

# Effects of pentobarbital in rats trained to discriminate between 2 and 22 hr food deprivation



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## Introduction

Assessing the effects of acute food deprivation may assist the development of medication for eating-related conditions and aid in the understanding of processes that affect food consumption. Previously, we found that neuropeptide Y (NPY) and ghrelin produced stimuli to those of 22 hr food deprivation. Cholecystokinin (CCK) and sibutramine reduced the effects of 22 hr food deprivation whereas naltrexone, oxytocin, exendin-4 and rimonabant did not. Glucagon-related peptide (GLP) agonist, exendin-4 decreased response rate and food intake, but did not alter the discriminative stimulus of 22 h food deprivation.

GABA receptor agonists have been shown to increase food intake by enhancing food palatability. More specifically, benzodiazepines have been shown to enhance consummatory behavior via this mechanism. In the present investigation, we seek to determine if the barbiturate pentobarbital also increases food intake through a mechanism related to the perceived palatability of food. A better understanding of this mechanism could lead to advances in the pharmacological treatment of anorectic symptoms.

## Method

### Subjects and apparatus

- Male Sprague-Dawley rats were housed in individual cages in a room with 12:12 light/dark cycle (lights on at 8:00 a.m.) and given continuous access to rodent chow (Harlan Teklad) and water unless noted.
- 45-mg food pellets (BioServe F#0021) were delivered as reinforcers in standard two-lever operant chambers (Med-Associates).

### Drug

- Pentobarbital (0.1-10.0mg/kg) was dissolved in 0.9% saline and administered s.c.

### Behavioral training

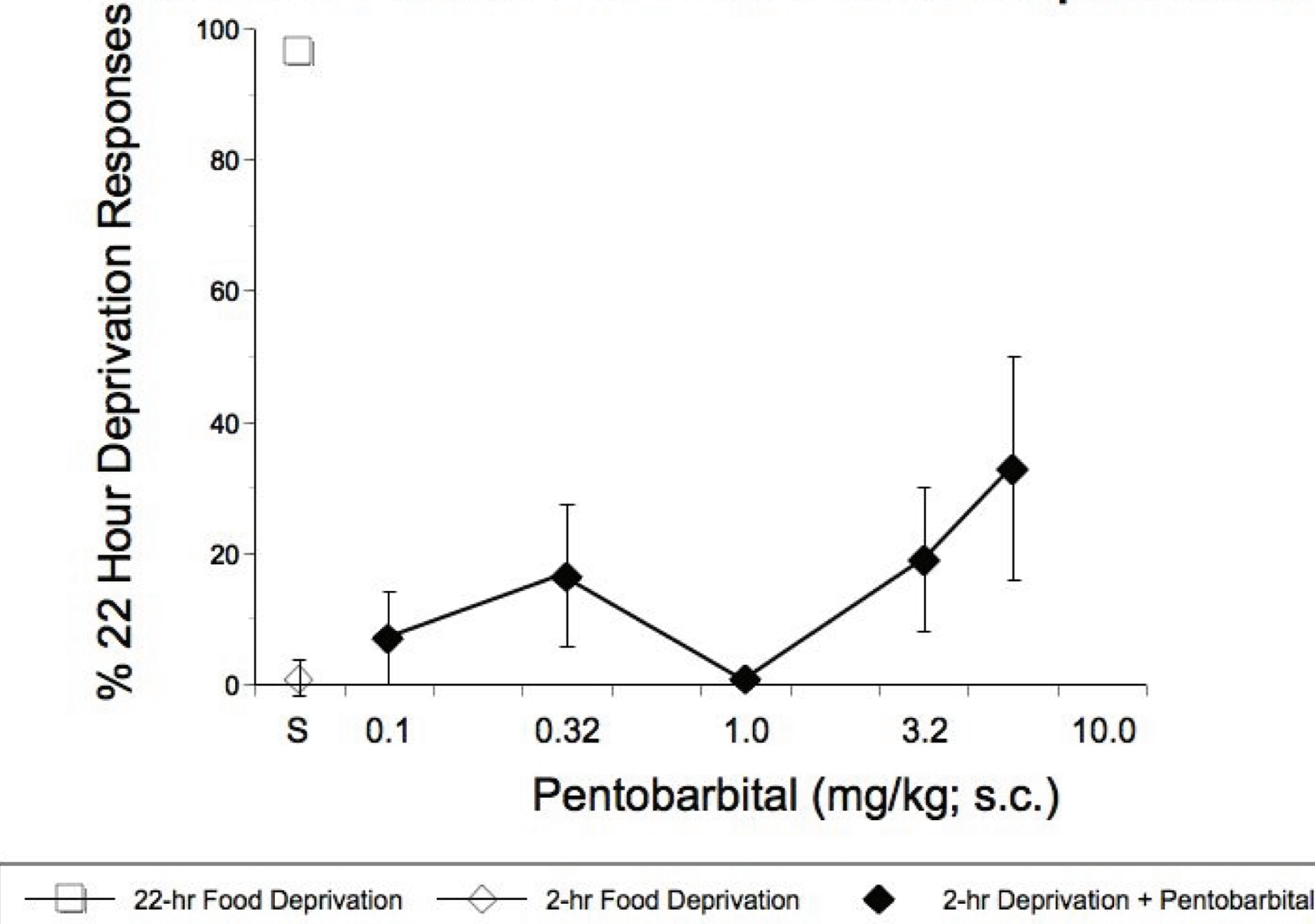
- Correct lever presses, left lever presses following 22 h food deprivation and right lever presses following 2 hr deprivation, were reinforced with food pellet delivery under FR-15.
- Incorrect lever presses resulted in an 8 second period of darkness.
- Each training session included two response cycles that ended after five food reinforcers were earned or 5 minutes elapsed, whichever occurred first.
- Training continued until subjects emitted greater than 80% condition-appropriate responses both prior to the first reinforcer delivery for each training cycle and for the complete training session.

### Generalized tests

- Tests were conducted similar to two-cycle training sessions except for the following differences:
- Injections occurred 15 min before a test session
  - Drug and control tests occurred under both 2 and 22 hr deprivation conditions
  - For test sessions, responses toward either lever were reinforced
  - Following each test session subjects were placed in suspended cages with free access to food and water
  - Food and water intake was measured after 1 hour
  - Data were collected 15 and 45 min after the injection. Data obtained during the test 45 min after the injection that did not differ from those obtained 15 min post-injection are not shown
  - Data were analyzed by ANOVA. If the results of the ANOVA were significant, Tukey post-hoc tests were implemented.

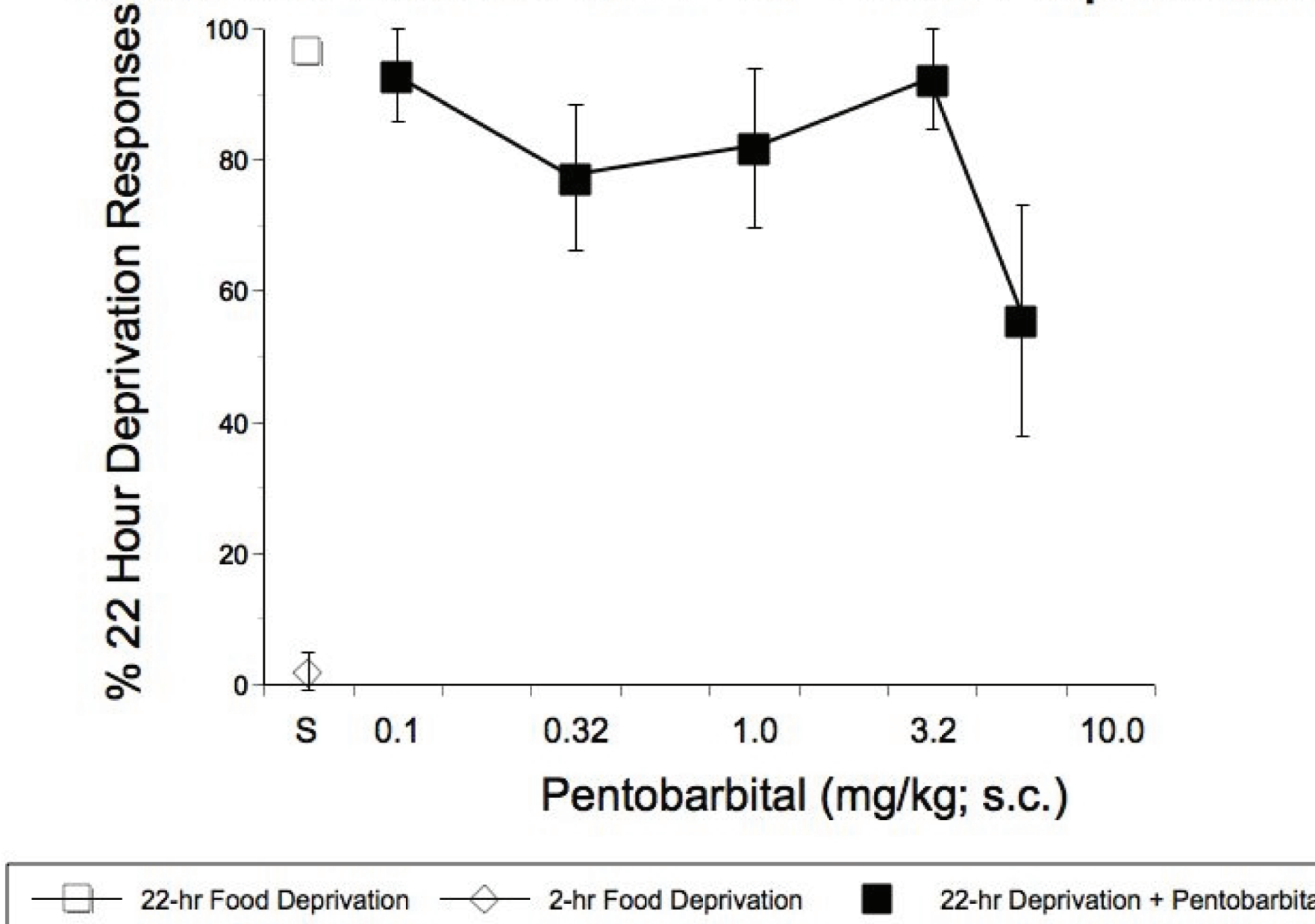
## Figures

Pentobarbital Does Not Alter Discriminative Stimulus Effects of 2-hr Food Deprivation



## Figures

Pentobarbital Does Not Alter Discriminative Stimulus Effects of 22-hr Food Deprivation



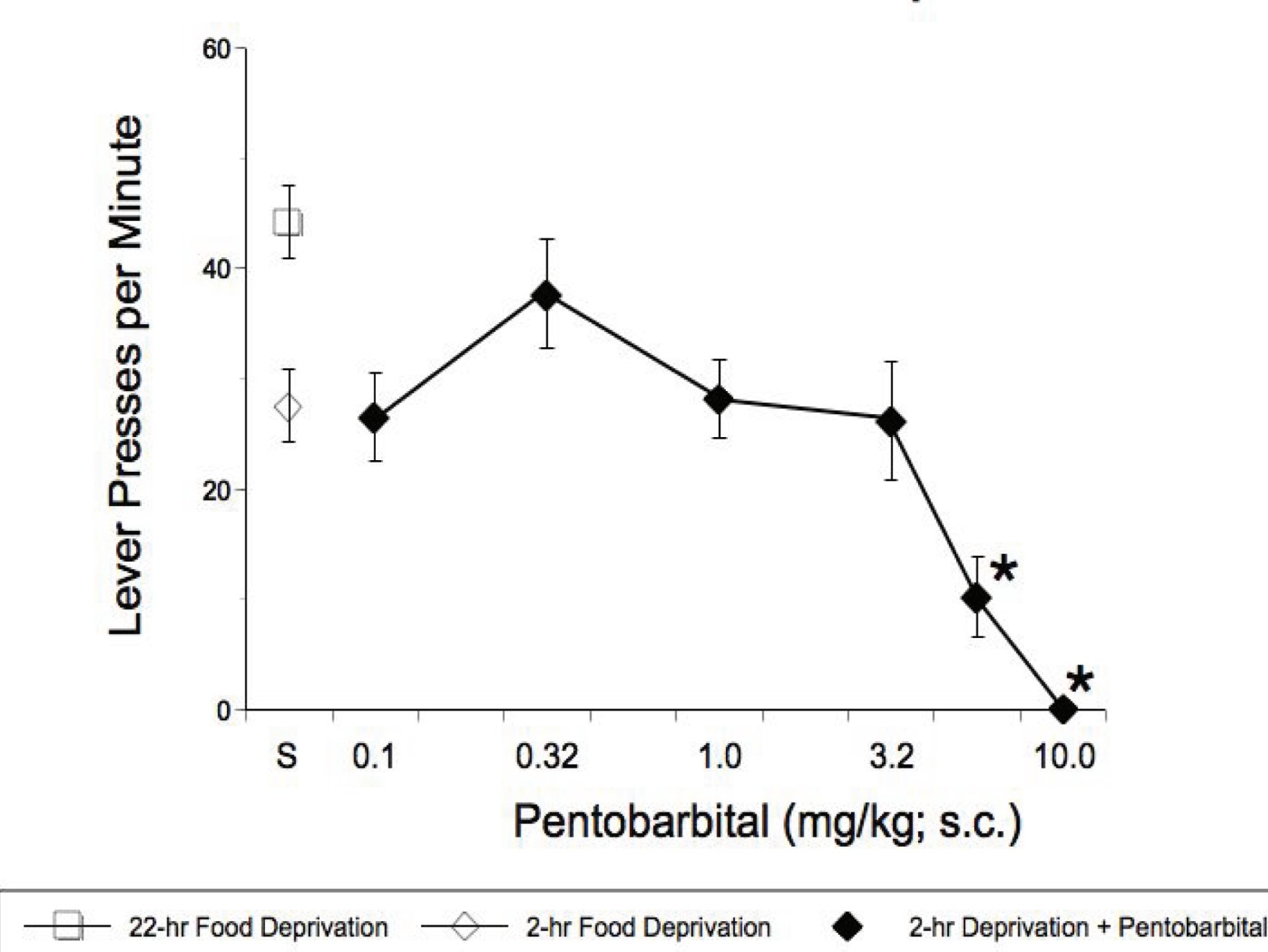
## Results

- Pentobarbital did not alter the discriminative stimulus effects of 2 or 22 hr food deprivation.
- Pentobarbital (5.6mg/kg and 10.0mg/kg) significantly decreased response rates.
- Pentobarbital did not significantly alter food intake following 2 or 22 hr food deprivation.

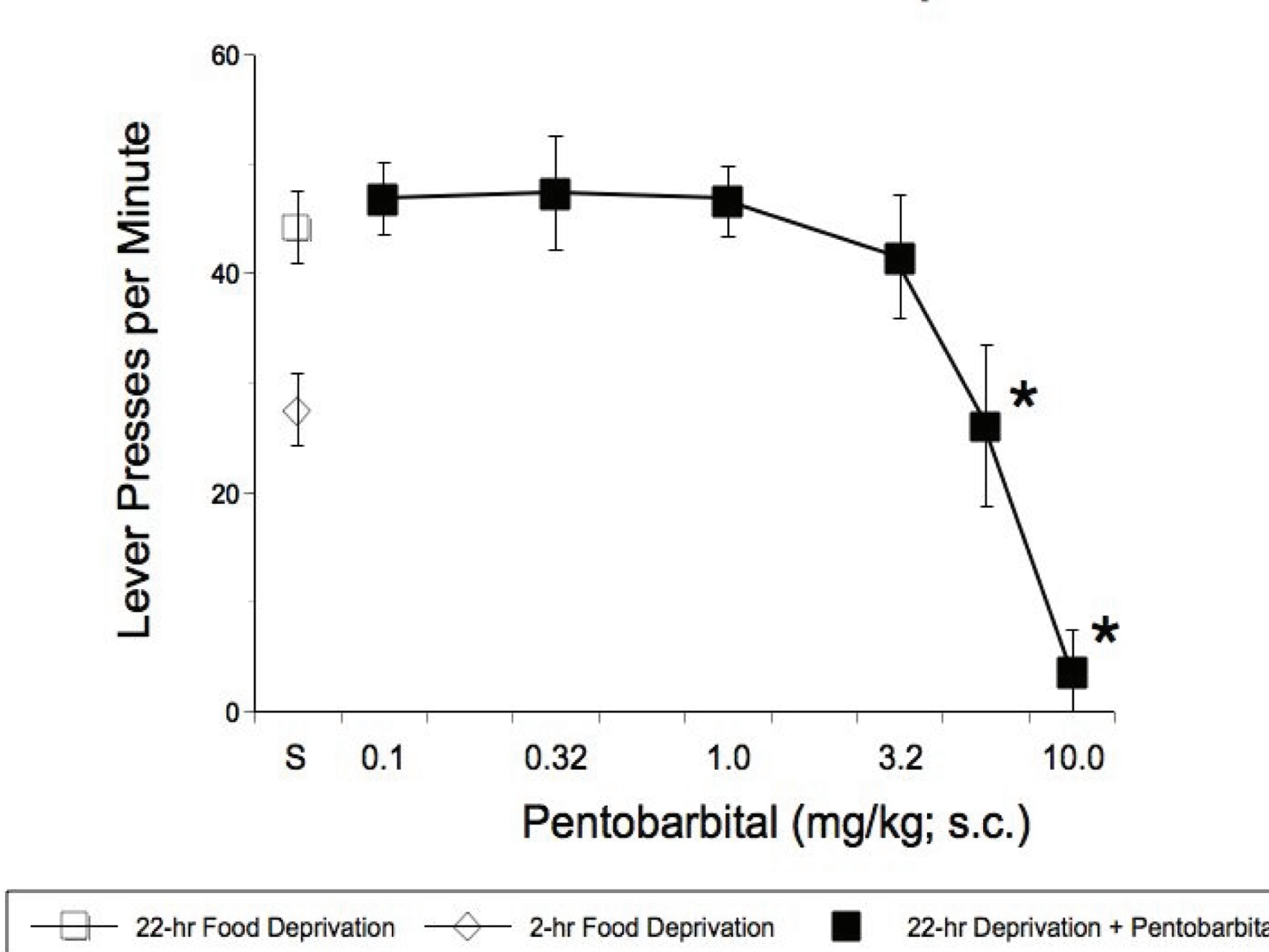
## Conclusions

Pentobarbital did not alter the discriminative stimulus effects of 2 or 22 hr food deprivation or food intake, but pentobarbital did significantly affect response rates. To date, we have found that CCK, serotonin, norepinephrine, NPY, and ghrelin systems appear to modulate the discriminative stimulus effects of 22 hr food deprivation. The assessment of the discriminative stimulus effects of acute food deprivation may help classify agents into those that affect energy needs or the initiation of eating and those that affect other mechanisms such as reward or palatability.

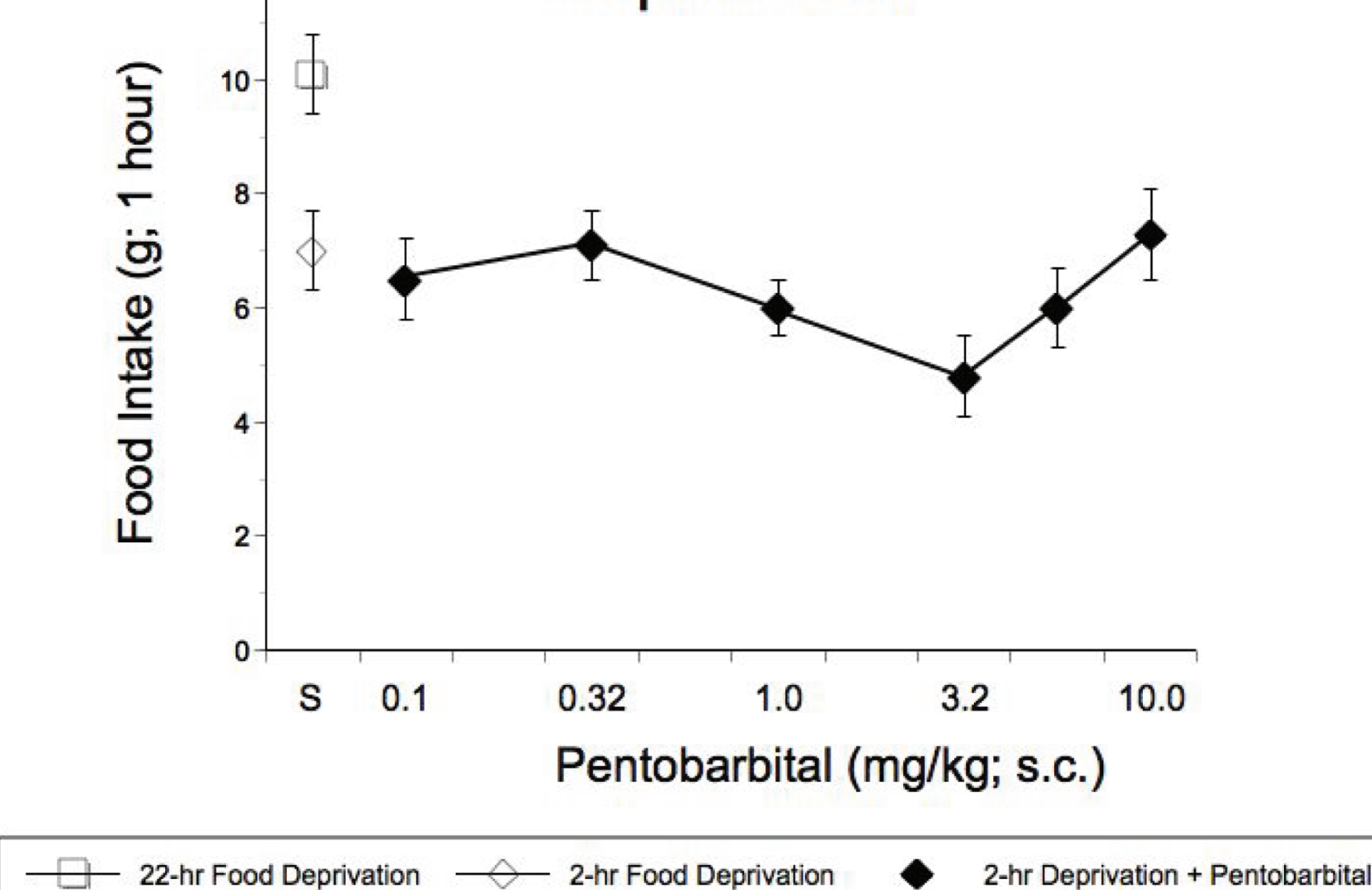
Pentobarbital Decreases Response Rates



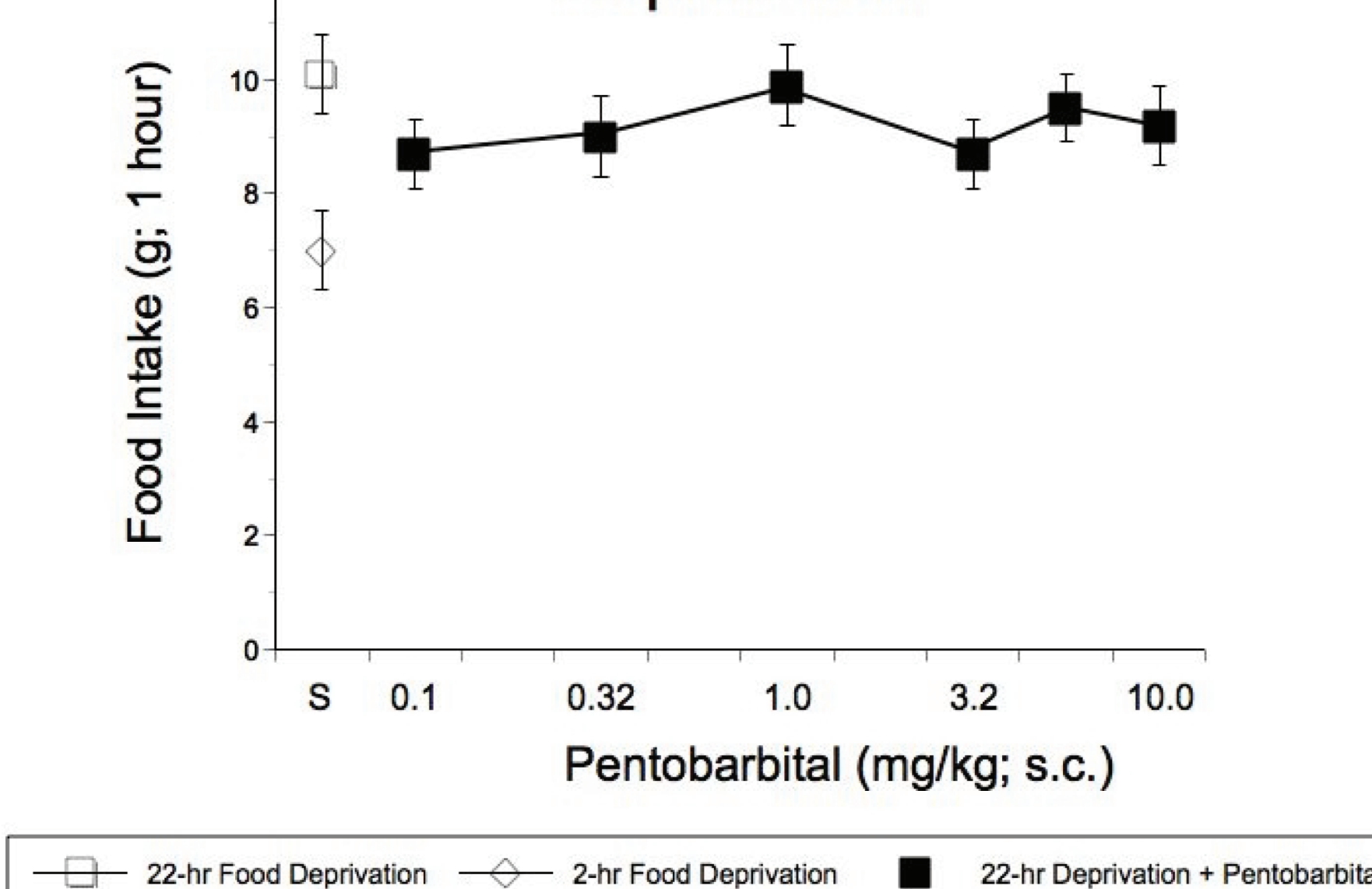
Pentobarbital Decreases Response Rates



Pentobarbital Does Not Alter Consumption of Rodent Chow Following 2 Hour Food Deprivation



Pentobarbital Does Not Alter Consumption of Rodent Chow Following 22 Hour Food Deprivation



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