


## CDP Increases and Alters Taste Palatability across Specific Tastants in Rats

Phillip Nell  
Isaac Rankin  
Michael Schechter

A research Thesis submitted in partial completion of PSY451 senior research thesis, at Wofford College

### Introduction




"What it comes down to is you have to find out what reaction they're looking for, and you give them that reaction."

- Anti-anxiety drug CDP, Benzodiazepines, and GABA
- CDP and other benzodiazepines heighten the hedonic value of food.
- Benzodiazepines alter taste palatability and lead to hyperphagia and weight gain
- Benzodiazepine receptor agonists and antagonists
- CDP may alter taste palatability

### Our Study...

- Previous Studies: Berridge and Treit (1986), Parker (1991), and Miller, McGinnis, and Richardson (2008) explore primarily sweet tastants, as well as some salty and bitter.
- Miller, McGinnis, and Richardson (2008) presented food over long periods of time; our study hoped to demonstrate the direct effects of CDP on taste palatability in short 15 second trials.
- Measure the effects of CDP on eating habits, consumption, and palatability of tastants saccharin, monosodium glutamate (MSG), ethanol, and capsaicin in Sprague-Dawley Rats.

### Our Study...



"IF WE DIDN'T DO SO WELL IN THE EASY BOX, THEY WOULDN'T HAVE GIVEN US THIS COMPLICATED BOX."

- Saccharin and MSG: The Sweet and Salty as observed in Miller et al. (2008) and Parker (1991)
- Capsaicin: a Trigeminal Nerve Irritant, non-taste-mediated
- Ethanol: Soderpalm and Hansen (1998)
- Hypotheses: Saccharin, MSG, and Ethanol: Taste-mediated increases in palatability
- Capsaicin: No significant changes.

## Methods

#### □ Animal Subjects

- Sprague-Dawley Rats
- 3 Phases
- Light/Dark Cycle
- Water Restriction


#### □ Chemical Stimuli

- Saccharin (2.5, 5, 10, 50 mM)
- MSG (0.1, 0.3, 0.5, 1.0 M)
- Capsaicin (5, 10, 15, 30 uM)
- Ethanol (2%, 4%, 8%, 12%)
- Water

## Methods: Behavioral Procedure

□ Phase I

- Davis Rig Measures Licking 15-s Trials
- Counterbalanced Schedule for Injections and Stimulus Presentations



|      |       |      |      |      |      |       |
|------|-------|------|------|------|------|-------|
| Rat1 | Water | MSG  | MSG  | Cap. | Cap. | Water |
| Rat2 | Water | MSG  | MSG  | Cap. | Cap. | Water |
| Rat3 | Water | Cap. | Cap. | Sac. | Sac. | Water |
| Rat4 | Water | Cap. | Cap. | Sac. | Sac. | Water |
| Rat5 | Water | Sac. | Sac. | EtOH | EtOH | Water |
| Rat6 | Water | Sac. | Sac. | EtOH | EtOH | Water |
| Rat7 | Water | EtOH | EtOH | MSG  | MSG  | Water |
| Rat8 | Water | EtOH | EtOH | MSG  | MSG  | Water |

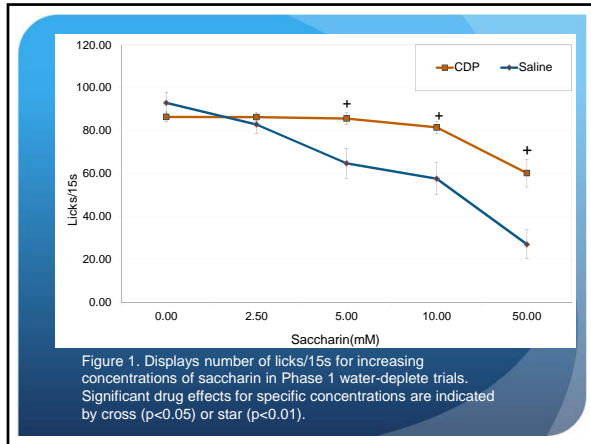


Figure 1. Displays number of licks/15s for increasing concentrations of saccharin in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by cross ( $p < 0.05$ ) or star ( $p < 0.01$ ).

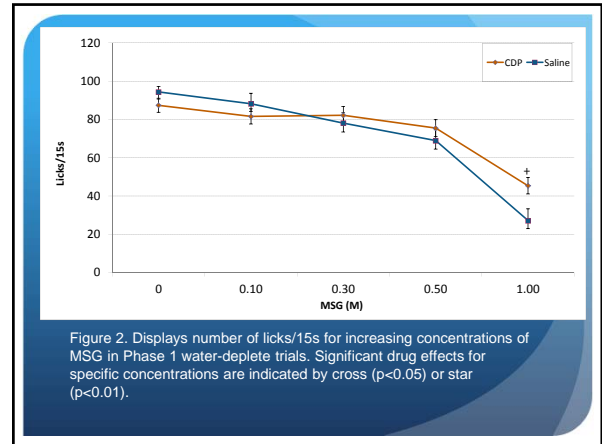


Figure 2. Displays number of licks/15s for increasing concentrations of MSG in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by cross ( $p < 0.05$ ) or star ( $p < 0.01$ ).

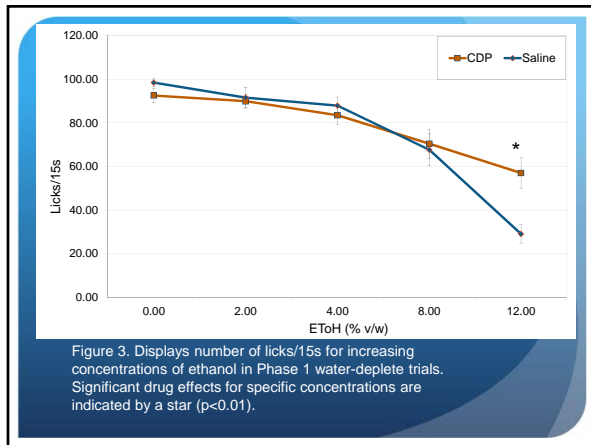


Figure 3. Displays number of licks/15s for increasing concentrations of ethanol in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by a star ( $p < 0.01$ ).

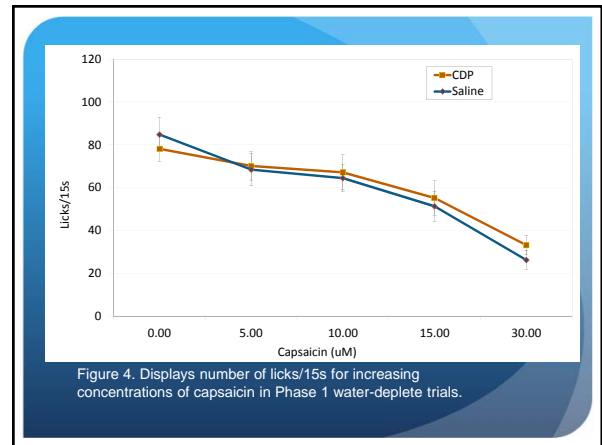


Figure 4. Displays number of licks/15s for increasing concentrations of capsaicin in Phase 1 water-deplete trials.

## Methods

☐ Phase 2

- Water Replete Testing:
- Tested at start of active dark phase 2 A.M to 2 P.M. Light/Dark Cycle
- Removed water 4hrs before testing Saccharin and MSG at all concentrations
- After 4 days of testing: Ceiling effect

☐ Phase 3: Replicate with water removal 30 minutes prior to testing

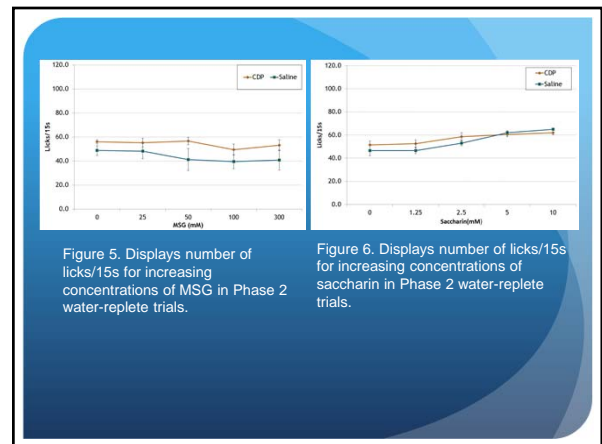


Figure 5. Displays number of licks/15s for increasing concentrations of MSG in Phase 2 water-replete trials.

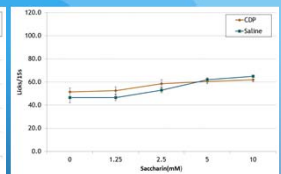
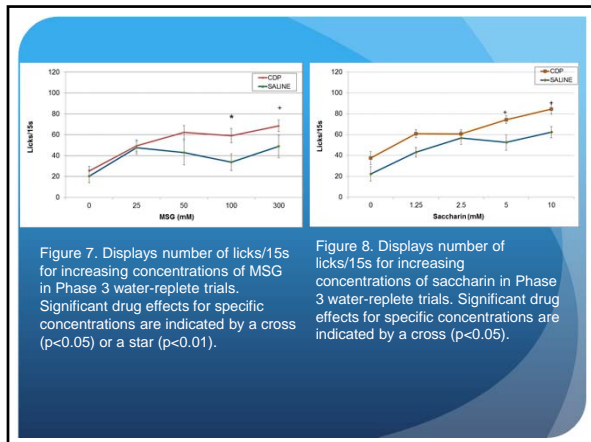



Figure 6. Displays number of licks/15s for increasing concentrations of saccharin in Phase 2 water-replete trials.




### Discussion

- CDP reduces licks to saccharin, MSG
  - Highest concentrations only
- No effect of CDP on aversiveness of capsaicin solution at any concentration
  - Contrary to criticism that CDP would reduce aversion to negative stimuli in general
- CDP causes increase in average number of licks to highest concentration of ethanol
  - Consistent with prediction that CDP would have a more pronounced effect on ethanol than capsaicin
- CDP caused increased ingestion of typically aversive tastants
  - Improves overall palatability of tastants
  - Did not have this effect on ingestion rates of capsaicin or water - Why?



© Original Artist  
Reproduction rights obtainable from  
www.CartoonStock.com

### Water replete testing



- Determined if thirst due to water deprivation caused increased number of licks to aversive stimuli
- Results indicated that rats with free access to water show similar increase in licks to aversive stimuli
- Pattern of increased licks to higher concentrations

### Future Research

- Different doses of CDP
- Directly inject CDP into PBN
- Effects of GABA antagonists in conjunction with CDP
- Practical implications?