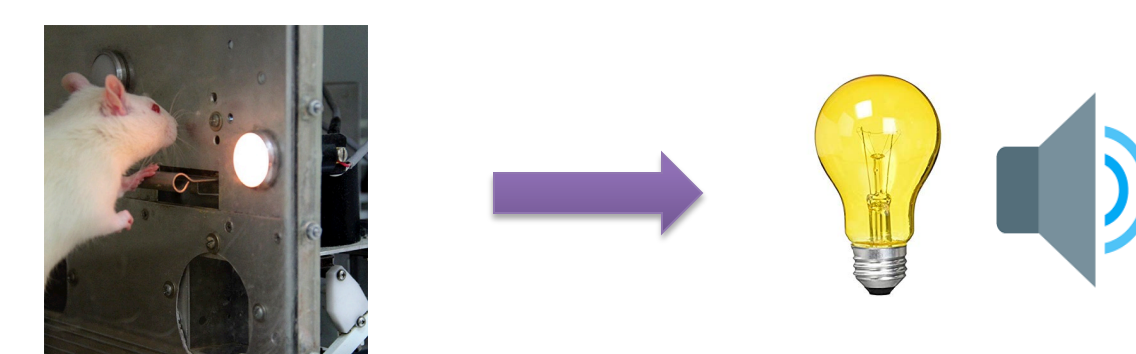
## General Method

**Subjects.** Sixteen Long-Evans rats; eight male, eight female

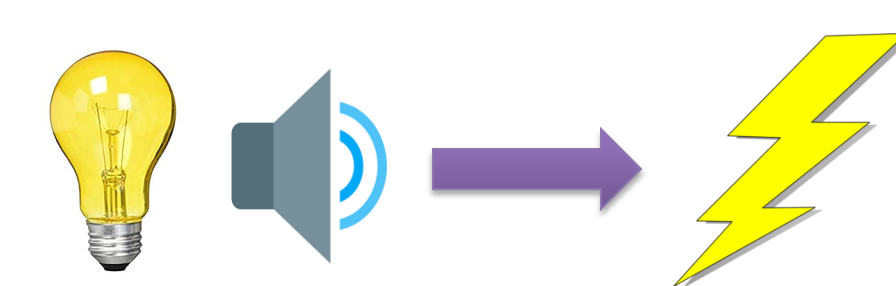
**Phase I: Pavlovian Conditioning.** Over 14 sessions, rats were presented with a 5-second audiovisual (light/tone) stimulus immediately followed by 10-seconds of sugar water (sucrose).



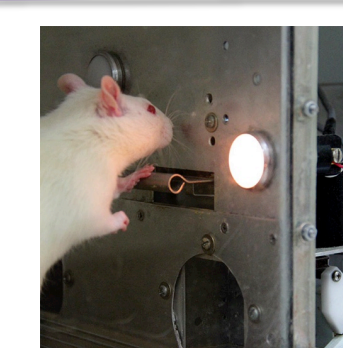
**Phase II: Conditioned Reinforcement.** Rats were presented with a lever. Lever pressing resulted in the presentation of the conditioned reinforcer (light/tone) for 5-seconds.



**Phase III: Conditioned Reinforcer Devaluation.** Rats were split into two groups: paired and unpaired. The paired (experimental) group received one pairing of the conditioned reinforcer immediately followed by a 4-second electrical shock. The unpaired (control) group received the conditioned reinforcer and shock, but separated in time (i.e., unpaired).



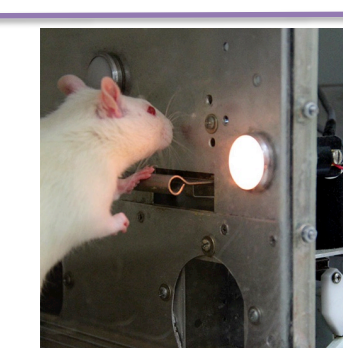
**Test I:** All rats were given the opportunity to lever press with no nominal consequences (i.e., no stimulus or shock)



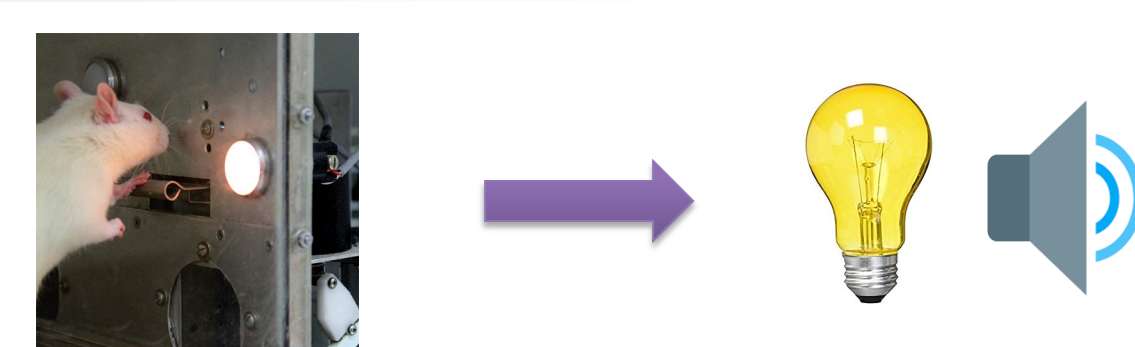
**Phase IV: Reexposure.** All rats were reexposed on one trial to the audiovisual stimulus without the lever or shock.



**Test II:** Lever pressing was measured as in Test I.

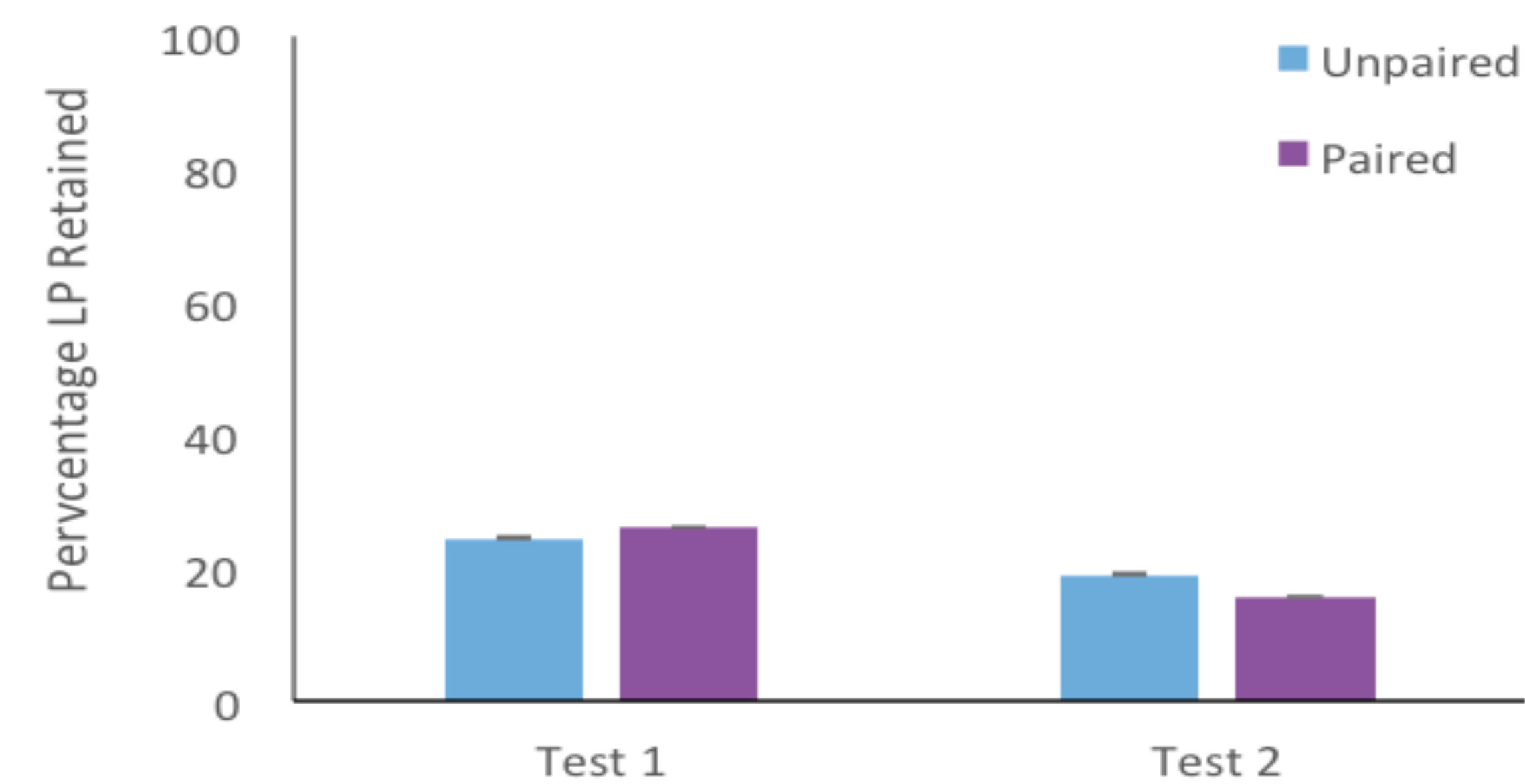


**Phase V: Reacquisition.** All rats were presented with the lever as in Phase II. Lever pressing resulted in the presentation of the audiovisual stimulus for 5-seconds.



## Results

### Did LP Decrease?

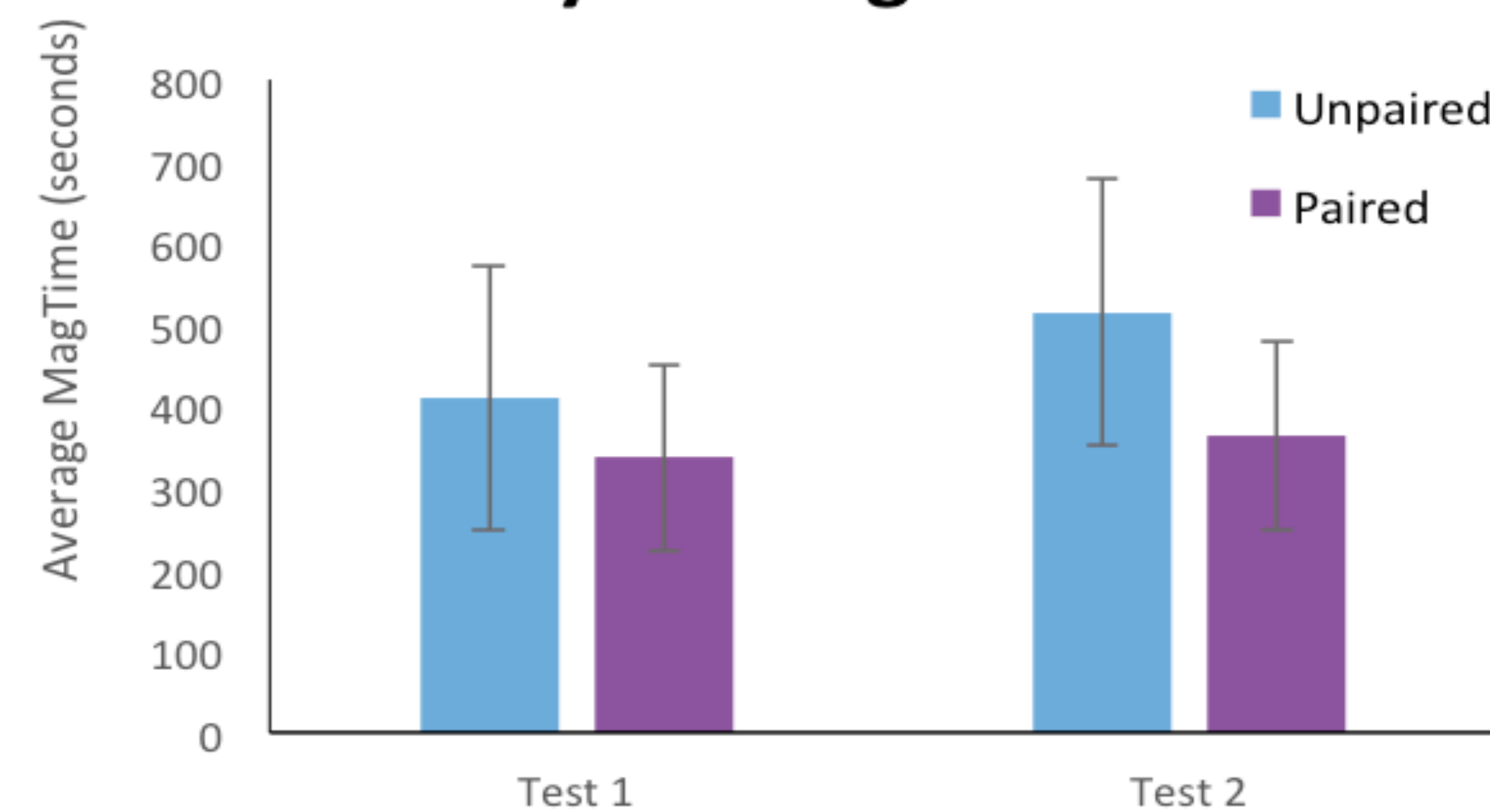


**Signaling:** Lever pressing should decrease for the paired group in Test 1.

**Hedonic Shift:** Lever pressing should be the same for both groups in Test 1, and only after reexposure should lever pressing decrease for the Paired group in Test 2.

There was a main effect of test,  $p = .013$ , with more lever pressing in Test 1 than Test 2. There was no main effect of group. These results indicate that the omission of the conditioned reinforcer after each response reduced responding across tests.

### Are they looking for food?

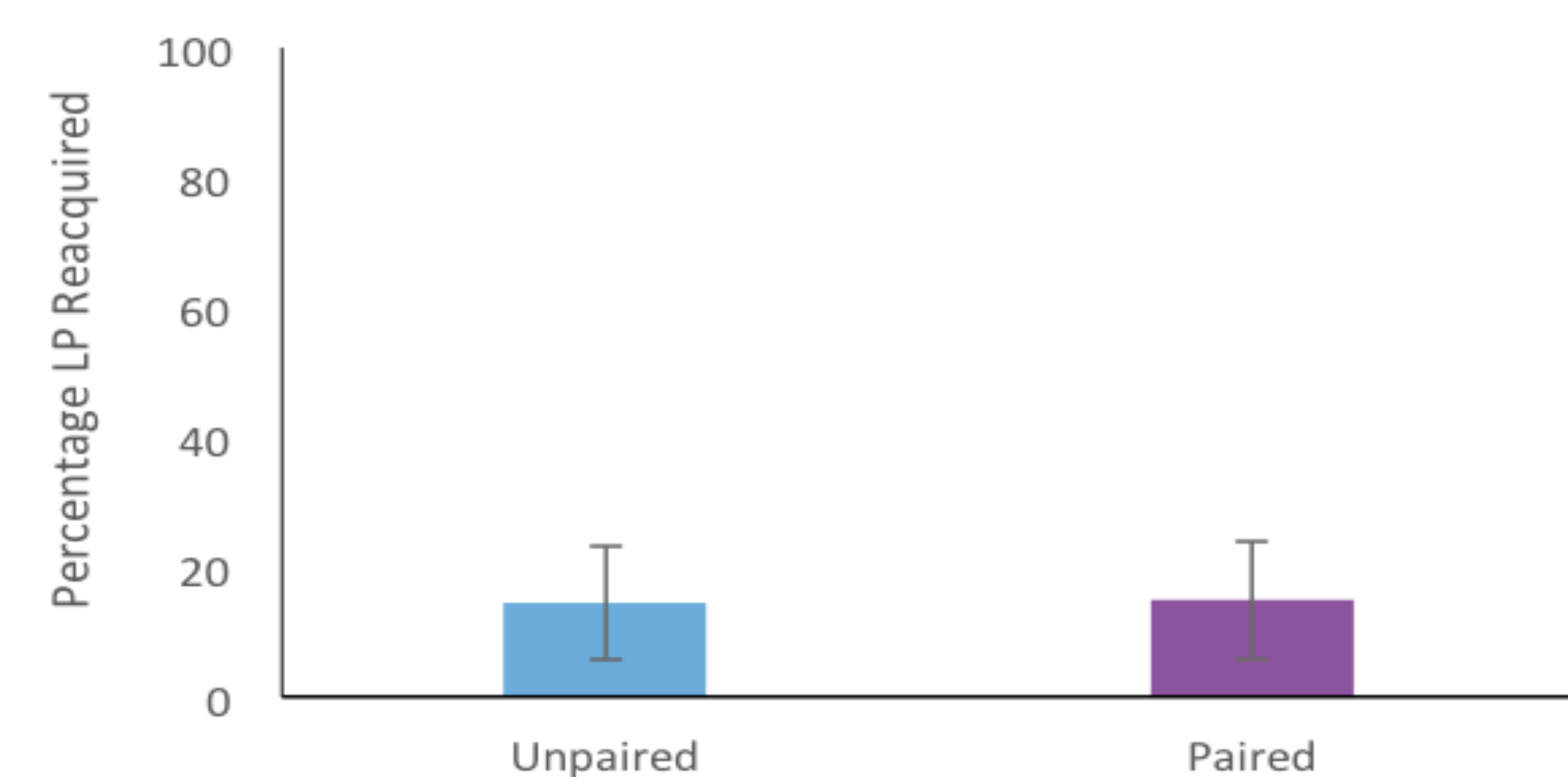


**Signaling:** The Paired group should look for food less than the Unpaired group for both tests.

**Hedonic Shift:** The Paired group should look for food the same amount as the Unpaired group in Test 1, but less in Test 2.

There was a marginally significant main effect of test,  $p = .061$ , with more time spent looking for food during Test 2. There was no main effect of group. This shows that as rats stopped lever pressing, they began exploring for food more.

### Did rats learn to LP again?



**Signaling and Hedonic Shift:** The Unpaired group should regain lever pressing, but the Paired group should not.

There was no main effect of group. Neither group regained lever pressing, which indicates that the audiovisual stimulus was no longer reinforcing, not due to devaluation, but due to several days where it was not paired with sucrose.

## Conclusions

- There was no significant difference in lever pressing between the Paired and Unpaired groups during Test 1 or Test 2. Consequently, we cannot draw clear conclusions in support of either the signaling or hedonic shift account.
- Further research directions may include:
  - Including a third group which receives the audiovisual stimulus and shock pairing twice
  - Limiting the length of time after the devaluation event to prevent extinction of lever pressing due to lack of reinforcement

## References

Adams and Dickinson (1981). Instrumental responding following reinforce devaluation. *The Quarterly Journal of Experimental Psychology Section B: Comparative and Physiological Psychology*, 33 (2), 109-121.

Balleine, B., & Dickinson, A. (1991). Instrumental performance following reinforcer devaluation depends upon incentive learning. *The Quarterly Journal of Experimental Psychology*, 43(3), 279-296.