

SHORT PAPER

Effects of exposure to alcohol-related cues on racial discriminationElena V. Stepanova* , Bruce D. Bartholow†, J. Scott Saults† & Ronald S. Friedman‡

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Abstract

Prior research has shown that exposure to alcohol-related images exacerbates expression of implicit racial biases, and that brief exposure to alcohol-related words increases aggressive responses. However, the potential for alcohol cue exposure to elicit differential aggression against a Black (outgroup) relative to a White (ingroup) target—that is, racial discrimination—has never been investigated. Here, we found that White participants ($N = 92$) exposed to alcohol-related words made harsher judgments of a Black experimenter who had frustrated them than participants who were exposed to nonalcohol words. These findings suggest that exposure to alcohol cues increases discriminatory behaviors toward Blacks.

Alcohol consumption has long been associated with dysregulated social behaviors, including aggression (see Giancola, 2000; Steele & Josephs, 1990) and the expression of racial and other social biases (Bartholow, Dickter, & Sestir, 2006; Bartholow, Henry, Lust, Saults, & Wood, 2012; Reeves & Nagoshi, 1993; Schlauch, Lang, Plant, Christensen, & Donohue, 2009; Schofield, Unkelbach, & Denson, 2017). Moreover, effects often associated with ingesting alcohol, such as increased aggression and tension-reduction, can be observed without actual consumption, following exposure to pictures of alcoholic beverages or words related to alcohol (i.e., alcohol-related cues; e.g., Bartholow & Heinz, 2006; Friedman, McCarthy, Bartholow, & Hicks, 2007; Friedman, McCarthy, Förster, & Denzler, 2005; Pedersen, Vasquez, Bartholow, Grosvenor, & Truong, 2014; Subra, Muller, Bègue, Bushman, & Delmas, 2010). Viewed in the context of basic research on priming of behavioral scripts (e.g., Bargh, Chen, & Burrows, 1996; Dijksterhuis & Bargh, 2001), such work suggests that cognitions or behavioral scripts pertaining to alcohol's effects can be triggered by perception of alcohol-related cues.

Recent work suggests that exposure to alcohol-related cues increases the expression of bias against stereotyped groups (Greitemeyer & Nierula, 2016; Stepanova, Bartholow, Saults, & Friedman, 2012). In the first such demonstration, Stepanova et al. (2012) found that compared to participants who had examined magazine ads for nonalcoholic beverages, participants who had viewed ads for alcoholic beverages were more likely to misidentify tools as guns when preceded by Black (compared to White) faces. These authors also

found that the increase in bias in the alcohol-priming condition was attributable to greater reliance on automatic associations in that condition. However, given that discriminatory behavior against outgroups is more controllable than are stereotypic associations (e.g., Bodenhausen, Todd, & Richeson, 2009), it remains unclear whether alcohol cue exposure would increase discrimination directed at Blacks. No prior studies have examined this issue. Accordingly, the current study aimed to investigate effects of exposure to alcohol-related cues on racial discrimination.

Racial discrimination comprises a broad range of behaviors reflecting unfair or inequitable treatment of an individual because of their race (e.g., Swim, Cohen, & Hyers, 1998). In the laboratory, discrimination can be measured by asking participants to evaluate the performance of another individual (e.g., an interaction partner or experimenter) on a dimension that has implications for that person's outcomes (e.g., access to a resource, or the opportunity to serve as a paid research assistant in future studies) (see Dovidio, Kawakami, & Gaertner, 2002; Talaska, Fiske, & Chaiken, 2008). This method also has been used as a subtle index of interpersonal aggression, in that negativity in such evaluations has been described as aggression (see Baron & Richardson, 1994; Chen & Bargh, 1997). Of relevance to the current study, previous research demonstrates that priming with alcohol-related cues increases aggressiveness directed at an experimenter as measured in this way (e.g., Brown, Coyne, Barlow, & Qualter, 2010; Friedman et al., 2007; Subra et al., 2010).

Considered alongside the finding that alcohol cue exposure increases automatic racial bias (Stepanova et al.,

2012), such findings suggest the possibility that racial discrimination following alcohol cue exposure might be expressed in terms of more negative (i.e., aggressive) evaluations of a Black relative to a White experimenter. This possibility is supported by work showing that increases in aggression following exposure to alcohol-related cues stems from biased social information processing under conditions of uncertainty (e.g., Pedersen et al., 2014). Other work, however, suggests that exposure to alcohol cues might increase racial bias through social disinhibition. Specifically, work by Freeman, Friedman, Bartholow, and Wulfert (2010) revealed that exposure to alcohol cues can facilitate expression of typically inhibited social behaviors. Importantly, these effects emerged only when participants believed their responses would be evaluated by the experimenter, perhaps because alcohol often is associated with loosening of societal proscriptions and self-presentational concerns (Hull, 1981; Steele & Josephs, 1990; Wilson, Abrams, & Lipscomb, 1980).

The Current Study

Considered together, findings from previous studies suggest an intriguing (if disheartening) possibility: among White participants, simple exposure to alcohol cues, without any consumption, might lead to discriminatory behavior toward Blacks (relative to Whites). More specifically, the tendency for alcohol cues to bias perception of others' ambiguous behaviors in a hostile manner (Bartholow & Heinz, 2006; Pedersen et al., 2014; Subra et al., 2010), to alleviate social presentational concerns (Freeman et al., 2010), and to exaggerate automatic racial bias (Stepanova et al., 2012) suggests that subtle exposure to alcohol-related cues might potentiate Whites' discriminatory behavior toward a Black person who frustrates them. To test this idea, we employed a manipulation designed to make an individual feel frustrated by a Black (or White) experimenter, after subtle exposure to alcohol-related (or nonalcohol-related) words, adapting the procedure used by Friedman et al. (2007). The outcome of interest was the negativity of participants' evaluations of the experimenter (Chen & Bargh, 1997; Friedman et al., 2007).

We predicted that, relative to participants exposed to nonalcohol cues, participants exposed to alcohol cues would rate a Black experimenter more harshly. Friedman et al. (2007) found that White participants' ratings of a White experimenter were moderated by their level of aggression-related alcohol outcome expectancies (explicit beliefs that people hold about the effects of drinking; Goldman, Darkes, & Del Boca, 1999). Previous alcohol cue-priming studies have produced mixed results concerning the role of expectancies, sometimes showing that expectancies moderate the effects of alcohol priming (e.g., Bartholow & Heinz, 2006; Friedman et al., 2005; Friedman et al., 2007; Moltisanti, Below, Brandon, & Goldman, 2013), but not always (see Stepanova et al., 2012; Subra et al., 2010). Therefore,

we tested for the possibility that expectancies and other theoretically relevant constructs (explicit race bias) might moderate the relationship between alcohol cue-priming and racial discrimination, but had no concrete predictions concerning moderation in this study.¹

Method

Participants

On the basis of previous research (Friedman et al., 2007; Pedersen et al., 2014), we initially aimed to recruit at least 80 participants for this study. We recruited 121 undergraduate students over the course of three semesters (91 participants during the first two semesters and an additional 30 participants during the third semester), which was necessary since we planned to exclude all non-Whites and Hispanics. After exclusion of all non-Whites and Hispanics, the final sample was comprised of 92 White participants ($M_{\text{age}} = 20.03$ yrs, $SD_{\text{age}} = 3.07$; 72% female).

Materials and Procedure

Participants were randomly assigned to one of four conditions within a 2 (Cue priming condition: alcohol, nonalcohol) \times 2 (Race of experimenter: Black, White) between-participants factorial design. All participants were run individually.

Race of experimenter manipulation. Participants interacted with either a White or a Black experimenter. Two White men and two Black men, all in their early twenties with shaved heads or short haircuts and trimmed facial hair (none wore glasses), served as the experimenters. Their attire consisted of black dress shoes, blue jeans, and a white Oxford-style shirt. All experimenters went through multiple training sessions to learn the script and act in a uniform manner. Experimenters were unaware of our hypotheses and the cue priming task condition.

Cue priming task. Participants underwent a "sub-optimal" cue-priming procedure (see Friedman et al., 2007; Pedersen et al., 2014), in which either alcohol-related or nonalcoholic beverage words were presented briefly during a lexical decision task (LDT). This priming methodology was meant to limit the duration and extent of processing of the cue words (Bargh & Chartrand, 2000; Neely, 1991). Participants were told that the task assessed their ability to distinguish words from non-words. On each of 110 trials, participants saw a fixation point (1 s), followed by a visual mask (XXXXXXXXXX) for 400 ms. Depending on condition, this mask was

¹The inconsistency in moderation by expectancies across studies in this literature calls for investigations of boundary conditions and other factors that might determine when expectancies should and should not influence cue-priming effects. Such an endeavor is beyond the scope of the current investigation, however.

replaced by 1 of 14 alcoholic beverage words (e.g., vodka, beer) or nonalcoholic beverage words (e.g., juice, water), shown for 250 ms. These cue words were then replaced by a another mask (XXXXXXXXXX) presented for 400 ms. Once the mask disappeared, a letter string that formed either a proper English word (e.g., irony) or a nonword (e.g., nogzp) was presented until participants responded; they were instructed to press the 'j' key as quickly as possible for words, and the 'f' key as quickly as possible for nonwords. Trials were separated by a 1000 ms inter-trial interval.

Discrimination assessment. Discrimination was assessed via evaluation of the experimenter following a mistake he made (Chen & Bargh, 1997; Friedman *et al.*, 2007; Subra *et al.*, 2010). After 110 trials of the LDT, participants saw an error message on the computer screen: "F11 Error: Failure Saving Data." Upon seeing this message, participants alerted the experimenter, who told the participants they would have to redo the task:

Hmm... I must've set it up incorrectly. Guess that was a waste of time! Well, I'm going to have to ask you to do that task over again at the end of the session since I can't recover your data. But before we continue, I'm supposed to have you fill out an incident report. We do this any time something goes wrong in a session.

Participants were handed a questionnaire to complete, along with a sealable envelope addressed to "Dr. Elena Stepanova, Director, Social Cognition and Behavior Laboratory, XXX Hall". The instructions at the top of the questionnaire read, "Please answer the following questions, then seal the completed survey in the envelope provided. Your responses will be entirely anonymous and confidential and will only be used by the lab director to evaluate the performance of the research assistant from today's session." The questionnaire contained three items: (1) "How would you rate the experimenter's overall performance during the experiment?" (rated on a scale from 1 [*very bad*] to 7 [*very good*]); (2) "To what extent would you recommend this experimenter for future studies?" (rated on a scale from 1 [*lowest possible recommendation*] to 7 [*highest possible recommendation*]); and (3) "How courteous was the experimenter in handling the problem that arose?" (rated on a scale from 1 [*not at all*] to 7 [*extremely*]).

Participants were instructed to seal their completed report in the envelope and place it in a locked mailbox labeled "Incidents Reports," located in the corner of the experimental room. The experimenter then left the room so the participant could complete the incident report in private.

Questionnaire Measures

After participants completed the incident report and placed it in the locked mailbox, the experimenter returned and handed the participant a set of questionnaires to complete. The first questionnaire inquired about basic demographic information and was always presented first. The remaining measures assessed participants' explicit racial attitudes, drinking experiences, and expectancies. The order of these measures was counterbalanced across participants.

The questionnaires assessing drinking experiences were the following: several questions assessing their alcohol use (measures adapted from the NIAAA Task Force on Recommended Alcohol Questions, 2003), including the average number of drinking occasions experienced per week and the average number of drinks consumed per occasion in both the past 3 months and 12 months. Participants completed the Risk and Aggression and Sociability subscales from the Comprehensive Effects of Alcohol Questionnaire (Fromme, Stroot, & Kaplan, 1993), and the Social Assertiveness and Arousal and Aggression subscales from the Alcohol Expectancy Questionnaire (Goldman, Greenbaum, & Darkes, 1997). Participants also completed the Modern Racism Scale (McConahay, 1986); Symbolic Racism Scale (Henry & Sears, 2002); Social Dominance Orientation Scale (Pratto, Sidanius, Stallworth, & Malle, 1994); Feeling Thermometers asking participants to indicate how favorably they viewed different social groups (including Whites and Blacks); and the Motivation to Respond without Prejudice Scale (Plant & Devine, 1998). After completing the questionnaire measures, participants were informed they would not have to complete the LDT again after all, after which the experimenter provided participants with a written copy of a debriefing and dismissed them.

Results

We excluded all non-White and Hispanic participants from the primary analyses, for two reasons: (1) there

Table 1 Drinking measures

Variable	Alcohol-cue Condition <i>M, SD</i>	Neutral-cue Condition <i>M, SD</i>
Drinking occasions per week, last three months	0.69, 1.02	0.76, 1.08
Number of drinks on any one occasion, last three months	2.59, 1.82	2.20, 1.98
Drinking occasions per week, last twelve months	0.73, 0.91	0.64, 0.79
Number of drinks on any one occasion, last twelve months	3.10, 2.18	2.02, 1.56

Note: *N* = 91 for questions 1–4 (one participant did not provide answers).

were insufficient numbers of non-White and Hispanic participants across conditions to permit tests of potential participant race effects; (2) retaining these participants in the overall sample can distort interpretation of hypothesized effects related to racial bias, an issue that has led numerous previous researchers to either exclude such data (e.g., Fazio & Dunton, 1997; Payne, Jacoby, & Lambert, 2004) or to specifically recruit only White samples (e.g., Amodio, Harmon-Jones, & Devine, 2003; Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Payne, 2001, 2005) when investigating race bias. This resulted in a sample of 92 White participants. There were no significant differences between two priming conditions in drinking habits among participants, all $|t| < .97$, $ps > .27$ (see Table 1), except for one question, number of drinks consumed on any one occasion over the last twelve months, $t(89) = -2.70$, $p = .037$.

Note that we performed exploratory data analyses after collecting data for the initial 54 White participants (out of 91 total). We decided to collect data for 4 additional weeks to reach a sample size of at least 80 such participants for this 2×2 design. Results obtained with the initial sample were completely replicated with the sample of all White participants ($N = 92$).

In previous research using similar procedures (Friedman et al., 2007; Subra et al., 2010) a composite evaluation index was created by averaging responses on all incident report items. Reliability of this composite was acceptable ($\alpha = .75$), but analyses indicated that if the third item ("How courteous was the experimenter...?") was excluded, reliability improved considerably ($\alpha = .90$). Therefore, we dropped the third item and created a composite index using the average of responses to the remaining two items. Note that Subra et al. (2010) used only these same two items to form their composite evaluation index.

On the basis of previous work (Pedersen et al., 2014; Stepanova et al., 2012), we predicted that participants in the alcohol priming condition would rate a Black experimenter more negatively than participants in the neutral priming condition, and that prime content would not affect ratings of the White experimenter. This prediction was tested using a 2 (Race of experimenter; Black, White) \times 2 (Cue priming condition; alcohol, nonalcohol) between-subjects factorial analysis of variance (ANOVA).² This analysis showed a marginal effect of Race of experimenter, $F(1, 88) = 3.74$, $p = .056$, $\eta_p^2 = .041$, which was qualified by the predicted Race of experimenter \times Cue priming condition interaction, $F(1, 88) = 6.78$, $p = .011$, $\eta_p^2 = .072$ (see Figure 1). As predicted, participants who interacted with the Black experimenter rated him more negatively in the alcohol

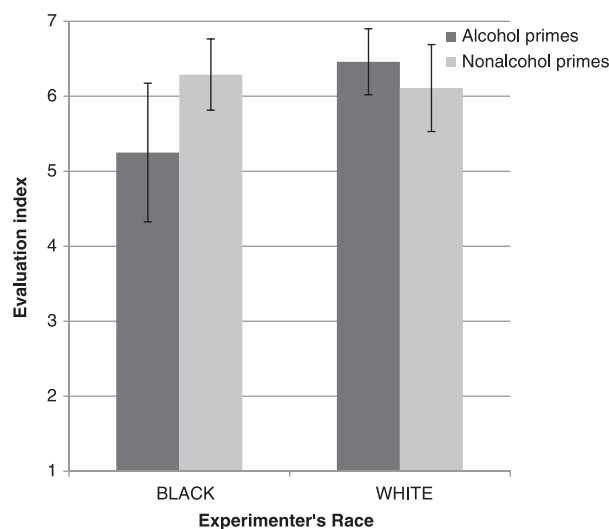


Fig. 1: Evaluation index scores as a function of experimenter's race and cue-exposure condition. Error bars represent standard deviations. Smaller numbers indicate a less positive evaluation of the experimenter

priming condition ($M = 5.25$, $SD = 1.85$, $n = 22$) than in the neutral priming condition ($M = 6.29$, $SD = 0.95$, $n = 19$), $F(1, 39) = 4.88$, $p = .033$. Ratings of the White experimenter did not differ across the alcohol ($M = 6.46$, $SD = 0.88$, $n = 24$) and neutral priming conditions ($M = 6.11$, $SD = 1.16$, $n = 27$), $F(1, 49) = 1.43$, $p = .24$.

Exploratory analyses concerning potential moderation of predicted effects by alcohol expectancies and explicit race bias produced no statistically significant effects (all $ps \geq .12$), see Supplementary Materials.

Discussion

The current findings indicate that brief exposure to alcohol-related cues can promote discrimination³ during interracial interactions. Racial bias often occurs in ambiguous situations, when others' intentions are unclear (Correll, Park, Judd, & Wittenbrink, 2002; Correll, Park, Judd, Wittenbrink, Sadler, & Keese, 2007; Plant & Peruche, 2005). Moreover, previous work has shown that alcohol primes exert their largest influence on behavior under conditions of uncertainty regarding another person's intentions (Bartholow & Heinz, 2006; Pedersen et al., 2014). In the current study, the experimenter's behavior was specifically designed to be ambiguous. It was not clear whether his mistake in setting up the computer program was negligent, beyond his control, or committed intentionally. Participants may have believed that the experimenter felt compelled to re-run the study as a part of his work obligations.

²The design and sample size did not provide sufficient statistical power to detect gender effects. We also recoded race of participants (creating White and non-White groups) and considered running parallel analyses with this variable as a fixed factor on a whole sample. However, given that the experimental groups were seriously imbalanced in terms of both number and racial heterogeneity, we decided against such analyses.

³While Friedman et al. (2007) (whose procedure we adapted) clearly framed the dependent measure as a hostility index, we are acutely aware that the validity of the specific aggression measure can be disputed. The means in all the conditions were above the midpoint of the scale. Therefore, we would like to stress that the main focus of our work is differential responding to Blacks in the alcohol versus neutral priming conditions.

Therefore, the current findings extend previous work suggesting that, much like stereotypes themselves (Correll, Wittenbrink, Crawford, & Sadler, 2015; Eberhardt, Goff, Purdie, & Davies, 2004), alcohol cues appear to encourage disambiguation of information during social interactions (see Friedman *et al.*, 2007; Pedersen *et al.*, 2014), leading to exaggeration of racial biases.

Although the current findings were consistent with the predicted pattern of lower evaluations of the Black experimenter following alcohol cue priming, alcohol cue exposure had no effect on the evaluations of the White experimenter. Viewed in the context of previous findings indicating that alcohol cue priming increases aggression (Friedman *et al.*, 2007; Pedersen *et al.*, 2014; Subra *et al.*, 2010) this might seem surprising. However, a closer examination of previous findings suggests some possible explanations. For example, Subra *et al.* reported orthogonal contrasts indicating that participants gave harsher ratings to the experimenter when primed with aggression-related words (worst rating) or alcohol-related words (moderately bad ratings) compared with neutral words (best ratings). They also reported no significant difference in ratings between the aggression and alcohol prime conditions, but did not report whether the alcohol and neutral prime conditions differed. They did not report the racial groups represented by their experimenters or participants (French university students), the vast majority of whom (90%) were women. In our work, the experimenter's behavior was designed to be ambiguous, while in Subra *et al.* no effort was made to decrease such impression, and consequently, their experimenter evaluations were less positive overall. Additionally, Subra *et al.* did not present the discrimination assessment as an incident report (as we did) that was only filled when something went wrong which might put participants in a particular state of mind. These issues make direct comparison with the current results somewhat challenging. Additionally, Friedman *et al.* reported no main effect of priming condition on experimenter ratings (all experimenters were White), but rather that alcohol cue exposure led to lower ratings among participants who had relatively strong aggression-related alcohol expectancies. While the range of the means for the composite hostility index in the alcohol priming and neutral conditions in Friedman *et al.* (6.09–6.14) was similar to our results, suggesting that the procedure was replicated very closely to the original work, there was one difference between the paradigm used by Friedman *et al.* and this study. Specifically, we employed longer prime presentations times (250 ms), while in Friedman *et al.* the authors used 40 ms primes (notably, Subra *et al.* used even shorter presentation times of 17 ms.). Perhaps the longer prime duration somehow mitigated the priming effect for the ingroup experimenter but not for the outgroup experimenter. In the current scenario, neither aggression-related nor sociability-enhancing expectancies moderated the effects of alcohol priming. Yet our failure to find moderation by aggression-related

expectancies in the White experimenter condition could be due to a variety of reasons such as regional differences.

It is also possible that current analyses failed to produce moderation effects because we failed to measure the most relevant expectancy domain, such as the expectation that alcohol increases race bias or reduces social inhibitions. Unfortunately, no such measures exist in the literature, and our previous attempts to construct them (Stepanova *et al.*, 2012; Stepanova, Bartholow, Sauls, Friedman, & Hollis, 2017) failed to show any moderation effects. Further, statistical power to detect moderation effects was low in the current study, regardless of which expectancy domain is considered.

We also would like to acknowledge that our race of experimenter manipulation only employed two different exemplars for each condition. Limited stimulus sampling (Wells & Windschitl, 1999) poses threats to construct validity and increases misinterpretation of interactions. Note, however, that our initial results ($N = 54$) obtained with one exemplar per race category were replicated with the full sample employing two exemplars per category. Future studies should aim to employ a higher number of exemplars for the race manipulation.

Effects of alcohol cue-priming on various behaviors generally have been explained in terms of activation of either explicit alcohol outcome expectancies or alcohol-related implicit memory associations (Reich, Below, & Goldman, 2010; Stacy, 1995, 1997; Wiers & Stacy, 2006). Although some theorists make little distinction between expectancies and associations (e.g., Moss & Albery, 2009), others clearly distinguish them and argue that the two constructs differentially associate with alcohol-related outcomes (see Wiers & Stacy, 2010). For example, whereas alcohol expectancies refer to the anticipation of systematic "if-then" relationships (Goldman, Brown, & Christiansen, 1987) and are deliberative and propositional in nature, implicit memory associations are not dependent on deliberative processes, are represented in distinct neural circuits (see Berridge, 2001), and can predict outcomes independently of expectancies (e.g., Thush, Wiers, Ames, Sussman, & Stacy, 2008). It seems plausible, then, that the current findings could reflect the influence of implicit memory associations rather than explicit expectancies.

Thus, it could be that alcohol cue exposure in the current study activated associations linking alcohol with loosened social proscriptions (Freeman *et al.*, 2010), thereby disinhibiting racial bias and producing harsher evaluations of the Black experimenter. Freeman *et al.* proposed a conditioning explanation for such effects: alcohol cues serve as discriminant stimuli indicating that specific behaviors will be reinforced, and no explicit alcohol-related expectancies are needed for those behaviors to occur. The effects of alcohol priming are explained by activation of implicit memory associations and the corresponding behavioral scripts with which

they are associated, regardless of whether explicit expectancies related to those effects have been articulated. Unfortunately, implicit memory associations were not assessed here, leaving this explanation to be tested in future research.

Given that (a) exposure to alcohol cues produced *less positive* (as opposed to more negative) behaviors toward Blacks; and (b) no negative/aggressive behavior was directed at White experimenters in both cue-priming conditions, we are inclined to believe that our effects reflect activation of social disinhibition-like rather than aggression-implicit memory associations with alcohol, leading to biased interpretation of the ambiguous situation. However, future conceptual and direct replication is necessary in order to instill more confidence in the current findings and proposed mechanisms.

The current study adds to a growing body of work indicating that brief and incidental exposure to alcohol-related stimuli can influence behavior in ways consistent with its effects when ingested. Among these, this study is the first to show that such exposures can affect the subtle expression of discrimination on the basis of race. Given the ubiquitous presence of alcohol cues in everyday life, in the form of advertisements, signs in grocery stores and in the windows of taverns and liquor stores, these findings suggest one explanation for the pervasiveness of biases emerging in ways we might not expect.

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Supporting information

Additional Supporting Information may be found online in the supporting information tab for this article.

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