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Sarah A. Lust
University of Missouri - Columbia

Bruce D. Bartholow
University of Missouri - Columbia

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Alcohol, adventure and sex: social drinkers’ P3 event-related potential reactivity to alcohol and arousing cues.

Sarah A. Lust and Bruce D. Bartholow
University of Missouri, Columbia, MO

INTRODUCTION

Consistent with other recent research (Bartholow et al., in press), drinkers with relatively low alcohol sensitivity showed enhanced P3 to alcohol vs. nonalcoholic beverages whereas high-sensitivity participants showed no difference in response to these cues.

However, alcohol sensitivity level was uncorrelated with P3 responses to erotic and adventure scenes, and was uncorrelated with a self-report measure of impulsivity (r = .07).

There was a significant Target x Sensitivity group interaction, F(1, 28) = 9.7, p = .004 such that LS participants exhibited a larger P3 to alcoholic stimuli (M=16.10) than non-alcoholic stimuli (M=10.48), whereas HS participants’ P3 reactions to alcohol (M=10.67) and non-alcohol (M=10.50) were similar. These analyses are reported for electrode site Pz (midline parietal) where the effect is largest (d=−.935); however, the effect is similar over the left (d=−.85) and right (d=−.582) hemispheres. There was no Target x Impulsivity level interaction (p=.068), though there was a trend (p=.07) such that higher impulsivity was associated with a larger P3 to alcohol than nonalcohol.

There was no significant Target x Sensitivity level interaction (p = .17). However erotic pictures produced a larger P3 amplitude (M=17.1) than adventure pictures (M=13.55) among all participants (i.e., regardless of sensitivity group or impulsivity levels).

RESULTS

Our data suggest that low-sensitivity participants’ reactivity to alcohol cues is specific to alcohol and is not driven by a heightened sensitivity to highly arousing cues more generally.

Also, the current data suggest that differences in alcohol sensitivity, as assessed by our self-report measure (O’Neill et al., 2002) are not simply a proxy for differences in impulsivity. Not only were sensitivity and impulsivity not correlated in this dataset, but patterns of P3 reactivity to alcohol and nonalcohol cues were dissimilar across sensitivity groups and impulsivity levels.

Since previous research has shown that the P3 elicited by alcohol cues predicts alcohol use prospectively, the data suggest that P3 amplitude reflects the motivational significance of substance-related cues (Bartholow et al., in press).

One limitation of the current study is that we currently have an imbalance in the number of male vs. female participants classified as low sensitivity (n = 3 females, 8 males). We are continuing to recruit LS women to balance the gender distribution across groups.

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METHOD

Participants were 33 (22 men) undergraduates who completed measures of self-reported alcohol sensitivity (O’Neill, Sher, & Bartholow, 2002) and the Barratt impulsivity scale (Barratt, 1959) at the beginning of the experiment.

ERPs were recorded from 28 standard scalp locations. Electroencephalographic data were sampled at 1000 Hz and filtered online at .05-40Hz.

Participants completed a visual oddball task that included 5 target conditions: alcoholic beverages, non-alcoholic beverages, adventure-related, erotic, and a neutral control. Targets were shown in the 4th or 5th position within a trial consisting mostly of neutral context images. All images came from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2001). Participants were asked to categorize each picture as either neutral or pleasant by pressing one of two keys.

Each image was presented for 1000ms, followed by an interstimulus interval (blank screen) that varied randomly between 900ms and 1200ms. There was a 500ms intertrial interval during which the word “pause” appeared on a black background. There were a total of 100 trials (500 total viewed images) such that participants viewed each target type 20 times.

Example of a trial

REFERENCES


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