Effects of the Environment and Deprivation Condition in Aged Rats Trained to Discriminate between 22- and 2- hr Food Deprivation

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Introduction

Jewett and collegues (2005) have previously trained rats to discriminate between food deprivation of 2hr and 22hr, and found 20 minute access to food reduced the stimulus effects of food consumption.

In our studies, we attempted to determine if rats trained to discriminate between 2hr and 22hr food deprivation conditions would demonstrate altered behavior occuring after short access to food.

Subjects in previous studies were given 1h food access post-test, potentially allowing an association to form with food consumption and the environment.

We were curious to assess if shorter periods of food access (2, 5, 10, 20 minutes) in the suspended cage without food altered discriminitive performance.

We wondered if previous experience in the suspended cage would play a role in lever response in rats aged 2-2.5 years, independent of the condition and food access in the suspended cage.

We sought to determine if adding a second daily training session would alter testing performance.

Method

Sprague-Dawley rats were housed in individual cages in a room with a 12:12 hour dark/light cycle with free access to water

Subjects were assigned quasi-randomly to either 22hr or 2hr food deprivation condition.

Experimental sessions were conducted in standard two-lever operant chambers (Med-Associated), food pellets (45mg, Bioserve F#0021) served as reinforcement during training and testing.

Condition appropriate lever presses (left-lever following 22hr deprivation, right-lever following 2hr deprivation) were reinforced under FR15 reinforcement schedule.

Training continued until subjects emitted greater than 80% correct lever responses both prior to the first reinforcer earned and for the complete training session in 8 of 10 consecutive sessions (*M*=71 sessions).

Study 1
After acquiring discrimination, subjects were required to meet the training criteria for 2 consecutive sessions. Daily training consisted of a single session. When testing, subjects were given a pretest and upon passing were assigned to either 2, 5,10, or 20 minutes in a suspended cage, with or without food access. After time elapsed, subjects were tested with behavior towards either lever reinforced.

Study 2
Subjects were required to meet the training criteria for 2 consecutive sessions before testing. Daily training consisted of 2 consecutive training sessions. Testing procedure followed that of study 1.

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Results

Figure A

Differences in left lever responses between 1 and 2 training sessions

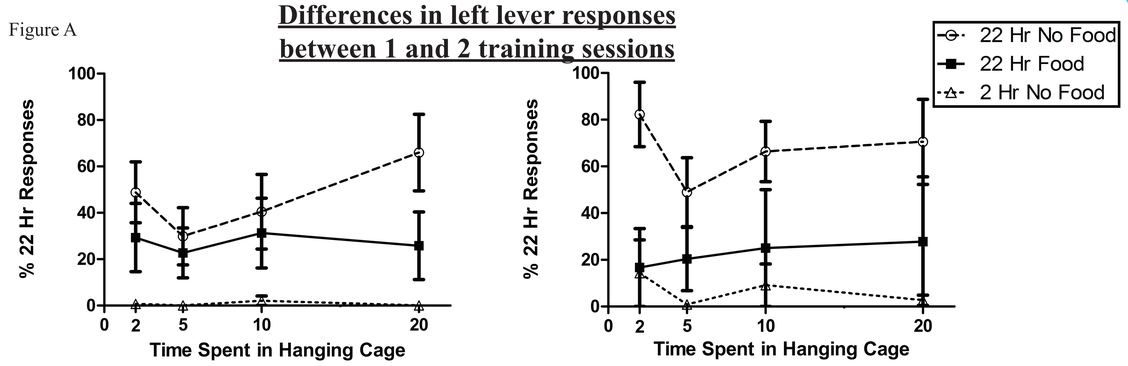


Figure B

Rate of responding between 1 and 2 training sessions

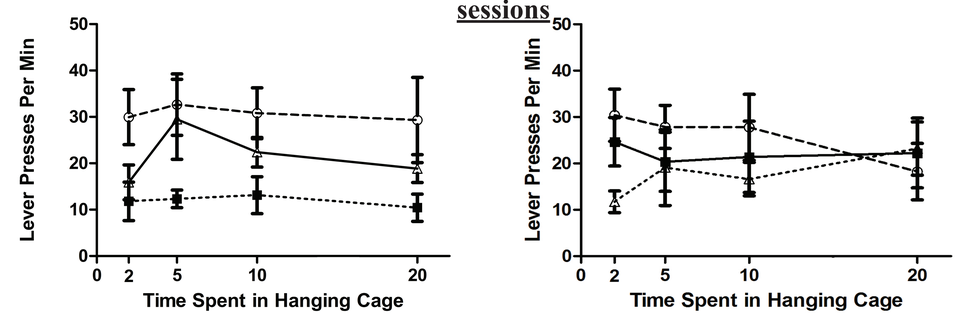


Figure C

Differences in left lever responses between 1 and 2 training sessions in subject 1470

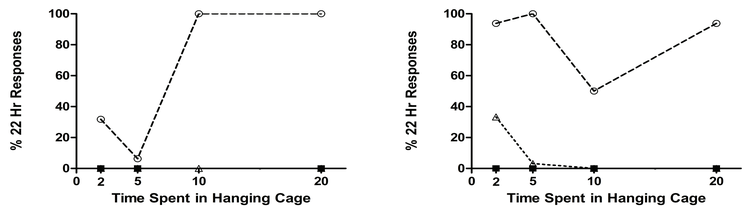
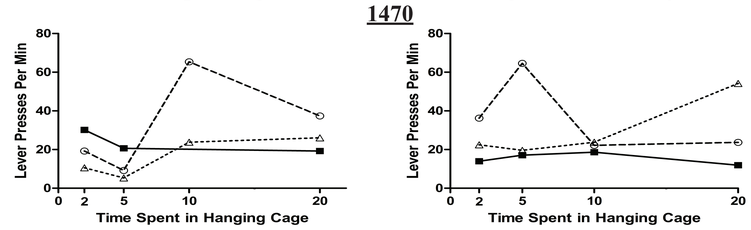


Figure D

Rate of responding between 1 and 2 training sessions in subject 1470



Discussion

Figure A: Under 22hr no food deprivation conditions, rats emitted a greater proportion of responses toward the lever associated with 22hr deprivation following 2 daily training sessions. No differences in discriminative performance were observed in the 22hr food and 2hr no food conditions.
Figure B: Response rates were not altered by the difference in daily training sessions.
Figures C and D: Depict data from a reprsentative subject in both training session conditions.

Conducting 2 training sessions per day overall increases rate and left lever responding during a 22hr no food test; therefore, it cannot be concluded that access to the suspended cage produces satiated-like effects in lever choice. Overall there is a noticeable effect of the 22hr no food testing condition increasing left lever pressing during 2 daily training sessions.