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# The Effects of Acute Alcohol Intoxication and Self-Focused Rumination on Triggered Displaced Aggression

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*An experiment simultaneously examined the effects of acute alcohol intoxication and self-focused rumination on triggered displaced aggression. An ethnically diverse sample of 97 young adult participants (41 men, 56 women) were recruited from a university community and surrounding area. Participants were provoked by an experimenter, randomly assigned to a 2 (alcohol, sober) × 2 (rumination, distraction) × 2 (trigger, no trigger)*

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*between-participants design, and then given an opportunity to aggress against an undeserving other who was either completely innocent or slightly annoying. Self-focused rumination increased displaced aggression only when participants were triggered by the slightly annoying participant. Alcohol independently augmented aggression.*

*KEYWORDS aggression, alcohol, intoxication, rumination, self-focus, triggered displaced aggression*

As Dave is leaving work, a coworker berates him for his poor performance on a recent collaborative project. Instead of going directly home, Dave stops at a bar for some drinks. While drinking, all Dave can think about is his negative mood and why these types of things always seem to happen to him. He encounters another coworker and describes what happened while leaving work. This coworker remarks in a neutral tone, "Well, maybe you should have tried a bit harder." Dave becomes enraged and insults his coworker.



This anecdote illustrates the effects of rumination and alcohol on triggered displaced aggression (TDA). The classic displaced aggression effect occurs when a person is provoked, is unwilling or unable to retaliate against the original provocateur, and subsequently aggresses against a seemingly innocent target (Dollard, Doob, Miller, Mowrer, & Sears, 1939; Hovland & Sears, 1940; Marcus-Newhall, Pedersen, Carlson, & Miller, 2000). In contrast to classic displaced aggression, TDA occurs when a subsequent target is the source of a second annoying provocation, referred to as the trigger (Pedersen, Gonzales, & Miller, 2000; Vasquez, Denson, Pedersen, Stenstrom, & Miller, 2005). In the anecdote, the coworker provided the trigger in the form of a relatively innocuous comment. Such comments elicit displaced aggression only when individuals have already been angered (Pedersen et al., 2000; Vasquez et al., 2005). In such instances, the retaliatory displaced aggression that it elicits toward the triggering person is not only strong, but is disjunctive in that it exceeds tit-for-tat norms (Axelrod, 1984; Miller, Pedersen, Earleywine, & Pollock, 2003; Pedersen et al., 2000; Vasquez et al., 2005).[1]

## INTOXICATION AND TDA

Both real-world and laboratory data provide unequivocal evidence that alcohol increases aggression. Alcohol consumption often precedes violent

[1] By disjunctively escalated, we mean that the level of displaced aggression exceeds the additive independent aggression-eliciting effects of the initial provocation and the subsequent triggering provocation when additively combined.

assault, homicide, suicide, sexual violence, and intimate partner violence (Boles & Miotto, 2003; Hoaken & Stewart, 2003; Taylor & Chermack, 1993; U.S. Department of Justice, 1998). Multiple meta-analyses of experimental aggression studies confirm that intoxication increases aggressive responding when provoked (Bushman & Cooper, 1990; Hull & Bond, 1986; Ito, Miller, & Pollock, 1996; Steele & Southwick, 1985). Proposed mechanisms include cognitive impairment resulting in the perception of only the most salient cues in the environment (e.g., Giancola & Corman, 2007; Steele & Josephs, 1990; Steele & Southwick, 1985), poor executive functioning leading to disinhibited behavior (Giancola, 2000, 2004), and decreased fear of retaliation due to the anxiolytic effects of alcohol intoxication (Pihl, Peterson, & Lau, 1993).

Despite the substantial evidence showing that intoxication augments aggression, only two previous studies have examined the effects of alcohol within the TDA paradigm (Aviles, Earleywine, Pollock, Stratton, & Miller, 2005; Denson et al., 2008). In the first experiment, after having been provoked, participants consumed either an alcoholic or a nonalcoholic drink. Subsequently, they were presented with either a trigger, as defined by mildly annoying feedback, or nontriggering neutral feedback (Aviles et al., 2005). An interaction was observed, such that among all experimental groups, triggered participants who consumed alcohol were the most aggressive. In a second experiment, participants were provoked, consumed either alcohol or a nonalcoholic drink, and were given either a highly salient trigger (a slightly annoying comment written in red ink) or a less salient trigger (the same comment embedded in a paragraph of blue ink; Denson et al., 2008). Again, among all experimental groups, intoxicated participants exposed to the highly salient trigger were the most aggressive. Thus, these two experiments demonstrate that alcohol increases TDA, as evidenced by increased aggression toward individuals who had nothing to do with the initial provocation.



## RUMINATION AND TDA

This study further elaborates on these prior findings by examining the effects of rumination and acute alcohol intoxication within the TDA paradigm. Rumination is central to TDA theory. Although rumination has many instantiations, it typically involves thinking about a distressing occurrence and is associated with intrusive and repetitive thoughts. Those who brood angrily about interpersonal provocations are said to engage in angry rumination (Caprara, 1986; Denson, Pedersen, & Miller, 2006; Sukhodolsky, Golub, & Cromwell, 2001). Angry rumination can be conceptualized as an individual difference dimension (e.g., Caprara, 1986) or manipulated in experimental settings (e.g., Bushman, 2002).

In experimental research, rumination has been defined experimentally by some as the induction of self-focused attention to one's own negative

emotions (Nolen-Hoeksema & Morrow, 1993). Consistent with recent models of aggression (e.g., Anderson & Bushman, 2002; Berkowitz, 1993), the disjunctively escalated aggression observed in TDA experiments is theorized to occur because the initial provocation primes aggression-related affect, cognition, and arousal, thus creating a readiness to aggress (Miller et al., 2003). By continually reactivating aggression-relevant cognition, affect, and arousal, rumination maintains and augments this readiness to aggress. Ultimately, when a subsequent triggering event is encountered, aggression is unleashed. Following past research, we induced rumination with a writing task following provocation and contrasted it with distraction (e.g., Bushman, Bonacci, Pedersen, Vasquez, & Miller, 2005; Denson et al., 2006; Rusting & Nolen-Hoeksema, 1998). Those induced to ruminate were asked to focus their attention inward, whereas those induced to distract themselves wrote about a neutral topic.

Experimental studies confirm much of this theorizing. Specifically, manipulations of rumination exacerbate feelings of anger (Rusting & Nolen-Hoeksema, 1998) and increase direct aggression toward the provocateur (Bushman, 2002). Furthermore, preventing postprovocation rumination reduces direct aggression (Konečni, 1974). Of particular relevance to this research is a series of three studies in which experimental manipulations of rumination within the TDA paradigm consistently augmented aggressive retaliation toward the person emitting the triggering act but had no effect on a nontriggering target person (Bushman et al., 2005). These findings were robust across different operationalizations of aggression (i.e., physical and written aggression measures) and time intervals (i.e., 25 minutes and 8 hours).



## ALCOHOL, RUMINATION, AND TDA

A correlational survey of undergraduate men and women found that trait rumination moderated the effects of heavy alcohol consumption on alcohol-induced aggression (Borders, Smucker Barnwell, & Earleywine, 2006). Specifically, heavy drinkers who were also frequent ruminators engaged in the most self-reported aggression. Although these results are consistent with the speculation that rumination is an important factor in the alcohol-induced aggression that occurs in real-world settings, experimental research is needed to assess whether rumination has a causal role in augmenting alcohol-induced aggression.

The attention-allocation model (also referred to as *alcohol myopia;* Steele & Josephs, 1990; Taylor & Leonard, 1983) argues that alcohol consumption interferes with cognitive functioning, narrowing attentional focus toward only the most salient cues in the environment. Following a provocation, which is typically a highly salient cue, intoxicated individuals primarily direct their attention toward it. As a consequence of their reduced attentional

capacity, internal inhibitory cues receive diminished attention (MacDonald, Fong, Zanna, & Martineau, 2000; MacDonald, MacDonald, Zanna, & Fong, 2000; Steele & Josephs, 1990; Steele & Southwick, 1985). Within the TDA paradigm, we have strongly supported the aspect of this theorizing that concerns salient aggressive cues (Denson et al., 2008). Specifically, presenting participants with a trigger that is high, rather than low in salience, augmented aggression among intoxicated individuals, but not sober ones. This shows that only intoxicated persons were differentially sensitive to cue salience (Denson et al., 2008).

Relative to distraction, self-focused rumination increases both anger and attention toward one's internal state (Rusting & Nolen-Hoeksema, 1998). Indeed, self-focused rumination increases negative affect to a greater extent than other forms of self-focused attention (Mor & Winquist, 2002). Thus, rumination will ordinarily increase the salience of negative affect, cognition, and physiological arousal elicited by the initial provocation, thereby priming a readiness to aggress (Berkowitz, 1993; Ray, Wilhelm, & Gross, 2008). In studies of direct aggression, the presence of the provocateur mobilizes these effects by directing attention externally. In TDA studies, however, exposure to a subsequent trigger is critical. As previously indicated, in three TDA studies (Bushman et al., 2005) the aggression-increasing effect of rumination was seen only when rumination was followed by a triggering event. For aggression to occur, attention must be directed toward its target. A triggering event will serve this external focusing function. Thus, when a person has been previously provoked, a subsequent trigger functions as a highly salient cue that evokes anger and aggression. This effect is augmented among intoxicated persons (Aviles et al., 2005; Denson et al., 2008) and should be further exacerbated by rumination. Thus, the self-focusing rumination induction used in this study produces an inward, internal focus. This type of rumination should produce a "myopic" state similar to that induced by alcohol wherein individuals focus on negative thoughts and feelings.



## THE CURRENT RESEARCH

This experiment simultaneously tested the effects of both alcohol and self-focused rumination on TDA. Specifically, all participants were first provoked. They then consumed either alcoholic or nonalcoholic beverages, were experimentally induced to engage either in self-focused rumination or were distracted, and then were given either slightly annoying feedback (i.e., trigger) or neutral feedback (i.e., no trigger) from a bogus participant. We expected one of two possible patterns of results. The first possibility is that rumination would augment displaced aggression only in the presence of a trigger and that this effect would be greatly exacerbated by intoxication (i.e., an Alcohol × Rumination × Trigger interaction). A second possibility is that

we would replicate research with sober participants showing that rumination augments TDA only when triggered (i.e., a Rumination × Trigger interaction; Bushman et al., 2005) and that alcohol would additively augment aggression for all participants (i.e., a main effect of alcohol) as it does many other forms of aggression (Boles & Miotto, 2003; Hoaken & Stewart, 2003; Ito et al., 1996).

## METHOD

### Design and Participants

Potential participants responded to advertisements in a university newspaper or a local community entertainment newspaper that offered payment for research participation from persons over 21 years of age. There were no differences in aggression between the two groups, $t(95) = 0.49$, $p = .63$ (student $M = 4.89$, $SD = 2.63$; community $M = 4.63$, $SD = 2.57$), random assignment to conditions, or the demographic variables. To avoid obtaining a biased sample, no mention of alcohol appeared. During an initial phone screening, those who reported previous adverse reactions to alcohol, poor health, or medication that contraindicated alcohol were excluded. The Michigan Alcoholism Screening Test (Selzer, 1971) was administered, and those who obtained scores of 8 or above were excluded to avoid recruiting problem drinkers. The remaining eligible participants were invited to undergo an in-person clinical interview using the Structured Clinical Interview for *DSM–IV* Axis I disorders (SCID–I). Written informed consent documents were obtained from all participants. At this time, participants also reported their weekly frequency and quantity of alcohol use. Only potential participants who did not meet criteria for Axis I disorders were included. Also, one participant was excluded due to a positive result on the pregnancy test that was administered to all potential female participants.

Participants who had not been excluded ($n = 116$) were invited to participate in the experimental study on another day. They were informed that they might be asked to consume alcohol, and were randomly assigned to a 2 (alcohol, sober) × 2 (rumination, distraction) × 2 (trigger, no trigger) between-participants design.[2] Although 19 (16%) were excluded due to suspicion or failure to understand the instructions, their distribution did

[2] The full experimental design for the TDA paradigm crosses provocation (present vs. absent) with trigger (present vs. absent). Theoretical considerations specify that a disjunctive escalation in aggression occurs when a minor trigger is preceded by provocation and indeed the empirical research in this paradigm attests to these effects (Vasquez et al., 2005). Because there is no theoretical reason to expect displaced aggression in the absence of prior provocation (Miller et al., 2003), and because five published studies consistently confirm that when it is absent no displaced aggression occurs (Bushman et al., 2005, exp. 2; Denson et al., 2006, exp. 1; Pedersen et al., 2000, exp. 1 and 2; Vasquez et al., 2005), we omitted these control conditions from our current design.

not differ as a function of experimental condition, $\chi^2(7, N = 116) = 11.54$, $p = .12$. Thus, the analyses included data from 97 participants (41 men and 56 women, $M_{age} = 25.78$, $SD_{age} = 4.02$ years; 32% White, 30% Black, 16% Asian, 9% Latino, 8% Middle Eastern, 4% other or biracial). Men and women were equally distributed across the experimental conditions, $\chi^2(7, N = 97) = 0.87$, $p = .87$, and no differences emerged for age as a function of condition, $F(7, 89) = 0.57$, $p = .78$.

## Procedure

Participants were asked to fast two hours prior to study participation and refrain from alcohol for 24 hours prior. On arrival at the laboratory, participants were told that the experiment examined the effects of alcohol on cognitive and social performance and physical distraction. The experimenter, who was blind to experimental condition, explained (as part of a cover story designed to mask the true purpose of the experiment) that the study consisted of four tasks: (a) completing a general measure of cognitive ability, (b) writing about a randomly chosen topic, (c) forming an impression about a second (bogus) participant who was also participating in the experiment, and (4) engaging in a decision-making and physical distraction task with the second participant. The experimenter further explained that the research assistant would run them in the experiment, whereas the experimenter would be running the "other" participant and scoring the questionnaires.

Participants then completed a brief demographics questionnaire and the Biphasic Alcohol Effects Scale (BAES; Martin, Earleywine, Musty, Perrine, & Swift, 1993). The instructions were "please rate the extent to which you feel each of the following sensations right now." The BAES consists of 14 items that measure stimulant (7 items, $\alpha = .90$; e.g., *elated*) and sedative effects of alcohol (7 items, $\alpha = .85$; e.g., *sedated*). It also includes an item assessing intoxication (i.e., *intoxicated*). Items were rated on 11-point scales with described endpoints (0 = *not at all,* 10 = *very much*). The BAES was included as a subjective measure of intoxication to complement the breath alcohol level (BAL) as an objective measure of intoxication. Weight and body fat percentage were measured with an electronic body fat scale to determine how much alcohol (if any) was to be administered. Participants then completed the first of four BAL measurements with an Alco-Sensor IV. The initial BALs revealed that all participants were sober at study initiation.

### Provocation procedure

The experimenter then proceeded to provoke all participants. Specifically, participants were informed that the cognitive ability task required solving anagrams while listening to music. They received a list of 15 anagrams and

were given 4 minutes to solve them. Eleven of the anagrams were difficult (e.g., cconiftesa = confiscate) and they had to be solved while listening to loud (80 db) and distracting background music (Stravinsky's *Rites of Spring*). After 4 minutes, the research assistant interrupted the participant, took the anagram answer sheet for scoring, and gave the participant a computer printout showing that most previous participants had gotten nearly all of the anagrams correct. A few minutes later, the experimenter entered with the score and insulted the participant in an irritated tone of voice: "You really got a lot of these wrong. These data are useless to me. We should probably just start all over, but to be perfectly honest with you, I don't want to waste my time." This provocation manipulation has successfully increased anger and aggression in past experiments (Denson et al., 2008; Vasquez et al., 2005).



### Beverage administration

Participants were told that the next part of the experiment was concerned with the effects of alcohol on the ability to use one's imagination. Participants in the alcohol condition received .7g alcohol/kg, a dose comparable to that of the low dose groups in the meta-analysis by Ito et al. (1996). Four alcoholic drinks were prepared by combining 100 proof vodka 1:8 with Sprite. The assistant brought one alcoholic drink every 5 minutes, for a total of 20 minutes. The sober condition was identical, except that the rims of the cups were rinsed with vodka to provide an odor of alcohol and only Sprite was administered. On completion of the writing task, which served as the rumination manipulation (see later), participants rinsed their mouths with water, and the research assistant took the second BAL.

### Rumination manipulation

Participants had 30 minutes to complete a writing task, which constituted the rumination manipulation. During the first 20 minutes of the task, they consumed their drinks while writing. During the remaining 10 minutes of the task, they focused exclusively on writing. Participants in the rumination condition wrote responses to a series of 20 statements or questions that focused their attention internally. Sample items include "what kind of person you are" and "why people treat you the way they do." When not preceded by an emotional event, these items had been rated as affectively neutral (Rusting & Nolen-Hoeksema, 1998). They were instructed to spend 1 to 2 minutes on each question. Those in the distraction condition were asked to describe the layout of their college campus. These manipulations have been used effectively in prior anger and aggression studies (Bushman et al., 2005; Denson et al., 2006, experiment 2; Rusting & Nolen-Hoeksema, 1998).

All participants completed the writing task 30 minutes after the initiation of drink consumption.

### Trigger manipulation

In the final phase of the experiment, participants were asked to list desirable traits for an astronaut (Denson et al., 2006; Vasquez et al., 2005). They were led to believe that both they and another participant, who was in fact bogus, were completing the task at the same time, that their solutions would be exchanged, and that each of them would evaluate the other's work. Participants were given a few minutes to evaluate their partner's bogus solution. They also gave an overall evaluation and were allowed to write open-ended comments. All items were rated on 7-point scales with described endpoints ranging from 1 (*no good at all*) to 7 (*extremely good*). They were then told that their respective evaluations would be exchanged. Next, they received the partner's evaluation of their solution, which contained the (bogus) partner's ratings of the originality, quality, effort, variety of their solution, and whether their solution made sense. Those in the trigger condition received respective ratings of 3, 4, 3, 3, 4, and 4. In the space designated for additional comments, the following statement was provided: "The performance was not great and I think that a college student could do better."[3] This mild trigger has the same effect as the no trigger control condition unless participants have been previously provoked (i.e., no displaced aggression is elicited; Pedersen et al., 2000; Vasquez et al., 2005). Participants in the no-trigger condition received ratings of 4, 5, 5, 4, 5, and 5 along with the following comment: "My partner did an adequate job." To confirm typical expectations, wherein strangers are viewed in a slightly positive manner, the no-trigger condition was intentionally made slightly positive rather than truly neutral because in the absence of prior knowledge about an individual, people tend to exhibit an initial positivity bias as a default position (Klar & Giladi, 1997; Sears, 1983; Wojciszke, Brycz, & Borkenau, 1993). After participants looked over their evaluations, the research assistant took the third BAL. Thus, the trigger manipulation was implemented approximately 38 minutes after the initiation of drink consumption.

### Physical displaced aggression measure

Next, participants were told that they would complete a decision-making and physical distraction task with their partner. The assistant offered a cup with two folded slips of paper and instructed the participant to pick one

[3] The term *college student* was replaced with *this person* for community participants.

ostensibly to determine his or her condition. In reality, the drawing was rigged so that the participant always picked the no-distraction condition and the (bogus) partner was always placed in the physical distraction condition. The research assistant informed the participant that he or she would need to briefly experience the distraction and then decide how long the (bogus) partner was to be distracted. Thus, all participants placed their hand in a bucket of cold water (10°C) for 5 seconds, so that they were aware that the water temperature was indeed aversive. They also indicated how long their (bogus) partner should be distracted by immersing his or her hand in ice water on a 9-point linear scale starting at 1 (*no distraction at all*) that increased by 10-second intervals to 9 (*80 seconds/very strong distraction*). Participants then placed the completed form in a sealed envelope, slid it under the door for the experimenter to pick up, and completed the secondary dependent measures. Participants completed the aggression measure approximately 43 minutes after the initiation of drink consumption.



### Manipulation checks

Participants then completed items to assess reactions to the trigger. Specifically, they rated the partner's intelligence, capability, potential, competence, likeability, and friendliness ($\alpha = .85$). Participants also rated how happy, annoyed, complimented, irritated, pleased, angry, and offended ($\alpha = .87$) the partner's evaluation made them feel on 7-point linear scales with described endpoints ranging from 1 (*not at all*) to 7 (*extremely so*). Finally, participants completed the second BAES (both subscale $\alpha$s = .90). The last BAL was administered on completion of the dependent measures. Participants completed the secondary dependent measures approximately 55 minutes after the initiation of drink consumption.

## RESULTS

### Alcohol Use and Gender

Because individual differences in alcohol use could complicate the interpretation of results, an alcohol use variable was created by multiplying the number of standardized drinks consumed on a typical occasion by the number of days spent drinking per week. Such quantity-frequency variables are commonly used in substance use research (e.g., Quigley, Corbett, & Tedeschi, 2002). This variable did not differ as a function of experimental condition. Furthermore, because gender yielded neither a main effect nor any interactions with the experimental manipulations, the following analyses

are based on the entire sample, excluding of course, participants who were suspicious.[4]

## Alcohol Manipulation Checks

### BAL ASSESSMENTS

Table 1 displays the means and standard deviations for the four BALs that were obtained at various points in the experiment. The first BAL was collected at the initiation of the experiment, at which time all participants had BALs equal to zero. Within the alcohol condition, a 2 (rumination, distraction) × 2 (trigger, no trigger) × 3 (time) analysis of variance (ANOVA) revealed no significant main effects or interaction. Thus, the four cells of the alcohol condition did not differ in their BALs prior to aggressing against the bogus participant, nor did BALs increase or decrease during data collection. Furthermore, the displaced aggression results remained significant even when controlling for BAL (see aggression results that follow).

### SUBJECTIVE ASSESSMENTS

The first BAES was administered at the beginning of the experiment when all of the participants were sober and did not yet know their assignment to alcohol or sober conditions. It yielded no differences between the alcohol and sober conditions for the stimulant descriptors (alcohol $M = 4.60$,

**TABLE 1** Means and Standard Deviations of Breath Alcohol Levels for Participants in the Alcohol Condition as a Function of Experimental Condition and Time

| | Time after alcohol consumption | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Baseline | | 30 min | | 38 min | | 55 min | |
| Condition | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| Rumination and trigger | .000 | — | .067 | .035 | .054 | .011 | .057 | .010 |
| Rumination and no trigger | .000 | — | .053 | .029 | .054 | .030 | .057 | .035 |
| Distraction and trigger | .000 | — | .066 | .039 | .057 | .023 | .056 | .025 |
| Distraction and no trigger | .000 | — | .062 | .021 | .061 | .031 | .058 | .035 |

*Note.* A 2 (rumination) × 2 (trigger) × 3 (Time) mixed analysis of variancerevealed no significant main effects or interactions (all *p*s > .17).

[4] Meta-analytic work suggests that whereas unprovoked men are more aggressive than unprovoked women, provocation markedly attenuates this gender difference (Bettencourt & Miller, 1996). Thus, the lack of gender effects is not surprising.

$SD = 1.93$; sober $M = 4.33$, $SD = 2.03$), $F(1, 95) = 0.46$, $p = .50$, $d = .14$. Those in the alcohol condition, however, endorsed more sedative descriptors than those in the sober condition (alcohol $M = 2.74$, $SD = 1.78$; sober $M = 1.98$, $SD = 1.68$), $F(1, 95) = 4.68$, $p = .03$, $d = .44$. Although unexpected, this increased sedation would presumably work against our prediction of increased aggression in the alcohol condition.[5] At the end of the experiment, those in the alcohol condition reported feeling more intoxicated ($M = 5.07$, $SD = 2.81$) than those in the sober condition ($M = 1.04$, $SD = 2.20$), $F(1, 86) = 56.88$, $p < .001$, $d = 1.58$. In addition, at the end of the experiment, participants in the alcohol condition endorsed more sedative descriptors on the BAES (alcohol $M = 4.06$, $SD = 2.20$; sober $M = 2.23$, $SD = 1.76$), $F(1, 95) = 72.67$, $p < .001$, $d = .91$, than those in the sober condition, but no differences emerged for stimulant descriptors (alcohol $M = 4.14$, $SD = 1.96$; sober $M = 3.98$, $SD = 2.27$), $F(1, 86) = 0.12$, $p = .73$, $d = .07$.[6]

## Trigger Manipulation Checks

To assess the trigger manipulation, we formed two composite scores. The first was a mean rating of the triggering partner on six traits (intelligence, capability, potential, competence, likeability, and friendliness, all items reverse scored). Triggered participants rated their partner more negatively ($M = 3.18$, $SD = 1.50$) than did nontriggered participants ($M = 2.63$, $SD = 0.87$), $F(1, 95) = 5.03$, $p = .03$, $d = .45$. The second manipulation check concerned affective reactions to the feedback that the partner had ostensibly provided (annoyed, irritated, angry, and offended). Triggered participants endorsed more negative emotional reactions to the feedback ($M = 3.14$, $SD = 1.88$) than did nontriggered participants ($M = 2.04$, $SD = 1.02$), $t(95) = 3.59$, $p = .001$, $d = .73$. These results indicate that the trigger manipulation was effective.

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[5] Although this Time 1 BAES effect does suggest the use of covariance analysis, nonetheless because the direction of the BAES Time 1 effect works against our predictions and because the covariance analysis has less power (due to fewer degrees of freedom) we did not report it as our primary analysis. Nonetheless, the results obtained with covariance analyses do mirror the analyses reported herein, although their $p$ values are slightly discrepant from those reported in the text.

[6] Pre–post comparisons on the BAES showed that participants in the alcohol condition reported no changes in stimulant effects during the course of the experiment ($M_{pre} = 4.56$, $SD_{pre} = 1.90$, $M_{post} = 4.14$, $SD_{post} = 1.96$), $F(1, 39) = 2.18$, $p = .15$, $d = -.27$, but significant increases in sedative effects ($M_{pre} = 2.96$, $SD_{pre} = 1.77$, $M_{post} = 4.06$, $SD_{post} = 2.20$), $F(1, 39) = 11.89$, $p = .001$, $d = .73$. Comparable pre–post comparisons on the BAES showed that participants in the sober condition showed no changes in stimulant ($M_{pre} = 4.36$, $SD_{pre} = 2.04$, $M_{post} = 3.98$, $SD_{post} = 2.27$), $F(1, 47) = 2.20$, $p = .15$, $d = -.19$, or sedative effects ($M_{pre} = 2.00$, $SD_{pre} = 1.66$, $M_{post} = 2.23$, $SD_{post} = 1.76$), $F(1, 47) = 1.13$, $p = .29$, $d = .16$, during the course of the experiment. Taken together, the effects for the BALs and the BAES are consistent with effective alcohol intoxication at a relatively modest dose. As anticipated, participants in the alcohol condition reported increased sedation at the end of the experiment, whereas those in the sober condition did not.

## Displaced Aggression

Figure 1 displays the means and standard errors for the physical aggression measure. A 2 (alcohol, sober) × 2 (rumination, distraction) × 2 (trigger, no trigger) between-participants ANOVA revealed main effects of alcohol, $F(1, 89) = 8.30$, $p = .005$, $\eta^2 = .09$; and trigger, $F(1, 89) = 5.11$, $p = .026$, $\eta^2 = .05$, suggesting that intoxicated and triggered participants were more aggressive than sober and nontriggered participants, respectively. This was qualified by a Rumination × Trigger interaction, $F(1, 89) = 7.78$, $p = .006$, $\eta^2 = .08$. The three-way interaction was not significant, $F(1, 89) = 0.94$, $p = .34$, $\eta^2 = .01$. Post-hoc tests revealed that participants in the rumination and trigger condition were more aggressive than those in the rumination and no-trigger condition, $t(44) = 3.33$, $p = .002$, $d = .98$, the distraction and trigger condition, $t(46) = 2.27$, $p = .011$, $d = .77$, and the distraction and no-trigger condition, $t(47) = 2.46$, $p = .018$, $d = .70$. Thus, rumination augmented displaced aggression only in the presence of a trigger and this effect was amplified among intoxicated participants. Moreover, the Rumination × Trigger interaction remained significant when controlling for

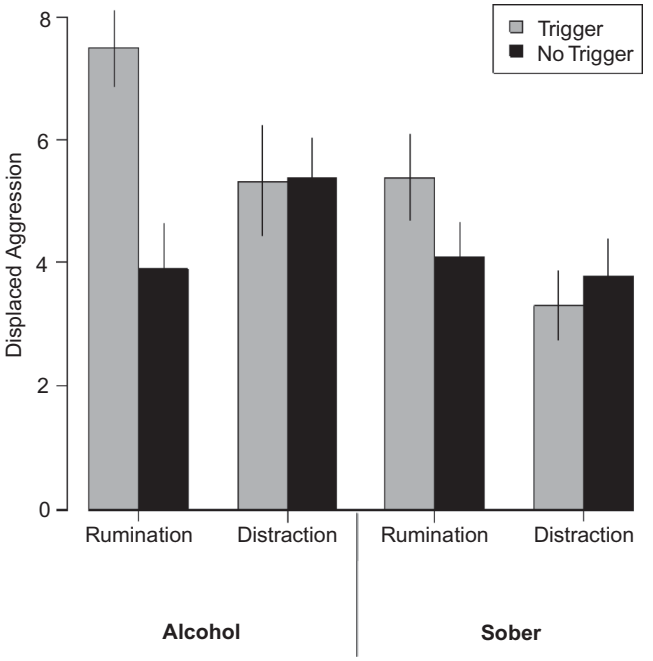


**FIGURE 1** Physical displaced aggression means and standard errors as a function of alcohol condition, rumination, and trigger. Aggression was assessed by asking participants to determine how long a fictitious participant should immerse his or her hand in a bucket of painfully cold ice water.

individual differences in BAL just prior to aggressing against the fictitious participant, $F(1, 41) = 5.73$, $p = .021$, $\eta^2 = .12$.

## DISCUSSION

This research examined the effects of experimentally manipulated rumination and alcohol intoxication on displaced aggression. Replicating Bushman et al. (2005), self-focused rumination increased displaced aggression only when provoked participants were subsequently triggered. Aggression was augmented by acute alcohol intoxication. Recall that aggressive action requires an external focus. Thus, a mildly annoying subsequent event was necessary to direct ruminating participants' aggression out toward the undeserving target. By contrast with rumination, distraction provides time for aggressive feelings, thoughts, and physiological arousal to subside (Rusting & Nolen-Hoeksema, 1998). Research supports the notion that distraction reduces the aggression-augmenting effect of intoxication (Giancola & Corman, 2007). Thus, it is not surprising that the trigger had no effect on aggressive behavior among distracted participants.

At first glance, our findings seem at odds with research on objective self-awareness (OSA) and direct aggression. According to OSA theory, self-awareness initiates a process whereby individuals compare their current state with personal standards (Duval & Wicklund, 1972). If there is a discrepancy and the individual is not capable of reducing this discrepancy, negative affect is increased via self-critical evaluation. However, research suggests that increasing self-awareness actually tends to decrease aggression in both sober and intoxicated participants and decreased self-awareness tends to increase aggression (Bailey, Leonard, Cranston, & Taylor, 1983; Duval & Wicklund, 1972; Hull, 1981; Hull & Reilly, 1983; Ito et al., 1996; Zimbardo, 1970). One important difference between our study and those that have examined OSA and aggression is the timing of our self-focus manipulation. In a typical OSA experiment, participants are seated in a room with a mirror or video camera and subsequently provoked. By contrast, our self-focus manipulation occurred following a provocation. A meta-analysis of self-focus and negative affect reported that self-focus following negative events and during rumination produces the highest levels of negative affect (Mor & Winquist, 2002). Thus, in the presence of a trigger, this negative affect is likely to facilitate increased aggression toward the undeserving individual.

One intriguing avenue for future research is the effect of rumination—particularly self-focused rumination—on self-aggression. It is known that alcohol is linked with extreme acts of self-aggression such as suicide (Hufford, 2001). Moreover, in laboratory experimentation alcohol ingestion has been shown to cause an increase in mild acts of self-aggression, as indexed by self-administered electric shock (McCloskey & Berman, 2003).

We have argued that within the TDA paradigm the trigger functions as an externally focusing aggressive cue. We found that in the absence of a trigger, when intoxicated persons are induced to engage in self-focused rumination, it did not increase aggression against another person. At the same time, however, it is possible that these same circumstances might increase self-aggression. Thus, research on the role of rumination in the self-aggression of intoxicated individuals could have implications for suicide prevention.

Future research might also investigate whether alcohol augments rumination-induced direct aggression (i.e., nondisplaced aggression). One can imagine a scenario in which an intoxicated bar patron is insulted and proceeds to ruminate about the provocation or engage in a distracting task (e.g., a game of pinball). Although we suspect that rumination would augment intoxicated direct aggression, it remains to be seen whether the provocateur must provide an additional instigation to aggress (e.g., a rude glance or gesture). Such an externally focusing cue is likely necessary when engaging in self-focused rumination to reorient the ruminator to the provocateur. However, when ruminating specifically about the insult, there might be little or no further instigation necessary to elicit increased direct aggression for our intoxicated bar patron. Future research could explore these questions.

One particularly relevant area for future empirical work on alcohol and aggression concerns individual differences in displaced aggression. Prior research reveals that, when provoked, certain individuals tend to ruminate about it over time and eventually vent their anger on innocent others such as romantic partners and fellow drivers (Denson et al., 2006). It is likely that intoxication would further exacerbate these personality tendencies among those high in TDA. Consistent with this speculation, Borders et al. (2006) reported that rumination and alcohol use are associated with high levels of self-reported aggressive behavior. Future research should explore the influences of these individual differences.

Future research might investigate the generalizability of our results to additional settings. For instance, it remains to be seen whether different triggers might elicit the same aggressive responses following provocation (e.g., being criticized on physical appearance or moral character). Theoretically, any form of criticism should elicit the same response so long as it is accompanied by a sense of being unjustly wronged (e.g., Anderson & Bushman, 2002). Another intriguing question concerns the source of the trigger. In our paradigm, the source was a stranger. It remains to be seen whether a trigger from a romantic partner elicits the same intensity of aggressive responding.

A further issue concerns the use of distraction as a long-term strategy. Presumably, distraction is effective in reducing aggression in the short term because it allows time for angry affect, aggressive cognition, and physiological arousal to subside. Nonetheless, distraction does not involve resolving the provocation. As such, subsequent rumination could occur at

a later stage, followed by aggression if triggered and intoxicated. Future research should explore whether distraction simply delays rumination or stops it entirely.

## Limitations

There are several limitations of the current research. Specifically, our intentional elimination of problem drinkers and participants with mental health problems limits the generalizability of these findings. Our sample was made up of young adults, and the results might not be applicable to older individuals. Furthermore, the current design used a low-to-moderate dose of alcohol. It is conceivable that under high doses of alcohol, different results would be obtained in research on TDA. Moreover, compared to the sober condition, participants in the alcohol condition tended to endorse feeling more sedated before the administration of any beverages or the manipulation of any independent variables. Although we have no explanation for this participant selection trend, because increased levels of arousal are typically associated with increased aggressive behavior, this selection trend would operate against our hypothesized effects. Similar considerations apply to our pre–post BAES comparisons: Specifically, at the low to moderate alcohol dose used in this study, no differences between alcohol and sober conditions on stimulant descriptors were obtained, but after beverage administrations, intoxicated participants endorsed feeling more sedated than sober ones. Alcohol typically augments direct aggression on the ascending limb of the blood alcohol curve, but not during the descending limb (e.g., Giancola & Zeichner, 1997). Despite this, alcohol increased rumination-induced TDA in this experiment. It remains to be seen whether our results would extend to rumination-induced TDA during the ascending limb.

Another limitation is that we did not use a balanced placebo design. Specifically, participants were told that they might or might not be in a condition wherein they would consume alcohol. Examination of the self-report manipulation checks revealed that those in the sober condition did indeed report very low levels of perceived intoxication, suggesting that these participants might have correctly concluded that they did not receive alcohol. Indeed, postexperiment debriefing revealed that most participants in the sober condition accurately guessed that they did not receive alcohol (although we did not keep records of these data). Nonetheless, a meta-analysis of aggression studies that used balanced placebo designs did not support a strong association between expectancy and aggression (Hull & Bond, 1986). Although a balanced placebo design is required to untangle pharmacological and expectancy effects, the purpose of this research was not directly concerned with this issue. Instead, the experiment was designed to examine whether alcohol would amplify the interactive effects of rumination and trigger within the TDA paradigm. To this extent, we believe that the

sober condition provided an adequate comparison condition, at least insofar as the initial exploration of alcohol's effects on TDA are concerned.

We also did not include a no-beverage control condition in addition to the sober condition. Some research suggests that participants given placebos overcompensate for the anticipated effects of alcohol, resulting in better performance on cognitive tasks relative to participants in a no-beverage control condition (Testa et al., 2006). Similarly, participants in the placebo condition might have tried to limit their aggression. However, we consider this unlikely as research demonstrates that engaging in acts of self-control actually increases subsequent aggression (DeWall, Baumeister, Stillman, & Galliot, 2007; Stucke & Baumeister, 2006).



## CONCLUSION

Our evidence shows that when provoked and exposed to a subsequent aggression-eliciting cue, namely a trigger, rumination increases aggression. Moreover, aggression was augmented among intoxicated participants. Distraction appears to be an effective means of reducing the deleterious effects of intoxication (Giancola & Corman, 2007; Josephs & Steele, 1990). We hope our results will contribute to a foundation of knowledge capable of informing evidence-based treatments designed to reduce real-world instances of alcohol and rumination-induced TDA such as intimate partner violence.

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