7-2015

The Effects of Alcohol on the Interpretation of Social and Emotional Cues: A Field Study of College Student Drinking, Emotion Recognition, and Perceptions of a Hypothetical Sexual Assault

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The Effects of Alcohol on the Interpretation of Social and Emotional Cues: A Field Study of College Student Drinking, Emotion Recognition, and Perceptions of a Hypothetical Sexual Assault

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Psychology.

by

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Virginia Tech
Bachelor of Science in Psychology, 2011,

July 2015
University of Arkansas

This thesis is approved for recommendation to the Graduate Council

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ABSTRACT

Alcohol use and abuse among emerging adults is highly correlated with increased risk for sexual victimization. Alcohol myopia theory has been used to explain impairments in social information processing resulting in decreased attention to environmental social cues including risk factors for sexual assault as well as facial emotional recognition. Those with deficits in social information processing may be at particular risk for the misperception of salient risk factors for sexual assault by victims, perpetrators, and bystanders when intoxicated. In this naturalistic field study, participants who had been consuming alcohol were recruited to engage in tasks of facial emotion recognition and sexual assault risk detection. Participants listened to a vignette depicting a hypothetical sexual assault and provided ratings assessing the women's desire to have sex, perceptions of consent, assessment of man's and woman's responsibility, and the approval of the behavior in the scenario. Breath alcohol concentration was measured at the conclusion of the study. Bivariate correlations revealed breath alcohol intoxication was negatively related to facial emotion identification. Hypotheses related to the moderation of the BAC and risk detection relationship by emotion identification were not supported. Important sex differences emerged such that women displayed on average, greater ability to identify risk in the hypothetical sexual assault scenario. Future research should seek to isolate the differences in the effects of alcohol on social information processing and specifically to sexual assault risk detection between men and women to inform prevention and bystander intervention programs.

TABLE OF CONTENTS

The effects of alcohol on the interpretation of social and emotional cues: A field study of college student drinking, emotion recognition, and perceptions of a hypothetical sexual assault

Alcohol use and abuse continues to present a chronic public health problem among college-aged emerging adults through its widespread prevalence and damaging consequences. Twelve-month prevalence rates have remained consistently high for over a decade; at least half of those between the ages of 18 and 24 years reported consuming alcohol over the last year (Grant et al., 2004; National Institute for Alcohol Abuse and Alcoholism, 2002; Substance Abuse and Mental Health Services Administration, 2010). Alcohol consumption is particularly dangerous in a college setting due to increased prevalence of risky drinking, with 43% of students reporting consuming five or more alcoholic drinks in a single setting in the last month (Substance Abuse and Mental Health Services Administration, 2010). Given rates of alcohol consumption and resulting negative interpersonal and psychological consequences, alcohol-related sexual assault is of particular concern amongst college aged emerging adults.

Alcohol and Sexual Assault

Sexual victimization can be defined as attempted or completed rape, any unwanted sexual contact, and verbal, physical, or other coercion of sexual behavior (Testa & Livingston, 2009). Nearly half of all victims of sexual assault will suffer physical or psychological consequences, including elevated rates of PTSD, depression, anxiety, alcohol use disorders, and an increased likelihood of revictimization compared to a nonvictimized sample of women (Holmes, Resnick, Kirkpatrick, & Best, 1996). The consequences of sexual victimization, including physical and mental health treatments, cost the United States up to $127 billion each year, more than any other interpersonal crime (Miller, Cohen, & Wiersma, 1996).

In particular, college women may be at an elevated risk for victimization; college women are more likely to experience sexual assault compared to similar aged women not in college (Fisher et al., 2000). It has been estimated between 25 and 50% of all college women report experiencing sexual victimization in college (Abbey, 1996; Harrington, 1994; Krebs, 2007). In 2005, this translated to 90,000 female victims of sexual assault between the ages of 18 and 24 years old (Hingson, Heeren, Winter, & Wechsler, 2005).

Alcohol has been repeatedly identified as a risk factor for sexual victimization; in approximately 50% of reported college sexual assault cases, alcohol was found to be used by the perpetrator, victim, or both (Abbey, 2002). Specifically, individuals who report binge drinking are twice as likely to also report an unwanted sexual experience while in college based on self-reported survey data (Wechsler & Nelson, 2001). Among college students, higher rates of alcohol consumption correlates with a greater number of unwanted sexual experiences (Abbey & McAusland, 2004; Testa & Parks, 1996). Furthermore, alcohol use is much more common in college students, with most sexual assaults occurring after a social date or party where alcohol is likely (Humphrey & Kahn, 2000; Muehlenhard, & Linton, 1987; SAMHSA, 2008). Nineteen percent of first-year female college freshman who reported regularly consuming alcohol had experienced some sexual victimization, three times more likely than those who did not report consuming alcohol (Parks, Romosz, Bradizza, & Hsieh, 2008). These increased rates of victimization among college alcohol drinkers, coupled with the high societal and personal costs, urges further study into risk factors and underlying mechanisms influenced by alcohol consumption which may contribute to sexual victimization.

Alcohol and Risk Detection

It has been hypothesized that alcohol places individuals at greater risk for sexual victimization and reduces intervention in hazardous situations by impairing individuals' ability to accurately assess risk in a social situation. Alcohol myopia theory describes the focus-narrowing effects of intoxication as a result of overall reduced cognitive capacity and the tendency to rely more heavily on salient cues (Steele & Josephs, 1990), and may help explain the observed connection between alcohol use and sexual victimization. Begue and Subra (2008) describe how the myopic effect of intoxication can impair an individual's ability to accurately process all social cues involved in a social interaction. Thus, alcohol has the potential to influence perpetrators, victims, and third party bystanders by dampening the perception of opposition or risk factors, respectively.

The impairing effects of alcohol on social information processing related to risk detection have been observed in a variety of experimental studies (Abbey, Buck, Zawacki, & Saenz, 2003; Loiselle & Fuqua, 2007; Testa, Livingston, & Collins, 2000). Loiselle and Fuqua (2007) examined the effects of a moderate dose of alcohol on 42 college women's ability to detect risk in an audio vignette. Women who had consumed alcohol (to a target blood alcohol concentration [BAC] of .04%) were significantly less likely to detect risk in a date-rape audio vignette compared to women who had not consumed alcohol. Alcohol myopia may influence victim and bystander behavior by impairing ability to accurately discern threatening cues when positive traits are present. This theoretical framework provides an explanation for the findings of Loiselle and Fuqua (2007) who revealed women perceived sexual pressure as less threatening and more acceptable when committed by a man previously described in a positive manner in the audio vignette.

Testa, Livingston, and Collings (2000) recruited single women between 21 and 29 years old to examine the effects of alcohol intoxication (to a target BAC of .08%) on risk perception in a first-person written vignette. Women read a hypothetical scenario in which an intoxicated male friend shows up to their door with beer and food; women then responded by writing a conclusion to the story placing themselves in the role of the woman in the story. Women who had consumed alcohol reported more positive views of the man and were less likely to perceive a negative outcome compared to women who did not consume alcohol.

Consistent with alcohol myopia theory from the perpetrator perspective, Flowe, Stewart, Sleath, and Palmer (2009) found as blood alcohol concentration increased, the hypothetical perpetration of sexually aggressive acts (i.e., choosing to continue with the hypothetical choices such as kissing the female victim despite refusal) increased when the female victim was dressed promiscuously in the story. In their field study, 157 male participants were recruited from a bar in the United Kingdom frequented by university students (with an average age of 27 years) and asked to respond with their hypothetical behavioral responses in a vignette. Participant BAC ranged from .00 to .10%, with a mean of .04%. Key features of the vignette included female victim intoxication and varied appearance of the woman. BAC was found to be related to hypothetical engagement in sexual assaultive behaviors when the woman was dressed promiscuously. Flowe and colleagues (2009) propose that rather than processing cues of displeasure and refusal, individuals were more likely to attend to the promiscuity of the woman in the scenario as a result of the myopic effects of alcohol. However, when the woman in the vignette was not dressed promiscuously, subjects were better able to process the woman's rejection of consent as evidenced by lower rates of perpetration.

Particularly relevant to a social bar setting, this shift in processing can also influence the evaluation of a situation from a third party when individuals hold perceptions about the traits and interest of a man and woman. If a woman is perceived as being interested in a man, the ability to perceive and predict risk may be decreased by bystanders. Among college men and women who consumed alcohol to a BAC of .08, perception of woman interest in the man in a hypothetical scenario was negatively related to ratings of the likelihood that forced sexual behavior may occur (Abbey et al., 2003).

Social Information Processing, Alcohol, and Sexual Assault Risk Behavior

Social information can be conveyed through verbal or nonverbal expression and relies on the accurate perception and interpretation for successful communication. Yeater, Hoyt, and Rinehart (2008) have proposed that an integrative approach should be taken to study all relevant social information processing factors which could contribute to sexual assault. Deficits in social information processing, specifically facial emotion recognition, could be an important moderator for the relationship between alcohol intoxication and risk for misinterpreting potential sexual assault scenarios. Facial emotion recognition has been studied by many, based on the initial work of Ekman and Friesen (1971) who outlined six universally identifiable facial expressions: happiness, sadness, disgust, anger, fear, and surprise. Alcohol impairs cognitive processing in such a way that places these nonverbal facial expressions at risk to be misinterpreted. Low doses of alcohol (30 mL ethanol, or approximately 1.5 standard alcoholic drinks led to a mean BAC of .012) led 15 Japanese male participants aged 22 – 42 years (mean age = 25.9) to recognize happiness more quickly and from a lower strength of expression in the face, though they were also more likely to incorrectly label a face with an expression other than happiness as displaying happiness when compared to individuals who had not consumed alcohol (Kano, Gyoba,

Kamachi, Hongo, & Yanai, 2002). Performance at identifying happy faces significantly decreased at higher doses of alcohol (120 mL, mean BAC of .069) compared to the low dose. Deficits in social information processing are also linked to sexual assault risk.

Convicted sexual offenders, for example, were less accurate at recognizing the emotions of fear, anger, and disgust compared to individuals incarcerated for non-sexual crimes, and control participants (Gery, Miljkovitch, Berthoz, & Soussignan, 2009; Hudson et al., 1993). These emotions are particularly relevant to sexual assault, as they may be displayed by victims in opposition to the sexual behavior. Although alcohol intoxication may impair social information processing for all, those who experience deficits in social information processing such as facial emotion identification may be particularly at risk for incorrectly assessing a scenario for sexual assault risk when intoxicated. The relationship between the effects of alcohol and impaired perception and evaluation of sexual assault victimization and perpetration may be different for those who do not show similar baseline impairments in social information processing.

Although many laboratory studies have sought to separately study social information processing relation to emotion recognition or perceptions of a hypothetical sexual scenario, their interrelationship has not been adequately explored. Lab studies frequently observe specific levels of intoxication ranging from 0.04 to 0.10 mL/L blood alcohol concentration which may not be representative of the binge drinking culture seen in a college environment. Recent field studies of college student drinking have found a range of breath alcohol concentrations from 0.000 to 0.261 with a mean of 0.096 mL/L (Smith, Coyle, Baldner, Bray, & Geller, 2013). A naturalistic field study best replicates the typical setting for this type of sexual victimization, allowing for increased generalization of observed effects of alcohol on the relationship between social emotional processing and sexual victimization. With little present knowledge of the relation of

particular emotion recognition difficulties on perceptions of sexual assault, the aim of the current study was to provide important data to assist in generating more specific hypotheses for future experimentation. Given the previously studied separate connections between alcohol use and sexual assault, and alcohol and facial emotion recognition, the current study seeks to better understand the mechanisms underlying the processing of these social and emotional environmental cues in a naturalistic setting.

Hypotheses

It was hypothesized breath alcohol concentration (BAC) would be negatively correlated with overall facial emotion recognition accuracy. BAC was also predicted to be positively correlated with individual items measuring risk-related factors, including higher approval of the man's sexually forceful behavior, increased blame on the female victim and decreased blame on the male perpetrator, increased perception of consent by the woman, decreased perception the scenario will end in rape, and increased perception of woman's desire to have sex in a hypothetical sexual assault scenario.

Facial emotion recognition was hypothesized to moderate the association between BAC and detection of sexual assault risk in a hypothetical sexual assault scenario such that those who show the greatest impairment in facial emotion identification will also show a stronger negative relationship between intoxication and risk detection. The interaction of BAC and overall accuracy of facial emotion recognition was expected to account, above and beyond individual effects for each dependent measure of sexual assault scenario risk detection (i.e., approval of forceful behavior, assessment of male perpetrator and female victim responsibility, perceptions of consent, and perception of the woman's desire for sex), when controlling for sex and past 30 day alcohol use.

Method

Participants

Participants were 89 volunteers (59.6% male, 74.1% college students, 83.1% white, 7.9% Hispanic, 3.4% American Indian, 2.2% Asian, and 1.1% Black) between the ages of 21 and 29 years (M_{age} = 22.81, *SD* = 1.89) recruited from a public area in the vicinity of several drinking establishments. See Table 2 for full demographic information. Participants were excluded if they reported that they were planning to drive or if they demonstrated dangerous behaviors or an inability to follow instructions. Consistent with previous research and field-based designs, participants were excluded from analyses if their breath alcohol concentration was greater than 0.16 given concerns of inattention and inability to comprehend instructions at twice the limit of legal intoxication (Grant, LaBrie, & Hummer; 2012; Lyvers, Cholakians, Puorro, & Sundram, 2011). Twelve participants were excluded from analyses who had BACs greater than .16.

Measures

Demographics. Age, sex, race and ethnicity, number of years of school completed, and current student status were assessed with self-report questionnaires (see Appendix A).

Past month alcohol use. Consistent with prior self-reported assessment of recent typical drinking behaviors, a past-month alcohol use quantity x frequency score was calculated (Cooper, 1994). Individual's reported "average number of drinking occasions per week in the last month" was multiplied by reported "average number of standard alcoholic drinks per drinking occasion in the last month" to determine an overall past-month typical alcohol use value (see Appendix A). For this study, one standard alcoholic drink was defined as 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of liquor.

Facial emotion recognition. Images of both men and women depicting one of four facial emotions (anger, happiness, sadness, and disgust) or showing no emotion were used to measure emotion recognition accuracy. Although Ekman and Friesen (1971) also identified surprise and fear as universally identifiable emotions, past research shows very poor reliability and applicability of these expressions (Gery et al., 2009; Hudson et al., 1993). Given the need for brevity, combined with the concerns related to the reliability in identification of surprise and fear expressions, these expressions were not included in the study. Each image was a composite image based on Ekman and Friesen's (1976) facial stimuli created by combining multiple images of varying strength of expression (for example, a face displaying 50% emotion expression strength is a composite image exactly halfway between no emotion being shown and 100% expression). Each image shown was a composite depicting 70% strength of expression.

The strength of expression was selected following pilot testing of images showing 30%, 50%, and 70% strength emotion expression in an online study amongst 235 undergraduate men and women (M_{age} = 19.4 years, SD = 2.56, 65% women; 86.4% Caucasian, 4.3% Hispanic/Latino, 2.6% Asian, 2.1% African American, and 4.6% Other) who reported that they had not been consuming alcohol. Participants were instructed they would view an image and respond to the question "What emotion did you see?" Images were displayed on screen for five seconds before disappearing. Out of a possible score of 10, the average correct number of emotions identified amongst 235 undergraduate men and women was 4.68 (*SD* = 1.52) for 30% strength of expression, 7.69 (*SD* = 1.56) for 50% strength of expression, and 8.71 (*SD* = 1.39) for 70% strength of expression. The 70% strength of expression was selected to represent a facial image that the majority of individuals who were not consuming alcohol could correctly identify,

thus strengthening the theoretical relationship between alcohol intoxication and impairment in emotion identification scores observed.

Participants in the present study were shown 10 total images (five emotions shown once by a male and once by a female face) and were asked to respond to the question "What emotion did you see?" by circling their choice from a list of possible responses (i.e., angry, happy, sad, disgust, no emotion). Images were displayed on a digital computer tablet screen timed to show the image for five seconds before disappearing to simulate the brief microexpressions experienced in a standard social situation. An overall accuracy score was calculated based on the number of correct identifications out of the total images shown.

Sexual victimization. A brief vignette portraying a hypothetical situation involving unwanted sexual contact between a male perpetrator and female victim was used to simulate sexual victimization (see Appendix C for full text). Modeled after the vignette used by Abrahams, Vicky, Maser, and Gerd (2003), the story begins with a college-aged woman meeting up with a male acquaintance whom she had met once before. They spend most of the night socializing, laughing, and getting to know each other better. As the gathering concludes, the woman agrees to return to the man's house to continue talking and have a drink. The woman begins to kiss the man for a short time period before deciding she would like to end the interaction and asking the man to stop. The man ignores her request, and instead begins to engage in increasing levels of sexual acts despite the lack of consent. The final scenario used in the present study was pilot tested concurrently with a similar hypothetical scenario that did not end in sexual penetration. The scenario used in the current study was selected given the ability of students who had not been consuming alcohol to accurately identify risk. Variance in risk detection was hypothesized to be a result of alcohol intoxication, thus if the scenario elicited

significant variation in responses prior to alcohol consumption, the ability to isolate of the effects of alcohol may be reduced (see Table 1 for pilot vignette data). Pilot testing revealed the scenario used did not result in a significant increase in distress amongst 235 undergraduate men and women who had not been drinking.

Consistent with the prior research of Abrahams et al. (2003) and Testa and Parks (2000), participant perceptions regarding the scenario were measured with six individual items assessing responsibility of the man and woman, approval of the man's behavior, degree of consent provided, woman's desire for sex, and the degree to which the scenario could be considered a rape. These items, though conceptually related, each separately measure a unique feature of the scenario that may not be captured by a composite score. Each of the following items were rated on a 7-point Likert-type scale (see Appendix D for full measure): "How responsible was Jason for this situation?" (1 = *Not at all*, 7 = *Completely responsible*), "How responsible was Kathy for this situation?" (1 = *Not at all*, 7 = *Completely responsible*), "How appropriate would you rate Jason's behavior?" (1 = *Not at all appropriate*, 7 = *Completely appropriate*), "Did Kathy want to have sex with Jason?" (1 = *Not at all*; 7 = *Kathy definitely wanted to have sex with Jason*), "Did Kathy consent to having sex?" (1 = *Not at all*; 7 = *Kathy gave complete consent*), and "How likely is this scenario to end in rape?" (1 = *Not at all*; 7 = *Definitely will end in rape*). The items "how likely is this scenario to end in rape" and "how responsible was Jason for the outcome of the situation" were reverse scored such that lower scores reflected greater risk detection to be consistent with the other items. On the final scale scores, lower score values represent greater risk detection for all items (i.e., Jason was completely responsible, Kathy was not at all responsible, Jason's behavior was not at all appropriate, Kathy did not at all want to have sex, Kathy did not at all consent, the scenario will definitely end in rape).

Breath alcohol concentration. Intoxication level was measured through breath alcohol concentration (BAC) collected using the Intoximeter Alco-Sensor FST®. The Intoximeter Alco-Sensor FST® model breathalyzer provides BAC estimates with a margin of error of 0.005 mL/L. The Intoximeter Alco-Sensor FST® was recalibrated prior to each evening of data collection according to manufacturer's specifications with a 0.038% ethanol dry gas canister.

Procedure

Participants were recruited from the downtown area of a town surrounding a large mid-Southern university between the hours of 11:00pm and 1:00am on varying Thursday, Friday, and Saturday nights. A pair of research assistants (comprised of various combinations of men and women) served as recruiters, approaching all passersby and stating "Would you be interested in participating in research study about drinking, social interactions and behavior? You will learn your Breath Alcohol Concentration at the conclusion of the study." If interested, eligibility criteria were reviewed, including being 21 years of age, having consumed at least 1 alcoholic beverage that evening, and denying intent to drive. Participants were informed completion of the study would require approximately 10 minutes. A trained, advanced research assistant reviewed details of the study including the potential risks (potential psychological distress from listening to a hypothetical scenario that may involve sexual interaction), benefits, and requirements to participate while ensuring the potential participant is able to comprehend verbal instructions and functioning at a capable level to complete the study. Verbal informed consent to participate was obtained. Participation was denied to any individuals who appeared to pose a threat to safety or research integrity, or for the protection of their health; however, no interested volunteers were rejected for participation due to these criteria. Each participant also received a unique anonymous subject code and contact information, and informed they were permitted to rescind

all responses and participation if desired in the 48 hours following study completion at no penalty. No participants requested to rescind their consent.

Following the explanation of all considerations and obtaining verbal consent to proceed, a trained research assistant certified in ethical research practice administered the questionnaire beginning with assessing participants' subjective level of distress (on a 0-100 subjective units of distress scale [SUDS; Wolpe, 1973]) and gathering demographic information. The order of the remainder of the study questions were counterbalanced such that half of the participants first completed the facial emotion recognition task before the sexual assault perception task, and the other half completed these two tasks in the reverse order.

To begin the facial emotion recognition task, research assistants informed participants they would be viewing facial images and asked to determine the emotion being displayed. Participants viewed two images of each of the five emotions, each depicted by one man and one woman, for a total of ten facial emotion images overall. Images were displayed via a digital display screen programmed to show the image for five seconds. Following the viewing of the image, participants were instructed to identify and record the emotion they perceived from a list of all possible choices including anger, happiness, sadness, disgust, and no emotion. This procedure was repeated for a total of ten trials, with display order of the images randomized per participant.

Next, research assistants instructed participants they would be hearing a story and asked to provide various ratings of the story at its conclusion. Participants listened to an audio recording via headphones of a reading of the sexual assault scenario. Upon completing the scenario recording, research assistants read aloud each item, explained the individual anchors for the Likert-type scale, and instructed the participant to indicate the response that best represented

their interpretation of the scenario by circling the appropriate number on their form for each item.

Following all survey items, SUDS ratings were again gathered in order to ensure that participants did not leave the study highly distressed. Given the potentially sensitive nature of sexual victimization, a clinical psychology graduate student trainee was present for all data collection to assess and manage any distress as a result of the study procedures. No participants reported acute distress as a result of the vignette task or any study procedures. Finally, BAC was measured. Upon completion, participants were adequately debriefed and provided a list of local psychological services. If participants later decided they did not wish to have their responses included in the study, they were provided a card indicating contact information with their unique subject code, and reminded they may communicate their desire to cancel participation at any time in the 48 hours following participation. Of all study participants who provided informed consent, none chose to later rescind their consent.

Results

Data Analytic Plan

Past month alcohol use scores were computed by multiplying average number of nights drinking per week by the average number of standard drinks consumed per drinking occasion. As mentioned previous, two risk detection items were reverse scored to create consistent items such that lower scores represented greater assessment of risk per item. The items reverse scored were responsibility attributed to the female victim and "how likely is the scenario to end in rape." The risk detection items were hypothesized to create a unitary scale of risk detection. Given correlations among risk detection items and Cronbach's alpha did not suggest the items formed a unitary scale, all analyses examined the six individual items rather than a composite

score. Bivariate correlations were conducted to test the relationship between age, past month alcohol use, risk detection items, breath alcohol concentration, and overall facial emotion recognition accuracy scores. Descriptive statistics were obtained for all study variables. Descriptive statistics and bivariate correlations were also obtained for men and women separately. Independent samples *t*-tests were used to compare responses by sex.

Hierarchical linear regressions were used to test the hypothesized BAC x facial emotion recognition interaction on each of six dependent measures regarding perception of the hypothetical sexual assault. All variables were checked for linear relationships between variables, multicollinearity, normality of error, and homoscedasticity. Past month alcohol use, emotion identification, and BAC were entered as centered variables. In each model, sex and past-month alcohol use were entered in the first step as covariates. In the second step, BAC and total number of facial emotions correctly identified were entered. The third step tested the interaction of BAC x facial emotion recognition score. This model was used to test each of the six individual dependent variables (i.e., risk detection items).

Preliminary Analyses

Past-month alcohol use. As shown in Table 3, men reported a greater number of drinking nights per week than women, $t(86) = -2.56$, $p = .01$. Average number of reported drinks did not differ by sex, $t(86) = -1.08$, $p > .05$. The average total past-month alcohol use for men ($M = 13.42$, $SD = 11.21$) was significantly higher than the total past-month drinking for women ($M = 8.68$, $SD = 7.20$), $t(86) = -2.32$, $p = .03$.

Facial emotion identification. Emotion identification scores were calculated based on the total number of correct facial identifications out of 10 trials, with a possible range of 0 to 10 and observed range of 4 to 10. Emotion identification scores did not significantly differ by sex,

$t(86) = 1.26$, $p > .05$. Each emotion was displayed to each participant a total of 2 times, with a range of scores from 0 to 2, ($M_{Happy} = 1.98$, $SD = 0.15$, $M_{Neutral} = 1.80$, $SD = 0.48$, $M_{Disgust} = 1.74$, $SD = 0.49$, $M_{Angry} = 1.51$, $SD = 0.59$ $M_{Sad} = 1.26$, $SD = 0.74$). See Table 3 for study variable means and standard deviations.

Risk detection. Means and standard deviations for each individual risk detection item are presented in Table 3, including means for men and women. Scores on two items, the blame attributed to the man, and the likelihood the scenario is to end is rape, were reverse scored prior to all tests. Scores ranged from 1 to 7 on each item, with lower scores on all items relating to increased awareness and accurate identification of the scenario. Men and women did not differ in ratings of approval of the male perpetrator's behavior. Women reported significantly lower scores for all other sexual assault risk detection items compared to men (i.e., assessing the level of the woman's interest, the degree of consent present, the responsibility of the male perpetrator, responsibility of the female victim, and the likelihood of the scenario ending in rape). Bivariate correlations were computed between individual risk detection items, including the level of consent present, the level of interest in sex from the female victim, ratings of responsibility attributed to the female victim, ratings of responsibility attributed to the man, and ratings of the item "how likely is this scenario to end in rape" (see Table 3). Correlations between items ranged from .01 to .56.

Breath alcohol concentration. BACs ranged from .00 to .16 and did not significantly differ by sex, $t(87) = -1.26$, $p > .05$. See Table 3 for means and standard deviations.

Bivariate Correlations

Bivariate correlations are presented in Table 4. BAC was significantly negatively correlated with facial emotion identification scores, such that those with higher BACs were less

accurate in identifying facial emotions. BAC did not significantly correlate with the six risk detection items. Emotion identification scores were unrelated to the six risk detection items.

Bivariate correlations separated by sex are displayed in Table 5. BAC was significantly negatively related to emotion identification for men. No significant relationship between BAC and emotion identification was observed for women. Correlations trending toward significance were observed for women between the item "how likely is this scenario to end in rape" and BAC (r = .31, p = .07) and the item "how likely is this scenario to end in rape" and emotion identification (r = -.30, p = .08). The correlations between BAC and the remaining risk detection items were similar for men and women.

Emotion Identification as a Moderator of BAC and Risk Detection

Risk detection scores for each item were regressed on breath alcohol concentration and emotion identification, controlling for sex and drinking history. Results from these regression analyses are presented in Table 6. Step 2 for each item in Table 6 displays the effects of BAC and emotion identification after controlling for sex and past month alcohol use (entered at Step 1). After accounting for sex and past month alcohol use, neither BAC nor emotion identification were significant predictors of any risk detection item. Scores for the item "how likely is this scenario to end in rape" were significantly predicted by the overall model including sex, drinking history, BAC, and emotion identification, R^2 =.11 F (4, 82) = 2.64, p = .04. In this model, sex was a significant predictor of response, β = .23, p = .02, with women reporting a greater likelihood of the scenario ending in rape than did men. Past 30-day alcohol use, emotion identification, and BAC did not contribute significantly to the model (p's > .05) at Step 2.

After controlling for sex and drinking history scores and the main effects, the interaction between emotion identification scores and breath alcohol concentration was not a significant

predictor of scores on any individual risk detection item. For the items regarding Kathy's interest in Jason, R^2 =.112 F (5, 81) = 2.05, p = .08, and the likelihood the scenario will end in rape, R^2 =.12 F (5, 81) = 2.15, p = .07, the full model including sex, drinking history, BAC, emotion identification, and the interaction of BAC and emotion identification each approached significance. In these models, sex was a significant predictor of response such that women were more likely to report the situation will end in rape and women were more likely to rate Kathy as being less interested in Jason, β = .23, p = .02. Past 30-day alcohol use, emotion identification, BAC, and the BAC x emotion identification interaction did not contribute significantly to any of the models. Full regression results are presented under Step 3 of Table 6.

Follow-up Analyses by Gender

First, individual risk detection item scores were regressed on past month alcohol use, BAC, emotion identification scores, and the interaction of emotion identification and BAC separately for men and women. Results of these analyses for men are presented in Table 7, results for each item for women are presented in Table 8. For women, the item "how likely is this scenario to end in rape" was significantly predicted by the model including drinking history, BAC, and emotion score, R^2 =.205 F (3, 38) = 3.26, p = .03. Emotion identification score was a significant contributor to this model, β = -.36, p < .05. Furthermore, the full model including past month alcohol use, BAC, emotion identification scores, and BAC x emotion score interaction significantly predicted scores on the item "how likely is this scenario to end in rape," R^2 =.236 F (4, 37) = 2.85, p = .04; however, no individual items were significant predictors in the full model. No other models were significant for women. No models were significant for men.

Discussion

This field study used breath alcohol concentration, an emotion identification task and a sexual assault vignette to study the relationship between alcohol intoxication, social information processing, and risk for sexual assault among emerging adults ages 21-29 who had been drinking at bars. Alcohol myopia theory provides a framework for understanding the impairing effects of alcohol on accurate processing of social situational cues, including cues of risk for sexual assault. As proposed by Yeater, Hoyt, and Rinehart (2008), further testing of social information processing variables may help to isolate processes which contribute to alcohol-related sexual assault. Identifying the specific processes involved in the perception and identification of verbal and nonverbal communication which may be impaired by alcohol has implication for targets of prevention programs. Overall, results supported the hypothesis that BAC would be negatively related to emotion identification ability. Results did not support the hypothesis that BAC would be related to items of risk detection nor the moderation of the relationship between BAC and risk detection by emotion identification.

Social Information Processing

Emotion identification scores were negatively associated with breath alcohol concentration such that participants who were more intoxicated were less likely to accurately identify facial emotions than those who were less intoxicated. Consistent with previous researchers (Kano et al., 2002; Townsend & Duka, 2003; Tucker & Vuchinich, 1983), it was found that level of alcohol intoxication was associated with impaired processing of social information. As proposed by alcohol myopia theory (Steele & Josephs, 1990), alcohol selectively disrupts cognitive processing ability such that all facets of social behavior may not be evenly or accurately interpreted. Furthermore, Schupp et al. (2004) found after consuming

alcohol, participants displayed decreased neurological responding to emotional situational cues, suggesting social information processing is impaired by alcohol intoxication at a psychophysiological level. This decreased accuracy in interpreting nonverbal social communication may be critical to further understanding many negative social consequences of alcohol consumption by way of decreased processing of social information. Of the emotions displayed, anger and sadness were both the most likely to be misinterpreted, while happiness was the most readily identifiable. For a third party bystander or a perpetrator in a potential sexual assault situation, the incorrect identification of anger and sadness in combination with a propensity to over interpret emotions as happy (Kano et al., 2002) may be of particular relevance for the misinterpretation of a social situation involving unwanted aggression. Present findings support the connection between alcohol intoxication and impairment in the accurate interpretation of nonverbal social cues. Further study of how intoxication impairs social information processing may help to reveal the mechanisms by which alcohol relates to risk for misinterpreting cues related to sexual victimization.

Sexual Assault Risk Detection

Contrary to hypotheses, breath alcohol concentration was not significantly related to any items seeking to measure assessment of a hypothetical sexual assault scenario. The present findings were inconsistent with several studies suggesting alcohol impairs sexual assault risk detection (Abbey, Buck, Zawacki, & Saenz, 2003; Loiselle & Fuqua 2007; Testa, Livingston, & Collins, 2000). However, one qualitative analysis of situational descriptions conducted by Livingston and Testa (2000) revealed women who had consumed alcohol detected risk equally well as women who had not consumed alcohol. Gidycz et al. (2006) conducted a review of sexual assault risk detection literature and discussed the variability in risk detection results based

on scenario characteristics, including the method of delivery (audio story, written vignette), and perspective (first person versus third person). Contrary to the present findings, experimental studies with third person vignettes and alcohol administration (Davis, 2000, Testa, Livingston, & Collins, 2000) have identified the impairing effects of alcohol on the perception of risk in a hypothetical sexual assault scenario as measured by questionnaires.

Davis (2000) also reported differences in risk detection depending on victim-perpetrator relationship, such that women's ability to detect risk was greater when the perpetrator was a new acquaintance compared to someone they were dating. The present study may have prompted increased risk detection amongst all participants with the use of a new acquaintance as the perpetrator. During informed consent procedures, participants were informed they would be listening to a hypothetical scenario that may involve sexual interaction. Women may have been prompted in the present study to be more aware of potential risk given the unfamiliar relationship of the man and women in the scenario; however, previous studies (e.g., Davis, 2000; Loiselle & Fuqua, 2007) have reported impairing effects of alcohol on sexual assault risk detection using a vignette scenario such as that used in the present study.

Several researchers have also incorporated a measure of behavioral response to a hypothetical sexual assault scenario in addition to the perception and detection of risk (Marx & Soller-Baillo, 2005; Meadows, Jaycox, Orsillo, & Foa, 1997; Messman-Moore & Brown, 2006). Given some researchers have no found the impairing effects of alcohol on risk detection (e.g., Livingston and Testa, 2000), reported risk detection may not capture all factors salient to situational risk, suggesting that although women who had been drinking identified similar risk to women who had not consumed alcohol, behavioral responding to threat may still be altered by intoxication. Compared to behavioral measures of intervention (i.e., participants choosing a

moment to leave or intervene), a third-person self-report rating may be less sensitive to detect ability to assess risk in a hypothetical scenario and thus further effects of alcohol may have been revealed with additional measures of responding.

Furthermore, the present study scenario ended in direct nonconsensual sexual behavior that may have been salient and obvious enough to prompt all study participants to attend to the nonconsensual nature of the scenario (the scenario concludes, "… Kathy pushed him away and asked him to stop. However, Jason did not listen to her, and instead used force to hold her down and eventually has sex with her."). A more ambiguous ending may reveal additional differences based on intoxication levels and social information processing ability as related to detection of risk in a hypothetical scenario.

Sex Differences

Consistent with other field-based alcohol research in our laboratory (Fugitt, 2013) and others (e.g., Smith et al., 2013), the sample is the current study was comprised of more men than women. Men and women responded to risk detection items differently. In the regression models, sex was a significant contributor to the overall model for the dependent variable "how likely is the scenario to end in rape?" with women more likely to report the scenario will end in rape. There was a trend for women to report a lower degree of consent present than did men. Given the differences by sex based on preliminary *t*-tests and the potential for results to be obscured by important sex differences, the relationships between emotion identification, intoxication levels, and risk detection were examined separately by sex. For men only, emotion identification was significantly correlated with BAC. Although tests of the BAC and risk detection relationship conducted separately by gender were not significant, these analyses were limited by small cell sizes and low power.

Results of the present study support further examination of differences in risk detection between men and women. Specifically, the impairing effects of alcohol and moderation by social information processing may be importantly different between men and women, and thus may require alternative strategies for intervention. For women only, results suggest a possible relationship between social information processing through emotion identification and sexual assault risk detection. Bystander intervention research (e.g., Banyard, 2008) has identified important differences in attitudes and predicted behavior related to intervening in an interpersonal violence scenario between men and women. These differences may be particularly relevant to consider when analyzing the impairing effects of alcohol on the interpretation of social information which may prompt the need for intervention from a bystander. If women in particular suffer from specific interference in social information processing from alcohol, intervention programs may target education based on the predicted effects of alcohol. Future research should further isolate the differences in social information processing and risk detection by sex to further inform prevention and bystander intervention programs to maximize effectiveness.

Limitations

The present study utilized a novel field study methodology to address the issue of alcohol-related sexual assault. Although the field setting provided an increased ecologically valid measure of college student drinking behavior, there were several limitations as a result of the setting and measures used. Given concerns of the total amount of time participants would be willing to volunteer, the comprehensiveness of study measures was limited. Although there is limited support suggesting expectancies regarding the effects of alcohol, as well as attitudes regarding alcohol use, may relate to the effects of alcohol on risk detection, the present study was

unable to include measures of attitudes or alcohol expectancies given participants were only assessed while intoxicated. Present intoxication levels may influence participant responding on these measures, unduly influencing responses to these measures. The current study would benefit from within-subjects comparisons of non-intoxicated functioning to intoxicated results; however, given the field setting this was not a feasible design. Additionally, research suggests risk detection may be influenced by previous experience with sexual victimization (Gidycz et al., 2006); however, given the present study's aims to minimize potential risk amongst intoxicated participants, prior sexual victimization history was not collected. As such, important moderators of the effects of alcohol on risk detection may have been missed due to study brevity and setting.

Furthermore, the present study utilized a correlational design. Participants were not experimentally assigned to intoxication level conditions; rather, participants who had previously been consuming alcohol were recruited for this study. All measures to assess past-month alcohol use, sexual assault risk detection, and emotion identification were all self-report questionnaires administered by a research assistant. Participants were intoxicated when responding; current alcohol consumption may alter accuracy of reporting past month drinking patterns. Participant responding may have been further influenced by social desirability. Given the sensitive nature of certain questions related to perceptions of the hypothetical sexual assault scenario, it is possible participant responding was influenced by the presence of a research assistant and thus responses were altered related to self-presentation. Study design arranged for all participants interviewed to be taken to an area separated from others such that privacy was maximized. However, given the public setting, it is possible responses may have been influenced by social desirability or biases related to the perception of others on looking participation.

Additionally, the sample size may not have been sufficient to detect effects. Post hoc power analyses with a total sample size of 89, 5 predictors, and small to medium effect size (f^2 range .06 to.14) for the regressions reported reveal observed power for the six individual analyses range from .39 to .74. The current sample size may not be large enough to be sufficiently powered to detect hypothesized relationships, and even more so when conducting analyses separately for men (n = 52) and women (n = 36). A priori power analyses suggested a total sample size of 110 to detect predicted effects. To detect moderation by sex with 8 predictors, medium effect size, and .80 power, a sample size of 120 would be required. Thus a larger sample size would be needed to test the predicted relationship between BAC, emotion identification, and risk detection as moderated by sex.

Finally, based on the selection of stimuli used for the sexual assault risk detection and emotion identification task, the current study should be interpreted as a highly conservative test of the impairing effects of alcohol. Specifically, the emotion identification faces and hypothetical sexual assault scenario were each chosen based on the ability of students who were not consuming alcohol to accurately identify most faces and accurately detect risk in the vignette. As such, each task was designed to reveal the effects of alcohol intoxication on a task most participants did not display difficulty with. As a result, the present stimuli used may have been too direct and too forward to display the same impairing effects of alcohol compared to stimuli that would allow for greater variability in responding.

Future Research

Given the limitations, a laboratory examination using expanded measures would allow for greater tests of social information processing and additional measures of sexual assault risk detection, including psychophysiological and behavioral reactions to a sexual assault scenario.

Additionally, measures of attitudes related to drinking and sexual assault may also be implicated in risk for sexual assault victimization and should be included.

Furthermore, alternative tasks should be considered to measure social information processing and risk detection. Social information processing may be measured with a variety of tasks including facial recognition or detection of emotion in a changing face. Alternative measures of risk detection used in previous research include a more behaviorally-based reaction to risk which could be utilized in a laboratory setting compared to the current field setting. It is possible additional variance in risk detection may be obtained from an alternate scenario and thus the effects of alcohol could be better examined. Research also suggests that many other factors may contribute to risk for sexual assault, including previous victimization (Gidycz et al., 2006). As such, a laboratory setting could provide the opportunity to conduct more comprehensive reviews of psychological and sexual history.

Conclusions

The current study represents a unique approach to the study of risk for sexual assault by examining the relationship of alcohol intoxication on emotion identification and sexual assault risk detection in a novel field setting. Alcohol intoxication was found to be related to social information processing impairment, but was not significantly related to items of sexual assault risk detection. Although emotion identification was not directly related to the current measurement of sexual assault scenario risk, previous research supports the importance of emotion identification and social information processing in social communication, linking difficulties in emotion identification with an increase in social communication problems. As such, social information processing remains an important area of study for further understanding

social problems resulting from alcohol intoxication and should be used with additional measures of risk for sexual assault.

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Table 1. Online pilot survey means and standard deviations

Variable	Men Mean (*SD*)	Women Mean (*SD*)	Mean (*SD*)
Age	20.20 (3.72)	18.92 (1.49)	19.36 (2.56)**
Average number of drinking nights per week	1.62 (1.22)	1.49 (0.95)	1.54 (1.06)
Average number of standard drinks per occasion	3.89 (3.60)	2.63 (2.28)	3.08 (2.88)**
Sexual Assault Vignette Ratings			
Woman Want Sex	2.01 (1.32)	1.98 (1.38)	1.99 (1.36)
Rating Man's Behavior	1.81 (1.84)	1.68 (1.72)	1.72 (1.76)
Degree of Consent	1.65 (1.44)	1.51 (1.15)	1.56 (1.26)
Man's Responsibility	2.60 (1.98)	2.20 (1.66)	2.34 (1.78)
Woman's Responsibility	3.45 (1.82)	3.25 (1.59)	3.32 (1.68)
Likelihood of Rape	1.28 (0.77)	1.18 (0.60)	1.22 (.67)

*Note: * denotes significant difference between men and women p < .05, ** denotes p < .01. BAC = Breath alcohol concentration.*

Table 2. Demographic information

			Total	Total Percent
Sex				
Men			52	59.6
Women			36	40.4
	Men	Women	Total	Total Percent
Ethnicity				
White	42	32	74	83.1
Hispanic/Latino	4	2	7	7.9
American Indian	2	1	3	3.4
Asian	1	1	2	2.2
Black	1	0	1	1.1
Other	2	0	2	2.2
Years in College				
Non-Student	18	7	25	28.4
Freshman	3	0	3	3.4
Sophomore	2	3	5	5.7
Junior	6	5	11	12.5
Senior	17	16	33	37.5
Graduate Student	5	5	10	11.4
Other	1	0	1	1.1

Table 3. Means and standard deviations

Variable	Men Mean (*SD*)	Women Mean (*SD*)	Mean (*SD*)
BAC	.069 (.043)	.058 (.033)	.064 (.040)
Age	23.10 (2.05)	22.42 (1.61)	22.81 (1.89)
Average number of drinking nights per week	2.87 (1.97)	1.93 (1.10)	2.5 (1.73)*
Average number of standard drinks per occasion	4.90 (3.08)	4.22 (2.20)	4.63 (2.76)
Emotion Identification	8.33 (1.31)	8.36 (1.61)	8.34 (1.43)
Sexual Assault Vignette Ratings			
Woman Want Sex	2.49 (1.60)	1.78 (1.12)	2.20 (1.46)*
Rating Man's Behavior	1.62 (1.20)	2.00 (1.91)	1.78 (1.52)
Degree of Consent	1.79 (1.41)	1.25 (0.69)	1.57 (1.19)*
Man's Responsibility	3.32 (1.67)	2.42 (1.40	2.96 (1.62)**
Woman's Responsibility	2.79 (2.07)	1.86 (1.46)	2.41 (1.89)*
Likelihood of Rape	2.57 (1.74)	1.61 (1.02)	2.18 (1.56)**

*Note: * denotes significant difference between men and women p < .05, ** denotes p < .01. BAC = Breath alcohol concentration.*

Table 4. Bivariate correlations

	2	3	4	5	6	7	8
1. BAC	-.27**	-0.01	0.10	.08	<.01	.01	.08
2. Emotion Score		.08	.04	-.03	-.04	.08	-.15
3. Woman Want Sex			.34**	.56**	.47**	.16	.26**
4. Rating Male Behavior				.35**	.13	.11	.03
5. Degree of Consent					.35**	.16	.29**
6. Male perpetrator's Responsibility						.17	.28
7 Female victim's Responsibility							.20*
8. Likelihood of Rape							

*Note: * denotes p < .05, ** denotes p < .01. BAC = Breath alcohol concentration.*

Table 5. Bivariate correlations by Sex

	1	2	3	4	5	6	7	8
1. BAC	---	-.28*	.03	.12	.16	.07	-.02	<.01
2. Emotion Score	-.12	---	.09	.08	-.23	-.23	.08	-.11
3. Woman Want Sex	-.02	.30	---	.68**	.51**	.34*	.23	.33*
4. Rating Male Behavior	.14	.07	.23	---	.36*	.16	.18	.03
5. Degree of Consent	.01	.20	.48**	.26	---	.19	.13	.26
6. Male perpetrator's Responsibility	.02	.25	.51**	.11	.42*	---	.01	.50*
7 Female victim's Responsibility	.06	-.04	<.01	.06	.18	.46**	---	.10
8. Likelihood of Rape	.31	-.30	.12	.10	.18	.30	.42*	---

*Note: Correlations for men (n = 52) presented above the diagonal; correlations for women (n = 36) presented below the diagonal; * denotes p < .05, ** denotes p < .01. BAC = Breath alcohol concentration.*

Table 6. *Associations of Background Variables, BAC, and Emotion Identification with Risk Perception Items*

Variable	B	SE	Beta
"Did Kathy want to have sex with Jason?"			
Step 1			
Sex	.56	.31	.20*
Drinking History	.02	.02	.16
	Model R^2 =.081 F (*2*, 84) = 3.68, p = .03		
Step 2			
Sex	.55	.31	.19
Drinking History	.02	.02	.16
BAC	1.08	3.97	.03
Emotion Score	.15	.11	.15
	Model R^2 =.102 F (*4*, 82) = 2.32, p = .06		
Step 3			
Sex	.57	.31	.20
Drinking History	.02	.02	.16
BAC	-24.16	25.84	-.66
Emotion Score	-.07	.25	-.07
BAC x Emotion Score	3.09	3.12	.68
	Model R^2 =.112 F (*5*, 81) = 2.05, p = .08		
"How acceptable was Jason's behavior?"			
Step 1			
Sex	-.44	.34	-.14
Drinking History	.01	.02	.04
	Model R^2 =.019 F (*2*, 84) = .82, p = .44		
Step 2			
Sex	-.49	.34	-.16
Drinking History	<.01	.02	.03
BAC	5.42	4.32	.14
Emotion Score	.11	.12	.10
	Model R^2 =.04 F (*4*, 82) = .89, p = .47		
Step 3			
Sex	-.45	.35	-.15
Drinking History	.01	.02	.03
BAC	-28.80	28.64	-.76
Emotion Score	-.20	.27	-.18
BAC x Emotion Score	4.31	3.47	.88
	Model R^2 =.06 F (*5*, 81) = 1.03, p = .41		
"To what extent was consent provided?"			
Step 1			
Sex	.38	.25	.17
Drinking History	.02	.01	.20
	Model R^2 =.060 F (*2*, 84) = 3.73, p = .03		

Step 2			
Sex	.36	.25	.16
Drinking History	.02	.01	.19
BAC	2.55	3.22	.09
Emotion Score	-.06	.09	-.08
	Model R^2 =.10 *F* (*4*, 82) = 2.37, *p* = .72		
Step 3			
Sex	.40	.25	.17
Drinking History	.02	.01	.19
BAC	-37.78	20.72	-.11
Emotion Score	-.36	.20	-.45
BAC x Emotion Score	4.21	2.51	1.15
	Model R^2 =.13 *F* (*5*, 81) = 2.39, *p* = .45		

"How responsible is the male for the outcome of this scenario?"

Step 1			
Sex	.72	.35	.24*
Drinking History	.01	.02	.06
	Model R^2 =.045 *F* (*2*, 84) = 3.04, *p* = .053		
Step 2			
Sex	.72	.35	.23*
Drinking History	.01	.02	.06
BAC	3.32	4.46	.08
Emotion Score	.04	.12	.03
	Model R^2 =.07 *F* (*4*, 82) = 1.64, *p* = .17		
Step 3			
Sex	.74	.35	.23*
Drinking History	.01	.02	.06
BAC	-13.70	29.12	-.34
Emotion Score	-.11	.28	-.10
BAC x Emotion Score	2.09	3.53	.42
	Model R^2 =.08 *F* (*5*, 81) = 1.37, *p* = .24		

"How responsible is the female for the outcome of this scenario?"

Step 1			
Sex	.98	.42	.25*
Drinking History	<.01	.02	-.02
	Model R^2 =.040 *F* (*2*, 84) = 2.81, *p* = .07		
Step 2			
Sex	.98	.43	.25*
Drinking History	<.01	.02	-.02
BAC	-.05	5.47	<.01
Emotion Score	.02	.15	.01
	Model R^2 =.06 *F* (*4*, 82) = 1.37, *p* = .25		
Step 3			
Sex	1.04	.42	.27

Drinking History	<.01	.02	-.01
BAC	-61.51	35.11	-1.24
Emotion Score	-.51	.33	-.38
BAC x Emotion Score	7.53	4.25	1.23
	Model R^2 =.10 F (5, 81) = 1.76, p = .13		
"How likely is this scenario to end in rape?"			
Step 1			
Sex	.70	.31	.24*
Drinking History	.02	.02	.15
	Model R^2 =.098 F (2, 84) = 4.54, p = .01		
Step 2			
Sex	.68	.31	.24
Drinking History	.02	.02	.14
BAC	2.72	3.97	.07
Emotion Score	-.09	.11	-.09
	Model R^2 =.11 F (4, 82) = 2.64, p = .04		
Step 3			
Sex	.69	.31	.24
Drinking History	.02	.02	.14
BAC	-10.53	25.92	-.29
Emotion Score	-.21	.25	-.21
BAC x Emotion Score	1.62	3.13	.36
	Model R^2 =.12 F (5, 81) = 2.15, p = .07		

Note. **p<.01, *p<.05. Drinking History = number of drinks consumed in the past month based on a typical weekly frequency x quantity score. BAC = Breath Alcohol Concentration. Sex was coded as Men = 0 and Women = 1.

Table 7. *Associations of Background Variables, BAC, and Emotion Identification with Risk Perception Items for Men*

Variable	B	SE	Beta
"Did Kathy want to have sex with Jason?"			
Step 1			
Drinking History	.03	.02	.26
	Model R^2 =.066 *F (1*, 54) = 3.79, *p* = .06		
Step 2			
Drinking History	.03	.02	.25
BAC	-.91	5.04	-.03
Emotion Score	-.10	.17	-.09
	Model R^2 =.072, *F (*3, 52) = 1.346, *p* = .27		
Step 3			
Drinking History	.03	.02	.23
BAC	16.82	22.71	.51
Emotion Score	.12	.32	.11
BAC x Emotion Score	-2.24	2.86	-.49
	Model R^2 =.083, *F (*4, 51) = 1.08, *p* = .34		
"How acceptable was Jason's behavior?"			
Step 1			
Drinking History	.01	.02	.07
	Model R^2 = <.01 *F (1*, 55) = 0.28, *p* = .60		
Step 2			
Drinking History	<.01	.02	.02
BAC	3.86	4.15	.15
Emotion Score	-.02	.14	-.02
	Model R^2 =.03 *F (3, 53*) = .53, *p* = .67		
Step 3			
Drinking History	<.01	.02	.02
BAC	-.91	18.66	-.09
Emotion Score	-.08	.27	-.09
BAC x Emotion Score	.63	2.40	.17
	Model R^2 =.03 *F (4*, 52) = .41, *p* = .80		
"To what extent was consent provided?"			
Step 1			
Drinking History	.01	.02	.31
	Model R^2 =.13 *F (1*, 53) = .91, *p* = .35		
Step 2			
Drinking History	.01	.02	.06
BAC	.61	4.29	.02
Emotion Score	-.25	.13	-.28
	Model R^2 =.31 *F (3, 51*) = 1.82, *p* = .16		
Step 3			
Drinking History	.01	.02	.08

BAC	-24.82	19.18	-.91
Emotion Score	-.57	.27	-.62*
BAC x Emotion Score	3.28	2.41	.84
	Model R^2 =.36 *F (4, 50)* = 1.85, *p* = .14		

"How responsible is the male for the outcome of this scenario?"

Step 1

Drinking History	.02	.02	.18
	Model R^2 = .03 *F (1*, 55) = 1.76, *p* = .19		

Step 2

Drinking History	.02	.02	.14
BAC	-.34	4.83	-.01
Emotion Score	-.18	.17	-.17
	Model R^2 =.06 *F (3, 53)* = .1.05, *p* = .38		

Step 3

Drinking History	.02	.02	.15
BAC	-12.45	21.64	-.41
Emotion Score	-.33	.31	-.31
BAC x Emotion Score	1.60	2.78	.36
	Model R^2 =.06 *F (4*, 52) = .86, *p* = .49		

"How responsible is Kathy for the outcome of this scenario?"

Step 1

Drinking History	-.01	.02	-.40
	Model R^2 = <.01 *F (1*, 55) = 0.18, *p* = .67		

Step 2

Drinking History	-.01	.02	-.01
BAC	-.3.78	6.21	-.10
Emotion Score	.03	.21	.02
	Model R^2 =.01 *F (3, 53)* = .23, *p* = .88		

Step 3

Drinking History	<.01	.02	<.01
BAC	-16.29	28.84	-.43
Emotion Score	-.13	.40	-.10
BAC x Emotion Score	1.65	3.58	.29
	Model R^2 =.02 *F (4*, 52) = .22, *p* = .93		

"How likely is this scenario to end in rape?"

Step 1

Drinking History	.01	.02	.08
	Model R^2 =.01 *F (1*, 55) = 0.39, *p* = .54		

Step 2

Drinking History	.01	.02	.07
BAC	-.31	4.96	-.01
Emotion Score	-.07	.17	-.07
	Model R^2 =.01 *F (*3, 53) = .17, *p* = .90		

Step 3

Drinking History	.01	.02	.07
BAC	2.24	22.29	.07
Emotion Score	-.04	.32	-.04
BAC x Emotion Score	-.33	2.87	-.08
	Model R^2 =.01 F (4, 51) = .13, p = .97		

Note. **p<.01, *p<.05. Drinking History = number of drinks consumed in the past month based on a typical weekly frequency x quantity score. BAC = Breath Alcohol Concentration

Table 8. *Associations of Background Variables, BAC, and Emotion Identification with Risk Perception Items for Women*

Variable	B	SE	Beta
"Did Kathy want to have sex with Jason?"			
Step 1			
Drinking History	-.02	.02	-.15
	Model R^2 =.022 *F (1*, 40) = 3.68, *p* = .35		
Step 2			
Drinking History	-.03	.02	-.19
BAC	-.06	3.37	<.01
Emotion Score	.20	.10	.30
	Model R^2 =.11, *F*(3, 38) = 1.58, *p* = .21		
Step 3			
Drinking History	-.03	.03	-.19
BAC	-1.29	2.12	-.52
Emotion Score	.31	.21	.47
BAC x Emotion Score	-1.29	2.12	-.52
	Model R^2 =.12, *F*(4, 37) = 1.26, *p* = .30		
"How acceptable was Jason's behavior?"			
Step 1			
Drinking History	<.01	.02	.07
	Model R^2 =.03 *F (1*, 40) = .03, *p* = .96		
Step 2			
Drinking History	<.01	.02	.02
BAC	3.86	4.15	.15
Emotion Score	-.02	.14	-.02
	Model R^2 =.11, *F*(3, 38) = .17, *p* = .92		
Step 3			
Drinking History	<.01	.02	.02
BAC	-.01	18.66	-.04
Emotion Score	-.08	.27	-.09
BAC x Emotion Score	.63	2.4	.17
	Model R^2 =.12, *F*(4, 37) = .13, *p* = .97		
"To what extent was consent provided?"			
Step 1			
Drinking History	.01	.01	.17
	Model R^2 =.03 *F (1, 40*) = 1.13, *p* = .29		
Step 2			
Drinking History	.01	.01	.14
BAC	.34	2.14	.03
Emotion Score	.06	.07	.16
	Model R^2 =.05 *F (3, 38*) = .68, *p* = .57		
Step 3			
Drinking History	.01	.01	.14
BAC	1.47	11.40	.11

Emotion Score	.08	.14	.19
BAC x Emotion Score	-.14	1.35	-.09
Model R^2 =.05 *F (4, 37)* = .50, *p* = .74			

"How responsible is the male for the outcome of this scenario?"

Step 1			
Drinking History	-.03	.03	-.15
Model R^2 = .02 *F (1*, 40) = 0.90, *p* = .35			
Step 2			
Drinking History	-.03	.03	-.15
BAC	-.88	4.30	-.03
Emotion Score	.15	.14	.17
Model R^2 =.05 *F (3*, 38) = .74, *p* = .54			
Step 3			
Drinking History	-.03	.03	-.16
BAC	18.59	22.82	.72
Emotion Score	.36	.28	.42
BAC x Emotion Score	-2.39	2.75	-.76
Model R^2 =.07 *F (4, 37)* = .74, *p* = .57			

"How responsible is Kathy for the outcome of this scenario?"

Step 1			
Drinking History	.01	.03	.07
Model R^2 = <.01 *F (1*, 40) = 0.18, *p* = .67			
Step 2			
Drinking History	<.01	.03	.02
BAC	5.85	4.82	.20
Emotion Score	-.06	.16	-.06
Model R^2 =.05 *F (3*, 38) = .67, *p* = .57			
Step 3			
Drinking History	<.01	.03	-.02
BAC	.32	25.83	.01
Emotion Score	-.12	.32	-.12
BAC x Emotion Score	.68	3.11	.19
Model R^2 =.05 *F (4, 37)* = .51, *p* = .73			

"How likely is this scenario to end in rape?"

Step 1			
Drinking History	-.01	.03	-.05
Model R^2 =.030 *F (1*, 40) = .04, *p* = .85			
Step 2			
Drinking History	-.01	.03	-.07
BAC	5.89	3.81	.23
Emotion Score	-.28	.12	-.36*
Model R^2 =.205 *F (3*, 38) = 3.26, *p* = .03			
Step 3			
Drinking History	-.01	.03	-.07

BAC	29.83	19.90	1.18
Emotion Score	-.03	.24	-.04
BAC x Emotion Score	-2.88	2.35	-.98

Model R^2 =.236 F *(4, 37)* = 2.85, p = .04

Note. **p<.01, *p<.05. Drinking History = number of drinks consumed in the past month based on a typical weekly frequency x quantity score. BAC = Breath Alcohol Concentration

Appendix A

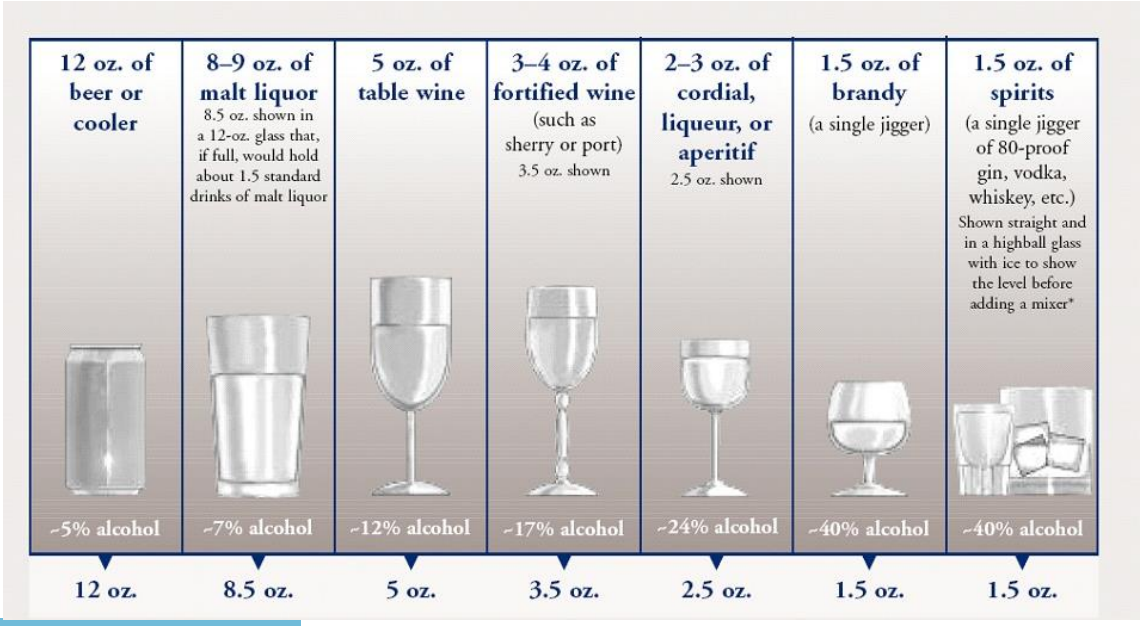
1. What is your sex? Male / Female
2. What is your age? ____
3. Are you currently a college student? Yes / No
4. What year are you in school?

   Freshman / Sophomore / Junior / Senior / Graduate Student / Other
5. With which race/ethnicity do you identify?

   White (non-Hispanic) / African American (non-Hispanic) / Hispanic / Asian / American Indian / Other
6. On average, how many nights per week did you consume alcohol over the last month? (please circle):

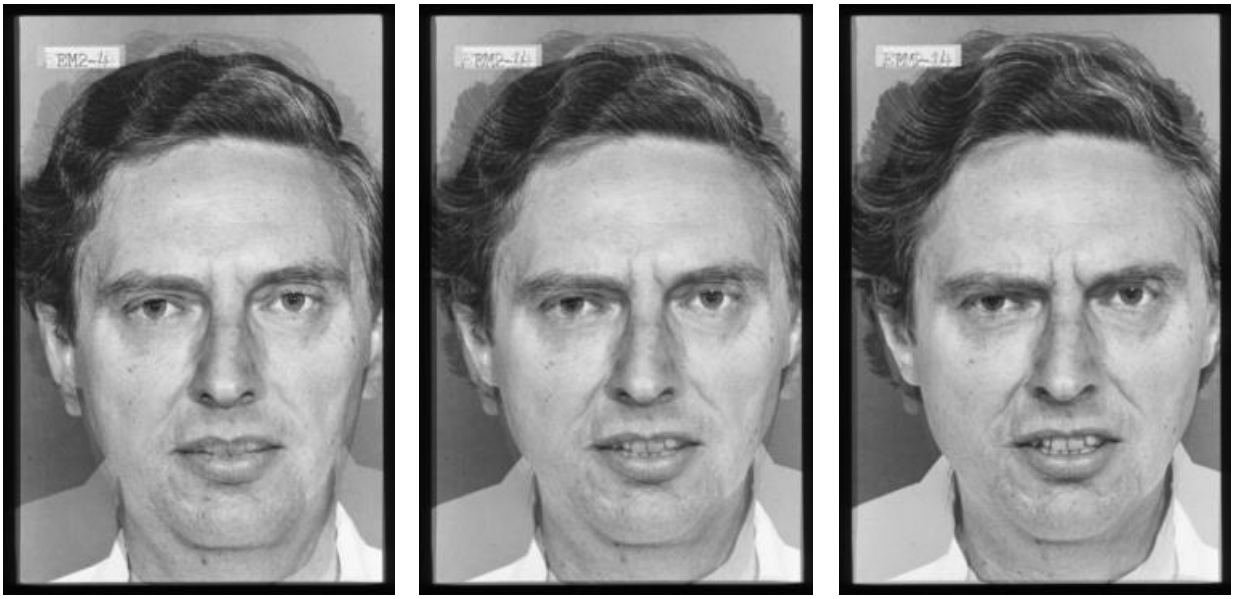
   1 night 2 nights 3 nights 4 nights 5 nights 6 night 7 nights/week
7. On average, how many standard alcoholic drinks did you consume each drinking occasion? ____

A STANDARD DRINK IS:



Appendix B

Sample images depicting three possible male faces for anger.



Male (30% Anger) **Male (50% Anger)** **Male (70% Anger)**

What emotion is being depicted? Angry / Happy / Sad / Disgust / No Emotion

Appendix C

"Jason and Kathy met and got acquainted at a party thrown by a mutual friend. Since they had a lot in common, they spent the night laughing, dancing, talking and flirting with each other. At the end of the party, Kathy invited Jason over to her apartment to talk some more and have a drink. When they got to her room, Kathy started kissing and caressing Jason. Jason then grabbed Kathy and tried to take her clothes off in order to have sex with her. At this point Kathy pushed him away and asked him to stop. However, Jason did not listen to her, and instead used force to hold her down and eventually has sex with her."

Appendix D

1. Did Kathy want to have sex with Jason?

1	2	3	4	5	6	7
not at all						Kathy definitely wanted to have sex with Jason

2. How would you rate Jason's behavior?

1	2	3	4	5	6	7
not at all appropriate						completely appropriate in this scenario

3. Did Kathy consent to having sex?

1	2	3	4	5	6	7
Kathy did not consent at all						Kathy gave complete consent

4. How responsible was Kathy for this situation?

1	2	3	4	5	6	7
Kathy is not at all responsible						Kathy is completely responsible

5. How responsible was Jason for this situation?

1	2	3	4	5	6	7
Jason is not at all responsible						Jason is completely responsible

6. Was this scenario rape?

1	2	3	4	5	6	7
Not at all						Definitely was

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

September 23, 2013

MEMORANDUM

TO:	Aleander Melkonian Lindsay Ham
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	13-09-086
Protocol Title:	*Effects of Alcohol on Social and Emotional Cue Processing*
Review Type:	☐ EXEMPT ☒ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 09/23/2013 Expiration Date: 09/22/2014

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 300 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu