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The Interactive Effects of Emotion Regulation and Alcohol Intoxication on Lab-Based Intimate Partner Aggression

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This study draws on Finkel and Eckhardt’s (2013) I3 framework to examine the interactive effects of 2 emotion regulation strategies—anger rumination (an impellance factor) and reappraisal (an inhibition factor), and alcohol intoxication (a disinhibition factor)—on intimate partner aggression (IPA) perpetration as measured with an analogue aggression task. Participants were 69 couples recruited from a large Midwestern university (total N = 138). Participants’ trait rumination and reappraisal were measured by self-report. Participants were randomized individually to an alcohol or placebo condition, then recalled an anger event while using 1 of 3 randomly assigned emotion regulation conditions (rumination, reappraisal, or uninstructed). Following this, participants completed an analogue aggression task involving ostensibly assigning white noise blasts to their partner. Participants in the alcohol condition displayed greater IPA than participants in the placebo condition for provoked IPA, but not unprovoked IPA. Results also revealed interactions such that for those in the alcohol and rumination group, higher trait reappraisal was related to lower unprovoked IPA. For provoked IPA, higher trait rumination was related to greater IPA among those in the alcohol condition and those in the placebo and uninstructed condition. In general, results were consistent with I3 theory, suggesting that alcohol disinhibits, rumination impels, and trait reappraisal inhibits IPA. The theoretical and clinical implications of these findings are discussed in the context of current knowledge about the influence of alcohol intoxication and emotion regulation strategies on IPA perpetration.

Keywords: aggression, alcohol intoxication, emotion regulation, intimate partner violence

Intimate partner aggression (IPA) includes physical, sexual, or psychological acts intended to cause harm to a significant other (Centers for Disease Control and Prevention, 2006). The current study focuses on physical IPA, which occurs with alarming frequency in the United States and causes both physical and mental health problems to its victims (Amar & Gennaro, 2005; Clements, Ogle, & Sabourin, 2005; Kaura & Lohman, 2007). These adverse effects underscore the need to examine risk factors that may lead to IPA perpetration. The I3 theory is an integrative framework that suggests instigation, inhibition, and impellance are three crucial processes that underlie IPA perpetration (Finkel, 2007; Finkel & Eckhardt, 2013). This model, which has received empirical support (Finkel et al., 2012; Maldonado, DiLillo, Hoffman, 2015; Slotter et al., 2012; Watkins, DiLillo, Hoffman, & Templin, 2015), proposes that IPA perpetration occurs when individuals are unable to control urges to aggress against an intimate partner. Instigation is the provocation that leads an individual to have an urge to aggress (e.g., an insulting comment from partner). Inhibition refers to factors that reduce risk for perpetrating IPA, by increasing one’s ability to override their urges to aggress (e.g., high self-control). Impellance factors increase an individual’s risk for perpetrating aggression when he or she experiences instigation (e.g., trait anger). These three general processes can be either dispositional or situational factors. Risk for aggression is highest when individuals experience strong impellance factors and weak inhibition (or strong disinhibition) factors at the time of instigation. The current study draws on I3 framework to examine the interactive impact of two emotion regulation strategies—anger rumination (an impellance factor) and reappraisal (an inhibition factor), and alcohol intoxication (a disinhibition factor)—on IPA perpetration.

Emotion Regulation and IPA

People develop relatively stable patterns of regulating emotion (i.e., trait emotion regulation). Yet, in particular situations, individuals are still able to engage in specific strategies that are different from the strategies they typically use (i.e., state emotion regulation; Gross & Thompson, 2007). Research demonstrates that greater difficulties with emotion regulation are related to increased IPA perpetration among both men and women (Gratz et al., 2009; Shorey, Brasfield, Febres, & Stuart, 2011; Shorey, Cornelius, & Iemma, 2011; Stuart, Moore, Gordon, Hellmuth, Ramsey, & Kahler, 2006; Watkins, Maldonado, & DiLillo, 2014). These findings suggest that attempts to regulate negative emotion and anger likely impact IPA.

Two emotion regulation strategies with particular relevance to IPA are anger rumination and reappraisal (Bettencourt, Talley, Benjamin, & Valentine, 2006; Denson, Pedersen, Friese, Hahn, &
Alcohol and IPA Perpetration

Alcohol intoxication is believed to disinhibit the urge to aggress and increase risk for aggression through its psychopharmacological effects on perception and thought (Giancola, Josephs, Parrott & Duke, 2010). According to the Alcohol Myopia Model (AMM; Steele & Josephs, 1990), in situations with high inhibition conflict (i.e., situations that have strong instigation and strong inhibition cues), intoxicated individuals disproportionately process and respond to salient cues (Steele & Josephs, 1990). In situations involving interpersonal aggression, the most salient cues tend to be provoking (e.g., hearing an insult), whereas aggression-inhibiting cues (e.g., considering the consequences of aggressive actions) tend to be less salient. This myopic state brought on by intoxication leads to an increased risk for general interpersonal aggression (Giancola et al., 2010).

Consistent with the AMM, empirical findings from both general aggression (i.e., aggression toward a stranger) and IPA research suggests that alcohol intoxication increases risk for aggression. The general aggression literature has repeatedly shown that intoxicated individuals enact greater aggression toward confederates than do sober participants (Bushman & Cooper, 1990; Exum, 2006). Likewise, IPA studies suggest that individuals who are administered alcohol in the lab demonstrate greater IPA-related behaviors than do sober individuals. For example, men who receive alcohol have greater negative verbalizations during marital conflict discussions (Leonard & Roberts, 1998). Likewise, university students (Stappenbeck & Fromme, 2014) and partner-violent men (Eckhardt, 2007) who receive alcohol state a greater number of aggressive verbalizations during anger-rousing scenarios. Recent studies using daily diary methods also find that both men and women are more likely to perpetrate IPA on days that they consume alcohol (Moore, Elkins, McNulty, Kivisto, & Handels, 2011; Shorey, Stuart, Moore, & McNulty, 2014; Testa & Derrick, 2014). Further, Testa and Derrick (2014) recently demonstrated a temporal relationship between alcohol use and IPA by establishing that the likelihood of IPA perpetration increased when alcohol was consumed in the previous 4 hours. Together, these studies point to alcohol intoxication as an important proximal risk factor for IPA perpetration. Nevertheless, negative verbalizations are not a measure of physical IPA. In addition, although daily diary studies address many limitations of traditional survey research, these investigations rely on self-reports of drinking and aggressive behaviors and thus may be impacted by recall bias or social desirability. With the current study we use an experimental approach to test the proximal effects of alcohol intoxication on IPA via an analogue aggression task.

Interactions Between Emotion Regulatory Strategies and Alcohol

The I3 theory holds that IPA results from a confluence of instigating, compelling, and inhibiting factors. Thus, dispositional traits that an individual brings to a situation can be moderated by more proximal factors. As highlighted above, trait and state emotion regulation may interact to impact risk for IPA. In addition, trait and state emotion likely interact with alcohol intoxication to influence IPA perpetration. Ruminating about an anger-provoking event is an internal process that may bring provoking cues to the forefront of one’s attention, which according to the AMM, should increase the risk of IPA when one is intoxicated. Support for this possibility comes from findings that both trait and state rumination interact with alcohol to predict general aggression toward strangers (Borders, Barnwell, & Earleywine, 2007; Borders & Giancola, 2011). On the other hand, reappraisal emphasizes interpreting an angering event in a new and less negative way and, according to the AMM, focusing on these nonprovoking cues when intoxicated should decrease risk for aggression. Supporting this notion are findings that individuals high in trait reappraisal who consume alcohol express fewer IPA intentions than those given no alcohol (Stappenbeck & Fromme, 2014). The AMM and these initial results suggest that alcohol will enhance the impact of rumination and reappraisal on IPA.

Summary and Purpose of the Present Study

In sum, I3 theory and prior empirical work suggest the potential for interactive effects of emotion regulation strategies and alcohol on IPA perpetration. The purpose of the present study is to test these potential interactive effects. The specific hypotheses are as follows:

Hypothesis 1: Although the link between alcohol intoxication and general aggression is well established, well-controlled
laboratory studies examining the proximal effects of alcohol intoxication specifically on IPA are limited; thus, our first hypothesis is that participants who are intoxicated will demonstrate greater IPA perpetration than participants who consume a placebo beverage.

Hypothesis 2: The relationship between trait rumination and IPA will vary according to alcohol and emotion regulation condition, such that those in the alcohol and rumination group will have the strongest positive relationship between trait rumination and IPA. We also expect a positive relationship between trait rumination and IPA among those in the placebo and un instructed group, placebo and rumination group, and the alcohol and un instructed group; no association between trait rumination and IPA is expected among those in the placebo and reappraisal group and the alcohol and reappraisal group.

Hypothesis 3: Relations between trait reappraisal and IPA will also differ across the alcohol and emotion regulation conditions, such that those in the alcohol and reappraisal group will have the strongest negative relationship between trait reappraisal and IPA. We also expect a negative relationship between trait reappraisal and IPA among those in the placebo and un instructed group, placebo and reappraisal group, and the alcohol and un instructed group; no relationship between trait reappraisal and IPA is expected among those in the placebo and rumination group and the alcohol and rumination group.

Method

Participants

Participants were 69 couples recruited from a large Midwestern university (total N = 138). One of these participants became ill during the study, did not complete study procedures, and was excluded from all analyses. Thus, the sample used in analyses included 137 participants (68 women, 69 men). To participate, individuals had to be at least 21 years old, report at least social drinking (defined as two or more drinks at least twice a month), and be in a committed dating relationship of at least 4 months.

Participants were an average age of 23.4 years (SD = 2.5, range = 21–32) and had been in a relationship for a mean of 32.0 months (SD = 23.3, range = 4–102). Participants described their relationship as dating (44.9%), dating and living together (24.6%), engaged (10.1%), or married or marriage-like (19.7%). Most participants were seniors (37.2%), 0.7% were freshmen, 10.2% were juniors, 23.4% were graduate students, and 27% were not students. The majority of participants described themselves as straight (94.2%), 1.5% identified as lesbian, 2.9% identified as gay (male), and 1.5% identified as bisexual. Regarding race and ethnicity, 9.5% of participants identified as Hispanic/Latino, 2.2% identified as African American, 0.7% identified as American Indian, Native American, or Alaskan Native, 5.8% identified as Asian or Pacific Islander, 87% identified as White, and 3.6% identified as “other” (participants were allowed to pick more than one category so percentages may exceed 100%).

Procedures

All procedures were approved by the Institutional Review Board of the home university. Participants were recruited through several methods, including an online tool that allows undergraduate psychology students to sign up for voluntary participation in research studies, campus-wide flyers, online advertisements on Facebook and Craigslist, and emails sent to university students who were at least 21 years of age. All recruitment methods stated that the study was about alcohol, emotional processes, and relationships. Although in all cases one member of the couple was a student, nonstudent partners were allowed to participate. Because of risks associated with alcohol consumption and IPA research (and consistent with prior research; Eckhardt, 2007; Giancola, 2002, Giancola et al., 2009, Giancola, Godlaski, & Roth, 2012) the following exclusion criteria were used: (a) current/past alcohol dependence, alcohol-related treatment, or hospitalization due to alcohol use; (b) current harmful drinking as indicated by a score of 10 or greater on the Alcohol Use Disorders Identification Test (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993); (c) any past serious head injuries; (d) serious psychological symptoms; (e) abstinence from alcohol use; (f) medical contraindications to the consumption of alcohol; (g) presence of a positive breath alcohol concentration (BrAC) upon arrival; (h) a positive on a urine pregnancy test administered upon arrival; and (i) if either member of a couple indicated two or more severe acts of physical IPA in the previous year (e.g., beating up partner). Couples who met the initial inclusion criteria as determined over the phone were scheduled for a single lab visit. Participants were asked to refrain from drinking alcohol and recreational drug use 24 hours prior to their scheduled appointment, and to refrain from eating 4 hours prior to the appointment. Upon arrival, partners were taken to separate rooms for the entirety of the study. Participants were provided informed consent and screened for further eligibility criteria.

Alcohol administration. Each participant was randomly assigned to drink an alcohol or a placebo beverage. Thus, sometimes one member of the couple received alcohol and one received the placebo, sometimes both members received alcohol, and sometimes both members received the placebo. Men in the alcohol condition were administered a dose of 0.80 g per kilogram of 95% pure grain alcohol mixed at a 1:5 ratio with orange juice not from concentrate. Because of gender differences in body fat composition, women were given a dose of 0.72 g per kilogram of alcohol. Placebo beverages contained orange juice and four milliliters of pure grain alcohol mixed at a 1:5 ratio with orange juice not from concentrate. Before and after the analogue aggression task, participants rated their current level of 0.07% 15 minutes after finishing their drinks, they were given the emotion regulation strategy instructions (described below). If participants had not reached a level of 0.07% 15 minutes after finishing their drinks, they were given extra time to absorb the alcohol. Because placebo manipulations are effective for a short period of time (Bradlyn & Young, 1983), the placebo group was given the emotion regulation strategy instructions immediately after drink consumption.

Before and after the analogue aggression task, participants rated how intoxicated they were on a scale from 0 (not drunk at all) to
11 (more drunk than I have ever been). After the task participants also rated how impaired they were from 0 (no impairment) to 10 (strong impairment). To determine if participants in the placebo and alcohol condition found the alcoholic beverages to taste differently, they rated the taste of the beverages on two items. One item was a scale from 1 (very unpleasant) to 4 (very pleasant) and the other was a scale from 1 (very bad) to 5 (very good). These two items were summed to provide a beverage taste rating score. Because the experience of unpleasant stimuli has been related to negative affect and aggression (Anderson, 2001) and the two groups differed on the taste ratings, this rating score was included as a control variable in analyses.

Cognitive emotion regulation strategy manipulation. Using modeling procedures described by Ray, Wilhelm, and Gross (2008), participants identified an unresolved event or issue in their relationship in which they became very angry with their partner (angering event). After alcohol administration, each participant was randomized to a rumination, reappraisal, or uninstructed condition. In each condition, participants were instructed to think about the previously identified angering event for 2 minutes. Participants in the rumination condition were told to “think about [the event] from your own perspective and turn it over and over in your mind. Focus on those things that initially made you feel and respond the way you did” (Ray et al., 2008). Participants in the reappraisal condition were asked to “think about [the event] from a different perspective from the one you used earlier. For example, you might try to see this event from the perspective of an impartial observer” (Ray et al., 2008). Finally, the uninstructed condition participants were asked to think about the event with no further instructions.

Two manipulation checks were employed to ensure that (a) recalling the event was successful in changing participants’ mood and (b) participants adhered to the emotion regulation strategy instructions. Participants completed a modified version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), consisting of 15 negative (e.g., “upset”) and positive (e.g., “happy”) emotion adjectives. Participants completed these ratings before and after event recall. Changes in positive affect and negative affect, from pre- to postevent recall were examined. Specific changes in anger were also examined by producing an anger summary score with five adjectives: “angry,” “hostile,” “irritable,” “disgusted,” and “annoyed” (see also Eckhardt, 2007; Maldonado et al., 2015). Alphas for the current sample were as follows: .75 for prerecall positive emotion, .85 for postrecall positive emotion, .68 for prerecall negative emotion, .82 for postrecall negative emotion, .65 for prerecall anger, and .82 for postrecall anger. Participants also rated the extent to which they thought about the event from their own perspective or from another person’s perspective on a 5-point Likert scale.

Analogue aggression task. In vivo intimate partner aggression was measured with a competitive computer reaction time (RT) task based on the Taylor Aggression Paradigm (Bushman & Baumeister, 1998; Taylor, 1967). The Taylor Aggression Paradigm and other similar laboratory paradigms have received strong support as reliable and valid measures of aggressive behavior for both men and women (Giancola & Chernack, 1998; Hoaken & Pihl, 2000). Participants were informed that they would play a RT game against their partner. Participants were not actually playing their partner; instead, the game responded to each person in the same way. Participants were instructed to complete a series of trials in which they press a button as quickly as possible after an onscreen stimulus changes color. Before each trial, participants designate a length (from 0 to 5 s) and volume (a level ranging from 0 to 10) of white noise to ostensibly be blasted over the headphones of their partner if they win and their partner loses. The noise levels range from 1 (60 decibels) to 10 (105 decibels) in 5-decibel increments. The noise duration is recoded to range from 0 (0 s) to 10 (5 s). The 105 decibel level is uncomfortable to hear but does not cause pain and is not harmful. Participants also have the option of choosing 0, which produces no sound and gives a nonaggressive alternative. Two outcome variables were created by averaging the noise intensity and noise duration from the first trial and the second trial. The first trial has been shown to provide the best measure of unprovoked aggression because participants have not yet received a blast of white noise from their ostensible opponent (Bushman & Baumeister, 1998). Consistent with prior research (Watkins et al., 2015), the second trial is a measure of provoked aggression because it occurs following a blast of maximum intensity and duration perceived to come from the participant’s partner. Individuals’ designations on the second trial were considered to be the best measure of provoked aggression because this is the only trial in which participants respond to receiving the maximum length and volume of white noise.

Positive mood induction and debriefing. After completion of data collection (which took approximately 1.5 hours for those in the placebo condition and approximately 2 hours for those in the alcohol condition due to the absorption period) participants watched two film clips that have been found to increase feelings of contentment (Gross & Levenson, 1995). Then, all participants were asked about their experience and thoughts about the study. Participants were fully debriefed, verbally and in writing. Once participants who consumed alcohol reached a BrAC of 0.03% or lower and passed a field sobriety test, they either had a friend pick them up or they took a study-provided taxi. Participants could receive course credit or compensation ($10 per hour) for their participation.

Measures

Trait rumination. The Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) was used to assess trait rumination. The ARS measures individuals’ tendency to focus on angry moods, remember past anger experiences, and think about the causes and consequences of anger episodes. Participants are instructed to respond to each of 19 items on a scale from 1 (almost never) to 4 (almost always). The items are summed to form a scale score, with higher values indicating greater rumination. The ARS has adequate internal consistency and test–retest reliability (Sukhodolsky et al., 2001). The internal consistency in the current sample is .90.

Trait reappraisal. Trait reappraisal was measured with the six-item reappraisal subscale of the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). Participants are instructed to indicate how much they agree with each item on a scale from 1 (strongly disagree) to 7 (strongly agree). The ERQ has good internal consistency and test–retest reliability (Gross & John, 2003). The alpha for the current sample is .73.

History of IPA perpetration. To control for history of IPA perpetration and facilitate comparison to past studies, physical IPA
was assessed with the 12-item Physical Assault subscale from the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996). Participants indicated the frequency at which they perpetrated each aggressive behavior against their partner during the previous 6 months from 0 (never) to 7 (more than 20 times). The number of endorsed items was summed, with higher values indicating more acts of IPA. For descriptive purposes, a dichotomous variable was created indicating whether or not each individual had any perpetrated aggression in the previous six months.

**Analytic Approach**

Both members of each couple assigned their partner white noise. These outcome variable observations, one from each member of a given couple, violate the ordinary least squares regression assumption of independence, which rules out the conventional analysis of variance approach. As such, multilevel modeling (MLM; Kenny, Kashy, Cook, 2006) was used to examine the effects of emotion regulation and alcohol on IPA. In the case of dyadic data, MLM treats the data from each partner as nested scores within a group of 2. The degree of nonindependence between outcomes was estimated as a covariance with a compound symmetry covariance structure (Campbell & Kashy, 2002; Kenny et al., 2006).

The first trial of the RT game exhibited a normal distribution and no excess skew or kurtosis. The multilevel model for this trial was estimated using maximum likelihood within SAS PROC MIXED. The second trial of the RT game was censored from above, such that about one fifth of the sample had the highest possible value of 10, indicating that the use of methods that assume a normal distribution of residuals would be biased. Thus, a multilevel censored regression model was used, which is a generalization of the standard Tobit model. This model quantifies the proportion of the sample that was unable to assume any value higher than the censoring limit of 10. The multilevel censored model was estimated using maximum likelihood via numerical integration within SAS PROC NLMIXED.

Because alcohol and emotion regulation conditions were categorical, they were dummy-coded to conduct group comparisons. Two dummy codes were computed from the emotion regulation strategy conditions that reflect comparisons between (a) the uninstructed group and the reappraisal group, and (b) the uninstructed group and the reappraisal group. All continuous variables (e.g., trait emotion regulation) were centered so that 0 equaled their mean. Interaction terms were computed by multiplying variables together. Nonsignificant, unnecessary interactive effects were discarded one-at-a-time. In addition to the main independent variables, we controlled for gender, past IPA perpetration, recent alcohol use and problems (AUDIT score), and beverage taste ratings. All estimates reported in the Results section are unstandardized coefficients. A total $R^2$ is used to describe effects size and was calculated as the square of the correlation between the actual outcomes and the outcomes predicted by the model fixed effects.

**Results**

**Data Descriptives**

During debriefing, six participants (4.4%) indicated they were suspicious they were not playing their partner after completing the first aggression trial. Thus, these participants’ second trial was not used in analyses. One participant indicated not following the emotion regulation directions and thus was not used in analyses examining emotion regulation effects.

Descriptives for study variables are displayed in Table 1. Regarding physical IPA, 7.2% of men and 16.2% of women perpetrated at least one act of physical IPA during the prior 6 months. These rates appear to be lower than what is typically found among similar samples (e.g., 20–30%; Shorey et al., 2008). Trait rumination was significantly negatively correlated to trait reappraisal, $r = -.31, p < .01$. Partners’ Trial 1 and Trial 2 aggression scores were not significantly correlated ($r = -.16$ and $r = .09$, respec-

<table>
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**Note.** IPA = Intimate partner aggression.

* Indicates mean is significantly higher than other gender.
tively. Individuals’ Trial 1 and Trial 2 scores were significantly correlated, \( r = .49, p < .01 \)

**Alcohol manipulation.** Sixty-eight participants were randomized to the alcohol condition (35 women, 33 men), whereas 69 participants were assigned to the placebo condition (33 women, 36 men). All participants in the alcohol condition reached a peak measured BrAC of over .07%. The average BrAC in the alcohol group was .090% (SD = 0.018) before the anger event recall and .097% (SD = 0.018) after the RT game. Participants in the alcohol group reported feeling significantly more intoxicated after anger event recall, \( t(135) = -11.90, p < .001 \), and after the RT game, \( t(135) = -9.96, p < .001 \), than the participants in the placebo group. The alcohol group also reported greater impairment during the RT game, \( t(135) = -6.49, p < .001 \). These differences are consistent with prior alcohol administration research (e.g., Giancola et al., 2012; Eckhardt, 2007). Participants in the placebo group reported that their drinks tasted significantly better than participants in the alcohol group, \( t(135) = 7.14, p < .001 \).

**Emotion induction and emotion regulation manipulations.** Forty-four participants were randomly assigned to the rumination condition (25 women, 19 men), 49 were assigned to the reappraisal condition (23 women, 26 men), and 44 were assigned to the uninstructed condition (20 women, 24 men). In the rumination condition, 22 participants were assigned to drink alcohol and 22 participants drank the placebo beverage. In the reappraisal condition, 24 participants drank alcohol and 25 drank the placebo beverage. In the uninstructed condition, 22 participants drank alcohol and 21 drank the placebo beverage.

To ensure that recall of the anger-event produced the desired changes in emotions, differences in participants’ prerecall and postrecall emotion scores were examined as a function of emotion regulation condition with a repeated-measures analysis of variance. Results revealed an increase in negative emotion, \( F(1, 133) = 3.80, p = .05 \), and anger, \( F(1, 133) = 19.08, p < .001 \), and a significant decrease in positive emotion, \( F(1, 133) = 36.69, p < .001 \). Reports of emotion did not differ by emotion regulation condition for negative \( F(2, 133) = 1.29, p = .28 \), anger, \( F(2, 133) = 0.80, p = .45 \), or positive emotion, \( F(2, 133) = 1.03, p = .36 \) from pre- to postrecall. Alcohol and trait emotion regulation were then included in the models, which showed that alcohol impacted positive emotion, \( F(1, 128) = 5.63, p < .05 \), but not negative emotion, \( F(1, 128) = 0.57, p = .61 \), or anger, \( F(1, 128) = 0.26, p = .61 \). Follow-up analyses indicate that positive affect decreased in both the alcohol condition, \( t(67) = 2.39, p = .02 \), and the placebo condition, \( t(68) = 6.11, p < .001 \). Before event recall, the alcohol and placebo condition did not differ significantly on the positive affect, \( t(135) = -0.94, p = .35 \), but after event recall the alcohol group had significantly greater positive affect than the placebo condition, \( t(135) = -2.58, p = .01 \). Both trait reappraisal and trait rumination did not impact positive \( F(1, 128) = 0.49, p = .49 \); \( F(1, 128) = 0.004, p = .95 \), anger \( F(1, 128) = .93, p = .34 \); \( F(1, 128) = 2.25, p = .14 \), or negative emotion \( F(1, 128) = .74, p = .39 \); \( F(1, 128) = 0.66, p = .42 \). Overall, these results provide consistent evidence that the anger-event recall task produced significant changes in emotion, as expected, and that emotion regulation strategies did not impact changes in emotion.

Further, responses to the in vivo strategy-use question, in which higher scores indicate taking someone else’s perspective during event recall and lower scores indicated taking one’s own perspective, differed among the three groups, \( F(2, 133) = 42.947, p < .001 \). Post hoc comparisons using Fisher’s least significant difference (LSD) test revealed that the reappraisal group mean (\( M = 3.49, SD = 0.82 \)) was significantly higher than the rumination group mean (\( M = 1.95, SD = 0.83 \)) and the uninstructed group mean (\( M = 2.26, SD = 0.90 \)), but that the rumination and uninstructed group means did not significantly differ. This lack of difference between rumination and uninstructed conditions intuitively makes sense; if an individual is instructed to think about a past personal event, he or she would most likely think about it from his or her own perspective.

**Results for Hypothesis 1**

Our hypothesis that participants who were assigned to the alcohol intoxication condition would demonstrate greater IPA perpetration compared to participants who did not consume alcohol was partially supported. The alcohol and placebo groups did not differ in their unprovoked IPA (Trial 1; Est. = .41, \( p = .18 \)). Yet, consistent with hypotheses, for provoked IPA (Trial 2), participants in the alcohol group allotted 1.97 (\( p < .01 \)) greater noise levels than the participants in the placebo group.

**Results for Hypothesis 2 and 3**

Next, interactions between alcohol and emotion regulation and control variables were added to the models. To ease readability, these results are presented by outcome (i.e., unprovoked IPA and provoked IPA).

**Unprovoked IPA.** The model parameters for unprovoked IPA are displayed in Table 2. This model accounted for 25.0% of the variance in unprovoked IPA. Two significant main effects were found. As recent alcohol use and problems increased, unprovoked IPA increased (Est. = 0.19, \( p = .03 \)). The effect of trait rumination was significant, indicating that as trait rumination increased, unprovoked IPA was expected to increase (Est. = 0.04, \( p = .02 \)). A significant (Est. = -0.36, \( p = .02 \)) negative three-way interaction was found between alcohol intoxication, emotion regulation strategy condition (specifically uninstructed vs. rumination), and trait reappraisal. This three-way interaction revealed that the interaction of alcohol intoxication by uninstructed-rumination was more negative as trait reappraisal increased. To further illustrate this three-way interaction, simple effects of trait reappraisal were also estimated (see Figure 1). These analyses indicated that trait reappraisal was only significantly related to unprovoked IPA among individuals who were in both the alcohol and rumination condition. Specifically, the effect of trait reappraisal was not significant in the placebo and uninstructed group (Est. = -0.08, \( p = .28 \)), the placebo and reappraisal group (Est. = -0.08, \( p = .35 \)), the placebo and rumination group (Est. = 0.01, \( p = .87 \)), the alcohol and uninstructed group (Est. = 0.05, \( p = .44 \)), or the alcohol and reappraisal group (Est. = 0.07, \( p = .34 \)). However, among the alcohol and rumination group, for every one-unit increase in trait reappraisal, unprovoked IPA was expected to decrease by 0.21 (\( p > .01 \)).

**Provoked IPA.** The final model parameters predicting Trial 2 after removing nonsignificant interactive effects are presented in Table 3. This model accounted for 20.0% of the variance in Trial 2. No main effects emerged as significant, but a significant posi-
A three-way interaction was found between alcohol intoxication, emotion regulation condition, and trait rumination (Est. = 0.44, p = .03). This three-way interaction revealed that the interaction of alcohol intoxication by un instructed-rumination was significantly more positive as trait rumination increases. Simple effects of trait rumination were estimated to further illustrate the three-way interaction (see Figure 2). Among individuals who were in the placebo and un instructed group, trait rumination positively predicted IPA on Trial 2 (Est. = 0.27, p = .02). The effect of trait rumination was not significant in the placebo and reappraisal group (Est. = 0.06, p = .47), the placebo and rumination group (Est. = 0.12, p = .17), the alcohol and un instructed group (Est. = −0.07, p = .47), or the alcohol and reappraisal group (Est. = −0.04, p = .68). Trait rumination did significantly predict Trial 2 IPA among the alcohol and rumination group, such that for every one-unit increase in trait rumination, Trial 2 IPA was expected to increase by 0.27 (p = .02).

**Table 2**

**Parameters for Unprovoked IPA Model**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Est.</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variables</td>
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<tr>
<td>Gender</td>
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<td>.09</td>
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<tr>
<td>Beverage taste rating</td>
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<td>.41</td>
</tr>
<tr>
<td>IPA history</td>
<td>−0.34</td>
<td>0.33</td>
<td>.30</td>
</tr>
<tr>
<td>Recent alcohol use and problems</td>
<td>0.19</td>
<td>0.08</td>
<td>.03</td>
</tr>
<tr>
<td>Primary IVs and interactions among IVs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beverage condition</td>
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<td>0.53</td>
<td>.83</td>
</tr>
<tr>
<td>Uninstructed vs. Rumination</td>
<td>0.32</td>
<td>0.54</td>
<td>.55</td>
</tr>
<tr>
<td>Uninstructed vs. Reappraisal</td>
<td>−0.07</td>
<td>0.51</td>
<td>.89</td>
</tr>
<tr>
<td>Trait rumination</td>
<td>0.04</td>
<td>0.02</td>
<td>.02</td>
</tr>
<tr>
<td>Trait reappraisal</td>
<td>−0.08</td>
<td>0.08</td>
<td>.28</td>
</tr>
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<td>Beverage Condition × Uninstructed vs. Rumination</td>
<td>0.46</td>
<td>0.75</td>
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<tr>
<td>Beverage Condition × Uninstructed vs. Reappraisal</td>
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<td>Beverage Condition × Trait Reappraisal</td>
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<tr>
<td>Uninstructed vs. Rumination × Trait Reappraisal</td>
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<td>0.12</td>
<td>.41</td>
</tr>
<tr>
<td>Uninstructed vs. Reappraisal × Trait Reappraisal</td>
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<tr>
<td>Beverage Condition × Trait Reappraisal</td>
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<tr>
<td>Beverage Condition × Uninstructed vs. Reappraisal</td>
<td>0.01</td>
<td>0.15</td>
<td>.92</td>
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</table>

**Note.** IPA = intimate partner aggression; IV = independent variable. Uninstructed vs. rumination and uninstructed vs. reappraisal reflect the dummy code comparisons between (a) the uninstructed group and the rumination group and (b) the uninstructed group and the reappraisal group.

**Figure 1.** Interaction between alcohol condition, emotion regulation condition, and trait reappraisal predicting unprovoked intimate partner aggression (IPA). The midpoint on the x-axis is the mean of trait reappraisal (31.5) and values to the left of the middle are 1 SD (26.7) and 2 SDs below the mean (21.9), while values to the right are 1 SD (36.3) and 2 SDs above the mean (41.0).

**Discussion**

The present study examined the proximal effects of the emotion regulatory strategies of anger rumination and reappraisal and alcohol intoxication on IPA perpetration. Consistent with I3 theory, the relationship between trait emotion regulation and IPA varied depending on the presence of a provocation following an angering event, instructions to ruminate or reappraise the angering event, and levels of trait rumination and reappraisal. Below we elaborate on these findings and discuss their theoretical and clinical implications.

First, our predictions for the effects of alcohol on IPA were partially supported. As expected, alcohol intoxication disinhibited the urge to aggress and contributed to the emergence of greater IPA perpetration on the second trial. This finding adds to the literature supporting the proximal relationship between alcohol intoxication and IPA (Eckhardt, 2007; Testa & Derrick, 2014), and may be the first to demonstrate this effect using random assignment to alcohol conditions and in vivo measurement of IPA. In contrast to findings from the second trial, those in the alcohol condition did not perpetrate greater IPA on the first trial. Though unexpected, these findings may be interpreted within the AMM. Whereas the second trial took place after participants had been blasted with white noise (a salient provoking cue likely to captivate the attention of intoxicated individuals), no such intense
provocation occurred in the first trial, reducing the risk of myopia-related aggression among those in the drinking condition.

Consistent with I3 theory, trait reappraisal, state rumination, and alcohol intoxication interacted to predict unprovoked IPA. However, unexpectedly, higher trait reappraisal was associated with less IPA only among individuals in the alcohol and rumination conditions. Although we did not expect this relationship among these conditions, it is somewhat consistent with the I3 model and has important implications. Those lower in trait reappraisal who were in the rumination and alcohol conditions displayed the highest levels of unprovoked IPA. Individuals with lower trait reappraisal may have succumbed to the disinhibiting properties of alcohol and impelling effects of rumination, leaving them less able to control urges to aggress against their partners. Conversely, the regular use of reappraisal may be a protective (inhibiting) factor against IPA perpetration, even in the presence of intoxication and rumination. Thus, those higher in trait reappraisal may have resisted aggressive urges brought on by alcohol and rumination by using skills such as considering their partner’s perspective when recalling the anger event. If so, these findings suggest that regular use of reappraisal may enable one to redirect alcohol’s myopic effect to less provoking cues as well as counteract the preservative qualities of rumination, at least as they relate to IPA. This potential benefit of trait reappraisal is consistent with recent evidence that regular use of reappraisal may be a protective factor against IPA perpetration in response to partner conflict (Finkel, Slotter, Luchies, Walton, & Gross, 2013).

With further provocation (i.e., being blasted by white noise ostensibly from one’s partner), trait and instructed rumination interacted with alcohol intoxication to predict greater IPA perpetration. Consistent with I3 theory, and as expected, when individuals experienced a strong instigation, the impelling influences of high trait rumination, and ruminated about an angering event, alcohol intoxication appears to have disinhibited the ability to control aggressive urges. This finding comports with the AMM by suggesting that among high trait ruminators who were intoxicated, the provoking cue of the intense noise blast on the first trial was highly salient—more so than nonprovoking cues (e.g., that retaliating with a high blast may hurt their partner or result in greater retaliation from their partner on the next trial)—resulting in greater aggression on the second trial. In addition, higher trait rumination impelled sober individuals who received no emotion regulation instructions to perpetrate greater Trial 2 IPA. This finding suggests

<table>
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<th>Predictors</th>
<th>Est.</th>
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<th>p</th>
</tr>
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<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Beverage taste rating</td>
<td>0.08</td>
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<td>IPA history</td>
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<td>Recent alcohol use and problems</td>
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<td>Primary IVs and interactions among IVs</td>
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</tr>
<tr>
<td>Beverage condition</td>
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<td>1.25</td>
<td>.23</td>
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<tr>
<td>Uninstructed vs. Rumination</td>
<td>1.20</td>
<td>1.20</td>
<td>.32</td>
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<tr>
<td>Uninstructed vs. Reappraisal</td>
<td>0.28</td>
<td>1.16</td>
<td>.81</td>
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<tr>
<td>Trait rumination</td>
<td>0.22</td>
<td>0.09</td>
<td>.03</td>
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<tr>
<td>Trait reappraisal</td>
<td>-0.10</td>
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<td>.21</td>
</tr>
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<td>Beverage Condition × Trait Rumination</td>
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<td>Uninstructed vs. Reappraisal × Trait Rumination</td>
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<td>0.12</td>
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<td>Uninstructed vs. Rumination × Trait Rumination</td>
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<td>0.13</td>
<td>.46</td>
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<tr>
<td>Beverage Condition × Uninstructed vs. Reappraisal × Trait Rumination</td>
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<td>Beverage Condition × Uninstructed vs. Rumination × Trait Rumination</td>
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<td>0.19</td>
<td>.03</td>
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</table>

Note. IPA = intimate partner aggression; IV = independent variable. Uninstructed vs. rumination and uninstructed vs. reappraisal reflect the dummy code comparisons between: 1) the uninstructed group and the rumination group, and 2) the uninstructed group and the reappraisal group.

Figure 2. Interaction between alcohol condition, emotion regulation condition, and trait rumination predicting provoked intimate partner aggression (IPA). Because, 2 SDs below the trait rumination mean was not in the sample’s range of values it is not included in this graph. The trait rumination mean is the second value from the left in Figure 2. Values increase by 1 SD away from the mean.
that after dwelling on a past conflict with their intimate partner and being provoked by a partner, high trait ruminators may resort to aggression more often than do low trait ruminators.

Although the influence of alcohol intoxication and emotion regulation strategies worked similarly across genders, men exhibited greater unprovoked aggression than women when controlling for other predictors. Although past research has found men to aggress at higher levels than women on lab-based paradigms (DeSteno, Valdesolo, & Bartlett, 2006; Giancola et al., 2009), a previous study with couples using the same aggression paradigm used here found no gender differences (Watkins et al., 2015). Further, the finding that the effect of alcohol on IPA did not vary across genders differs from past studies showing a stronger relationship between alcohol and general aggression among men (Giancola, 2002; Hoaken & Pihl, 2000). Nevertheless, the present finding is consistent with results from a daily diary study, which found no gender differences in the impact of drinking on IPA (Testa & Derrick, 2014). It is possible that the effect of alcohol differs across genders for general aggression, but not for IPA. Given that women perpetrate IPA at similar or slightly higher rates than men (Archer, 2000), alcohol may influence each gender’s IPA perpetration similarly.

Limitations of this study suggest directions for future research. First, the sample consisted primarily of European Americans who were students at a large university. These factors, as well as the extensive exclusion criteria required to conduct alcohol administration studies, limit the generalizability of the results. It is important for future research to examine the effects of alcohol and emotion regulation strategies among community couples and individuals with a more severe IPA history. Finally, although a strength of the current study was the inclusion of a RT task to measure in vivo IPA, some argue that laboratory-based aggression paradigms are not the best indicators of actual aggression (see Tedeschi & Quigley, 1996 and Giancola & Chermack, 1998 for a rebuttal). In addition, we used the second trial as a measure of provoked aggression, which has limited use in prior research. Future work should examine the correspondence of these reactions to everyday acts of provoked aggression. Further, using this task with a sample of couples produced some challenges. For example, several participants reported that they became aware that they were not playing their partner during the task. Participants may have become suspicious because the maximum blast of noise they received on the first trial could have been an atypical behavior for their partner. Future research could develop and examine different analogue IPA tasks to determine the task with the best external validity. Finally, our study did not include a no-alcohol control group. Although meta-analytic studies find no differences between no-alcohol and placebo control groups, placebo groups may sometimes produce compensatory responses that could reduce aggression compared to no-alcohol control groups (Bushman & Cooper, 1990). Future studies could include a no-alcohol control group.

Given that the current study was conducted among relatively low-risk couples who were asked to recall a conflict (rather than engage in an actual argument), these interactive effects may be stronger among higher risk couples in a natural setting (couples drinking at higher levels and engaging in actual conflicts with each other). Further work is needed to examine the interactive effects of alcohol intoxication and emotion regulation strategies during conflict. Our finding that alcohol intoxication may increase IPA underscores the importance of addressing alcohol use in IPA treatment programs (see, e.g., O’Farrell, Fals-Stewart, Murphy, & Murphy, 2003). Results further suggest that interventions that focus on building emotion regulation skills may help to reduce IPA. For example, those low in trait reappraisal may benefit from a series of brief trainings to boost the regular use of reappraisal. Past research indicates that eight 10-min reappraisal trainings over the course of a semester can increase trait reappraisal (Barlett & Anderson, 2011). Further, regular use of reappraisal rather than in-the-moment instructed reappraisal has the potential to help intoxicated individuals’ redirect myopic attention to less provoking cues (i.e., by taking another’s perspective rather than their own). Finally, mindfulness training and cognitive–behavioral therapies that explicitly target rumination have been found to reduce ruminative thinking associated with depression (Deyo, Wilson, Ong, & Koopman, 2009; Watkins et al., 2007). These interventions could potentially be adapted for individuals prone to anger rumination.

Overall this study suggests the importance of alcohol intoxication and emotion regulation as predictors of partner aggression. Most notably, the consistent use of reappraisal appears to serve as a protective factor for IPA even when intoxicated, whereas anger rumination exacerbates the likelihood of physically harming one’s partner while under the influence of alcohol. This study highlights the need to teach reappraisal strategies and address ruminative thinking styles and alcohol use in IPA prevention programs and interventions.

References


