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

Acacia M. Nawrocki-Madrid, Richard J. Lamb, Brett C. Ginsburg
Department of Psychiatry and Behavioral Sciences, The University of Texas Health Science Center at San Antonio

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. This procedure could help identify treatments that slow or speed this shift — speeding the shift could prevent relapse.
- Here we extend this procedure in four ways:
  1) Test for sex differences
  2) Test for differences due to stimulus mode (light or tone)
  3) Test for effect of longer drinking history before recovery
  4) Compare repeated testing results to previous, more laborious method

Methods
Rats are trained under two conditions:
- **Drinking Phase:**
  - Stimulus A
  - Food FR150
  - Ethanol FR5
- **Recovery Phase:**
  - 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
- Recovery days 0, 1, 2, 4, 8 & 16
- Measure: Number of food responses before the first five ethanol responses in test trials

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

### Results

**10 days of drinking**
- (Females)

**10 days of drinking**
- (Males)

**20 days of drinking**
- (Females)

**20 days of drinking**
- (Males)

**Effect of Recovery Day on Mean Number of Food Responses**
- Stratifed by Gender and 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

**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

**Acknowledgements**
- Funded by NIAAA Grant AA025664
- Experiments approved by UTHSCSA IACUC

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

Acacia M. Nawrocik-Madrid, Brett C. Ginsburg, Richard Lamb

Department of Psychiatry and Behavioral Sciences, The University of Texas Health Science Center at San Antonio