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The Effects of Alcohol-Related Stimuli Priming on the Expression of Relational Aggression

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ABSTRACT

The semantic network model of memory states that concepts closely related (e.g., pencil-paper) are stored together in memory (Posner & Snyder, 1975). When one concept is activated, other related concepts becoming more accessible, which increases the likelihood that related concepts will influence behavior. Past research has established a link between aggressive behaviors after exposure to alcohol-related words (Bartholow, Grosvenor, Pedersen, Truong, & Vasquez, 2014). Previous research has also shown that alcohol outcome expectancies contribute to problematic drinking behavior (Fromme, Stroot, & Kaplan, 1993). In the present study, alcohol outcome expectancies of each participant were assessed by the CEOA questionnaire. Then, participants were randomly assigned to one of four conditions: control – aggression, control – non-aggression, alcohol – aggression, or alcohol – non-aggression. The two alcohol conditions included priming with alcohol-related words (beer, vodka), and the two control conditions including priming with non-alcoholic words (milk, soda) by use of the Lexical Decision Task. The current study sought to explore the effect of alcohol-related stimuli priming on the expression of relational aggression in a sample of 70 college students ($M_{age} = 19.40$; $SD = 1.64$). Statistical analyses revealed a significant difference between the control – aggression group and the alcohol – aggression group on the rating of experimenter performance using a three-item hostility assessment. These findings show the effect of alcohol-related words on an individual's relational aggression behaviors, without the involvement of any alcohol consumption. Implications, limitations, and future directions are further discussed.

Key words: interpersonal aggression, physical aggression, alcohol outcome expectancies, alcohol-related priming

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The Effects of Alcohol-Related Stimuli Priming on the Expression of Relational Aggression

Approximately 88,000 people die from alcohol-related deaths every year in the United States alone. This makes it the third leading preventable cause of death in the nation (Substance Abuse and Mental Health Services Administration, 2013). Problematic alcohol use remains a prevalent issue among college students in America today. (Hingson, 2010). The results of a recent survey conducted by the National Data Survey on Drug Use and Health (2010) showed that individuals between the ages of 18 -22, who were enrolled as full-time college students, were more likely to report current heavy drinking compared to those who were between the ages of 18-22 and not full-time college students. It is clear that college students are a special population in regards to problematic drinking behaviors.

Alcohol Outcome Expectancy Theory

According to alcohol outcome expectancy theory, an individual holds general assumptions of what to expect both physically and psychologically if they were to consume alcohol, and these are known as *alcohol outcome expectancies*. These expectancies can be broken down into positive expectancies and negative expectancies (Jones, Corbin, & Fromme, 2001). For instance, the scoring of the Comprehensive Effects of Alcohol questionnaire (Fromme, Stroot, & Kaplan, 1993) presents a clear separation between the positive and negative expectancies and all of the categories that belong to each type. Positive expectancies include: sociability (e.g., "It would be easier to talk to people"), tension reduction (e.g., "I would feel calm"), liquid courage (e.g., "I would feel brave and daring"), and sexuality (e.g., "I would enjoy sex more"). Negative expectancies include: cognitive and behavioral impairment (e.g., "I would neglect my

obligations"), risk and aggression (e.g., "I would act aggressively), and self-perception (e.g., I would feel self-critical"). Past research shows that problem drinkers usually hold more positive expectations about the effects of alcohol when compared to social drinkers. Heavier drinkers also tend to regard the negative effects of alcohol as less important than do lighter drinkers (Reis & Riley, 2000). It is important to understand the different alcohol outcome expectancies because they have a strong influence on a person's experience with alcohol.

Previous research has shown that the positive expectancies predict future drinking in nondrinking adolescents. Certain alcohol expectancies are closely related to specific populations. For example, the sociability expectancy tends to be more important for men with psychological issues (Smith, Goldman, Greenbaum, & Christiansen, 1995). Also, a positive correlation between the cognitive and behavioral impairment expectancy and drinking levels exists, in that the evidence points to this expectancy not being viewed as negatively in college students with problematic drinking habits (Ham & Hope, 2003). However, these alcohol expectancies still affect the behavior of individuals who consume alcohol.

A large body of literature has established a link between alcohol expectancies and alcohol use on subsequent aggressive-related behaviors (e.g., Friedman, Bartholow, Hicks, & McCarthy, 2007). Past research has shown that people who expect alcohol to make them aggressive actually become more aggressive while intoxicated (Bartholow & Engelhardt, 2013). Furthermore, these expectations and beliefs about alcohol do not have to involve personal experience, but can be learned vicariously. For instance, research has shown elementary school children with no personal drinking histories still hold

expectancies about the effects of alcohol (Jester, Wong, Cranford, Buu, Fitzgerald & Zucker, 2014), which indicates the relevance of investigating expectancies in a sample of college students, of which many are under the legal drinking age. Research has also shown that these expectancies of alcohol can also influence a person just by the priming of alcohol-related stimuli. The process occurs by activating links to aggression in the participant's long-term memory, which increases the chance of an aggressive response from the individual (Bartholow & Heinz, 2006). The use of only alcohol-related stimuli is powerful enough to evoke a change in behavior strong enough to be detected.

Measures of Participant Aggression Levels

A variety of methods have been used in past research designs to evoke and measure levels of aggression in participants. In a historic example, Buss (1963) used an "Aggression Machine" in which participants could administer a shock to mock subjects whom they thought were actually real. Participants could choose at what level of intensity to shock the mock subjects, and those levels served as a measure of displayed aggression. Another common task used to measure aggression is the Competitive Reaction Time task, wherein the participant believes they are competing with another individual in a competitive situation. The participant is told that the loser of the task must listen to a loud noise blast as punishment, and the winner determines the level and duration of each noise blast administered. The study is designed in a way that the participant is always the winner. Aggression is measured by the intensity and duration of the noise blast (Brown, Coyne, Barlow, & Qualter, 2010). These procedures represent creative ways to assess for physical aggression in participants.

A variety of studies have supported the effectiveness of inducing physical aggression in participants. Thesis research conducted by Hooks (2012) used the Competitive Reaction Time task, along with more overt ways of provoking aggression in the participants. The researcher argued with all of the participants throughout the study, while also intermittently ignoring each participant. In the middle of the study the researcher would answer their cellphone and have a loud phone conversation with the other research assistant, as past research has shown overhearing a one-sided phone conversation is annoying and causes poor performance on cognitive tasks (Emberson, Lupyan, Goldstein, & Spivey, 2010). Near the end of the study the researcher told the participants that they were leaving early to meet up with a friend, and the research assistant would enter and complete the procedure. At the end of the session the participants completed a research evaluation form to measure for relational aggression. The results showed a correlation between alcohol consumption and aggressive beliefs but only for the condition that primed alcohol-related stimuli. The current study will investigate whether a correlation between problematic alcohol use and the alcohol-aggression related expectancies exist.

Measurement of aggression is not limited to only physical qualities, but also can encompass relational aspects of aggression. Relational aggression can be understood as behavior toward another person that is aimed at damaging an individual's social status through any act that does not involve physical contact, such as ostracism or teasing (Crothers, Kolbert, Kanyongo, Field, & Schmitt, 2014). The connection between gender and relational aggression has received much attention in previous research. The findings state that males tend to display more overt forms of physical aggression and females tend

to be display more relational aggression (Crick & Grotpeter, 1995). Past research has also shown that young adults, who are characterized as relationally aggressive by their peers, tend to have difficulty with control their anger and impulsivity (Werner & Crick, 1999). In this study relational aggression primarily took the form of damaging the researcher's reputation with their supervisor by rating them poorly on the evaluation form.

Priming Alcohol-related Aggression

Recent evidence indicates that people do not need to actually consume alcohol to have increased aggressive thoughts and behavior—mere exposure to alcohol-related cues can increase aggression (Bartholow, Grosvenor, Pedersen, Truong, & Vasquez, 2014). A notable theory of how these alcohol-related cues lead to aggression is the semantic network model of memory (Posner & Snyder, 1975). It posits that concepts that frequently co-occur (e.g. 'bread' and 'butter') or that share similar meaning ('kill' and 'death') are stored closely together in memory. When one concept is activated, other related concepts also become more accessible through a spreading activation process, which increases the likelihood that those related concepts will impact behavior.

Alcohol-related stimuli have been primed in the past by using various techniques. For instance, advertisements and general alcohol photographs have been used in previous research to explicitly prime participants (Hooks, 2012; Monem; 2015). The Lexical Decision Task (LDT) has been used in previous research to implicitly prime participants with alcohol-related stimuli (Bartholow & Heinz, 2006; Friedman et al., 2007). This study will expand on the work of Friedman et al. by using the LDT to prime alcohol-related words and control words.

Purpose of Study

Previous research on alcohol-related aggression conducted by Friedman et al. (2007) limited their measurement of alcohol expectancies related to risk, aggression, and social beliefs about alcohol. This study sought to replicate and expand on their findings by assessing a broader range of alcohol expectancies, alcohol use, and aggression-related behaviors to more thoroughly investigate these relationships within a college sample.

Aim 1. The first aim was to investigate the alcohol outcome expectancies in a college-age sample. Seven subscales comprise the Comprehensive Effects of Alcohol (CEOA) questionnaire: Sociability, Sexuality, Tension Reduction, Liquid Courage, Cognitive and Behavioral Impairment, Risk and Aggression, and Self-Perception. Expanding on the work of Friedman, et al. (2007), who only used the Risk/Aggression and Sociability subscales, this study used all of the subscales to explore alcohol-related expectancy associations with problematic drinking in a college-age population in the South.

Hypothesis 1. It was predicted that participants would positively associate risk and aggression, sociability, and sexuality with problematic drinking.

Aim 2. The second aim was to replicate and expand upon the findings of the original study conducted by Friedman et al. (2007), who used the Lexical Decision Task to elicit aggressive thoughts and behaviors. The original study found that individuals with stronger expectancies that alcohol increases aggression treated the experimenter with more hostility after instigation. In the original study, there were only two conditions: control words and alcohol-related words, and all participants were instigated for aggression. This study will add two more conditions for a total of four different

conditions: control – aggression, control – non-aggression, alcohol – aggression, or

alcohol – non-aggression. The difference between the four conditions will be observed in

order to fully investigate the effect of the instigation of relational aggression.

Hypothesis 2. Participants in control groups who receive non-alcohol-related

words will have lower levels of aggression than participants in the experimental

groups who receive alcohol-related words.

Method

Participants

A total of 79 undergraduate participants enrolled at a southern university completed this study. Control items were placed randomly within the questionnaires to ensure vitality of the data. Participants who failed to correctly respond to a control item were removed from the data analysis ($N = 9$). The remaining participants ($N = 70$) consisted of college students (male: $n = 27$, 38.60%; female: $n = 43$, 61.40%). College freshmen ($n = 37$, *52.90%*), sophomore ($n = 18$, 25.70%), junior ($n = 9$, 12.90%), and senior ($n = 6$, 8.60%) students participated in this study to earn credit for partial fulfillment of their undergraduate psychology course requirements (note: students were offered alternative assignments if they did not wish to participate in research studies). Participants were recruited via the sampling of an online subject pool through the SONA system managed by the Psychology Department at Georgia Southern University.

Ages of participants ranged from 18 to 24 years old, with an average age of 19.40 ($SD = 1.64$). Self-reported ethnicity was White ($n = 47$, 67.10%), African-American ($n = 22$, 31.40%), and Hispanic ($n = 1$, 1.40%). Participants' self-reported relationship status ranged from single ($n = 67$, 95.70%), engaged ($n = 1$, 1.40%), separated ($n = 1$, 1.40%), and divorced ($n = 1$, 1.40%). Self-reported native language of participants was English ($n = 69$, 98.60%) and Spanish ($n = 1$, 1.40%). All procedures were approved by the IRB prior to completion of data collection.

Measures

Demographics Questionnaire. Each participant completed a demographics questionnaire that assessed the characteristics of each individual who completed the

study. Demographic questions included age, gender, race/ethnicity, primary language, highest level of education completed, current university classification, major, city of birth, city of residence, marital status, and current living situation.

Problem Drinking. Problem drinking was assessed with a 10-item questionnaire known as the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Asland, Babor, De La Fuente & Grant, 1993). The AUDIT screens for risk of alcohol-related problems on a scale ranging from 0 (*Never*) to 4 (*Daily or almost daily* or *Yes, during the last year*). If an individual scores 8 or higher it is indicative of problematic drinking behavior. Scores of 13 for women and 15 for men indicated a strong likelihood of alcohol dependence. The AUDIT has sufficient internal consistency in the literature (α = .65; Saunders et al., 1993). In the current study, the AUDIT was observed to be internally reliable (α = .81).

Alcohol Expectancies. The alcohol expectancies held by the participants in the study was assessed using the Comprehensive Effects of Alcohol questionnaire (CEOA) (Fromme et al., 1993). The CEOA consists of 38 items that cover both the positive and negative expected effects upon the consumption of alcohol. The subscales within the questionnaire are divided into positive factors: Sociability (e.g., "It would be easier to talk to people"), Tension Reduction (e.g., "I would feel calm"), 'Liquid Courage' (e.g., "I would feel brave and daring"), and Sexuality (e.g., "I would enjoy sex more"). Negative factors of the CEOA include: Cognitive and Behavioral Impairment (e.g., "I would neglect my obligations"), Risk and Aggression (e.g., "I would act aggressively"), and Self-Perception (e.g., "I would feel self-critical"). Each question allows a response of 1 (D*isagree*) through 4 (*Agree*) (Ham, Stewart, Norton, & Hope, 2005). The subscales of

the CEOA have adequate internal reliability (Sociability: α = .82; Tension Reduction: α = .66; Liquid Courage: α = .84; Sexuality: α = .73; Cognitive and Behavioral Impairment: α = .82; Risk and Aggression: α = .82; Self-Perception: α = .68). In the current study, all subscales of the CEOA demonstrated adequate internal reliability (Sociability: α = .88; Tension Reduction: α = .75; Liquid Courage: α = .85; Sexuality: α = .76; Cognitive and Behavioral Impairment: α = .88; Risk and Aggression: α = .77; Self-Perception: α = .73).

Drinking Motives. Participants completed the Drinking Motives Questionnaire-Revised (DMQ-R) to assess their motives for drinking alcohol. The DMQ-R is separated into four different types of motives: Social, Coping, Enhancement, and Social Pressure/Conformity (Cooper, 1994). The 'Social' motive describes an individual who drinks primarily to engage in customary or normative behavior, meaning they are not drinking to cope with any negative emotion or to conform to the group. The 'Coping' motive describes an individual who drinks primarily to cope with negative emotions. The 'Enhancement' motive describes an individual who drinks primarily to enhance positive emotions. The 'Conformity' motive describes an individual who drinks primarily to conform to the group in a social situation (Cooper, 1994). All subscales of the DMQ-R have demonstrated good internal reliability (Social: α = .85; Coping: α = .84; Enhancement: α = .88; Conformity: α = .85). In the current study, all subscales of the DMQ-R demonstrated excellent internal reliability (Social: α = .95; Coping: α = .91; Enhancement: α = .93; Conformity: α = .92).

Aggression Measure. The Buss-Perry Aggression Questionnaire (BPAQ) (Buss & Perry, 1992) assessed participants' engagement in aggressive behaviors. This self-report questionnaire consists of 29 items that assess four factors of aggression, including:

Physical Aggression (e.g., "I have become so mad that I have broken things") Verbal

Aggression (e.g., "I often find myself disagreeing with people"), Anger (e.g., "I have

trouble controlling my temper"), and Hostility (e.g., "When people are especially nice, I

wonder what they want"). Participants were asked to respond on a Likert-type scale

ranging from (*Extremely Uncharacteristic of Me*) to 5 (*Extremely Characteristic of Me*),

with 4 (*Unsure*) being the midpoint (Tsorbatzoudis, Travlos, & Rodafinos, 2013). All

subscales the BPAQ have adequate internal reliability (Physical Aggression: $\alpha = .85$;

Verbal Aggression: $\alpha = .72$; Anger: $\alpha = .83$; Hostility: $\alpha = .77$). In the current study,

only the 'Hostility' section had adequate internal reliability ($\alpha = .75$). The 'Anger' section

had unacceptable internal reliability ($\alpha = .45$), and both the 'Physical Aggression' ($\alpha = .66$) and the 'Verbal Aggression' ($\alpha = .62$) sections had questionable internal reliability.

Consequences of Drinking Measure. The Drinker Inventory of Consequences

(DrInC-2R) assessed participants' experiences of previous negative consequences as a

result of consuming alcohol. The DrInC-2R was developed to assess the common

problems experienced by an individual when they consume alcohol (Miller, Tonigan, &

Longabaugh, 1995). The questionnaire consists of 50 items, divided into seven subscales:

Physical Consequences (e.g., "I have had a hangover after drinking"), Intrapersonal

Consequences (e.g., "I have been unhappy because of my drinking"), Social

Responsibility Consequences (e.g., "I have missed days of work or school because of my

drinking"), Interpersonal Consequences (e.g., "My family or friends have worried or

complained about my drinking"), Impulse Control Consequences (e.g., "I have taken

foolish risks when I have been drinking"), and Control (e.g., "I drank alcohol normally,

without any problems"). Responses range from 0 (*Never, Not at All, or No*) to 3

represents (*Daily or almost daily, Very much*, or *Yes, more than once*). All the subscales of the DrInC have at least adequate internal reliability (Physical Consequences: $\alpha = .74$; Intrapersonal Consequences: $\alpha = .86$; Social Responsibility Consequences: $\alpha = .80$; Interpersonal Consequences: $\alpha = .85$; Impulse Control Consequences*: $\alpha = .70$*). The DrInC has excellent internal consistency overall ($\alpha = .94$). In the current study, the questionnaire also yielded excellent internal reliability ($\alpha = .94$).

Priming Alcohol-related Aggression. The Lexical Decision Task (LDT) comes from the area of psycholinguistics and is a common priming task. The LDT presents participants with a letter string of words and non-words (e.g., 'irony' or 'nogzp'), and the participant indicates whether or not it is a proper English word. Figure 1 shows an example of the way the task was presented to participants (see Appendix A). If the participant was in a control condition they were primed with non-alcohol-related stimuli (e.g., 'water'). If the participant was in a alcohol condition they were primed with alcohol-related stimuli (e.g., 'vodka'). Table 1 contains a list of control and alcohol-related words used in the task (see Appendix B). Many studies have successfully used this task to prime participants with certain categories of words. (Friedman et al., 2007; Mathey, Doignon-Camus, & Chetail, 2013; Yap, Balota, & Tan, 2012). Close to the end of the task, which was designed to take between thirteen – fifteen minutes, the computer appeared to crash for participants in the two aggression conditions. An error message appeared on the screen "F11 Error: failure to save data". The experimenter acted naïve and ignorant and informed the participant that he/she would have to do the task over again, but first they must fill out an incident report. The incident report consisted of three questions that ask the participant to rate the experimenter's performance, competency,

and courteousness during the study. The incident report was exactly the same for participants in both the control groups and the experimental groups; the only difference was that the control groups were told the title of the form was an experimenter evaluation and the experimental groups were told the title of the form was an incident report. The responses made on the incident report were used as a measure of relational aggression and hostility in the participants.

Participant Hostility Assessment. Each participant completed the Lexical Decision Task (LDT), but only those in the control groups finished it without technical problems. For the participants in the experimental (aggression) conditions, the computer would display a "F11 Error: Failure to Save Data" message.

When the error message appeared on the screen the participant would naturally seek out the researcher who was trained to say in a naïve and indifferent tone:

"Ah, I think I set this up wrong. You're going to have to do the task over again. But, first you need to fill out this incident report we have to do this anytime we have a problem with the study. I don't see your responses only my supervisor does, so put it in this envelope and seal it when you're done. I am going to step out of the room while you fill this out."

The participants in the control conditions were told to complete an experimenter evaluation form. The participants in the two experimental conditions were told to complete an incident report. The form read as follows:

"Instructions: Please answer the following questions, then seal the completed survey in the envelope provided. Your responses will be anonymous and

confidential. Only the lab director will read your responses in order to evaluate

performance of the research assistant from today's session."

Each participant completed a researcher evaluation form adopted from the

research of Friedman and colleagues (2007) that contained three questions designed to

assess their level of hostility in the present moment. The form contained three questions

to assess participant hostility: (1) "How would you rate the experimenter's overall

performance during the study up to this point?" (2) "To what extent would you

recommend this experimenter to run other studies in the future?" and (3) "How courteous

was the experimenter in handling the problem that arose?" Each questions was rated on a

Likert-type scale ranging from 1 to 7, or *very bad* to *very good.*

Procedure

The experiment was conducted in the Alcohol, Mental, and Physical (AMP)

Health Laboratory at Georgia Southern University. Only one participant completed the

study each session in order to avoid social influence across participants. Upon entering

the room participants read and signed a copy of the informed consent. They were not told

the full nature of the study, as this could have influenced their responses on the

questionnaires and assessments.

Each participant was randomly assigned to one of four conditions at the beginning

of the session: (1) control – aggression ($N = 19$), (2) control – non-aggression ($N = 18$),

(3) alcohol – aggression ($N = 21$), or (4) alcohol – non-aggression ($N = 12$). Next, each

participant completed all sections of the questionnaire portion of the study, including the

demographics questionnaire, the AUDIT (Saunders et al., 1993), the CEOA (Fromme et

al., 1993), the DMQ-R (Cooper, 1994), the BPAQ (Buss & Perry, 1992), and the DrInC-

2R (Miller, Tonigan, & Longabaugh, 1995). The questionnaire portion of the study was administered using the computer program MediaLab version v2014. The questionnaires were counterbalanced across the four different conditions of the experiment to account for potential ordering effects.

After each participant completed the questionnaire portion of the study, they began LDT via INQUISIT 4 computer software. Participants in conditions 2 and 4 finished the computer task without encountering any error messages or computer problems, thus they were not instigated for aggression. Participants in conditions 1 and 3 aggression groups would encounter an "F11 Error: Failure to Save Data" message near the end of the LDT, thus they were instigated for aggression.

Next, each participant completed a three-question hostility assessment questionnaire adopted from the Friedman et al. (2007). The questionnaire was titled "Experimenter Evaluation Form" for participants in the two non-aggression conditions (conditions 2 and 4), and it was titled "Incident Report" for participants in the two aggression conditions (conditions 1 and 3). At the conclusion of the study, all participants were fully debriefed using the computer program MediaLab v2014, thanked for their participation, and awarded full credit.

Results

Preliminary Analysis

The current sample can be characterized social drinkers overall (AUDIT: $M =$ 5.31, $SD = 4.83$). The current sample is characterized as socially motivated drinkers overall, with coping motivations being the lowest, as determined by the DMQ-R. Mean scores for social motivation was $M = 13.69$ ($SD = 6.50$). Mean scores for coping motivation was $M = 9.49$ ($SD = 5.34$). Mean scores for enhancement motivation was $M = 11.39$ ($SD = 5.72$). Mean scores for conformity motivation was $M = 7.39$ ($SD = 4.16$). Mean scores for this sample for physical aggression was $M = 23.01$ ($SD = 6.09$), which is lower in comparison to the original study in which the measure was developed ($M = 24.30$, $SD = 7.00$) (Buss & Perry, 1992). Mean scores of verbal aggression on a scale of 5 − 25 was $M = 12.90$ ($SD = 4.06$), which was slightly lower in comparison to the original study ($M = 15.20$, $SD = 3.90$) (Buss & Perry, 1992). The mean score of hostility, on a scale of 5 − 40, for this sample was $M = 20.14$ ($SD = 6.41$), compared to the original data from Buss and Perry (1992) ($M = 21.30$, $SD = 5.50$). The mean score of anger on a scale of 5 − 35 ($M = 15.73$, $SD = 3.84$) was slightly lower than the mean score of anger in the original Aggression Questionnaire (Buss & Perry, 1992; $M = 17.00$, $SD = 5.60$). The total score for aggression for the current sample was a score of 71.78 on a scale of 29 − 145 in comparison to the original study (M = 90.88; Buss & Perry, 1992).

Alcohol Expectancies and Aggression in a College Sample

Table 2 contains correlational statistics for problematic drinking and alcohol outcome expectancies (see Appendix C). Bivariate correlational analyses revealed statistically significant relationships between problematic drinking (AUDIT) and risk and

aggression alcohol expectancies ($r = .30$, $p < .05$), sexuality expectancies ($r = .30$, $p < .05$), sociability expectancies, ($r = .45$, $p < .01$), as well as liquid courage expectancies ($r = .47$, $p < .01$). Problem drinking was negatively correlated with hostility ($r = -.25$, $p < .05$); as problem drinking increased, hostility decreased. Problematic drinking was not correlated with physical or verbal aggression.

The Effects of Alcohol-Related Stimuli Priming on Relational Aggression

A one-way, between groups Analysis of Variance (ANOVA) was used to investigate the effects of alcohol-related stimuli on participants' level of hostility. Levene's test was used to evaluate the assumptions of normality and homogeneity of variance, which was not violated. Results revealed a significant interaction effect of alcohol-related stimuli priming and condition (aggression v. non-aggression) on the rating given by the participant regarding the experimenter's current performance, $F(3, 66) = 2.94$, $p < .05$. Figure 2 contains a graph of the means and standard errors of each question within the different conditions (see Appendix D).

Researcher Performance. A statistically significant difference in relational aggression was seen depending on participant condition and priming stimuli. Specifically, a significant difference between the alcohol – aggression group ($M = 5.67$, $SD = 1.12$) and the control – aggression group ($M = 6.53$, $SD = .77$) on the researcher's performance rating within the three-question hostility assessment was detected. In contrast, no significant differences were seen in the non-aggression groups regardless of priming stimuli, with the control – non-aggression group ($M = 6.44$, $SD = .98$) and the alcohol – non-aggression group ($M = 6.08$, $SD = 1.17$) both rating the researcher's performance relatively the same.

Researcher Competency. No significant differences were detected between groups based on priming stimuli, nor condition, on the extent to which researchers were viewed as competent overall. Specifically, differences were not found between the alcohol – aggression group ($M = 5.71$, SD $= 1.01$) and the control – aggression group ($M = 6.37$, $SD = .90$), or between the control – non-aggression group ($M = 6.17$, $SD = 1.43$) and the alcohol – non-aggression group ($M = 6.17$, $SD = 1.03$) on the researcher's competency rating within the three-question hostility assessment.

Researcher Courteousness. Similar to researcher competency, no significant differences between the alcohol – aggression group ($M = 6.14$, $SD = 1.06$) and the control – aggression group ($M = 6.68$, $SD = .75$) on the researcher's competency rating within the three-question hostility assessment were detected. Moreover, no significant differences between the control – non-aggression group ($M = 6.56$, $SD = .98$) or the alcohol – non-aggression group ($M = 6.67$, $SD = .65$) on the researcher's courteousness rating were found.

Discussion

A large amount of research exists on the semantic network model of memory. The ability of specific words to activate other words, which leads to behaviors, is well demonstrated in the literature (Posner & Snyder, 1975). Past research has also shown that individuals are motivated by the effects they predict they will feel after the consumption of alcohol, known as alcohol outcome expectancies. This study sought to investigate the typical alcohol outcome expectancies of a college sample. This sample typically associated problematic drinking behaviors with the alcohol outcome expectancies of risk and aggression, sexuality, sociability, and liquid courage. This study also sought to expand upon the findings of Friedman et al. (2007), who found that individuals with higher risk and aggression expectancies treat a target person with more hostility after provocation. The original study only used two groups, both of which included instigation for relational aggression. The current study used four groups, two of which were instigated and two of which who were not.

The results of this study show a significant relationship between problematic drinking and risk and aggression expectancies, which lines up with the previous research in this area (Friedman et al., 2007). Liquid courage was also positively correlated with problematic drinking, which can be understood through understanding one of the primary effects of alcohol: decreased inhibition (Fields, 2013). The sociability expectancies were also positively correlated with problematic drinking, which is consistent with the social drinker categorization of the overall assessment of problematic drinking, as determined by the AUDIT.

Problematic drinking was not correlated with physical or verbal aggression in this sample, and a couple of different things could explain this. It could be the case that this sample was too young, that is, below the legal drinking age, to be correlated with aggression. Binge drinking and over-consumption of alcohol is often seen as a normative behavior in the college setting (Wechsler and Nelson, 2001). There was also a negative correlation with problematic drinking and hostility, which could be explained by the sample more closely associating drinking with sociability expectancies and endorsing socially motivated reasons for drinking (as opposed to drinking to alleviate negative emotion, such as sadness or anger).

Alcohol priming was suspected to result in increased expression of interpersonal aggression for those in the alcohol – aggression condition (condition 3). Results supported this hypothesis: alcohol-related priming and instigation lead to an increased expression of hostility toward the researcher in condition 3 than the group with control words and instigation (condition 1). The results are consistent with research that suggests that alcohol sometimes leads to aggression (Bartholow, Grosvenor, Pedersen, Truong, & Vasquez, 2014) These results show that an individual can become aggressive, solely by being primed with alcohol-related stimuli and slightly evoked, which adds something to the previous research that did not exist.

The results could look much different in an older, non-college population. Those within that population who endorse greater levels of aggression could have a stronger association with problematic drinking and the risk and aggression expectancy. The tension reduction expectancy could also be different for that population because of the

stress of a full-time career, since most students in college do not hold full time careers, and familial responsibilities.

These results can have a strong implication on behavior at places where alcohol is typically consumed in large quantities, such as a bar. People at bars are constantly being primed with alcohol-related stimuli, thus it is possible for them to be evoked in some way at any given moment. Relational aggression leads the risk of turning to physical aggression for certain populations, primarily men. Treatment approaches for individuals who suffer from anger management issues in combination with alcohol use problems could benefit from education around priming risks.

Limitations and Strengths

Although this study significantly contributes to previous research investigating the impact of alcohol expectancies and alcohol priming on subsequent aggressive behaviors, it did have a few limitations. First, a small sample size for each of the four conditions contributed to lower statistical power, thus potentially impacted the ability to detect meaningful relationships between variables of interest. Second, participants were obtained through convenient sampling of college undergraduates enrolled in Psychology courses via SONA, an online database. Third, it is possible that the experimental manipulation designed to elicit aggression was not potent enough for some of the participants. Moreover, multiple research assistants—three of which were male and two of which were female—conducted this study. It is a possibility that some participants were influenced by individual characteristics of the researcher (e.g., race or age) when completing the incident report/researcher evaluation form. This possibility was not accounted for during analysis. Also regarding the experimental manipulation, some of the

participants did not believe it to truly be a "mistake" of the researcher, but rather a software error out of the researcher's control. For instance, one participant verbally told a research assistant that he was very upset that he would have to start the LDT over again, yet when he gave the envelope to the research assistant he said, "Don't worry I still gave you a good recommendation." It could be the case that other participants also held back their honest opinion when answering questions.

This study also has several strengths. First, the study involved multiple questionnaires that covered a wide range of individual characteristics regarding alcohol use, beliefs, and behaviors. Therefore, it provided a clear picture of a sample of college-age students. Second, the study had a fairly even number of participants across the two aggression groups. Third, this was a one-part study, which eliminates influences of maturation. Fourth, only one method was used to evoke relational aggression (F11: computer error) and every other variable was held constant, so it is clear that the difference is from the computer error.

Future Directions

Considering the limitations of this study, it would be beneficial to replicate this study in the future. Certain methodological changes could be made to improve the design of this study if it is replicated in the future. First, a more potent form of evoking relational aggression could be used in order to get more hostile responses on the evaluation form/incident report. Perhaps the researcher could ignore the participant, talk to another person their cell phone during their session, or blame the computer error on the participant. Second, there would be more power if each condition had at least fifty participants. Third, the researchers could disregard convenient sampling, and instead

recruit participants from other classes across departments (e.g., health, biology, philosophy). This would help provide a more diverse sample rather than only introduction to psychology students. A thorough understanding of alcohol outcome expectancies is important in the treatment of alcohol use disorders because recovery models must prepare clients for triggering situations based on the awareness of beliefs they hold about substance use. Alcohol outcome expectancies are considered a risk factor for individuals who consume alcohol. Through therapeutic exploration and identification of beliefs and their subsequent effects on behavior, the client could be less susceptible to the effects of problematic drinking.

The results of this study could also be used to guide some of the advertisements sporting events or carry-and-conceal laws in public places, such as bars. Such places tend to be crowded, and it may not take much for an individual who expects alcohol to make them more aggressive to behave in a dangerous manner. The results could be when considering the gun policies and issuing of permits across the United States, which is increasingly important as previous research has shown that the presence of guns makes people more aggressive (Klinesmith, Kasser, & McAndrew, 2006). The current study suggests that alcohol also does the same for certain individuals. Perhaps, the combination of gun-related stimuli and alcohol-related stimuli could have an additive effect. This line of inquiry warrants further investigation.

Conclusion

Problematic drinking affects not only those who consume alcohol, but also their friends and family. Alcohol outcome expectancies strongly guide those individuals who drink alcohol. Past research has shown that people do not actually have to consume

alcohol for these expectancies to play a role in their behavior (Friedman et al., 2007). This study highlights that alcohol-related priming and slight instigation can increase the level of hostility within an individual without any actual alcohol consumption. The findings of this study, along with other research within addiction, can be used to help individuals with problematic drinking behaviors.

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Appendix A

Figure 1. Lexical Decision Task Example

Appendix B

Table 1. List of Control and Alcohol-Related Words

Control Words	Alcohol-Related Words
Water	Beer
Milk	Whiskey
Juice	Brandy
Soda	Wine
Tea	Vodka
Lemonade	Gin
Smoothie	Tequila
Milkshake	Rum

Appendix C

Table 2. Correlations of Self-Reported Measures

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Problem Drinking	--	.03	-.14	-.11	-.25*	.30*	.07	.30*	-.12	.45**	.11	.47**
2. Physical Aggression	.03	--	.26*	.27*	.28*	.09	-.11	.01	-.16	.01	.25*	.15
3. Verbal Aggression	-.14	.26*	--	.44**	.37**	.20	.19	-.11	.15	-.03	-.02	.04
4. Anger	-.11	.27*	.44**	--	.44**	.08	-.03	.03	-.02	-.05	.05	.04
5. Hostility	-.25*	.28*	.37**	.44**	--	-.08	.18	.02	-.12	-.01	.24*	.01
6. Risk and Aggression	.30*	.09	.20	.08	-.08	--	.53**	.49**	.43**	.36**	-.07	.62**
7. Cog and Bx Impairment	.07	-.11	.19	-.03	.18	.53**	--	.29*	.61**	.14	.06	.35**
8. Sexuality	.30*	.01	-.11	.03	.02	.49**	.29*	--	.16	.53**	.13	.59**
9. Self-Perception	-.12	-.16	.15	-.02	-.12	.43**	.61**	.16	--	-.09	-.22	.13
10. Sociability	.45**	.01	-.03	-.05	-.01	.36**	.14	.53**	-.09	--	.21	.58**
11. Tension Reduction	.11	.25*	-.02	.05	.24*	-.07	.06	.13	-.22	.21	--	.17
12. Liquid Courage	.47**	.15	.04	.04	.01	.62**	.35**	.59**	.13	.58**	.17	--

Note: *significant at p < .05; **significant at p < .01

Appendix D

Figure 2. Levels of Hostility Within Each Condition