

# A Rapid Procedure to Assess Shifts in Discriminative Control over Drinking During Recovery-Like Behavior

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## Background

- Relapse is the critical clinical challenge for those recovering from alcohol use disorders.
- Recovery requires engagement in alternative activities to drinking, especially in places where drinking had often occurred.
  - Over time, the control the environment (stimuli) exerts over drinking decreases, as does the risk of relapse.
- Previously we described a procedure to quantify this decrease in stimulus control over drinking during recovery-like behavior.<sup>1-4</sup>
  - This procedure could help identify treatments that slow or speed this shift
    - Slowing the shift could promote relapse
    - Speeding the shift could prevent relapse
- Here we extend this procedure in four ways:
  - Test for sex differences
  - Test for differences due to stimulus mode (light or tone)
  - Test for effect of longer drinking history before recovery
  - Compare repeated testing results to previous, more laborious method

## Methods

Rats are trained under two conditions:

**Drinking:** Stimulus A Food FR150 Ethanol FR5  
**Recovery:** Stimulus B Food FR5 Ethanol FR5

**Training/Baseline:** >5 days multiple concurrent schedule

- No more than 5 responses on food lever during Stimulus A
- At least 70% discrimination under both stimuli conditions

**Drinking Phase:** Drinking condition for 10 or 20 sessions

**Recovery Phase:** Recovery-like conditions for 16 sessions

**Test trials:** Drinking conditions presented (in extinction) in first trial on Recovery days 0, 1, 2, 4, 8 & 16

- Measure:** Number of food responses before the first five ethanol responses in Test trials

**Analysis:** ANOVA (four-way mixed) of number of responses with days of recovery, days of prior drinking, sex, and stimulus (light, tone) as factors

**Subjects:** Adult Lewis rats

Sex	Light 10-day	Light 20-day	Tone 10-day	Tone 20-day
Female	4	4	16	16
Male	17	17	19	19

**Stimulus Conditions:**

- Visual:** Lights above both levers flashing (10 Hz, Drinking) or solid (Recovery)
- Auditory:** Tone in chamber 8kHz (Drinking) or 16kHz (Recovery)

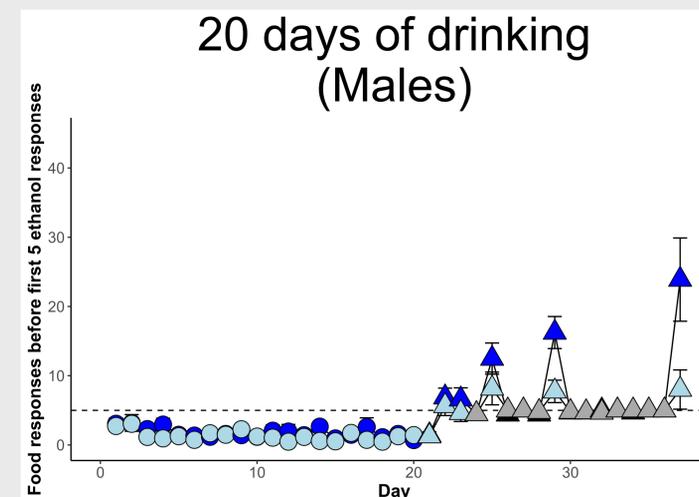
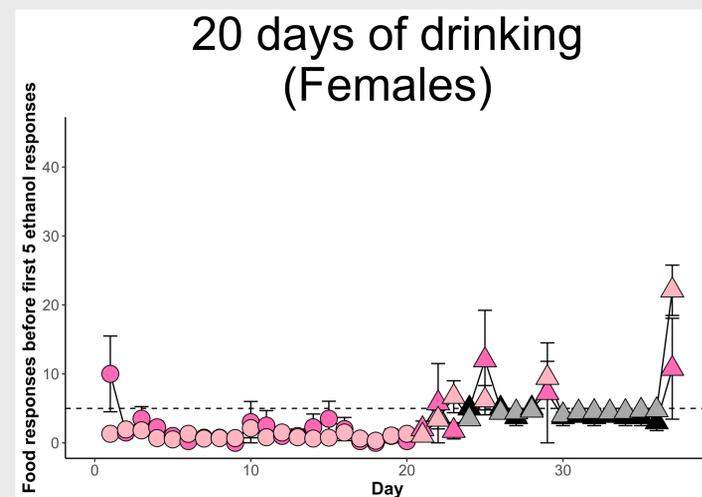
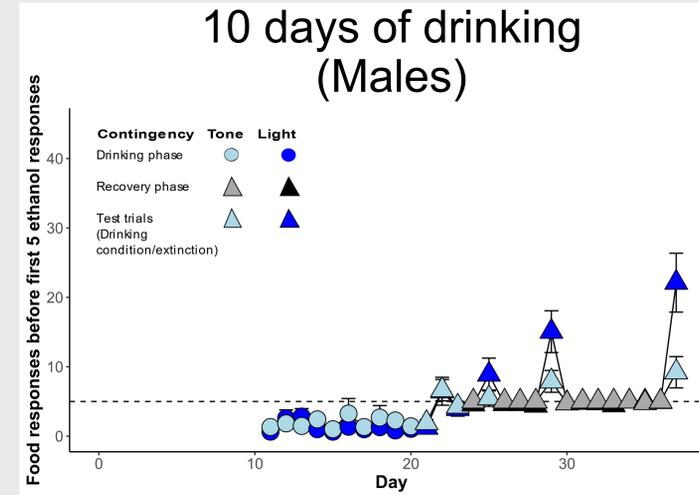
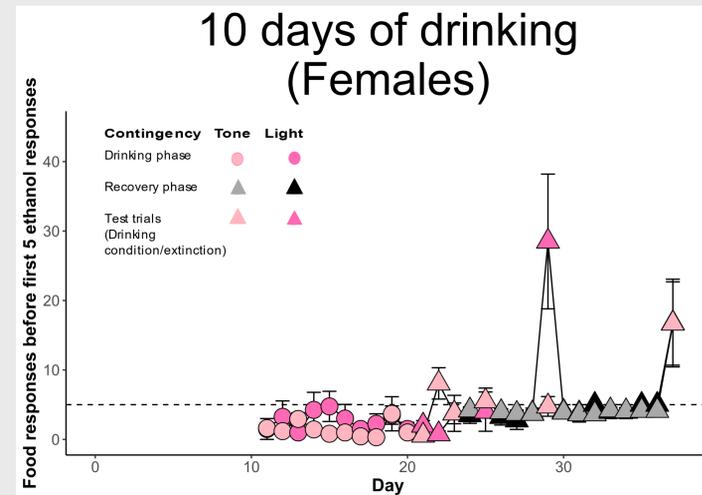
**Ethanol:** 95% ethanol in water (8% w/v)

**Food:** Bio-Serv 45mg dustless pellets

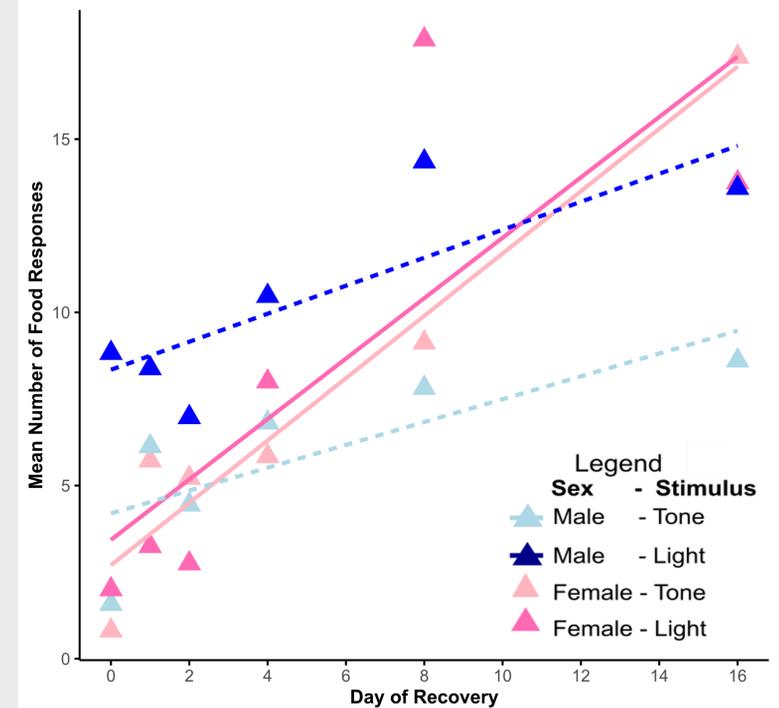
## Acknowledgements

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## Results



**Effect of Recovery Day on Mean Number of Food Responses Stratified by Gender and Stimulus**



### SUMMARY:

- Main effect of recovery day on food responses  
 $F[5,6291]=11.5, p<0.001$   
*Similar to results from prior procedure*
- Interaction between sex and stimulus
- No effect of drinking history
- No effect of sex
- No effect of stimulus

## Discussion

- This more efficient procedure generated similar results as the prior, more laborious procedure
  - Supports use of this procedure to examine effects of treatments or experimental manipulations on stimulus control over drinking in recovery.
- Application of this model can include studying the effect of alternative reinforcements and the method by which those reinforcements are administered
- Drinking history may have been too limited in dose or duration to produce an effect
- Decreased stimulus control over drinking during recovery appears to be a general behavioral process, consistent across sex or different controlling stimuli
- Results are consistent with clinical findings of decreased risk of relapse and attention to alcohol-related stimuli during recovery<sup>5</sup>

## References

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