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Short Communication

Mood & alcohol-related attentional biases: New considerations for gender differences and reliability of the visual-probe task

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HIGHLIGHTS

- Tested associations between attentional biases and weekly alcohol consumption.
- Tested if mood activates attention biases and are conditional upon drinking motives.
- Attentional biases were positively related with alcohol consumption but only in men.
- Split-half and test–retest reliability of the visual-probe task were poor.
- Issues related to the reliability of visual-probe task are discussed.

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ABSTRACT

Introduction: Alcohol-related attentional biases are positively associated with drinking history and may represent a mechanism by which alcohol use behavior is maintained over time. This study was designed to address two unresolved issues regarding alcohol-related attention biases. Specifically, this study tested whether acute changes in positive and negative mood increase attentional biases toward alcohol cues and whether coping and enhancement drinking motives moderate these effects.
Methods: Participants were 100 college students aged 18–25, who drank alcohol at least once in the last 90 days. In a 2 × 3 mixed design, participants were randomized to one of three mood conditions (neutral, negative, or positive) and completed visual-probe tasks pre- and post-mood-induction.
Results: Attentional biases toward alcohol cues were significantly associated with alcohol consumption among men, but not women. Although the mood manipulation was highly successful, attentional biases did not vary as a function of mood condition and hypothesized moderating effects of drinking motives were not significant.
Conclusions: The largely null findings of the experiment are discussed in light of the fact that the visual probe task had poor reliability. Issues related to the reliability of visual-probe task are discussed, as more research is needed to evaluate and improve the psychometrics of this method.

1. Introduction

The prevalence of alcohol consumption and associated consequences are elevated among college students (SAMHSA, 2013). Thus, understanding psychological mechanisms that contribute to the development of problem drinking is important for both prevention and treatment efforts. One mechanism thought to contribute to problem drinking is alcohol-related attentional biases (AAB; Field & Wiers, 2012). AAB are the propensity for alcohol-related stimuli to capture the attention of the sensory systems at the expense of processing competing stimuli. Research indicates that individuals with problematic alcohol use patterns exhibit AAB (Field & Cox, 2008). AAB are thought to index the processes that promote compulsive substance-seeking behavior (Franken, 2003; Robinson & Berridge, 2003). A more comprehensive understanding of AAB and their associations with internal and external cues, individual difference factors, and substance use outcomes is needed to better delineate their role in the etiology of alcohol use disorder.

AAB develop through classical conditioning where alcohol-related cues acquire conditioned incentive-motivational properties due to their repeated pairing with the specific effects of alcohol, such as increased positive affect (PA) or alleviation of negative affect (NA; Franken, 2003; Robinson & Berridge, 2008). AAB develop over time in concert with increased drinking (Field & Cox, 2008; Field & Quigley, 2009) and are thought to have a reciprocal relationship with alcohol consumption. However, the exact role of AAB in drinking decisions remains unclear (Field & Cox, 2008; Field & Wiers, 2012).

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Table 1
Correlation matrix and descriptive statistics ($N = 100$).

Variables	*M*	(*SD*)	1	2	3	4	5	6	7
1. Gender	–	–	–						
2. Enhancement motives	15.02	4.87	−.01	–					
3. Coping motives	9.35	3.60	−.17	.53***	–				
4. Alcohol consumption	14.59	11.46	.45***	.36***	.28**	–			
5. Alcohol use frequency	5.39	1.26	−.17	−.23*	−.32**	−.60***	–		
6. Alcohol-related attentional bias T1	9.36	5.53	−.05	−.16	−.16	.03	.16	–	
7. Alcohol-related attentional bias T2	−0.23	12.60	.18	−.08	−.04	−.01	.07	−.01	–

Note: Gender (men = 1, women = 0), alcohol use frequency (9 = no use, 1 = more than once a day).
* $p < .05$.
** $p < .01$.
*** $p < .001$.

The influence of AAB on drinking decisions varies as a function of both individual difference and contextual factors (Field & Powell, 2007). Research shows that contextual factors appear to activate AAB, increasing them compared to when these factors are absent (Field & Quigley, 2009). For example, laboratory stressors increase AAB, but only among drinkers with high levels of coping motives (Field & Powell, 2007; Field & Quigley, 2009). Conversely, associations between PA and implicit biases are conditional upon level of enhancement motives (Birch et al., 2008; Grant, Stewart, & Birch, 2007). These findings suggest that person × situation interactions contribute to AAB and individual drinking decisions.

Given the above literature, we sought to replicate previous research by examining the following hypotheses: first, alcohol consumption would be positively associated with AAB. Second, induced NA and PA would increase AAB, and those relationships would be moderated by mood-congruent drinking motives (i.e., negative × coping and positive × enhancement), strengthening them.

2. Method

2.1. Participants

One-hundred participants aged 18–24 ($M = 19.85$, $SD = 1.45$, 61% female) who reported drinking alcohol at least once in the past 90 days were recruited. Four-percent identified their ethnicity as Hispanic or Latino. The sample was 87% White, 3% African American, 3% Asian, 2% Native American/Alaskan Native, 1% Native Hawaiian/Pacific Islander, 2% Multiracial, 1% Other, and 1% did not wish to respond.

2.2. Measures

2.2.1. Positive and negative affect schedule: expanded form (PANAS; Watson & Clark, 1999)

The PANAS assessed affect in the current moment on a 5-point scale. To assess NA, the 10-item NA subscale (e.g., distressed; α ranged from .84–.91) was used. PA was assessed by the 8-item joviality subscale (e.g., happy; α ranged from .94–.96).

2.2.2. Visual-probe task

AAB was assessed with the visual-probe task, which consisted of 80 trials where 2 images were presented simultaneously on a computer screen. There were 20 filler trials containing 2 matched neutral images. The remaining 60 trials had 1 alcohol-related picture and 1 matched neutral picture. Both trial types were randomly distributed throughout the task. Trials began with a fixation cross centrally presented for 500 ms, followed by a left–right bilateral presentation of a picture pair for 500 ms. After which, a small dot was presented in the space previously occupied by an image. Probes remained until participants identified which side the probe was on by pressing the corresponding button on a two button response box which recorded their reaction time, or until 2000 ms elapsed. This was followed by a 1000 ms intertrial interval. AAB scores were calculated using the following formula (Kujawa et al., 2011; MacLeod & Mathews, 1988).[1]

$$\textbf{AAB score} = ½[(\textbf{Rneutral–Ralcohol}) + (\textbf{Lneutral–Lalcohol})]$$

2.2.3. Drinking motive questionnaire—revised (DMQ-R; Cooper, 1994)

The DMQ-R is a 20-item questionnaire that measures motives for drinking on a 5-point scale. Only the 5-item coping (α = .77) and enhancement (α = .84) subscales were used.

2.2.4. Alcohol consumption

Alcohol consumption in the past 90 days was assessed using the Modified Daily Drinking Questionnaire (MDDQ; Dimeff, Baer, Kivlahan, & Marlatt, 1999). The MDDQ is a grid representing the 7 days of the week; participants indicate typical daily alcohol consumption for a normal week. Weekly alcohol consumption was the total drinks per week. Alcohol use frequency in the past 90 days was assessed by 9-point anchored rating scale (Simons, Oliver, Gaher, Ebel, & Brummels, 2005).

Moods were induced with evocative picture slides and mood-congruent music (Treloar & McCarthy, 2012; Wardell, Read, Curtin, & Merrill, 2012). Sixty slides from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) were selected from each valence group to ensure the highest average rating for each mood. Positive and negative valenced slides were also selected for high arousal ratings. Each slide-set was paired with mood-congruent music to enhance mood effects, Alexander Nevsky's *Op.78 Russia Under the Mongolian Yoke* and *The Battle on the Ice* for negative, excerpts from George Frideric Handel's *Water Music* for positive (Conklin & Perkins, 2005; Treloar & McCarthy, 2012) and Gabriel Faure's *Ballad for Piano and Orchestra Op.19* played at half-speed for neutral (Stöber, 1997). Each slide was presented for 8 s (total duration = 8 min).

2.3. Procedure

Participants were randomly assigned to a mood group (33 negative, 33 neutral, 34 positive). All participants completed the following, in order; demographics, baseline PANAS, T1 visual-probe, pre-mood PANAS, assigned mood-induction, post-mood PANAS, T2 visual-probe, positive mood-induction (to ensure no residual distress), and alcohol consumption and drinking motives questionnaires.

[1] In this equation, the R and L refer to the right and left side of the screen, while neutral and alcohol refer to what image the probe replaced. The equation subtracts the mean reaction time (RT) from trials where the probe replaced the neutral image from the mean RT from trials where the probe replaced the alcohol images for both the left and right sides of the screen, and then takes the average of the 2 scores. If participants were preferentially attending to alcohol images, then RTs will be shorter on trials where the probe replaces those alcohol images, and the bias scores will be positive. If participants were preferentially attending to neutral images, the bias scores will be negative.