The Manipulation of Attentional Biases in a Sample of Young Adult Social Drinkers

Peter Luehring-Jones[1], Tracy A. Dennis-Tiwary[1,2], Courtney Louis[1], and Joel Erblich[1,2,3]

[1]Hunter College, The City University of New York; [2]The Graduate Center, The City University of New York;
[3]Icahn School of Medicine at Mount Sinai

INTRODUCTION

Attentional biases to alcohol-related stimuli represent the preferential allocation of attention to those stimuli in the environment. Frequent drinkers exhibit greater levels of bias than occasional and social drinkers, and these biases may in turn be important contributors to the development and maintenance of problem drinking (Field & Cox, 2008).

Recent research has demonstrated that attentional biases can be modified through attentional bias modification (ABM) in which drinkers are repeatedly trained to direct their attention away from alcohol-related stimuli and toward neutral stimuli (see, e.g., Field & Eastwood, 2005; Schoenmakers, Wiers, Jones, Bruce, & Jansen, 2007).

While ABM training effects have been observed in heavy and dependent drinkers (Fadardi & Cox, 2009; Field et al., 2007), less research has focused on the efficacy of ABM in social drinkers (Wiers, Gladwin, Hofmann, Salemink, & Ridderinkhof, 2013).

The present study sought to extend ABM research to a cohort of young adult social drinkers to investigate whether ABM might be an appropriate tool for reducing biases in this group of individuals who may be at risk for the future development of problematic drinking habits.

HYPOTHESES

1. Completion of a single, laboratory-based session of ABM training will reduce attentional biases in young adult social drinkers as measured by both an alcohol-Stroop and visual dot probe task.

2. Pre-treatment attentional bias would be correlated with the actual drinking behavior of our participants, as revealed by a timeline follow-back questionnaire (Sobell & Sobell, 1992).

METHOD

Participants

- Participants were 31 young adult social drinkers (61% female) with an average age of 22.6 (SD=2.1) years.
- Participants began drinking at an average age of 18.8 (SD = 2.5) years and consumed an average of 3.7 (SD = 1.9) drinks per drinking episode with 2.3 (SD = 1.2) drinking episodes per week.

Alcohol Stroop Task

- Attentional bias to alcohol-related words was assessed via pre- and post-training alcohol-Stroop tasks (Field, Mogg, Mann, Bennett, & Bradley, 2012; Sharma, Albery, & Cook, 2001).
- The task consisted of one block of 100 alcohol-related words and one block of 100 neutral (nature-related) words presented in each of four different colors (blue, green, red, and yellow).
- Stroop interference score = (average alcohol word RT – average neutral word RT), so that positive scores indicate that responses to the alcohol words took longer than responses to the neutral words.

Dot Probe Task

- Attentional bias to alcohol-related images was assessed via pre- and post-training dot probe tasks modeled after the visual probe task described in Miller and Fillmore (2010).
- Participants completed 80 trials in which images of alcoholic beverages (40 trials) or non-alcoholic beverages (40 trials) were paired with neutral filler images. In half of the trials, the probe replaced the beverage image (in alcohol congruent and alcohol incongruent conditions); during the other trials, the probe replaced the filler images.
- Attentional bias score = (average alcohol incongruent RT – average alcohol congruent RT), so that positive scores indicate a bias toward the alcohol-related stimuli.

Timeline Follow-back Questionnaire

- Participants reported their past 90-day drinking histories during a guided TLFB interview (Sobell & Sobell, 1992). The interview data allowed the calculation of total drinks, drinking days, and drinks per drinking day during the 90-day period for each participant.

Attention Bias Modification (ABM) Training

- Dot probe-based ABM task: Participants briefly viewed paired sets of simple alcoholic and non-alcoholic beverages against a plain white background and thereafter had to identify the location of a probe that replaced one of the images (as described in Field & Eastwood, 2005). Participants completed three blocks of 256 trials with a five-minute break between the first and second block and a 10-minute break between the second and third block.
- In the active ABM training task, the probe replaced the non-alcoholic beverage during all trials.
- In the sham ABM training task, the probe replaced the two types of images with equal frequency.

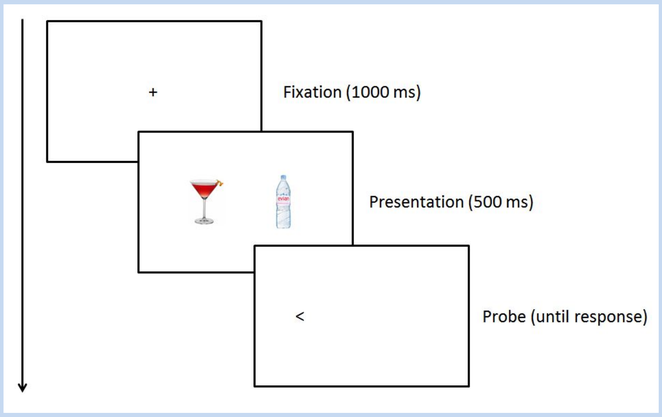

Figure 1: ABM Training Procedure

RESULTS

Post-Training Alcohol-Stroop Task

Consistent with our hypotheses, after ABM training, and when controlling for pre-training scores, participants in the active training condition exhibited significantly lower Stroop interference scores than participants in the sham training group, F(1,26) = 5.70, p=.025.

Figure 2: Post-Training Stroop Interference Scores

Post-Training Dot Probe Task

The ABM training did not result in significant changes to dot probe-based attentional bias scores.

However, after ABM training, and when controlling for pre-training scores, participants in the active training condition became significantly faster at identifying the location of the probe when it replaced neutral stimuli (the alcohol incongruent condition) than participants in the sham training group, F(1,26) = 4.796, p = .039.

RESULTS, CONTINUED

Interestingly, participants in the active training condition also became marginally faster at locating the probe when it replaced the alcohol-related stimuli, suggesting that the active ABM training may have increased task efficiency more generally, F(1,26) = 3.944, p = .058.

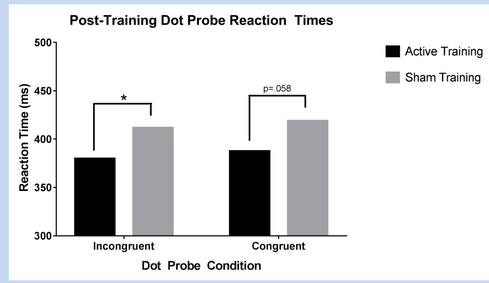

Figure 3: Post-Training Dot Probe Reaction Times

Attentional Biases and Alcohol Consumption

Pre-training attentional bias scores were not related to past alcohol consumption. However, using a multivariate model, we found that dot probe reaction times in the alcohol-incongruent condition predicted alcohol consumption as revealed by the 90-day TLFB (using Wilk's Lambda, Λ = .779, F(2,26) = 3.678, p = .039). Follow-up univariate analyses showed that this effect was due to increases in drinking days among participants with longer reaction times to the alcohol incongruent condition of the dot probe task, F(1,27) = 7.094, p = .013.

DISCUSSION

Changes in Attentional Allocation

We found that a single session of ABM training can affect the allocation of attention in a cohort of young adult social drinkers.
Participants in the active training condition had significantly smaller post-training Stroop interference scores than participants in the sham training condition, suggesting that the active training was able to reduce the attentional impact of the alcohol-related words on those participants.
Participants in the active training condition also became significantly faster than participants in the sham training condition at identifying the location of a visual probe that appeared in a separate location from an alcohol-related image, again suggesting that the active training was able to lessen the attention-grabbing salience of the alcohol-related images used during the task.

Measuring Bias in Young Adult Social Drinkers

Our ABM training program did not result in significant differences in dot probe-based attentional bias scores between our active and sham training groups.
However, the fact that we observed significant post-training differences in reaction times to the alcohol incongruent condition of the dot probe task and also established a relationship between those reaction times and past drinking days suggests that alcohol-incongruent reaction times may be a more useful measure of attentional bias in young adult social drinkers than more traditional attentional bias scores.

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