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Effects of Alcohol Intoxication and Neurocognitive Processing on Intimate Partner Aggression

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EFFECTS OF ALCOHOL INTOXICATION AND NEUROCOGNITIVE PROCESSING ON INTIMATE PARTNER AGGRESSION

by

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EFFECTS OF ALCOHOL INTOXICATION AND NEUROCOGNITIVE PROCESSING ON INTIMATE PARTNER AGGRESSION

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Intimate partner aggression (IPA) is a serious public health concern that occurs with alarming frequency, results in both physical and psychological harm to victims, and costs billions of dollars per year due to healthcare costs and loss of productivity. These adverse consequences highlight the need to understand risk factors of IPA perpetration. Attempts to identify these risk factors have focused mostly on broad factors that may predispose someone to perpetrate aggression, including individual demographic and dispositional characteristics (e.g., low socioeconomic status, psychopathy). Although valuable, this knowledge cannot reveal the specific circumstances that may prompt an individual to perpetrate aggression against a partner (O'Leary & Slep, 2006). The present study addresses this issue by examining two important *situational processes* that may play important roles in predicting IPA. Drawing on the alcohol myopia model (Steele & Josephs, 1990), the present study utilizes an experimental approach to test a model in which *attentional deficits* in neurocognitive processing, which have been independently linked to IPA, are hypothesized to mediate associations between acute alcohol intoxication and partner aggression. This process model was examined in a community sample of individuals with and without histories of IPA perpetration. This project used an experimental design involving lab-based alcohol administration, as well as an assessment of neurocognitive processing using high density EEG technology to

assess event related potentials (ERP). A well-validated paradigm for eliciting aggressive verbalizations in the context of romantic relationships is also employed. Results indicated a significant IPA and alcohol interaction in which only individuals with a history of IPA who were intoxicated exhibited increased aggressive verbalizations during anger arousal. Tests of the proposed mediated moderation model were not significant. The importance of targeting alcohol use in the treatment of IPA and implications for the development of intervention and prevention strategies will be discussed, as will possible explanations for the lack of mediated moderation.

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Chapter 1: Introduction

Intimate partner aggression (IPA) is a startlingly common societal problem with overwhelmingly negative consequences for individuals and society (Bagner, Storch, & Preston, 2007; Centers for Disease Control and Prevention, 2003; Kaura & Lohman, 2007). It is therefore vital to understand factors that contribute to aggression occurring between intimate partners. To date, the study of risk factors for IPA has primarily focused on individual demographic and dispositional factors; however, research has begun to reveal specific situational factors that prompt an individual to perpetrate aggression against a partner *in the moment.* One such factor is alcohol use, which has strong links to partner aggression; however, this relationship is not universal, indicating that other variables play an important role in this association. One variable that may contribute to the alcohol-IPA relationship is neurocognitive processing during anger arousal. Research suggests that alcohol intoxication is especially disruptive to neurocognitive processing among individuals prone to aggression. Utilizing an experimental approach, this study will test the impact of acute alcohol intoxication on partner aggression, as well as examine attentional deficits in neurocognitive processing, which has been independently linked to IPA, as a possible mediator of the associations between alcohol use and partner aggression.

Definition and Scope of the Problem

IPA encompasses a range of potentially harmful acts between romantic partners, including physical, sexual, verbal, and/or psychological aggression (Centers for Disease

Control and Prevention, 2012). These acts occur between current or former intimate partners, and span a continuum of a single episode to ongoing violence (CDC, 2012). IPA is perpetrated by women and men (Archer, 2002) in both heterosexual and same-sex couples (Messinger, 2011). Although IPA includes sexual and psychological aggression, the focus of this study is on physical aggression between romantic partners. Physical aggression occurs when a person harms or tries to harm their partner through the use of physical force, such as slapping, kicking, or punching (CDC, 2012).

The rates and consequences of IPA perpetration are alarming. It is estimated that past-year physical IPA perpetration ranges from 12% to 50% among both women and men (Caetano, Cunradi, Schafer, & Clark, 2000; Schumacher & Leonard, 2005; Smith, Thornton, DeVellis, Earp, & Coker, 2002; Straus & Gelles, 1990; Tjaden & Thoennes, 2000). IPA results in billions of dollars per year in healthcare costs and loss of productivity due to the psychological and physical consequences for victims, which include depression, anxiety, substance abuse, somatization, and bodily injuries, for both women and men (Amar & Gennaro, 2005; Bagner et al., 2007; Kaura & Lohman, 2007). Male-to-female IPA is a particular problem, accounting for 26% of violence-related injuries in women presenting in hospital emergency departments (Rand, 1997) and 33% of adult female homicides (Rennison, 2003). Female-to-male aggression is a concern as well, with studies showing equal or higher rates of female-to-male IPA perpetration (Archer, 2002; Straus & Gelles, 1990; Straus & Ramirez, 2007); however, male-to-female IPA tends to involve more severe physical acts and have more harmful effects on victims (see Archer, 2000, for a review). To address IPA as a public health concern, it is

crucial to understand the etiological factors contributing to both women and men's aggression within intimate relationships.

Situational Risk Factors of IPA

Research examining risk factors for IPA perpetration has focused mostly on individual demographic and dispositional characteristics (e.g., low SES, psychopathy; Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000; Riggs, Caulfield, & Street, 2000). Although this work has been valuable in identifying individual characteristics that are associated with IPA, these risk factors tend to be stable over time (Bell & Naugle, 2008) and thus may be rather resistant to change through interventions. Moreover, knowledge of broad risk factors cannot reveal the more *immediate situational processes* that may prompt an individual to perpetrate aggression against a partner in the moment (O'Leary & Slep, 2006). For example, the vast majority (81%) of IPA incidents are immediately preceded by verbal conflict (Greenfield et al., 1998). Hence, an increased understanding of provocation and escalation patterns of aggression among intimate partners is important to help uncover the specific instances that influence the likelihood of IPA perpetration and can be targeted in treatment (Wilkinson & Hamerschlag, 2005).

Alcohol and IPA

One important situational risk factor that has consistently been linked to IPA perpetration among both women and men is alcohol use (see meta-analysis by Foran & O'Leary, 2008). Survey studies indicate that a variety of drinking behaviors, including problem drinking (Baker & Stith, 2008; Fossos, Neighbors, Kaysen, & Hove, 2007; Weinsheimer, Schermer, Malcoe, Balduf, & Bloomfield, 2005; White & Chen, 2002),

which involves experiencing problems as a result of alcohol, increased drinking frequency (Luthra & Gidycz, 2006; Rapoza & Baker, 2008), and binge drinking (Hines & Straus, 2007; O'Leary & Schumacher, 2003) are associated with IPA perpetration. Also, self-reported alcohol use by both individuals and couples appears to play an important role in the alcohol-IPA relationship (Leadley, Clark, & Caetano, 2000; Lipsky, Caetano, Field, & Larkin, 2005; Maldonado, Watkins, & DiLillo, in press; Testa et al., 2012). Survey and daily diary studies also show that alcohol consumption occurs within close proximity of an IPA episode (Kantor & Straus, 1990; Shook, Gerrity, Jurich, & Segrist, 2000) and that perpetrators are often intoxicated at the time of aggression (Makepeace, 1981; Roudsari, Leahy, & Walters, 2009; Williams & Smith, 1994). According to the National Crime Victimization Survey (Bureau of Justice Statistics, 2010), alcohol-related aggression involved intimate partners more than any other type of violence. Hence, abundant data generated from a variety of non-experimental studies has linked alcohol use to perpetration of IPA, making it an important risk factor to investigate to further delineate its role in facilitating aggression.

The correlational and cross-sectional nature of work linking alcohol use to IPA perpetration suggests the possibility of a causal relationship between these two variables. This causal connection has been explored in studies examining the relationship between alcohol and general interpersonal aggression (e.g., Giancola, 2002, 2004a; Giancola & Zeichner, 1995; Lau, Pihl, & Peterson, 1995). Typically, this work involves randomizing participants to an alcohol, no alcohol, and/or placebo condition, then asking them to play a competitive "reaction time" game with a fictitious opponent. Participants who win a trial assign the intensity and duration of shocks to their "opponent" (which is used as an

index of aggression); however, if they lose, participants expect to receive a shock from their opponent. These experimental studies consistently find evidence of a causal connection between alcohol intoxication and aggression (see Bushman & Cooper, 1990, for a review), and suggest that aggressive responding tends to increase with rising levels of provocation (Giancola, Helton, Osborne, Terry, & Westerfield, 2002).

Only a few studies have utilized similar experimental procedures involving alcohol administration to test the direct effects of alcohol intoxication on partner (versus general) aggression (Eckhardt, 2007; Leonard & Roberts, 1998; Stappenbeck & Fromme, 2014). The focus of earlier studies was on the effects of alcohol intoxication on the content of conflict discussions among intimate partners with and without a history of aggression (e.g., Leonard & Roberts, 1998). This work shows that when men are intoxicated, both partners display increased negativity during a conflict discussion, including using more criticism, engaging in more disagreements, using a negative voice tone, and expressing more intense displays of contempt and disgust. However, more recent investigations have begun to explore the effects of alcohol intoxication on proxy measures for partner aggression in the lab. For example, Eckhardt (2007) conducted an experimental study on the effects of alcohol intoxication on aggressive verbalizations during anger arousal, a risk factor for physical IPA perpetration. In this study, maritally violent and martially nonviolent men were randomly assigned to one of three alcohol conditions: alcohol, placebo, or no alcohol. Participants then completed the Articulated Thoughts in Simulated Situations (ATSS) paradigm to arouse anger and assess participants' aggressive verbalizations in response to emotionally evocative scenarios involving intimate partners. Articulation of aggressive verbalizations included verbal

aggression (insulting or demeaning a character in the scenario), physical aggression (desires to hit or shove, or any reference to a physical altercation), and belligerence (attempts to initiate an altercation by provoking, threatening, or challenging a character) verbalized by participants. Eckhardt (2007) found that martially violent men under the influence of alcohol articulated significantly more aggressive verbalizations during anger arousal than all other participants.

In a subsequent study, Eckhardt and Crane (2008) examined alcohol's effects on aggressive verbalizations among both women and men. Participants were randomly assigned to consume either an alcoholic or placebo beverage, then completed the ATSS task, from which articulations of aggressive verbalizations during anger arousal were again coded. Dispositional aggression was assessed with a well-validated self-report measure. Consistent with past research, results indicated that when intoxicated, highly aggressive women and men articulate more aggressive verbalizations during anger arousal compared to individuals reporting low tendencies toward aggression (Eckhardt & Crane, 2008). Further, no gender differences were found suggesting that the effects of alcohol on IPA are similar for both women and men.

In a more recent study, Stappenbeck and Fromme (2014) examined the effects of alcohol, emotion regulation, and emotional arousal on aggressive verbalizations among both women and men. Participants who were in a romantic relationship were randomized to an alcohol, placebo, and no alcohol condition. Similar to Eckhardt (2007) and Eckhardt and Crane's (2008) studies, the ATSS paradigm was used, but aggressive verbalizations (termed "aggression intentions" in this study) were measured by totaling the number of verbally and physically aggressive statements made during the ATSS

scenario, while belligerence statements were not included. Consistent with previous work, this study found that both women and men in the alcohol condition articulated more aggressive verbalizations during anger arousal compared to individuals in the no alcohol condition. However, the number of aggressive verbalizations articulated did not differ for individuals in the placebo condition compared to either the alcohol or no alcohol condition. The authors concluded while alcohol clearly effects the expression of aggression, the role that alcohol expectancies play in the alcohol-IPA relationship is less clear. Taken together, these studies consistently demonstrate a relationship between alcohol and aggressive verbalizations, a known risk factor of IPA perpetration, among people predisposed to engage in aggressive behavior.

Alcohol myopia model. Although alcohol appears to increase aggression among women and men who are prone to engage in IPA, this relationship may be mediated by important intervening variables that serve to facilitate the expression of aggression during alcohol intoxication (Kantor & Straus, 1987; Leonard, 2005). Therefore, there is a need to examine not only the direct linkages between alcohol intoxication and IPA, but also the variables that may mediate this relationship. Such research would address the question of what processes lead acute alcohol intoxication to increase IPA perpetration. The alcohol myopia model (Steele & Josephs, 1990) provides a possible explanatory framework with which to examine this question. This model proposes that the psychopharmacological effects of alcohol intoxication impair neurocognitive processing (Giancola, 2000; Giancola, Josephs, Parrott & Duke, 2010), resulting in problems with processing internal/external cues. Specifically, alcohol intoxication is thought to produce a narrowing of attention, which restricts the range of internal and external cues that are

perceived and processed (Giancola et al., 2010; Steele & Josephs, 1990). In particular, intoxicated individuals are more likely to focus on the most salient provoking cues in their environment, while ignoring the more distal inhibiting cues (e.g., the negative consequences of their actions). This attentional narrowing is said to foster behavioral dysregulation, including impulsive aggression of the type seen in IPA (Steele & Josephs, 1990).

Research supports the theoretical notion that alcohol has a myopic effect that reduces attentional capacity in a manner that can potentiate a person's risk for aggression. For example, in one early study, Zeichner and colleagues (1982) examined whether manipulating intoxicated men's attention on a laboratory aggression task impacted their aggressive responding. Men from the community who identified themselves as being social drinkers were told they were going to play a reaction time game involving shocks, ostensibly with an unknown partner, to examine the effects of alcohol on reaction time and pain perception. Participants were instructed to press one of five buttons upon hearing a tone in order to terminate the tone. They were then informed that pressing the first button would administer a hardly noticeable shock to their partner, while pressing one of the other buttons (2-5) would administer increasingly painful shock levels. Participants were then led to believe that their partner provided them feedback by sending the participant a tone level (contingency tone) indicating the degree of pain they felt. Participants then received instructions that either forced them to attend to the contingency information provided or distracted them from attending to the contingency information. Before completing the reaction time game, participants were administered either an alcoholic or placebo beverage. Intoxicated men who were forced to attend to the

aggression task exhibited increased aggression as measured by shock duration, while both intoxicated and sober men who were distracted exhibited decreased aggression.

Similarly, Leonard (1989) examined the effects of alcohol intoxication and presenting explicit aggressive and implicit non-aggressive cues on aggression among college-aged men. He found that both intoxicated and sober men responded nonaggressively on a shock task after being presented with an explicit nonaggressive cue, as well as when that cue was followed by an implicit nonaggressive cue. Similarly, all men responded aggressively after being presented with an explicit aggressive cue. However, a different response pattern occurred when an explicit aggressive cue was followed by an implicit nonaggressive cue: intoxicated men continued to respond aggressively on the shock task, while sober men decreased their aggressive response. These results suggest that the effects of alcohol intoxication led the intoxicated men to focus their attention on the more salient aggressive cue, while ignoring the less salient nonaggressive cue.

More recently, Giancola and Corman (2007) investigated the role of alcohol myopia in facilitating alcohol-related aggression by examining whether alcohol compared to placebo increased aggression in men who were not distracted from a provoking stimulus. In this study, male social drinkers played a competitive reaction time game with a confederate opponent, in which shocks were received and administered at varying levels of intensity. Men were randomized to receive either alcohol or placebo, and either a distracter or no distracter. Those in the distraction condition simultaneously engaged in the reaction time game and a computerized task that put a strain on working memory resources. Results showed that intoxicated men who were not distracted exhibited more

aggression on the shock task compared to intoxicated men who were distracted and non-intoxicated men in both distraction conditions. These findings provide further support for the alcohol myopia model by demonstrating that alcohol's impairment of attentional capacity may lead to greater aggression when men are presented with prominent provoking cues in their environment. These results have been replicated in a similar study that utilized a diverse community sample (Gallagher & Parrott, 2011).

Brain Imaging Research on Alcohol and IPA

In addition to the experimental studies mentioned above, there is also evidence from brain imaging studies supporting the underlying theory of alcohol myopia. These studies show disruption of neurocognitive processing during acute alcohol intoxication, as well as evidence of pre-existing attentional deficits among individuals prone to aggression. This research utilizes brain imaging techniques, specifically electroencephalogram (EEG), to assess event-related potentials (ERP) among individuals who are intoxicated and who have a prior history of committing aggression. Due to the technical nature of these studies, a brief overview of the relevant brain imaging terminology is presented.

Electroencephalogram (EEG). This term refers to a non-invasive brain imaging instrument that is widely used in experimental psychological research to measure electrical activity of the brain (Rösler, 2005). EEG involves placing a soft net of woven electrodes over an individual's head. An adult net typically has 256 electrodes which are evenly spaced around the scalp. A continuous reading of the electrical impulses emitted by the brain cells is recorded to produce constant waves of EEG data. The EEG is a particularly useful tool because when used in conjunction with performing a cognitive

task, it provides us with useful information about changes in brain activity that can help us make knowledgeable inferences regarding the population in which we are interested.

Event-related potential (ERP). ERPs consist of sections of EEG data (Rösler, 2005), also known as components, which are averaged across a number of trials and "time locked" to the onset of a specific stimulus (e.g., auditory, visual, or somatosensory), yielding a brain waveform (Baars & Gage, 2012). Hence, it is used to measure brain responses to specific stimuli presented to an individual. An EEG waveform produces several ERP components, including the P100, P200, and P300. These components are identified by their polarity and latency in milliseconds following a stimulus presentation. The P100 is related to the processing of visual stimuli and is believed to reflect the cost of shifting attention (Luck et al., 1994). The P200 reflects postperceptual selective attention, including detection and analysis of a stimulus (Hajcak, Weinberg, MacNamara, & Foti, 2011). The P300 reflects attentional processing (Picton, 1992) and has particular relevance to aggression. This component is conventionally assessed through an oddball paradigm, which involves the random presentation of frequent and infrequent stimuli (which are most commonly visual or auditory). Participants are instructed to respond only to the infrequent stimulus by pressing a response key each time it appears. The P300 is a positive wave component occurring at approximately 300 ms after a low-probability stimulus presentation. One way to measure the P300 is by assessing its amplitude (μV; size), which is directly related to the amount of attentional resources engaged in processing stimuli (Johnson, 1988; Polich, 1998; Polich & Kok, 1995). Larger amplitudes are indicative of greater attention allocation (Polich & Kok, 1995).

Effects of alcohol on neurocognitive processing. Alcohol's disruptive effects on neurocognitive processing has been substantiated by research demonstrating reduced attentional capacity during acute alcohol intoxication, as evidenced by decreases in the P300 amplitude (Bartholow et al., 2003; Jääskeläiinen, Nääitäinen, & Sillanaukee, 1996; Oscar-Berman, 1987; Porjesz & Begleiter, 1996; Rohrbaugh et al., 1987; Wall & Ehlers, 1995). For example, Bartholow and colleagues (2003) examined ERPs in response to a cognitively demanding attentional task to directly test the alcohol myopia model. Women and men participants were assigned to consume either a high or moderate dose of alcoholic beverage or a placebo beverage. Participants' ERPs were then assessed while they completed a computerized response inhibition task where they were asked to respond to a target letter with one hand, while responding to another target letter with the other. The response patterns presented resulted in the participants responding to either compatible or non-compatible target letters. Results indicated that relative to a placebo, both moderate and high doses of alcohol tended to decrease the P300 amplitude in response to the cognitively demanding attentional task. Consistent with the alcohol myopia model theory, alcohol decreased attentional processing during completion of a task that involved viewing salient patterns. In a similar study, Wall and Ehlers (1995) examined the effects of alcohol on attentional processing among a sample of Asian men. This study randomized participants to an alcohol or placebo condition and utilized an auditory oddball paradigm to elicit the P300 amplitude. Findings were consistent with previous studies showing that alcohol compared to placebo produced significant P300 amplitude reductions indicating decreased attentional processing. Taken together,

research findings demonstrate that alcohol intoxication clearly produces a narrowing of attentional capacity.

Attentional deficits among aggression-prone individuals. While alcohol intoxication adversely affects attentional processing, it has been suggested that alcohol intoxication is especially disruptive to neurocognitive processing among individuals prone to aggression, thereby further potentiating the risk of violence perpetration (Giancola, 2000). In support of this conjecture, deficits in neurocognitive processing have been independently linked to increased impulsive-type aggression, similar to that occurring in IPA (Harmon-Jones, Barratt, & Wigg, 1997; Mathias & Stanford, 1999; Patrick, 2008). This work consistently finds lower P300 amplitudes in impulsively aggressive individuals compared to non-aggressive individuals (Barratt, Stanford, Kent, & Felthous, 1997; Drake, Pakalnis, Brown, & Heitter, 1988; Gerstle, Mathias, & Stanford, 1998; Mathias & Stanford, 1999; Stanford, Houston, Villemarette-Pittman, & Greve, 2003). Additionally, research has found a relationship between decreased P300 amplitudes and increased verbal and physical aggression among adolescents (Harmon-Jones et al., 1997), as well as higher anger and impulsivity among aggressive men (Barratt et al., 1997). Furthermore, these P300 differences are not found among individuals who commit premeditated aggression (Stanford et al., 2003).

In perhaps the only study to examine ERP in relation to IPA specifically, Stanford and colleagues (2007) investigated cognitive and neurocognitive processing of convicted male IPA perpetrators compared to non-violent men. Participants completed a series of standardized executive functioning measures, which assesses an individual's ability to use higher-order cognitive processes for planning, executing, and regulating goal-directed

behavior (Luria, 1973). The battery of executive function measures included the Trail Making Test, which measures speed of attention, mental flexibility, motor sequencing and visual scanning, and the Wisconsin Card Sorting Task, which measures the ability to plan, strategize, and respond to changing contextual contingencies. Participants also completed an auditory oddball task to assess the P300 amplitude. For this task, participants were randomly presented with 156 trials of the frequent (1000 Hz) tone and 48 trials of the infrequent (2000 Hz) tone, and asked to attend to the infrequent stimuli by silently counting the infrequent 2000 Hz tones. Findings indicated that IPA perpetrators, compared to non-violent men, demonstrated significant cognitive deficits from their performance on the executive functioning tasks. Specifically, the types of problems IPA perpetrators displayed on the executive function tests indicate difficulties with attention. Furthermore, consistent with the literature on aggression-prone individuals showing attenuated P300 amplitudes, results found that the IPA perpetrators exhibited greater attentional processing deficits, as indicated by decreased P300 amplitude in response to the auditory oddball paradigm.

The Present Study

Despite these individual linkages between both IPA and alcohol in relation to neurocognitive deficits, these relationships have yet to be examined as part of a more coherent whole. The alcohol myopia model provides a unifying theory with which to examine the bivariate associations found in past work. Specifically, this model suggests that alcohol use and IPA history not only make independent contributions to IPA, but that they may interact to increase aggression, and that this interaction may be mediated by neurocognitive processing deficits. More specifically, neurocognitive attentional deficits

found in individuals with a history of IPA perpetration, particularly when intoxicated, may facilitate alcohol's narrowing of attention on aggressive cues, thus accounting for the likelihood of aggression in these individuals. The present investigation employs an experimental design to test this proposed model, as depicted in Figure 1.1 below. Specifically, IPA perpetration, alcohol intoxication, and neurocognitive processing during anger arousal will be examined as part of an integrative model in which deficits in attentional capacity (indexed by P300 amplitudes) are expected to mediate the interactive effects of alcohol intoxication and IPA on verbalized aggression.

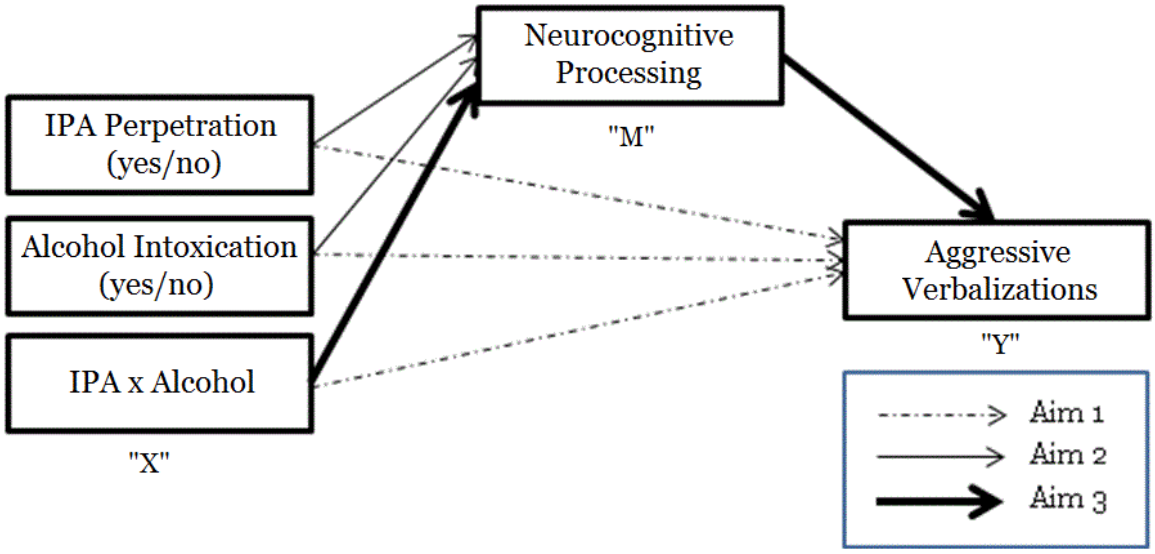

Figure 1.1

Hypothesized mediated moderation model where neurocognitive processing is predicted to mediate the interactive effects of alcohol intoxication and IPA on aggressive verbalizations.

If, as suggested here, the relationship between pre-existing neurocognitive deficits and alcohol intoxication play important roles in the emergence of IPA, then their impact might be clearly seen in the aggressive verbalizations that arise from couple conflict. An overwhelming majority of IPA incidents are precipitated by verbal conflict (Greenfield et

al., 1998), while self-reported verbal aggression arising from such conflicts is an important longitudinal predictor of IPA perpetration for both women and men (Schumacher & Leonard, 2005). Moreover, in lab studies using the ATSS (Davison, Robins, & Johnson, 1983) to expose participants to emotionally evocative scenarios involving intimate partners, Eckhardt and colleagues (1998, 2002) have shown that aggressive verbalizations predict IPA, such that violent men in dating and marital relationships articulate more aggressive verbalizations during anger arousal compared to non-violent men (Barbour, Eckhardt, Davison, & Kassinove, 1998; Eckhardt, Jamison, & Watts, 2002). Therefore, in testing the proposed model, the present investigation uses an experimental design involving lab-based alcohol administration, assessment of neurocognitive processing using cutting-edge event related potential (ERP) technology, and a well-validated paradigm for eliciting aggressive verbalizations in the context of romantic relationships. Consistent with the literature described above, the following study aims and hypotheses are proposed.

Study Aims and Hypotheses

Aim 1. Examine the main and interactive effects of alcohol intoxication and IPA on aggressive verbalizations during anger arousal.

Hypothesis 1A. Alcohol intoxication (vs. placebo) will be associated with increased aggressive verbalizations during anger arousal.

Hypothesis 1B. Past IPA perpetration (vs. no IPA perpetration history) will be associated with increased aggressive verbalizations during anger arousal.

Hypothesis 1C. Alcohol intoxication and IPA history will interact such that

intoxication among IPA perpetrators will result in the greatest increase in aggressive verbalizations during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals.

Aim 2. Examine the main and interactive effects of alcohol intoxication and IPA on neurocognitive processing during anger arousal.

Hypothesis 2A. Alcohol intoxication (vs. placebo) will be associated with decreased P300 ERP component amplitude during anger arousal.

Hypothesis 2B. Past IPA perpetration (vs. no IPA perpetration history) will be associated with decreased P300 ERP component amplitude during anger arousal.

Hypothesis 2C. Alcohol intoxication and IPA history will interact such that intoxication among IPA perpetrators will result in the greatest decrease in P300 ERP component amplitude during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals.

Aim 3. Examine the role of neurocognitive processing in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations.

Hypothesis 3A. A mediated moderation model is proposed in which neurocognitive processing is predicted to mediate the interactive effects of alcohol intoxication and IPA history on aggressive verbalizations. Specifically, during alcohol intoxication, IPA perpetrators will exhibit the greatest deficits in neurocognitive processing (smallest P300 ERP component amplitude), which will predict increased aggressive verbalizations during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals.

Chapter 2: Methods

Overall Strategy

This investigation employed a between-subjects design to examine the influence of acute alcohol intoxication and neurocognitive processing deficits on aggressive verbalizations displayed during anger arousal among a community sample of women and men with and without a history of IPA perpetration. Participants' history of IPA perpetration was assessed via the Revised Conflict Tactics Physical Assault subscale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Participants were randomized to an alcohol condition (intoxication or placebo) and then asked to verbalize their thoughts and feelings in response to anger-arousing relationship scenarios via the Articulated Thoughts in Simulated Situations (ATSS) paradigm (see Eckhardt, 2007). While listening to the ATSS, participants' brain electrical activity was recorded in the form of visual event-related brain potentials (ERPs), using an oddball paradigm (described below). Aggressive verbalizations were assessed using coding procedures developed by Dr. Christopher Eckhardt and used in numerous published studies (Eckhardt et al., 2002; Eckhardt & Crane, 2008). Neurocognitive processing was assessed with the P300 amplitude derived from responses to the visual oddball paradigm presented to the participant during the ATSS task. Participants also completed a self-report measure of anger experience and other negative affect throughout the experimental procedure. This study was approved by the University's Institutional Review Board (see Appendix A).

Participants

The study sample included 38 participants (18 women and 20 men) currently in a committed heterosexual intimate relationship of six months or longer, recruited from Lincoln, Nebraska. Participants were recruited through flyers posted throughout the Lincoln community, and advertisements posted on Craigslist and Facebook. Craigslist is an electronic database of classified advertisements. Facebook is a social media site that allows for targeted ad placement according to users' demographic characteristics, including age, relationship status, and geographic location. This method enabled us to efficiently reach Lincoln community members who met eligibility requirements. Community members were recruited for "a research study about alcohol use, brain processing, and relationships."

To participant in the study, individuals had to be between 21 years (legal drinking age) and 30 years of age, an age range at high risk for IPA perpetration (Stith, Smith, Penn, Ward, & Tritt, 2004). Participants must also be at least social drinkers and right-handed, to control for ERP handedness effects (Hoffman & Polich, 1999). Because of risks associated with alcohol consumption and IPA research, and to minimize risks associated with the use of EEG, a number of additional exclusion criteria were employed, including: 1) current/past alcohol abuse or dependence; 2) history of treatment for or hospitalization due to alcohol use or other substance abuse; 3) current harmful and/or hazardous drinking; 4) a legal restriction against drinking (e.g. as condition of probation or parole); 5) weighing over 250 pounds if less than 6 feet tall or weighing over 300 pounds if over 6 feet tall; 6) a history of traumatic brain injury, neurological disorder, or loss of consciousness for 20 minutes or longer; 7) serious psychological symptoms; 8)

abstinence from alcohol use; 9) learning disabilities; 10) a condition of medication use in which alcohol consumption is medically contraindicated; 11) presence of a positive breath alcohol concentration (BAC) upon arrival; 12) if a female participant is nursing or tests positive on a urine pregnancy test administered upon arrival; 13) committing two or more very severe acts of intimate partner physical aggression in the previous year (threatening or use of a weapon, beating with a closed fist, altercations resulting in injuries requiring medical attention); 14) cochlear implants; 15) significant hearing loss or other severe sensory impairment; 16) shrapnel; 17) neurostimulators; 18) history of metal fragments in the eyes or skin; a fragile health condition (e.g., heart condition, auto-immune disorder, cancer, severe allergies); 19) history or seizures or current use of anticonvulsants; 20) current use of psychoactive medications; and 21) any metal or electromagnetic implants. Finally, since Antisocial Personality Disorder has been shown to be associated with a reduction of the P300 ERP component amplitude (O'Connor, Bauer, Tasman, & Hesselbrock, 1994), individuals who met criteria for this disorder were excluded. All individuals interested in participating in the study and their romantics partners provided verbal informed consent (see Appendix B) prior to completing the telephone screening interview. All participants provided written informed consent prior to participation in the study session (see Appendix C).

To determine initial study eligibility, 104 individuals and their partners completed a telephone screening interview. Figure 2.1 illustrates the flow of participant recruitment. Based on this initial screening, 55 participants were eligible to schedule a study session. A total of 46 participants (24 women and 22 men) completed the study, but 8 participants (6 women, 2 men) were not included in analyses. One participant was excluded because

no ERP data were collected due to a technical error, while seven participants were excluded due to their ERP data displaying excess artifacts as described below.

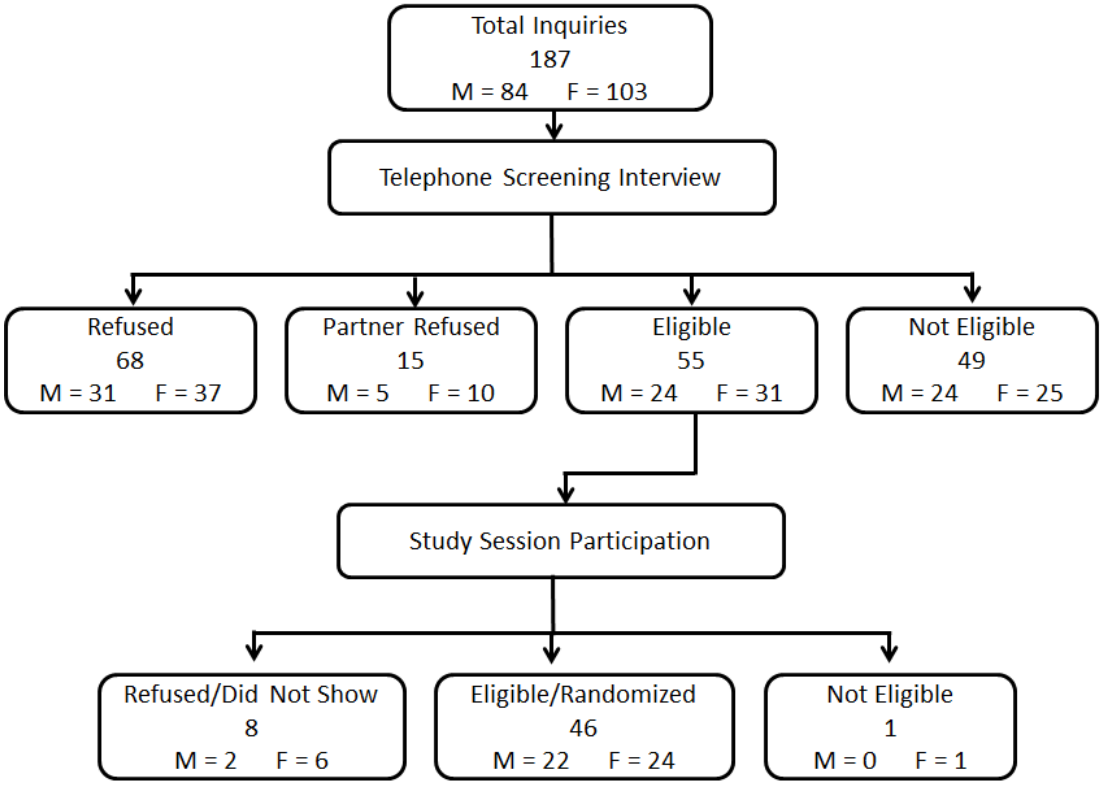

Figure 2.1

Flow chart of participant recruitment.

Participants were an average of 28.84 years of age (*SD* = 2.65, range = 21 to 30) and had been in a relationship for a mean of 32.27 months (2.69 years; *SD* = 26.02, range = 6 to 98 months). Participants had an average of 16.39 years of education (*SD* = 2.57, range = 12 to 23). The majority of participants reported they were in a dating relationship (44.7%), while 18.4% reported being engaged, 28.9% reported not being married but living with their partner, and 7.9% reported being married. Regarding ethnicity, 7.9% of participants reported that they were of Latino, Hispanic, or Spanish origin, 2.6% reported American Indian or Alaska Native, 7.9% reported Asian, 2.6%

reported African-American or Black, 78.9% reported White, and 10.5% reported Mixed. Regarding average yearly income, 2.6% of participants reported earning $0-$5,000, 7.9% reported earning $5,000-$10,000, 39.5% reported earning $10,000-$20,000, 23.7% reported earning $20,000-$30,000, 15.8% reported earning $30,000-$40,000, 2.6% reported earning $40,000-$50,000, 2.6% reported earning $60,000-$70,000, and 5.3% reported earning $70,000 or more.

Lab Tasks

Alcohol administration. Alcohol administration procedures were similar to those used by Giancola and colleagues (2002, 2004, 2009). Participants were randomly assigned to drink alcohol or a placebo beverage. Men who received alcohol were administered a dose of .9 g/kg of 95% alcohol by volume (Everclear), mixed at a 1:5 ratio with orange juice. Because of gender differences in body fat composition, women were given a dose of .85 g/kg of Everclear. For men, this is approximately .015 ounces of alcohol per pound, and for women this is approximately .014 ounces of alcohol per pound. Therefore, a 180-pound man would drink 2.7 ounces of alcohol mixed with 13.5 ounces of orange juice. A 130-pound woman would drink 1.82 ounces of alcohol mixed with 9.1 ounces of orange juice. Four milliliters of alcohol were added to each placebo beverage (orange juice) and alcohol was sprayed on the rim of the placebo beverage glass. Participants were given 20 minutes for beverage consumption. Breadth alcohol content (BAC) was measured using the Intoximeters Alco-Sensor FST Breathalyzer. Those who consumed alcohol had their BAC tested 20 minutes after they finished their beverage. Participants were administered the laboratory tasks (ATSS and visual oddball paradigm) after they reached a BAC of .08%, based on prior research suggesting that a BAC of at

least .08% is effective in evoking aggression (Giancola & Zeichner, 1997). Because alcohol placebo manipulations have been found to be effective for only approximately 30 minutes after beverage consumption (Bradlyn & Young, 1983), the placebo group had their BAC tested and then completed the ATSS and visual oddball paradigm immediately after beverage consumption. The BAC for all participants was assessed following the completion of the laboratory tasks.

Articulated Thoughts in Simulated Situations (ATSS) paradigm. Mirroring procedures used by Eckhardt and colleagues (2007, 2008), the ATSS (Davison et al., 1983) paradigm (see Appendix D) was used to induce anger arousal and assess participants' cognitions in response to emotionally evocative scenarios involving intimate partners Three audio-recorded relationship scenarios (neutral and two jealousy conversations) were digitally recorded and noise-filtered using Audacity software (http://audacity.sourceforge.net). The neutral scenario involved a game night scene with another couple in which the participant performs poorly at a new game, while the participants' partner excels at the game. The two anger-arousing scenarios involved themes of jealousy that portrayed conversations in which the participants' partner was flirting with someone of the opposite sex. The ATSS scenarios were presented to the participants via a speaker that was positioned one meter above the center of their head, at an average intensity of 75 dB sound pressure level. Participants were instructed to listen to and imagine they are involved in all three scenarios. Participants were also asked to talk out loud about their thoughts and feelings during these scenarios when promoted to do so by a tone. Each scenario was divided into eight 15 to 25-second segments of simulated interaction separated by 30-second pauses during which participants verbally

expressed their thoughts and feelings. Participants first completed the neutral (non-anger inducing) scenario to familiarize themselves with the procedures for responding. The two jealousy conversation scenarios were counterbalanced. Articulations were recorded via MediaLab software (Jarvis, 2004). The primary dependent variable derived from the ATSS was the total frequency of aggressive verbalizations articulated throughout the two anger arousing scenarios. Aggressive verbalizations is an aggregate variable representing verbal aggression (insulting or demeaning a character in the scenario), threats of physical aggression (desires to hit or shove, or any reference to a physical altercation), and belligerent statements (attempts to initiate an altercation by provoking, threatening, or challenging a character). To quantify the frequency of aggressive verbalizations verbalized by participants, articulations were transcribed and coded using procedures by Eckhardt and colleagues (e.g., Eckhardt & Jamison, 2002; Eckhardt et al., 2002; Eckhardt, 2007; Eckhardt & Crane, 2008). Five advanced undergraduate research assistants who were blinded to the hypotheses of the study completed 25 hours of training and served as coders. To measure inter-rater reliability, 20% of the independently coded data were randomly selected to be coded by an additional coder. An intraclass correlation calculated for aggressive verbalizations from a two-way mixed model suggested very high reliability ($r_{IC} = .90$, $p = .002$).

Visual oddball paradigm. During each ATSS scenario, participants viewed a visual oddball task (see Appendix D) used extensively in ERP research to examine the P300 component as an index of attention (Picton, 1992). The visual oddball task was created and presented to the participants using E-Prime software version 2.0 (Schneider, Eschman, Zuccoloto, 2007). The visual oddball stimuli were presented to participants

using Courier New bold font, size 22, with the duration between the stimuli set at random intervals between 1,200 and 1,635 milliseconds. Participants were seated comfortably and were asked to sit as still as possible to minimize blinking while completing the visual oddball task. While listening to each ATSS simulated interaction, participants viewed frequent ("x") and infrequent ("o") occurring stimuli on a computer screen (frequency and letter designations were counterbalanced across subjects) that was positioned one meter away from the participant's head. Frequent stimuli ("x") were presented 70% (84 trials) of the time, while infrequent stimuli ("o") were presented 30% (36 trials). Participants were instructed to respond to only the infrequent stimulus by pressing a response key each time it appeared. ERPs to both visual stimuli were recorded (see data collection procedures). ERP recording only took place during the listening portion of the ATSS task, and was suspended during periods of vocalization. P300 amplitudes served as the dependent variable.

Self-Report Measures

IPA perpetration. History of IPA perpetration was assessed via the Relationships Behaviors measure and the Revised Conflict Tactics Physical Assault subscale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996; see Appendix E). Participants and their partners' first completed the relationship behaviors measure that was developed for this study during the phone screen. This measure consists of 33 items assessing how partners have handle disagreements in the past six months. The measure is comprised of both positive and negative relationship behaviors, including the minor and severe physical assault subscale items of the CTS2 (see description below). Participants first indicated how they were victimized by their partner during the past six months, then

how often they perpetrated each behavior towards their partner. Responses for each physical aggression item were totaled to create a sum score with higher scores representing more partner physical aggression. Additionally, responses for severe aggression items were totaled to create a sum score with higher scores representing more severe partner aggression. Individuals were excluded from participating in the study if they reported perpetrating two or more acts of severe physical aggression or their partners' reported being victims of two or more acts of severe physical aggression on this measure. Participants who reported no acts of perpetrating physical aggression and whose partners reported no acts of being physically victimized by their partners were categorized in the no-IPA group. Participants who reported perpetrating one or more acts of physical aggression or whose partners reported being victims of one or more acts of physical aggression were categorized in the IPA group.

During the laboratory session, participants also completed the CTS2 physical assault subscale to assess IPA perpetration in a more confidential setting (i.e., on a computer in a private room rather than over the telephone). This subscale consists of 12 self-report items that are designed to measure history of IPA perpetration. Participants indicated the frequency with which they perpetrated each behavior against an intimate partner in the past six months, using a scale ranging from 0 (*never*) to 6 (*more than 20 times*). Responses for each item were totaled to create a sum score with higher scores representing more partner aggression. Participants with a sum score of 0 and whose partners did not report any instances of partner physical victimization on the Relationships Behaviors measure were categorized in the no-IPA group, while those with a sum greater than 0 were categorized in the IPA group. The CTS2 is the most widely

used self-report measure of IPA (Langhinrichsen-Rohling, 2005) and has demonstrated adequate internal consistency reliability and good construct validity (Newton, Connelly, & Landsverk, 2001; Straus et al., 1996). The coefficient alpha was .70 for this sample.

Self-reported anger. To assess effects of the ATSS task on mood, participants completed the Mood Rating Scale (MRS; see Appendix E), an abridged version of the Positive and Negative Affective Schedule-Expanded Form (PANAS; Watson & Clark, 1992). This 15-item measure describing different feelings and emotions includes five adjectives that create an anger factor (angry, hostile, irritable, disgusted, and annoyed; Watson & Clark, 1992). Alpha reliability for this anger factor was .88 to .93 in similar studies (Eckhardt, 2007; Eckhardt & Crane, 2008; Maldonado, DiLillo, & Hoffman, in press). Participants completed these ratings immediately before and after each ATSS scenario, rating the extent to which they are feeling each feeling/emotion at the present moment, on a 5-point scale, from 1 (*very slightly or not at all*) through 5 (*extremely*). Coefficient alpha was .92 for this sample.

Demographics. Participants also completed a demographic form (see Appendix E) assessing age, sex, education level, ethnicity, relationship status and length, and average yearly income.

Perceived drunkenness. Participants completed a perceived drunkenness assessment (Zeichner, Giancola, & Allen, 1995; see Appendix E), with 1 equaling "not drunk at all", 5 equaling "moderately drunk", and 10 equaling "the most drunk I've ever been".

Alcohol expectancies. Although several studies suggest that alcohol consumption has a stronger effect on aggression than alcohol expectancies (Bushman &

Cooper, 1990; Hull & Bond, 1986; Steffensen & Southwick, 1985), some studies have found that alcohol expectancies related to aggression predict IPA perpetration (Field, Caetano, Nelson, 2004; Senchak & Leonard, 1994; Zhang, Welte, & Wieczorek, 2002). Therefore, to examine the role of alcohol expectancies in the present study, the Risk and Aggression subscale of the Comprehensive Effects of Alcohol (CEOA; Fromme, Stroot, & Kaplan, 1993; see Appendix E) scale was administered. This subscale has been shown to be psychometrically strong (Fromme et al, 1993) and includes 5-items assessing the extent to which participants expect to behave aggressively while under the influence of alcohol.

Executive cognitive functioning. The Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005) was administered to examine executive cognitive functioning. This measure consists of 75 items assessing nine different aspects of individuals' executive functions, including inhibit, shift, emotional control, self-monitor, initiate, working memory, plan/organize, task monitor, and organization of materials. The scores for these nine aspects are summed to create two index scores, the Behavioral Regulation Index (BRI) and the Metacognition Index. The BRI, which is comprised of the inhibit, shift, emotional control, and self-monitor subscales, measures a person's ability to appropriately modulate their emotions and behavior, including controlling impulses. The Metacognition Index, which is comprised of the initiate, working memory, plan/organize, task monitor, and organization of materials subscales, measures a person's ability to systematically solve problems via planning and organization, including setting goals and beginning activities. Executive cognitive functioning has been identified as a moderator of the effect of alcohol on

aggressive behavior in a laboratory setting (see review by Giancola, 2000). Specifically, compared to the Metacognition Index, the BRI was found to be the strongest predictor of intoxicated aggression (Giancola, Godlaski, & Roth, 2012), and therefore will serve as a covariate in analyses examining primary hypotheses. The Behavioral Regulation Index raw scores were converted to *T*-scores, with greater scores indicating greater difficulties with executive functioning. The BRIEF-A has demonstrated good internal consistency reliability and construct validity (Roth et al., 2005). The coefficient alpha for the four BRI subscales for this sample ranges from .63 to .78, with a mean of .72. The coefficient alpha for the BRI was .85 for this sample.

Screening Measures

Participants were administered a series of measures (see Appendix B) for the purpose of screening participants and determining study eligibility. These measures, described below, were unrelated to the primary study hypotheses.

Hazardous alcohol use. Two measures were administered to examine harmful or hazardous alcohol use, including the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) and the National Institute on Alcohol Abuse and Alcoholism's (NIAAA's) Alcohol Use Questionnaire. The AUDIT is a simple and reliable 10-item screening measure that helps determine whether an individual's alcohol consumption may be harmful. Specifically, this measure assesses quantity and frequency of drinking, symptoms of dependence, and problems caused by alcohol use. Each item is scored from 0 to 4 and total scores can range from 0 to 40. Higher scores indicate greater hazardous alcohol use. Individuals scoring 10 or higher were not eligible to participate in the study. However, only individuals who consumed at

least 2 or more alcoholic drinks at least twice per month were eligible to participate. The AUDIT has demonstrated high internal consistency, can reliably identify individuals who engage in hazardous drinking (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Saunders et al., 1993), and has been used extensively in research examining individuals from the community (e.g., Reinert & Allen, 2007; Shakeshaft, Bowman, & Sanson-Fisher, 1998).

To further assist with determining whether an individual's alcohol consumption may be problematic, the NIAAA Alcohol Use questionnaire was also administered. This 7-item questionnaire assesses for more comprehensive information about potential alcohol issues, including frequency and number of drinks consumed within a 24-hour period, during the past 12 months, and during the participants' lifetime. Individuals reporting problematic or excessive drinking behaviors were not eligible to participate in the study.

Antisocial personality disorder. The Structured Clinical Interview for DSM-IV Personality Disorders – Antisocial Personality Disorder Module (SCID-II ASPD Module; First, Spitzer, Gibbon, Williams, Benjamin, 1994) was administered to assess for antisocial personality disorder. This interview assesses whether individuals exhibit common traits of antisocial personality, including impulsivity, deceitfulness, aggressiveness, recklessness, and irresponsible and exploitative behavior. Individuals who met DSM-IV criteria for antisocial personality disorder were not eligible to participate in the study.

Brain injury. The HELPS Brain Injury Screening Tool (Picard, Scarisbrick, & Paluck, 1991) was administered to assist with identifying individuals who may have

experienced a traumatic brain injury. This measure evaluates whether an individual ever experienced a head trauma that resulted in an emergency room visit, loss of consciousness, problems with concentration and memory, sickness, or other physical problems following injury. A HELPS screening is considered positive when an individual reports hitting their head, being seen by a doctor because of an injury to their head, or having significant sickness, as well as experiencing loss of consciousness or feeling dazed, and suffering from two or more chronic problems as a result of an injury to their head. Participants who scored positive on the HELPS screening were excluded from the study.

Handedness. The Edinburgh Handedness Questionnaire (Oldfield, 1971) is a 10-item measure used to assess individuals hand dominance in a variety of everyday activities, such as writing, opening a box or lid, and using a toothbrush or spoon. Participants indicated their preference in the use of hands (i.e., right or left) for each activity. Responses are then scored to obtain a Laterality Index, with scores of -40 or below indicating left-handedness, scores between -40 and +40 indicating being ambidextrous, and scores +40 or greater indicating right-handedness. Only individuals scoring +40 or greater on this measure were included in the study.

Auditory acuity test. Participants' hearing was evaluated with an auditory acuity test to ensure participants did not exhibit significant hear loss and were able to listen to the study's auditory stimuli (i.e., the ATSS audio-recorded scenarios). Participants were fitted with earphones and a trained research assistant randomly presented each participant with a series of tones (500Hz, 2000Hz, 4000Hz, and 6000Hz frequencies) at different sound levels, separately in each ear. For each frequency, the series of tones were

presented for a 3 second duration beginning at 80dB, and then at decreasing increments of 10dB, ending at 20dB or until the participants were no longer able to hear the tone. Participants were instructed to raise their hand each time they heard a tone. Participants were only included in the study if they could accurately detect tones in each ear of at least 30dB at each frequency.

Visual acuity test. Participants' vision was examined with a visual acuity test to ensure that each individual's visual acuity was adequate to view the study's visual stimuli (i.e., the letters presented in the visual oddball task). During this assessment, participants were asked to keep their corrective lenses on (e.g., glasses or contacts) if they normally wore them while reading. Participants were asked to stand 20 feet from a Snellen chart displaying a list of letters of varying sizes and to cover their right eye with the palm of their hand. Participants were then asked to read the letters out loud from largest to smallest. This process was repeated with the left eye covered. Participants must have demonstrated adequate vision (i.e., 20/30 vision or better) to participate in the study.

Procedures

Participants who expressed interests in the study and their romantic partners were telephone screened (see Appendix B) to assess initial eligibility. Figure 2.2 depicts a flow chart of the study procedures. Those who met the initial inclusion criteria were scheduled for a single lab visit. Individuals were instructed to refrain from consuming alcohol and recreational drugs for 24 hours prior to their scheduled appointment, to refrain from consuming caffeine, nicotine, or processed sugar the morning prior to testing, and to refrain from eating four hours prior to their appointment. All participants were scheduled to participate in the study session between 12:00pm and 4:00pm.

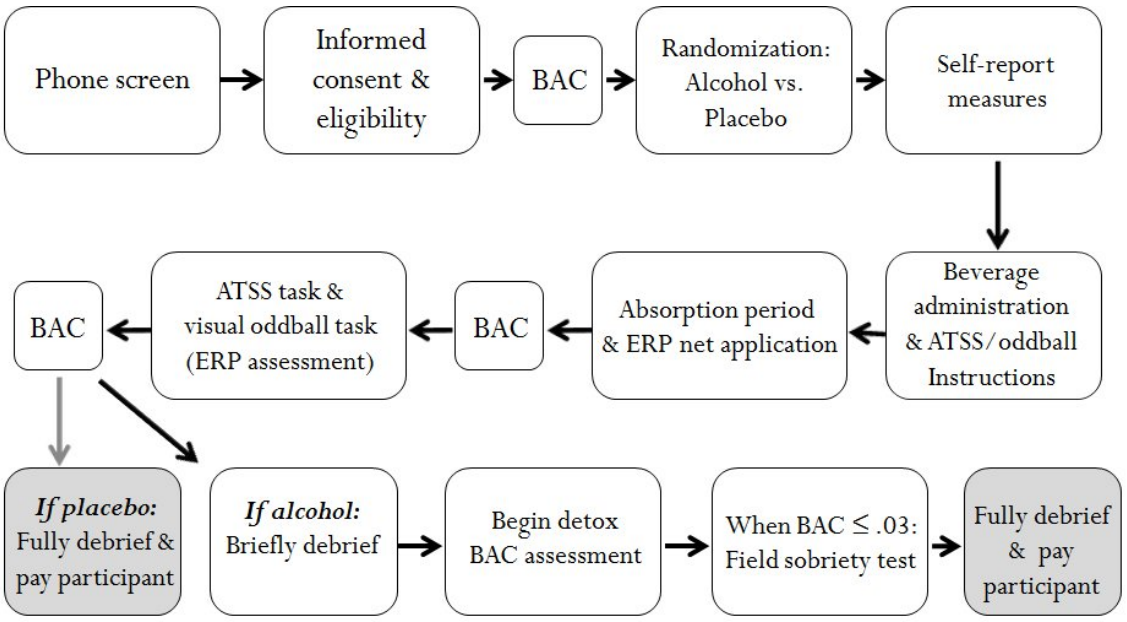

Figure 2.2

Flow chart of study procedures.

Data collection. Following informed consent, participants' BAC was assessed to ensure sobriety. Participants' BAC level must have been at a 0 at the beginning of the session to participate in the study. Female participants completed a urine pregnancy test (using the Clearview hCG Combo II test cassette) at this time. Participants were then weighed and administered auditory and visual acuity tests. Participants with a negative BAC and who met weight, hearing, and vision requirements, and female participants with a negative pregnancy test then completed the self-report assessments administered on a computer in a private room. Participants were then seated comfortably and their heads' were measured to determine the appropriate electrode net size by identifying the mid-central position on the top of their head (Cz) and the central position at the top of the bridge of their nose (nasion; Fz). Individuals were then randomized to the alcohol or placebo condition (stratified by IPA status). During beverage (alcohol or placebo) administration, participants received the ATSS and visual oddball paradigm instructions.

For participants consuming a placebo beverage, immediately following beverage consumption, participants were fitted with a 256 high-density electrode net. For participants consuming alcohol, during the last half of the 20-minute absorption period, participants were fitted with a 256 high-density electrode net. After application of the electrode net and following the absorption period for individuals in the alcohol condition, participants completed the experimental tasks. During the experimental procedures, the lights were turned off and two research assistants were present in the room during data collection. To heighten participants' privacy, the research assistants wore noise-canceling headphones and were seated directly behind the participant with a 5-panel room divider between them. During the experimental portion of the study, participants listened and verbally responded to three ATSS relationship scenarios (neutral and two anger-arousing scenarios), while viewing a computer screen that presented frequent ("x") and infrequent ("o") occurring visual stimuli (frequency and letter designations were counterbalanced across subjects; see Figure 2.3 for a graphical representation of the experimental task procedures). During each ATSS relationship scenario, the frequent stimuli ("x") were presented 70% (84 trials) of the time, while infrequent stimuli ("o") were presented 30% of the time (36 trials). Participants were instructed to respond to only the infrequent stimulus by pressing a response key each time it appeared. ERPs to both visual stimuli were recorded only during the listening portion of the ATSS scenarios and averaged. P300 amplitudes served as the dependent variable. Participants completed the MRS before and after each of the three scenarios. Additionally, participants' BAC was assessed following the absorption period and immediately after the ATSS procedure.

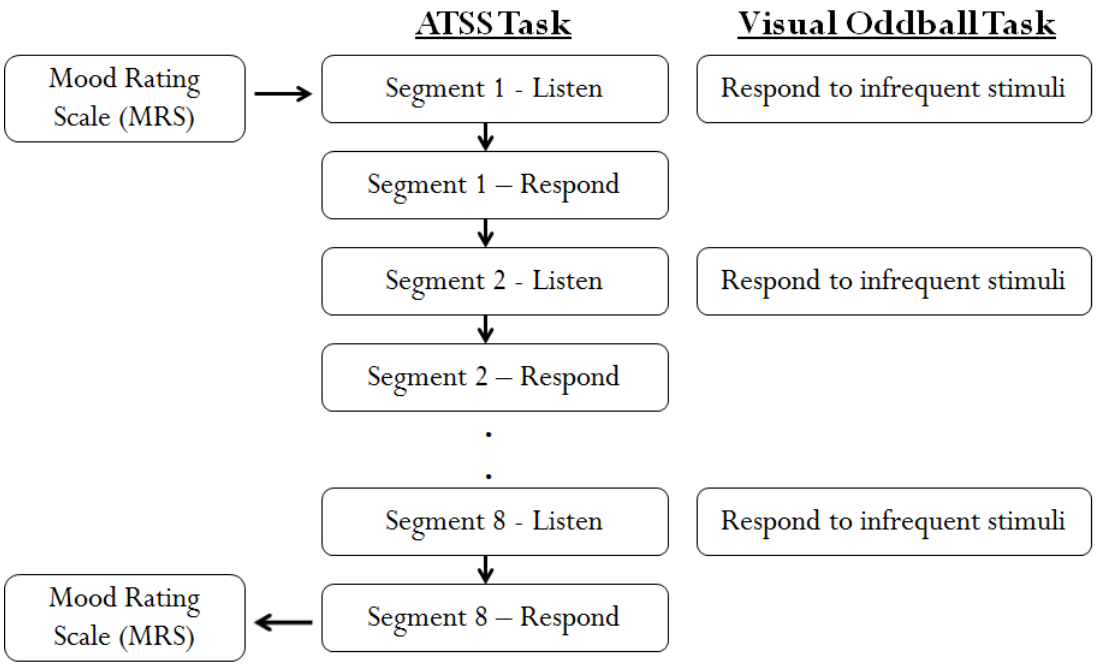

Figure 2.3

Graphical representation of the experimental task (ATSS and visual oddball) procedures.

Event-related potential (ERP) assessment. Participants were asked to respond to infrequent stimuli ("o") and to ignore frequent stimuli ("x") presented on a fixation point on the computer screen while listening and verbally responding to the ATSS procedure. During the task, participants' EEG was continuously monitored and stimulus presentation paused during periods of high electromyography (EMG) activity that might otherwise contaminate the ERP signals. The electrophysiological data was recorded with a sampling rate of 250 samples/sec using NetStation© 4.4.1 (EGI, Inc.). The brainwaves were recorded using a high-density array of 256 HydroCel electrodes embedded in soft sponges and arranged into a net (Geodesic Sensor Net, EGI Inc.). Prior to positioning of the net on the participant, the electrode net was soaked in a warm potassium chloride solution (2.25 teaspoons of KC1, 1.5 L of distilled water with a dash of Johnson's Baby Shampoo) to improve the conduction of electrical signals from the brain to the electrodes

of the net. Electrode impedances were examined prior to recording the EEG data and a warm potassium chloride solution was applied to impedances over 40 kOhms. The visual oddball stimuli presentation did not begin until there were fewer than five electrodes with impedances greater than 40 kOhms. The signals filter setting for high-pass was set to .1 hz and low-pass to 100 hz to eliminate extremely high and low electrical frequency activity. All electrodes were referenced to the Cz while the brainwaves were being recorded and were later transformed to a linked mastoid reference for data analysis. The components of interest occurred within the first 1000 ms of stimulus onset. Therefore, the EEG was recorded for a 1200 ms period starting 200 ms before the onset of each stimulus (Stanford, Conklin, Helfritz, & Kockler, 2007). The baseline was calculated using the average of the 200 ms pre-stimulus period. The 1000 ms portion of the EEG response following the onset of the infrequent oddball stimulus (P300) was submitted to data analysis.

Debriefing and assessment of sobriety. All participants were fully debriefed, verbally and in writing (see Appendix F), about the purposes of the study. All participants who received alcohol remained in the laboratory until their BAC dropped to at least a .03% (National Advisory Council on Alcohol Abuse and Alcoholism, 2005) and they passed a field sobriety test (see Appendix G). At the end of the study session, participants were paid $10 per hour for their participation.

Data Analysis Procedures

Preliminary analyses. All behavioral data were double-checked for data entry errors. Descriptive analyses were conducted to examine sample characteristics on demographic and other study variables. To determine whether alcohol intoxication

versus no intoxication impacted the P300 amplitude or aggressive verbalizations beyond what is accounted for by BAC variation, perceived level of drunkenness and alcohol expectancies, were examined in relation to all study variables, and if necessary, statistically controlled in the proposed models.

Initial inspection of the distribution of one of the study's dependent variables, aggressive verbalizations, revealed a non-normal distribution. Because the standard analysis of variance (ANOVA) model assumes normal distribution of the residuals, alternative statistical models that were more appropriate for these data were employed. Four generalized linear models for modeling non-normal count data were examined, including Poisson, zero-inflated Poisson, negative binomial, and zero-inflated negative binomial models, each of which includes a log link for the prediction of the count outcome. The Poisson model assumes that the model-predicted mean of aggressive verbalizations is equal to its residual variance; the negative binomial model does not make this assumption, allowing the residual variance to exceed the mean (i.e., overdispersion) if necessary. The zero-inflated versions of each model also include a separate model to predict the probability of excess zeros using a logit link and a binomial residual distribution.

To determine the best model for describing the distribution of aggressive verbalizations, each model was estimated using maximum likelihood within SAS PROC GENMOD (with a logit link for zero-inflated models), and included the main effects of IPA status, alcohol condition, and all interactions. The fit of the Poisson and negative binomial models were initially compared with likelihood ratio tests. The negative binomial model was found to fit significantly better than the Poisson model, $-2\Delta LL(1) =$

20.58, $p < .0001$. Then, Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) values were examined to compare the fit of the negative binomial model (AIC = 229.70; BIC = 239.52) to the fit of the zero-inflated Poisson (AIC = 253.11; BIC = 262.93) and zero-inflated negative binomial (AIC = 230.37; BIC = 241.83) models. Given that smaller AIC/BIC values indicate better fit, these results indicated that a zero-inflation factor was not necessary to include. Thus, a negative binomial regression model was estimated to examine study hypotheses with aggressive verbalizations as the dependent variable.

Pre-processing of EEG data. To extract ERP data from the EEG recording for statistical analyses, EEG data was pre-processed following procedures outlined by Molfese, Molfese, & Kelly (2001). Utilizing Net Station 4.4.1 software (EGI Inc), a 0.1 to 30 Hz digital bandpass filter was initially applied to the EEG data to eliminate electrical noise not produced by the participants' brain, including movement artifacts. The EEG data was then segmented into 100 event-related epochs (70 frequent and 30 infrequent trials) of 1200 ms in length, with an offset of 25 ms for both visual oddball stimuli. Visual ERPs to the frequent and infrequent stimuli were averaged separately for each ATSS scenario (neutral, anger scenario 1, anger scenario 2) with an epoch starting 200 ms prior to the visual oddball stimulus onset and lasting 1000 ms afterward.

The single trial ERPs were then screened using standard procedures for eye-related artifacts. All segmented data were first visually inspected for bad channels, including eye blinks and eye movements. Then, trials with eye channel differences (measured at electrodes placed at canthal, supraorbital, and sub-orbital positions relative to each eye) in excess of +/-70 μV or more than 5% bad channels (defined as detecting

voltage shifts in excess of 150 μV within and across trials) were rejected. As mentioned above, following these procedures, seven participants were excluded due to their ERP data displaying excess artifacts, including participants' who had eye-related artifacts present in 30% or more segments of their ERP data.

Following electrooculograph and artifact screening, electrode channels characterized by consistent high voltages were replaced using the spherical interpolation algorithm as described by Picton and colleagues (2000). The EEGs were then baseline corrected, using the average of the 200 ms pre-stimulus period as a baseline measure. Consistent with similar studies (Fallgatter & Herrmann, 2001; Franken, Nijs, Muris, & Strien, 2007; Stanford et al., 2007), electrodes were referenced to the linked mastoids. Separate averaged ERPs were calculated for each ATSS scenario (neutral, anger scenario 1, anger scenario 2) for the 256 electrodes placed across five brain regions (frontal, central, parietal, temporal, and occipital) for both the left and right hemispheres. A principal components analysis (PCA) was conducted to describe the ERP data and determine whether a distinct P300 waveform was elicited by the study stimuli.

To assist with statistical analyses of the study hypotheses, ERP data files were averaged by IPA status (yes, no) and alcohol condition (alcohol, placebo). A grand average that included all participants was also conducted. The grand average spatial topography (see Figure 2.4) was examined for color variations representing amplitude variability to determine the location of the largest ERP amplitudes representing the P300 waveform. Based on this examination, a cluster of electrodes surrounding the Pz area (see Figure 2.5) exhibiting the strongest ERP activity between 300 and 600 ms after stimulus presentation were selected for analyses. The Pz area, which corresponds to the

parietal brain region, is the location of the brain where the maximum P300 amplitude is typically largest (Rugg, 1992). A peak amplitude analysis was conducted between 300 ms to 500 ms post stimulus onset to determine the maximum amplitude of the P300 waveform. This time frame is consistent with prior ERP studies examining the P300 amplitude (e.g., Euser, van Meel, Snelleman, & Franken, 2011; Stanford et al., 2007), and with the latency of the P300 component elicited by the visual oddball paradigm as indicated by the principal components analysis (described below). The maximum amplitude value for the P300 component was then averaged across the two anger-arousing scenarios and used as the neurocognitive variable in study analyses, including the mediated moderation model (refer to Figure 1.1).

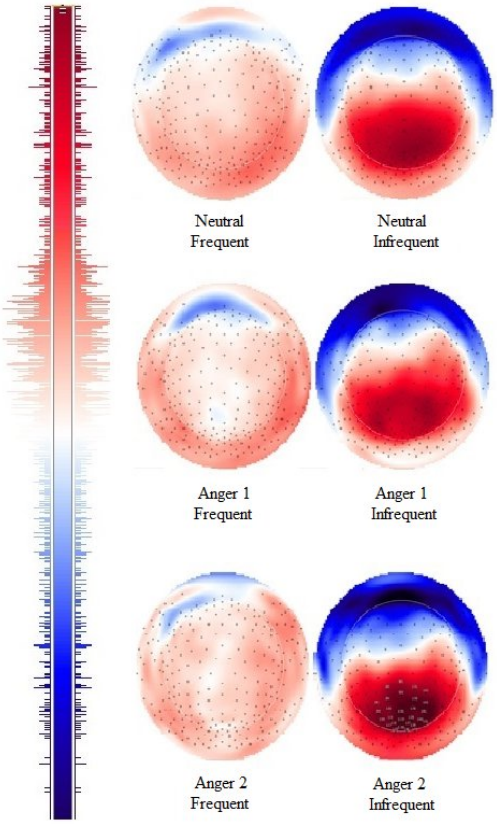

Figure 2.4

Spatial topography at 400 ms following onset of stimulus presentation by ATSS scenario (neutral, anger 1, anger 2) and oddball stimulus condition (frequent, infrequent). Color

variations represent ERP waveform amplitude variability. The ERP waveform baseline is represented by white, increases in ERP amplitudes are represented by red, and decreases in ERP amplitudes are represented by blue.

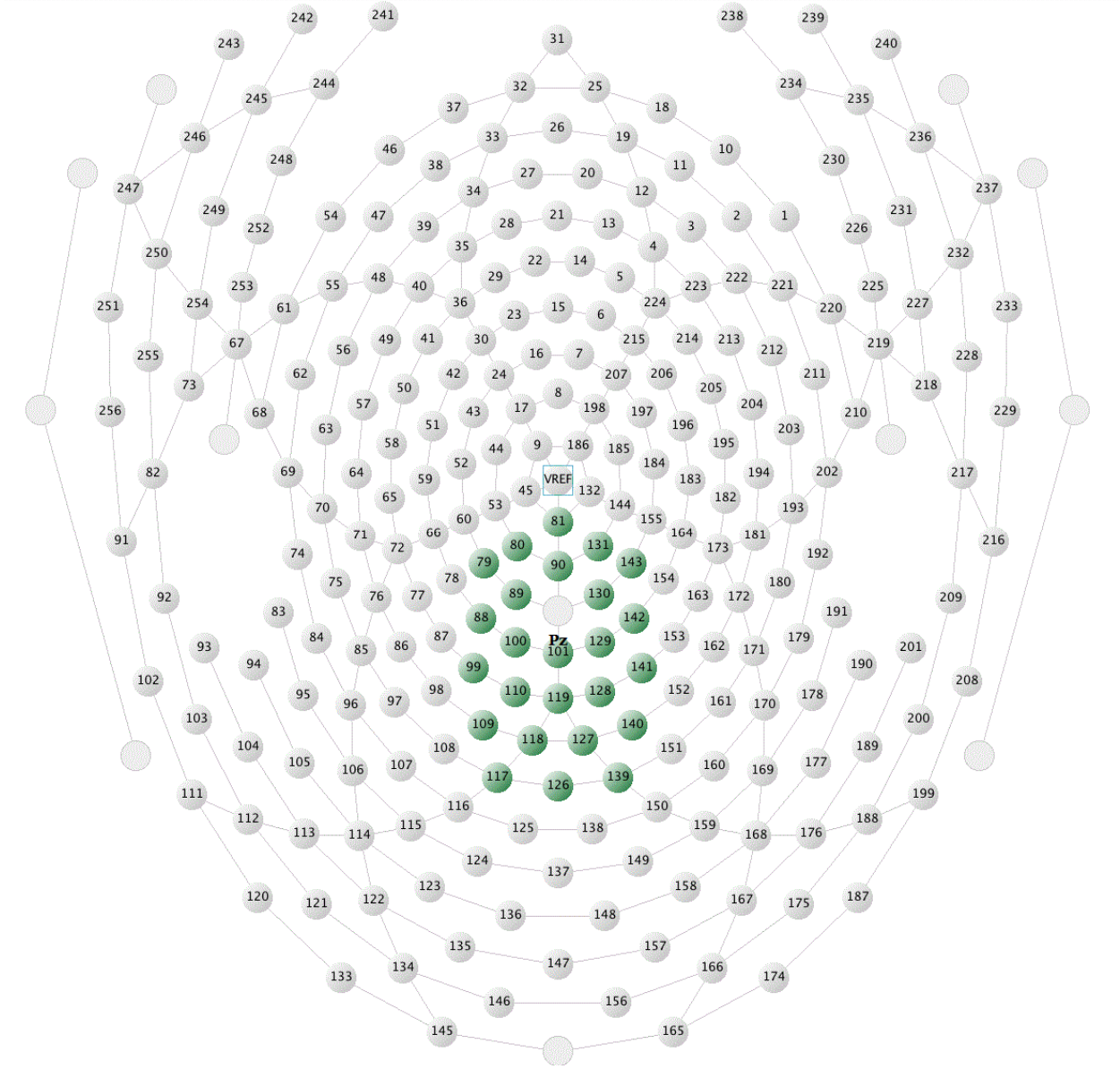

Figure 2.5

Cluster of electrodes used in ERP analyses.

Chapter 3: Results

Consistent with prior studies utilizing the ATSS to examine the relationships between aggressive verbalizations and IPA (Eckhardt et al., 2002; Maldonado et al., in press), no differences were found in aggressive verbalizations articulated during the two ATSS anger scenarios, z = -1.01, p = .31, using a Wilcoxon paired signed-rank test to account for the non-normal distribution of aggressive verbalizations. Therefore, both anger scenarios were combined and examined as a single anger scenario score for testing study hypotheses.

Descriptive Data

Study variable descriptive statistics are presented in Table 3.1. A total of 19 participants (50%; 8 women, 11 men) were categorized in the IPA perpetration group based on their responses on the CTS2 and relationship behaviors measure, and their partners' responses on the relationship behaviors measure. There were no differences in the frequency of IPA perpetration reported by participants in the alcohol condition versus the placebo condition, $U(36) = 110.00$, $Z = -2.06$, $p = .04$. Individuals with a history of IPA articulated more aggressive verbalizations during anger arousal compared to individuals with no history of partner aggression, $U(36) = 162.00$, $Z = -.62$, $p = .53$. All participants reported being social drinkers which was supported by their overall low AUDIT total scores ($M = 6.47$, $SD = 2.01$, range = 3 to 9). No differences in AUDIT scores were found between the alcohol and placebo conditions, $t(36) = -1.74$, $p = .09$, and the IPA and no-IPA groups, $t(36) = -.64$, $p = .53$. The majority of participants believed they consumed two alcoholic drinks during the study session (36.8%), followed by four drinks (23.7%), three drinks (21.1%), one drink (7.9%), five drinks (5.3%), and six drinks

(.3%). Participants in the alcohol condition believed they consumed more alcoholic drinks than participants in the placebo condition, $t(36) = -5.05$, $p < .001$. BAC levels for participants in the alcohol condition compared to the placebo condition were significantly higher prior to, $t(36) = -20.76$, $p < .001$, and immediately following completion of the experimental tasks, $t(36) = -27.55$, $p < .001$. Further, expectations to behave aggressively while under the influence of alcohol did not differ between participants in the alcohol versus placebo conditions, $t(36) = .67$, $p = .51$, and IPA and no-IPA groups. $t(36) = .82$, $p = .42$. Finally, while no differences emerged in overall executive cognitive functioning between participants in the alcohol and placebo conditions, $t(36) = -.80$, $p = .43$, participants with a history of IPA perpetration reported greater difficulties with executive cognitive functioning compared to participants without a history of IPA perpetration, $t(36) = -3.30$, $p = .002$.

Table 3.1

Descriptive statistics for study variables

	Overall		Alcohol		Placebo		Difference	IPA		No IPA		Difference
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*t(df=36)*	*M*	*SD*	*M*	*SD*	*t(df=36)*
IPA frequency	2.74	10.58	1.28	2.74	4.05	14.40	162.00[a]	5.47	14.63	.00	.00	57.00[a]***
Executive cognitive functioning (BRI)	48.29	6.81	49.22	6.42	47.45	7.20	-.80	51.53	6.30	45.05	5.79	-3.30**
Perceived level of drunkenness	3.53	2.28	5.39	1.85	1.85	.88	-7.66***	3.26	2.51	3.79	2.04	.71
# of drinks participants' believed they consumed	2.97	1.29	3.83	1.25	2.20	.70	-5.05***	2.95	1.35	3.00	1.25	.13
Risk and aggression alcohol expectancies	14.11	15.86	12.28	2.99	15.75	21.81	.67	12.00	3.93	16.21	22.19	.82
AUDIT total	6.47	2.01	7.06	2.01	5.95	1.90	-1.74	6.68	2.06	6.26	2.00	-.64
Amount of alcohol consumed (mL)	44.02	44.42	88.48	17.80	4.0	0	-21.26***	40.50	45.58	47.55	44.18	.48
BAC level pre ATSS	.04	.05	.09	.02	.004	.005	-20.76***	.04	.05	.05	.04	.13
BAC level post ATSS	.05	.06	.11	.02	.000	.001	-27.55***	.05	.06	.06	.06	.55
Aggressive verbalizations-neutral	.24	.94	.50	1.34	.000	.000	-1.67	.42	1.30	.05	.23	-1.21
Aggressive verbalizations during anger arousal	7.47	7.36	10.11	9.19	5.10	4.18	117.50[a]	10.11	8.84	4.84	4.31	110.00*[a]
P300 amplitude-neutral	6.44	3.17	7.23	3.15	5.72	3.09	-1.48	6.90	3.06	6.90	3.06	.64
P300 amplitude during anger arousal	7.22	4.15	6.76	4.11	7.63	4.24	.90	7.69	4.46	7.68	4.46	.68

Note: [a]Mann-Whitney U statistic reported to account for the variable's non-normal distribution; BRI = Behavioral Regulation Index; *$p < .05$; **$p < .01$; ***$p < .001$

Bivariate analyses. Bivariate correlations were conducted to examine associations between study variables (see Table 3.2). These analyses indicate that having a history of IPA was associated with greater aggressive verbalizations during anger arousal. Additionally, being randomized to the alcohol condition was associated with feeling more drunk and believing that one consumed more alcohol during the study session. Consuming greater amounts of alcohol was associated with an increased perception of drunkenness, greater BAC levels immediately following the experimental tasks, and aggressive verbalizations during the ATSS neutral and anger-arousing scenarios. Further, neither perceived level of drunkenness nor aggression-related alcohol expectancies was associated with the study dependent variables, aggressive verbalizations articulated during anger arousal and the P300 amplitude. Aggressive verbalizations articulated during the neutral scenario were positively associated with aggressive verbalizations articulated during the anger-arousing scenarios. Finally, as expected, increased difficulties with executive cognitive functioning was associated with greater aggressive verbalizations articulated during anger arousal. Based on these analyses, statistically controlling for perceived level of drunkenness and alcohol expectancies was not considered to be necessary. However, executive cognitive functioning and aggressive verbalizations articulated during the neutral scenario were statistically controlled for by including both variables as main effects in all models examining study hypotheses.

Table 3.2

Bivariate correlations among study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. IPA condition[a,b]	--												
2. Alcohol condition[a,c]	-.11	--											
3. IPA frequency	.71**	-.10	--										
4. Executive cognitive functioning (BRI)	.49*	.08	.14	--									
5. Perceived level of drunkenness[a]	-.17	.76**	-.06	.15	--								
6. # of drinks participants believed they consumed	-.06	.67**	-.10	.13	.71**	--							
7. Risk and aggression alcohol expectancies	.05	.16	-.04	-.20	.27	-.05	--						
8. Amount of alcohol consumed (mL)	-.06	.94**	-.13	.17	.71**	.73*	-.11	--					
9. BAC level post ATSS	-.08	.92**	-.13	.13	.70**	.65*	-.11	.97*	--				
10. Aggressive verbalizations-neutral	.11	.31	-.05	.28	.28	.31	-.03	.37*	.34*	--			
11. Aggressive verbalizations-anger arousal	.34*	.30	.19	.35*	.30	.30	.01	.35*	.39*	.57*	--		
12. P300 amplitude-neutral	-.12	.25	-.19	-.21	.002	.26	-.14	.20	.16	-.07	-.18	--	
13. P300 amplitude during anger arousal	-.10	-.07	.05	.11	-.12	.04	.30	-.10	-.14	-.06	-.21	.53*	--

Note. [a]Spearman's rank correlation is reported; Pearson correlations are reported for all other variables; [b]No IPA history was coded 0, IPA history was coded 1; [c]Placebo condition was coded 0, alcohol condition was coded 1; BRI = Behavioral Regulation Index; * $p < .05$; ** $p < .001$.

Gender Differences

Although existing models have not suggested systematic differences in risk factors for women and men in IPA perpetration (e.g., O'Leary, Smith Slep, & O'Leary, 2007; White, Merrill, & Koss, 2001), the general aggression literature has suggested some differences among genders in levels of perpetration (e.g. Exum, 2006). Therefore, potential gender effects were explored in the current study. Consistent with past IPA literature and prior studies that used the ATSS paradigm to examine aggression among women and men (Eckhardt & Crane, 2008; Maldonado et al., in press; Stappenbeck & Fromme, 2014), results did not reveal a significant main effect for gender, $\chi^2(1) = 1.78$, $p = .18$, nor interactive effects between gender and IPA status, $\chi^2(1) = 2.37$, $p = .12$, gender and alcohol condition, $\chi^2(1) = 1.08$, $p = .30$, or gender, IPA status, and alcohol condition, $\chi^2(1) = 1.15$, $p = .28$, in predicting aggressive verbalizations. Further, with regards to the P300 amplitude during anger arousal, results did not reveal a significant main effect for gender, $\chi^2(1) = 3.15$, $p = .08$, nor interactive effects for gender and IPA status, $\chi^2(1) = .52$, $p = .47$, gender and alcohol condition, $\chi^2(1) = .99$, $p = .32$, or gender, IPA status, and alcohol condition, $\chi^2(1) = .26$, $p = .61$. Therefore, data for women and men were examined collectively.

Manipulation Checks

Alcohol. To ensure that beverage manipulation was successful, BAC levels following the absorption period and immediately after the ATSS procedure were examined as a function of alcohol condition (placebo, alcohol) with a mixed analysis of variance. BAC level means by alcohol condition are shown in Table 3.1. Participants in the alcohol condition reached the target BAC of .08% ($M = .09$, $SD = .02$) prior to

beginning the experimental tasks. Results indicated significant differences in BAC levels between the alcohol and placebo conditions prior to the beginning of the ATSS task, $F(1, 36) = 430.86$, $p < .0001$, and after completing the ATSS task, $F(1, 36) = 758.954$, $p < .0001$. Specially, BAC levels for individuals in the alcohol condition were significantly higher than those in the placebo condition. Further, BAC levels for individuals in the alcohol condition significantly increased during the ATSS task, $t(17) = -4.233$, $p = .001$, while BAC levels for individuals in the placebo condition significantly decreased, $t(19) = 3.022$, $p = .007$.

Anger arousal. To assess whether participants experienced increased anger by the ATSS procedure, differences in self-reported anger (i.e., a summary score calculated from the Mood Rating Scale) across the four time conditions (pre-ATSS, post-neutral, post-anger after each scenario) were examined as a function of IPA status (IPA, no-IPA) and alcohol condition (placebo, alcohol). Given the positive skewness of the self-reported anger scores, a lognormal residual distribution was used for the anger outcome rather than a normal distribution. Condition means of anger ratings by IPA status and alcohol condition are shown in Table 3.3 There was a significant increase in anger ratings across the time, $F(3, 34) = 15.96$, $p < .0001$, indicating that participants experienced increased anger arousal in response to the ATSS. Anger ratings across ATSS procedure did not differ significantly by IPA status, $F(1, 34) = 1.57$, or by alcohol condition, $F(1, 34) = 1.35$, $p = .25$. While no interactions were found between time and IPA status, $F(3, 34) = .30$, $p = .83$, and time, IPA status, and alcohol condition, $F(3, 34) = 2.36$, $p = .09$, there was a significant interaction between time and alcohol condition, $F(3, 34) = 3.41$, $p = .03$. Thus, while the ATSS manipulation induced self-reported anger

across all participants, individuals who were intoxicated reported experiencing greater changes in anger over time compared to individuals in the placebo condition. However, follow-up analyses indicated no differences in anger ratings at the completion of the ATSS anger arousal task between the placebo and alcohol conditions, $t(34) = 1.16$, $p = .25$. Additionally, follow-up analyses revealed a difference in anger ratings before and after the ATSS anger arousal task was completed, $t(34) = 5.49$, $p < .0001$. No differences in anger ratings were found between the two anger arousing scenarios, $t(34) = 0.60$, $p = .55$.

Table 3.3

Mean ratings of angry mood during Articulated Thoughts in Simulated Situations (ATSS) by IPA and alcohol condition

	ATSS Scenario							
	Pre-ATSS		Post-Neutral		Post- Anger 1		Post-Anger 2	
Group	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
IPA	8.11	1.63	9.21	3.24	15.73	6.67	16.68	8.33
No-IPA	7.58	1.02	9.11	4.59	13.47	7.08	13.57	7.32
Alcohol	8.17	1.50	10.94	5.06	14.83	7.66	16.11	8.98
Placebo	7.55	1.19	7.55	1.15	14.40	6.30	14.25	6.89

ERP Waveform Analyses

Principal components analysis. Although it is not a part of the original study hypotheses, a principal components analysis (PCA) was conducted to provide a thorough depiction of the ERP waveforms produced across study conditions and to determine whether a distinct P300 waveform was elicited by the study stimuli using a data-driven analysis strategy. Following procedures utilized in Dr. Molfese's lab (Molfese, Burger-

Judisch, Gill, Golinkoff, & Hirsch-Pasek, 1996; Molfese et al., 2001; Molfese et al., 2006) and outlined by Dien (2010, 2010a), a temporal principal components analysis (PCA), using a covariance matrix with Varimax rotation, was conducted to identify P300 amplitude variability across the duration of the visual ERPs for all participants. The factor scores derived from the temporal distributions reflecting P300 amplitude variations in the visually evoked ERPs served as the dependent measures in a series of ANOVAs to identify differences in ERP responses between the different participant conditions.

There were a total of 16,416 average ERPs from 0 ms to 600 ms after the stimulus onset (divided into 4 ms intervals) calculated by the temporal PCA analyses (38 participants X 2 IPA groups [IPA, no-IPA] X 2 alcohol conditions [alcohol, placebo] X 3 ATSS scenarios [neutral, anger 1, anger 2], X 2 visual oddball stimuli [frequent, infrequent] X 9 scalp regions [orbitofrontal, inferior frontal, prefrontal, temporal, inferior temporal, parietal, temporo-parietal, occipital, inferior occipital] X 2 hemispheres [right, left]). Table 3.4 shows the cluster of electrodes corresponding to each scalp region in both hemispheres. The temporal PCA revealed four distinct factors (using an eigenvalue > 1; see Figure 3.1), representing ERP components or periods of time when the EEG signals are highly correlated with one another. These four factors accounted for 79.98% of the variance. Factor 1, which accounted for 60.71% of the variance and corresponds to a late slow wave, represents an area of high variability between 416 ms and 600 ms, with a peak at 560 ms. Factor 2, which accounted for 9.86% of the variance and is most similar to the P300 component, represents an area of high variability between 296 ms and 440 ms, with a peak at 376 ms. Factor 3, which accounted for 5.27% of the variance and corresponds to the P100 component, represents an area of high variability between

112 ms and 166 ms, with a peak at 144 ms. Finally, Factor 4, which accounted for 4.14% of the variance and corresponds to the P200 component, represents an area of high variability between 192 ms and 280 ms, with a peak at 216 ms. The temporal PCA provides confirmatory evidence that the visual oddball task in this study produced a distinct ERP waveform pattern that reflects the P300 component (i.e., Factor 2). Figure 3.2 illustrates the waveform patterns of the P300 component separately for IPA status and alcohol condition.

Analyses of variance. A series of ANOVAs were conducted with the Varimax rotated factor scores as the dependent variables to determine whether ERP waveform variability changed systematically as a condition of IPA status and alcohol condition, with separate repeated-measures ANOVAs for hemisphere (right and left), scalp regions (orbitofrontal, inferior frontal, prefrontal, temporal, inferior temporal, parietal, temporo-parietal, occipital, and inferior occipital), ATSS condition (neutral and anger-arousing scenarios), and stimulus condition (frequent and infrequent). A summary of the ANOVAs main and interactive effects for Factor 2 (i.e., the P300 component) are presented in Table 3.5. When necessary, the Greenhouse-Geisser statistical values (Greenhouse & Geisser, 1959) are reported instead of *df* values to correct for violations of sphericity assumptions according to Mauchly's (1940) test of sphericity.

Table 3.4

Cluster of electrode channels for each of the scalp regions by hemisphere

Hemisphere	Scalp region	Cluster of electrode channels
Right	Orbitofrontal	1, 2, 3, 4, 5, 10, 11, 12, 13, 14, 18, 19, 20, 21, 25, 31
	Inferior frontal	225, 226, 227, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240
	Prefrontal	6, 7, 8, 185, 186, 196, 197, 198, 205, 206, 207, 213, 214, 215, 222, 223, 224
	Temporal	172, 180, 181, 191, 192, 193, 194, 195, 202, 203, 204, 210, 211, 212, 219, 220, 221
	Inferior temporal	199, 200, 201, 208, 209, 216, 217, 218, 228, 229
	Parietal	90, 119, 128, 129, 130, 131, 132, 141, 142, 143, 144, 152, 153, 154, 155, 161, 162, 163, 164, 173, 182, 183, 184
	Temporo-parietal	169, 170, 171, 176, 177, 178, 179, 188, 189, 190
	Occipital	126, 127, 138, 139, 140, 149, 150, 151, 158, 159, 160, 167, 168, 175, 187
	Inferior occipital	147, 148, 156, 157, 165, 166, 174
Left	Orbitofrontal	22, 26, 27, 28, 29, 32, 33, 34, 35, 37, 38, 39, 46, 47, 54
	Inferior frontal	241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254
	Prefrontal	9, 15, 16, 17, 23, 24, 30, 36, 40, 41, 42, 43, 44, 48, 49, 50, 51
	Temporal	55, 56, 57, 58, 61, 62, 63, 64, 67, 68, 69, 70, 71, 74, 75, 76, 83
	Inferior temporal	73, 82, 91, 92, 93, 102, 103, 111, 255, 256
	Parietal	45, 52, 53, 59, 60, 65, 66, 72, 77, 78, 79, 80, 81, 86, 87, 88, 89, 97, 98, 99, 100, 101, 110
	Temporo-parietal	84, 85, 94, 95, 96, 104, 105, 106, 112, 113
	Occipital	107, 108, 109, 114, 115, 116, 117, 118, 120, 121, 122, 123, 124, 125, 137
	Inferior occipital	133, 134, 135, 136, 145, 146

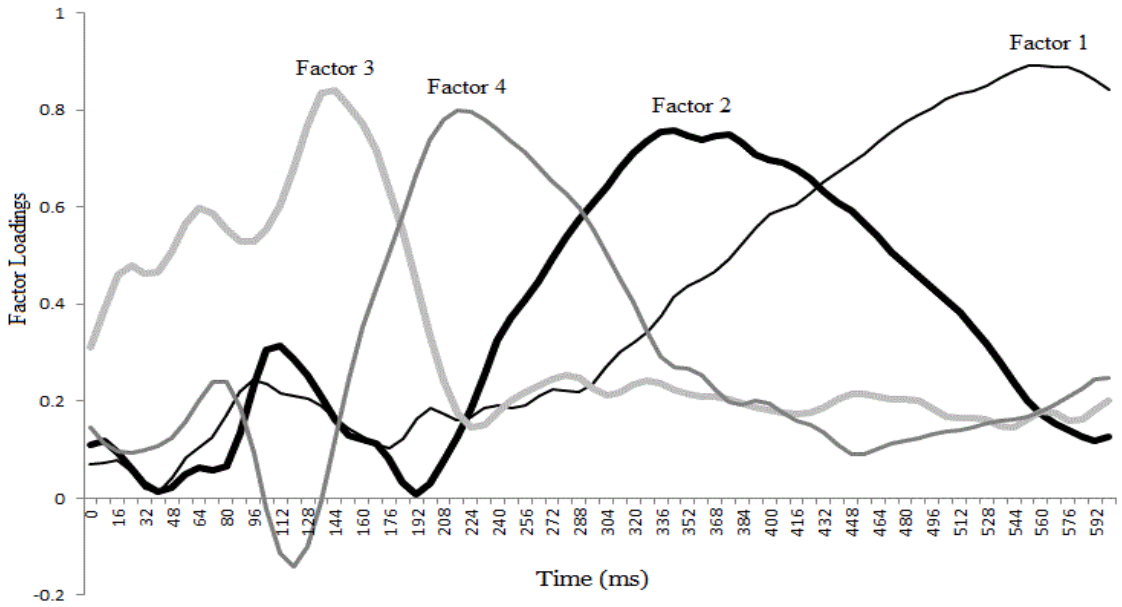

Figure 3.1

Four temporal factors extracted by the principal components analysis, displaying the loadings as a function of time for the rotated factors. Factor 2 represents the P300 amplitude.

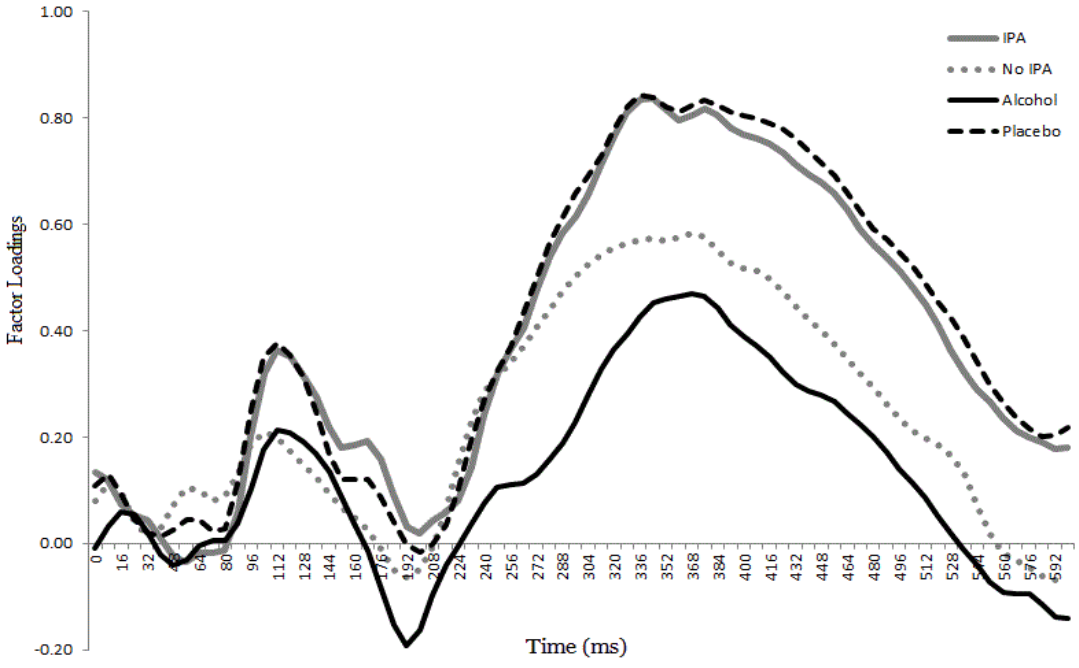

Figure 3.2

P300 component waveforms by IPA status and alcohol condition.

Table 3.5

Main and interactive effects from ANOVAs of the P300 component (Factor 2) elicited by IPA status and alcohol condition across hemispheres, scalp regions, ATSS scenarios, and visual oddball stimulus conditions.

Description	*F*	*df*	Observed power
IPA status	1.13	1,34	.18
Alcohol condition	2.58	1,34	.35
IPA * alcohol	0.09	1,34	.06
Hemisphere	0.58	1,34	.11
Region	22.05**	2.33,79.33	1.0
ATSS scenario	0.32	2,68	.25
Oddball stimulus	0.63	1,34	.12
IPA * hemisphere	1.58	1,34	.23
IPA * region	0.17	2.33,79.33	.08
IPA * ATSS scenario	1.85	2,68	.37
IPA * oddball stimulus	1.10	1,34	.17
Alcohol * hemisphere	0.09	1,34	.06
Alcohol * region	4.42*	2.33,79.33	.79
Alcohol * ATSS scenario	0.15	2,68	.07
Alcohol * oddball stimulus	1.16	1,34	.18
ATSS scenario * hemisphere	0.48	2,68	.13
ATSS scenario * region	1.28	2.91,98.89	.33
ATSS scenario * oddball stimulus	0.47	2,68	.12
Hemisphere * region	1.86	8,272	.78
Hemisphere * oddball stimulus	1.86	1,34	.26
Region * oddball stimulus	5.48*	2.09,71.19	.85
IPA * alcohol * hemisphere	0.27	1,34	.08
IPA * alcohol * region	0.89	2.33,79.33	.21
IPA * alcohol * ATSS scenario	0.89	2,68	.20
IPA * alcohol * oddball stimulus	0.12	1,34	.06
IPA * ATSS scenario * hemisphere	0.89	2,68	.20
IPA * ATSS scenario * region	0.32	2.91,98.89	.11
IPA * ATSS scenario * oddball stimulus	1.96	2,68	.39
IPA * hemisphere * region	0.30	3.70,125.65	.11
IPA * hemisphere * oddball stimulus	1.13	1,34	.18
IPA * region * oddball stimulus	1.31	8,272	.60
Alcohol * ATSS scenario * hemisphere	0.27	2,68	.09

Alcohol * ATSS scenario * region	0.50	2.91,98.89	.15
Alcohol * ATSS scenario * oddball stimulus	1.06	2,68	.23
Alcohol * hemisphere * region	1.48	3.70,125.65	.43
Alcohol * hemisphere * oddball stimulus	0.01	1,34	.05
Alcohol * region * oddball stimulus	2.48	2.10,71.19	.49
Hemisphere * region * ATSS scenario	0.64	5.62,191.20	.24
Hemisphere * region * oddball stimulus	0.89	4.12,139.23	.28
Hemisphere * ATSS scenario * oddball stimulus	0.31	2,68	.10
Region * ATSS scenario * oddball stimulus	1.23	3.79,128.89	.37
IPA * alcohol * ATSS scenario * hemisphere	1.29	2,68	.27
IPA * alcohol * ATSS scenario * region	1.28	2.91,98.89	.33
IPA * alcohol * ATSS scenario * oddball stimulus	0.68	2,68	.16
IPA * alcohol * hemisphere * region	1.56	3.70,125.65	.45
IPA * alcohol * hemisphere * oddball stimulus	0.36	1,34	.09
IPA * alcohol * region * oddball stimulus	0.42	2.09,71.19	.12
IPA * ATSS scenario * hemisphere * region	0.38	5.62,191.20	.15
IPA * ATSS scenario * hemisphere * oddball stimulus	0.02	2,68	.05
IPA * ATSS scenario * region * oddball stimulus	0.19	3.79,128.89	.09
IPA * hemisphere * region * oddball stimulus	0.70	4.12,139.23	.23
Alcohol * ATSS scenario * hemisphere * region	1.03	5.62,191.20	.39
Alcohol * ATSS scenario * hemisphere * oddball stimulus	1.71	2,68	.35
Alcohol * hemisphere * region * oddball stimulus	2.28	4.12,139.23	.66
Alcohol * ATSS scenario * region * oddball stimulus	0.73	3.79,128.89	.23
IPA * alcohol * ATSS scenario * hemisphere * region	0.43	5.62,,191.20	.17
IPA * alcohol * ATSS scenario * hemisphere * oddball stimulus	0.31	2,68	.10
IPA * alcohol * ATSS scenario * region * oddball stimulus	1.52	3.79,128.89	.45
IPA * alcohol * hemisphere * region * oddball stimulus	1.02	4.12,139.23	.32

Note: * $p < .05$; ** $p < .001$

No main or interactive effects were found for IPA status and alcohol condition, indicating that the Factor 2 waveform (corresponding to the P300) did not significantly vary as a function of IPA status or alcohol condition. Regarding within subject effects, a main effect emerged for region, $F(2.33,79.33) = 22.05$, $p < .001$. Additionally, significant interactions were found for region x alcohol, $F(2.33,79.33) = 4.42$, $p = .01$, and region x oddball stimulus condition, $F(2.09,71.19) = 5.48$, $p < .01$.

Follow-up analyses revealed that the P300 waveforms did not differ between the parietal and occipital regions, $t(37) = 1.00$, $p = .32$ (see Figure 3.3), but the P300

waveforms in these regions were significantly larger compared to all other scalp regions (inferior frontal, $t(36) = 6.63$, $p < .001$; $t(36) = 6.33$, $p < .001$, inferior occipital, $t(37) = 4.41$, $p < .001$; $t(37) = 7.23$, $p < .001$, inferior temporal, $t(37) = 6.04$, $p < .001$; $t(37) = 6.72$, $p < .001$, orbitofrontal, $t(37) = 6.59$, $p < .001$; $t(37) = 4.67$, $p < .001$, prefrontal, $t(37) = 5.86$, $p < .001$; t(37) = 3.23, $p < .01$, temporal, $t(37) = 6.53$, $p < .001$; $t(37) = 4.52$, $p < .001$, and temporo-parietal, $t(37) = 2.35$, $p = .03$, $t(37) = 2.95$, $p < .01$. Further, there were significantly larger P300 waveforms for individuals in the alcohol condition compared to the placebo condition in the following regions (see Figure 3.4): inferior frontal, $t(35) = -3.46$, $p = .001$, inferior temporal, $t(36) = -2.85$, $p = .007$, and orbitofrontal, $t(36) = -2.18$, $p = .04$.

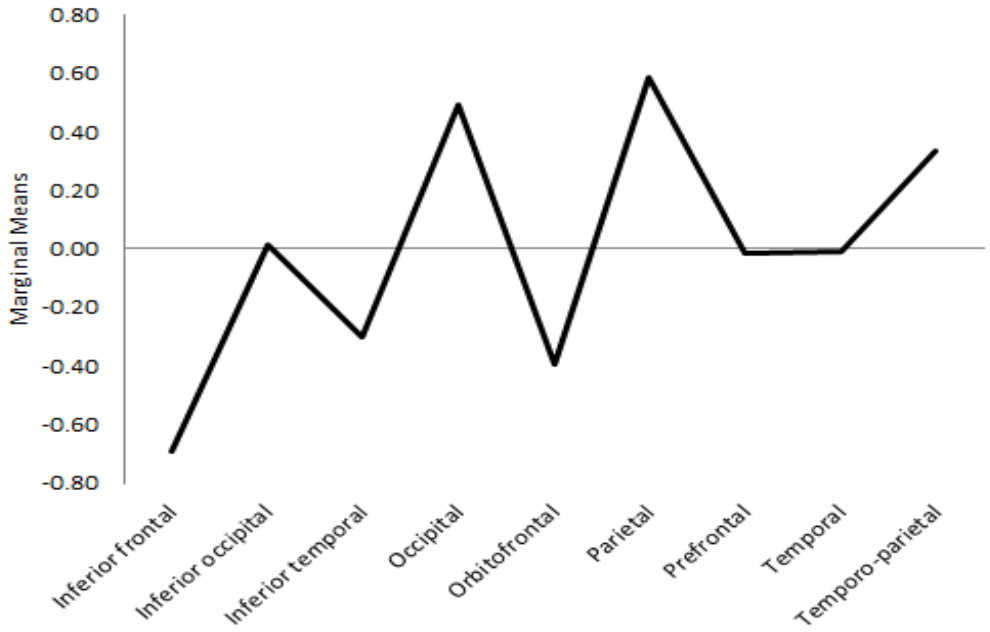

Figure 3.3

Graphical representation of differences in the region of Factor 2 (P300 component).

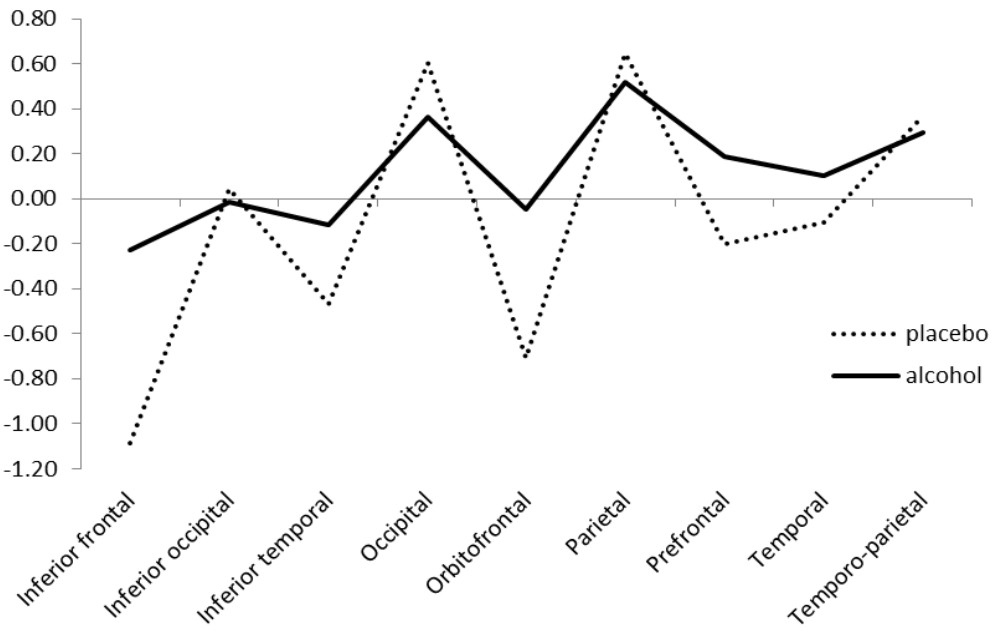

Figure 3.4

Graphical representation of differences in the region of Factor 2 (P300 component) by alcohol condition.

The point of interest for this current study is Factor 2, which corresponds to the P300 component; therefore, ANOVA results for Factors 1, 3, and 4 relevant to study conditions are only briefly reported for descriptive purposes. Regarding Factor 1 (late slow wave), there were significant interactions for region x ATSS scenario, $F(4.40, 149.42) = 2.80$, $p = .02$, hemisphere x ATSS scenario x IPA status, $F(2, 68) = 3.99$, $p = .02$, and region x oddball stimulus x ATSS scenario, $F(4.79, 162.75) = 2.62$, $p = .03$. Follow-up analyses indicated that for individuals without a history of IPA, greater late slow waveforms were elicited in the right hemisphere compared to the left hemisphere during the ATSS anger-arousing scenario, $t(16) = 2.07$, $p = .05$. For individuals with a history of IPA, greater late slow waveforms were found in the right hemisphere compared to the left hemisphere during the ATSS neutral scenario, $t(20) = 2.91$, $p < .01$.

Regarding Factor 3 (P100 component), there was a significant main effect for alcohol condition, $F(1, 34) = 8.87$, $p = .005$, indicating that individuals in the alcohol condition had smaller P100 waveforms compared to those in the placebo condition. Further, results for Factor 3 revealed a significant main effect for region, $F(1.81, 61.58) = 25.58$, $p < .001$. There was also a significant main effect for ATSS scenario, $F(2, 68) = 3.32$, $p = .04$, indicating that the P100 waveform was significantly smaller during the ATSS anger-arousing scenarios compared to the neutral scenario, $t(37) = 2.81$, $p < .01$. Significant interactions were also found for region x alcohol, $F(1.81, 61.58) = 12.89$, $p < .001$, region x ATSS scenario, $F(2.89, 97.85) = 13.16$, $p = .04$, and IPA status x alcohol x oddball stimulus, $F(1, 34) = 4.92$, $p = .03$. Follow-up analyses indicated that the P100 waveform for the infrequent oddball stimulus was significantly reduced for individuals in the alcohol condition compared to those in the placebo condition, but only among individuals with no history of IPA, $F(1, 16) = 10.17$, $p = .006$.

Regarding Factor 4 (P200 component), there was a significant main effect for region, $F(8, 272) = 44.47$, $p < .001$, and ATSS scenario, $F(2, 68) = 3.45$, $p = .04$. Significant interactions were found for alcohol x ATSS scenario, $F(2, 68) = 4.08$, $p = .02$, region x ATSS scenario x alcohol, $F(3.29, 111.81) = 2.84$, $p = .04$, hemisphere x IPA status x alcohol x oddball stimulus, $F(1, 34) = 5.97$, $p = .02$, IPA status x alcohol x ATSS scenario x oddball stimulus, $F(2, 68) = 3.58$, $p = .04$, and IPA status x alcohol x ATSS scenario x oddball stimulus x region, $F(16, 544) = 1.71$, $p = .04$. Follow-up analyses indicated that the ATSS anger scenario elicited larger P200 waveforms compared to the neutral scenario for individuals in the placebo condition, $t(16) = -2.58$, $p = .02$. Additionally, compared to the frequent oddball stimulus, the infrequent oddball stimulus

elicited greater P200 waveforms during the ATSS neutral and anger-arousing scenarios for individuals with a history of IPA in both the placebo condition (neutral: $t(9) = -2.85$, $p = .02$; anger: $t(9) = -3.36$, $p < .01$) and alcohol condition (neutral: $t(10) = -2.65$, $p = .02$; anger: $t(9) = -4.38$, $p < .001$). However, among individuals without a history of IPA, this finding was only found during the ATSS neutral scenario for the alcohol condition, $t(9) = -4.84$, $p = .001$, and the ATSS anger-arousing scenario for the placebo, $t(6) = -4.55$, $p < .01$ condition.

Peak amplitude and latency analyses. The maximum peak amplitude of the P300 component in the parietal brain region during anger arousal was measured between 300 ms to 500 ms post stimulus onset, as described above. These values were used for all analyses pertaining to the study hypotheses. This time frame was chosen based on the principal components analysis and is consistent with how the P300 amplitude is derived for analyses in similar studies (e.g., Stanford et al., 2007). The P300 amplitude of the infrequent oddball stimuli presented during anger arousal was compared to the amplitude of the waveform elicited from the frequent oddball stimuli. The P300 amplitude was larger for the infrequent stimuli than the frequent stimuli for no-IPA individuals in the placebo, $t(8) = -3.56$, $p < .01$, and alcohol conditions, $t(8) = -3.46$, $p < .01$, and for IPA perpetrators in the placebo condition, $t(7) = -4.39$, $p < .01$. However, no differences between the infrequent and frequent stimuli were found for IPA perpetrators in the alcohol condition, $t(7) = -2.28$, $p = .06$.

A latency analysis for the P300 amplitude during anger arousal was also conducted. Peak latency values were examined to determine whether there were differences in the timing of the P300 amplitude between IPA status and alcohol

condition. Peak latency means are presented in Table 3.6. Results did not reveal any significant differences in latency between the alcohol and placebo conditions, $t(36) = -.68$, $p = .50$, or the IPA and no-IPA groups, $t(36) = .81$, $p = .42$.

Table 3.6

Peak latency means for the P300 amplitude during anger arousal by IPA status and alcohol condition.

	Peak latency	
Group	M	SD
No IPA		
placebo	405.78	52.78
alcohol	435.00	48.33
IPA		
placebo	412.72	35.14
alcohol	402.25	61.09

Hypothesis-Driven Analyses

The specific aims of the study are to examine the main and interactive effects of alcohol intoxication and IPA on aggressive verbalizations and the P300 during anger arousal, and to examine the role of the P300 in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations. Although the main and interactive effects of Aims 1 and 2 were examined separately by conducting regression analyses in SAS v.9.2 (SAS Institute Inc., Cary, NC), the proposed mediated moderation model of Aim 3 was examined as a whole within a path analytic framework estimated using structural equation modeling (Edwards & Lambert, 2007) in Mplus v.7 (Muthén & Muthén, 2012).

Aim 1. The first aim was to examine the main and interactive effects of alcohol intoxication and IPA on aggressive verbalizations during anger arousal. It was hypothesized that alcohol intoxication compared to placebo will be associated with increased aggressive verbalizations during anger arousal (Hypothesis 1A), that past IPA perpetration will be associated with increased aggressive verbalizations during anger arousal (Hypothesis 1B), and that alcohol intoxication and IPA will interact such that intoxication among IPA perpetrators will result in the greatest increase in aggressive verbalizations during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals (Hypothesis 1C). To examine these hypotheses, a negative binomial model was estimated using maximum likelihood within SAS PROC GENMOD.

Descriptive data of participants' aggressive verbalizations per IPA status and alcohol condition are presented in Table 3.7. As a measure of effect size ($r = .75$), the correlation between the model predicted and actual outcomes was obtained. Main effects of executive cognitive functioning and aggressive verbalizations articulated during the neutral scenario were included in the negative binomial model to control for these variables; however, neither executive cognitive functioning, $\chi^2(1) = .82$, $p = .37$, nor neutral scenario aggressive verbalizations, $\chi^2(1) = .74$, $p = .39$, had significant main effects. Results did not reveal a significant marginal main effect for alcohol condition (hypothesis 1A), $\chi^2(1) = .09$, $p = .76$, indicating that, on average, individuals who were intoxicated did not express more aggressive verbalizations during anger arousal compared to individuals in the placebo condition. Additionally, there was no significant marginal main effect for IPA status (hypothesis 1B), $\chi^2(1) = .03$, $p = .87$, indicating that,

on average, IPA perpetrators did not express more aggressive verbalizations during anger arousal compared to non-perpetrators. However, as shown in Figure 3.5, there was a significant alcohol x IPA status interaction (hypothesis 1C), $\chi^2(1) = 4.22$, $p = .04$.

Table 3.7

Mean number of aggressive verbalizations during anger arousal as a function of IPA status and alcohol condition.

	ATSS Anger Scenario		
Group	M	SD	95% CI
No IPA			
placebo	4.89	4.26	2.29, 7.99
alcohol	4.80	4.59	2.20, 7.91
IPA			
placebo	5.27	4.31	2.83, 7.77
alcohol	16.75	9.35	10.90, 23.43

Note. ATSS = Articulated Thoughts in Simulated Situations

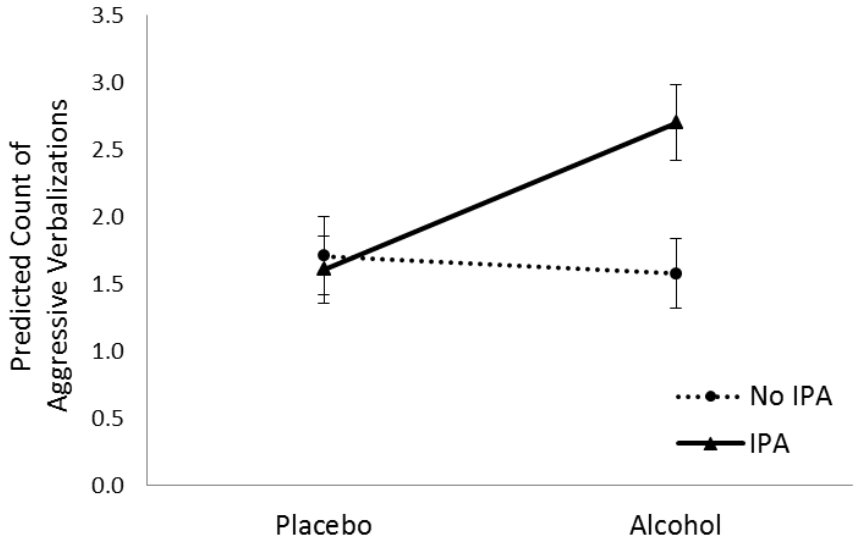

Figure 3.5

Negative binomial predicted means for aggressive verbalizations articulated during ATSS anger scenarios as a function of IPA status and alcohol condition.

Simple effects were examined to describe the interaction first with respect to IPA differences by alcohol condition and then condition differences by IPA status. Within the placebo condition, IPA perpetrators and non- perpetrators did not differ in the number of aggressive verbalizations articulated during anger arousal, $\chi^2 = .03$, $p < .87$. More notably, and consistent with hypotheses, within the alcohol condition, IPA perpetrators articulated greater aggressive verbalizations during anger arousal than non-perpetrators, $\chi^2 = 6.80$, $p < .01$. Further, in considering differences across alcohol conditions, no differences were found in aggressive verbalizations articulated during anger arousal in the placebo condition compared to the alcohol conditions for individuals without a history of IPA perpetration, $\chi^2 = .09$, $p = .76$. However, greater aggressive verbalizations were articulated in the alcohol condition relative to the placebo condition for IPA perpetrators, $\chi^2 = 6.68$, $p < .01$.

Aim 2. The second aim of the study was to examine main and interactive effects of alcohol intoxication and IPA on neurocognitive processing during anger arousal. It was hypothesized that alcohol intoxication compared to placebo will be associated with decreased P300 ERP component amplitude during anger arousal (Hypothesis 2A), past IPA perpetration will be associated with decreased P300 ERP component amplitude during anger arousal (Hypothesis 2B), and that alcohol intoxication and IPA will interact such that intoxication among IPA perpetrators will result in the greatest decrease in P300 ERP component amplitude during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals (Hypothesis 2C). To examine these hypotheses, a general linear model was estimated using SAS PROC GLM.

Descriptive data of participants' P300 amplitude per IPA status and alcohol condition are presented in Table 3.8. Main effects of executive cognitive functioning and aggressive verbalizations articulated during the neutral scenario were included in the negative binomial model to control for these variables; however, neither executive cognitive functioning, $F(1,33) = .15$, $p = .70$, nor neutral scenario aggressive verbalizations, $F(1,33) = -.72$, $p = .47$, had significant main effects. Contrary to hypotheses, results indicated no significant main effects for both alcohol condition (hypothesis 2A), $F(1,33) = -.06$, $p = .94$, and IPA status (hypothesis 2B), $F(1,33) = -.40$, $p = .70$. Further, the IPA status x alcohol condition interaction was not significant (hypothesis 2), $F(1,33) = -.60$, $p = .56$. The effect size (r^2) for this model was .09.

Table 3.8

Maximum P300 amplitude during anger arousal as a function of IPA status and alcohol condition.

	P300 amplitude during anger arousal		
Group	M	SD	95% CI
No IPA			
placebo	7.58	5.13	4.58, 11,39
alcohol	7.78	4.03	5.34, 10.37
IPA			
placebo	7.68	3.62	5.55, 9.71
alcohol	5.49	4.11	2.88, 8.53

Aim 3. The final aim of the study was to examine the role of neurocognitive processing in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations. A mediated moderation model was proposed in which

neurocognitive processing was predicted to mediate the interactive effects of alcohol intoxication and IPA on aggressive verbalizations (Hypothesis 3A). Specifically, during alcohol intoxication, IPA perpetrators are expected to exhibit the greatest deficits in neurocognitive processing (smallest P300 ERP component amplitude), which will predict increased aggressive verbalizations during anger arousal compared to IPA perpetrators in the placebo condition and non-violent individuals. Analyses for Aim 3 hypotheses were conducted under maximum likelihood estimation with robust standard errors using Mplus v.7 (Muthén & Muthén, 2012).

Mediated moderation model results are presented in Table 3.9 and a graphical representation of the model with coefficients is presented in Figure 3.6. Standardized coefficients are displayed in Figure 3.6 to ease comparisons among predictors with smaller and larger scales. Unstandardized coefficients are presented in the tables and text. Executive cognitive functioning and aggressive verbalizations articulated during the neutral scenario were both included as controls in the model by regressing the dependent variable (i.e., aggressive verbalizations) and mediating variable (i.e., P300 amplitude) on the executive cognitive functioning variable (i.e., BRIEF BRI scores) and neutral scenario aggressive verbalizations variable. However, results indicated that executive cognitive functioning did not predict the P300, $b = .13$, $p = .25$, or aggressive verbalizations during anger arousal, $b = .02$, $p = .35$. Further, neutral scenario aggressive verbalizations did not predict the P300, $b = -.60$, $p = .32$, or aggressive verbalizations during anger arousal, $b = .13$, $p = .11$.

Consistent with the regression analyses described above, the path model indicated a significant interaction between IPA status and alcohol condition on aggressive

verbalizations, $b = 1.12$, $p = .02$. All other main and interactive effects on the mediating and dependent variable were not significant (see Table 3.9). Additionally, the indirect effects (hypothesis 3A) were not significant for alcohol condition, $b = -.002$, $p = .77$, IPA status, $b = .001$, $p = .96$, nor the interaction of alcohol and IPA status, $b = .02$, $p = .59$. Therefore, contrary to the hypothesis, a mediated moderation model in which neurocognitive processing was predicted to mediate the interactive effects of alcohol intoxication and IPA on aggressive verbalizations was not supported in this study.

Table 3.9

Mediated moderation results for the P300.

	P300		Aggressive verbalizations	
Variable	*b*	*SE*	*b*	*SE*
IPA	-.84	2.24	-.02	.39
Alcohol	-.13	2.10	-.12	.40
IPA x alcohol	-1.69	2.71	1.22*	.48
P300	--	--	.02	.04

Note. * $p < .05$

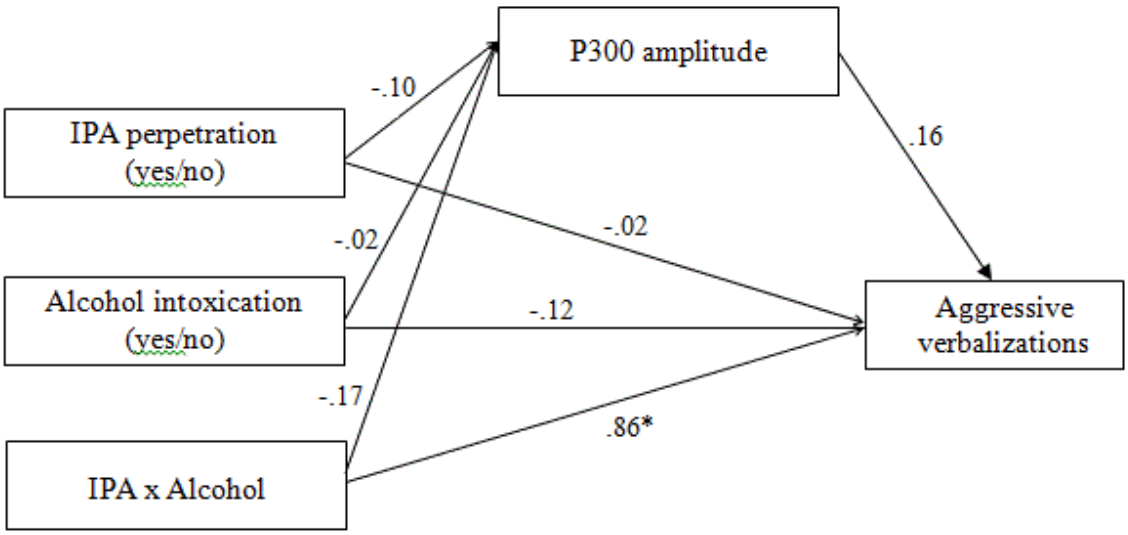

Figure 3.6

*Mediated moderation model results for the P300. Standardized coefficients are provided.*p < .05.*

Exploratory analyses. Exploratory analyses were conducted based on the principal component and ANOVA analyses of the ERP waveforms, as well as indications from the literature suggesting that alcohol and prior aggression may individually impact the P100 and P200 components (Bars, Heyrend, Simpson, & Munger, 2001; Drake et al., 1988; Fisher, Ceballos, Matthews, & Fisher, 2011; Houston & Stanford, 2001; Krull, Smith, Parsons, 1994; Rohrbaugh et al., 1987; Wiswede et al., 2011). Specifically, the main and interactive effects of alcohol intoxication and IPA status on both the P100 and P200 components during anger arousal were examined. Additionally, these ERP components were each tested as a possible mediator of the interactive effects of alcohol intoxication and IPA on aggressive verbalizations articulated during anger arousal. Exploratory analyses were conducted using SAS PROC GLM to estimate the general linear models, and under maximum likelihood estimation with robust standard errors using Mplus v.7 (Muthén & Muthén, 2012) to estimate the mediated moderation model. Mediated moderation model results are presented in Tables 3.10 and 3.11, and a graphical representation of the models with coefficients are presented in Figures 3.7 and 3.8. Standardized coefficients are displayed in these figures to ease comparisons among predictors with smaller and larger scales. Unstandardized coefficients are presented in the tables and text. Executive cognitive functioning and aggressive verbalizations articulated during the neutral scenario were both included as controls in both of the models.

P100. A general linear model was estimated to examine the main and interactive effects of alcohol intoxication and IPA on the P100 component during anger arousal. Neither the main effect of executive cognitive functioning, $F(1,33) = -1.10$, $p = .28$, nor neutral scenario aggressive verbalizations, $F(1,33) = 1.70$, $p = .10$, were significant. Results demonstrated a significant main effect for alcohol condition, $F(1,33) = -3.18$, $p < .01$, indicating that on average, individuals who were intoxicated exhibited decreased P100 waveforms compared to individuals who were not intoxicated. No main effect was found for IPA status, $F(1,33) = -.49$, $p = .63$. Further, the IPA status x alcohol condition interaction was not significant, $F(1,33) = 1.20$, $p = .24$. The effect size (r^2) for this model was .33.

A mediated moderation model was tested to examine the role of the P100 component in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations (refer to Table 3.10 for model results). Consistent with the regression analyses described above, the path model results indicated that alcohol significantly predicted decreased P100 component waveforms, $b = -.61$, $p < .001$. However, the main effect of IPA and interactive effects of alcohol intoxication and IPA on the P100 component were not significant. Further the indirect effects of the P100 component was non-significant for the main and interactive effects of alcohol and IPA on aggressive verbalizations during anger arousal.

Table 3.10

Mediated moderation results for the P100.

	P100		Aggressive verbalizations	
Variable	*b*	*SE*	*b*	*SE*
IPA	-.10	.20	-.02	.38
Alcohol	-.61**	.16	.13	.44
IPA x alcohol	.33	.25	.93*	.48
P100	--	--	.43	.24

Note. * $p < .05$, ** $p < .001$.

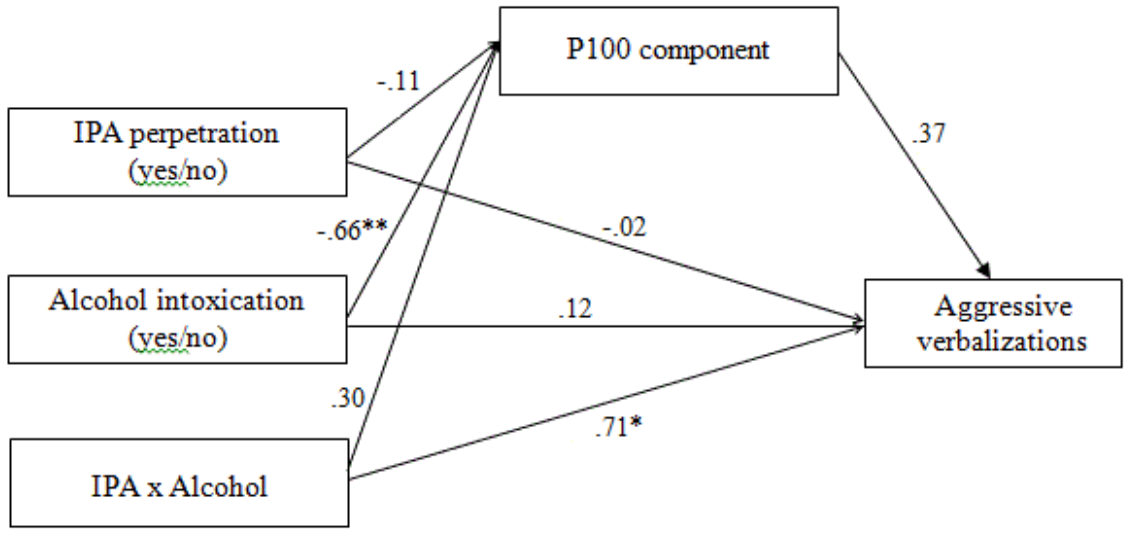

Figure 3.7

*Mediated moderation model results for the P100. Standardized coefficients are provided. *p < .05; ** p* < .001.

P200. A general linear model was estimated to examine the main and interactive effects of alcohol intoxication and IPA on the P200 component during anger arousal. Neither the main effect of executive cognitive functioning, $F(1,33) = .07$, $p = .94$, nor neutral scenario aggressive verbalizations, $F(1,33) = .08$, $p = .94$, were significant.

Results indicated no significant main effects for both alcohol condition, $F(1,33) = -.76$, $p = .45$, and IPA status, $F(1,33) = .12$, $p = .91$. Further, the IPA status x alcohol condition interaction was not significant, $F(1,33) = .18$, $p = .86$. The effect size (r^2) for this model was .03.

A mediated moderation model was tested to examine the role of the P200 component in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations (refer to Table 3.11 for model results). Results revealed no significant main or interactive effects of alcohol intoxication and IPA on the P200 component. Further, the P200 component did not significantly predict aggressive verbalizations articulated during anger arousal. Finally, the model findings did not find support for the P100 mediating the relationship between the interaction of alcohol and IPA on aggressive verbalizations during anger arousal.

Table 3.11

Mediated moderation results for the P200.

	P200		Aggressive verbalizations	
Variable	*b*	*SE*	*b*	*SE*
IPA	.03	.21	-.09	.37
Alcohol	-.19	.24	-.12	.40
IPA x alcohol	.07	.32	1.23*	.48
P100	--	--	.14	.29

Note. * $p < .05$

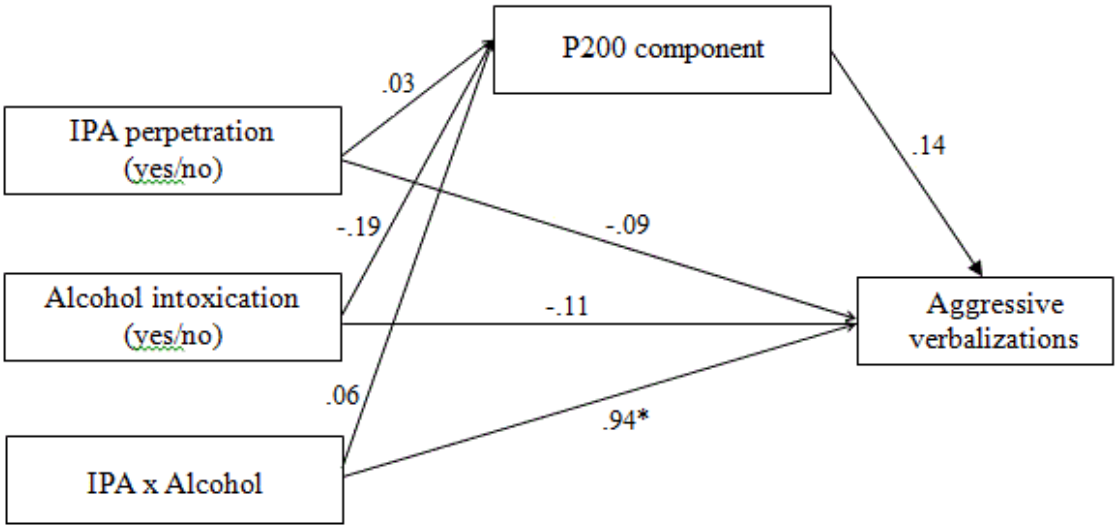

Figure 3.8

*Mediated moderation model results for the P200. Standardized coefficients are provided. *p < .05.*

Chapter 4: Discussion

Drawing on the alcohol myopia model, the present study utilized an experimental approach to test the impact of alcohol intoxication and neurocognitive processing on partner aggression. Specifically, the main and interactive effects of alcohol intoxication and IPA on aggressive verbalizations and attentional processing during anger arousal were examined, as well as the role of attentional processing in mediating the interactive effects of alcohol intoxication and IPA on aggressive verbalizations. While neither alcohol intoxication nor a history of IPA perpetration independently predicted increased aggression during anger arousal, a significant interaction emerged such that only individuals with a history of IPA and who were intoxicated exhibited increased aggressive verbalizations during anger arousal. Unexpectedly, attentional processing as measured by the P300 did not predict the expression of aggression during anger arousal

or mediate the interactive effects of alcohol intoxication and IPA on aggression. However, exploratory analyses revealed that alcohol intoxication predicted decrements in the P100 component. The theoretical and clinical implications of these findings, as well as direction for further research, are discussed below.

Descriptive findings. Prior to discussing the findings related to the study hypotheses, a review of the descriptive findings is warranted. Based on the participant's and their partner's report, 19 individuals (50% of the participants) were identified as having a history of IPA perpetration. A wide range of IPA prevalence estimates have been reported (Caetano, Cunradi, Schafer, & Clark, 2000; O'Leary, Barling, Arias, & Rosenbaum, 1989), and research reviewing this literature estimated that lifetime rates of IPA is most likely between 21 and 45% (Lewis & Fremouw, 2001). Although the prevalence rate found in this study is high, it is still generally comparable with studies showing that IPA occurs in as high as nearly 50% of romantic relationships (e.g., Arias, Samios, & O'Leary, 1987; Morse, 1995; Schumacher & Leonard, 2005). The high prevalence rate for IPA was found despite not specifically recruiting for individuals with a history of IPA or excluding individuals for not reporting an IPA perpetration history. However, recruitment was targeted towards young adults who consumed alcohol, which is strongly linked to the occurrence of IPA (e.g., Foran & O'Leary, 2008). It is also possible that the interviewing techniques used to assess IPA in this study contributed to a high prevalence estimate. First, the participants' partner was also interviewed to evaluate whether they had been physically victimized by the participant. Only 13 participants (34.2%) of the 19 in the IPA group admitted to perpetrating partner aggression at least once during the past six months. The remaining six participants denied engaging in IPA

perpetration but were identified by their partners as having been physically aggressive in the relationship. Additionally, to enhance the likelihood that individuals would disclose sensitive information, participants and their partners were first asked a series of questions rating the quality of their relationship. Afterwards, individuals were asked about both positive and negative relationship behaviors that they had experienced from their partner, and then positive and negative relationship behaviors that they engaged in towards their partners. These "lead in" questions may have helped respondents feel more comfortable about disclosing instances of IPA perpetration. While the overall prevalence of any IPA in this study was rather high, the frequency with which participants were found to have perpetrated partner aggressive behaviors is consistent with past literature (Tjaden & Thoennes, 2000a; Eckhardt, 2007), and did not statistically differ between the alcohol and placebo conditions.

In general, the present study was successful in using a placebo design to study partner aggression. Specifically, prior to completing the experimental tasks, participants in the alcohol condition reached an average BAC of .09%, which past research suggests is more than sufficient to evoke aggression (Giancola & Zeichner, 1997) and produce large decrements in the P300 amplitude (Colrain, Taylor, McLean, Buttery, Wise, & Montgomery, 1993). Further, as indicated by the increased BAC levels following the experimental tasks, the alcohol manipulation was successful in presenting the experimental tasks to participant's during the ascending limb of the BAC curve, which is associated with increased aggression compared to the descending limb (Giancola & Zeichner, 1997). Conversely, individuals in the placebo condition, who received a minimal amount of alcohol, demonstrated decreased BAC levels (from .004% to .00%) from the beginning to the end of the experimental tasks. On average, participants in the placebo condition believed they consumed 2.2 alcoholic

drinks, while participants in the alcohol condition believed they consumed an average of 3.83 alcoholic drinks. Although the study was successful in leading placebo participants to believe they were drinking alcohol, placebo participants did not believe they consumed as many alcoholic beverages as participants in the alcohol condition. Further, participants in the alcohol condition reported experiencing greater levels of drunkenness. However, bivariate analyses indicated that neither the number of drinks a person believed they consumed nor their perceived level of drunkenness were related to the study's primary dependent variables (i.e., aggressive verbalizations articulated during anger arousal and the P300 amplitude). These results are consistent with similar studies examining alcohol and aggression using a placebo design (e.g., Eckhardt, 2007; Eckhardt, 2008; Stappenbeck & Fromme, 2014).

When examining the connection between alcohol and aggressive behavior, some researchers have argued that alcohol expectancies, rather than the pharmacological effects of alcohol, account for this relationship. According to this expectancy theory, a person who believes that alcohol increases aggression will display greater levels of aggression when under the influence of alcohol (e.g., Dermen & George, 1989). In support of this theory, some studies have found that aggression-related alcohol expectancies predict IPA (Field, Caetano, Nelson, 2004; Senchak & Leonard, 1994; Zhang, Welte, & Wieczorek, 2002). However, several laboratory studies suggest that compared to alcohol expectancies, alcohol consumption actually has a stronger effect on aggression (Bushman & Cooper, 1990; Chermack & Taylor, 1995; Hull & Bond, 1986; Steele & Southwick, 1985). In the present study, no differences were found in aggression-related alcohol expectancies between the alcohol and placebo conditions or

the IPA and no-IPA groups. Consistent with previous laboratory findings examining alcohol and aggression, results showed that alcohol expectancies related to aggression were not related to the level of aggression displayed during the ATSS paradigm. Further, perceived level of drunkenness was not associated with aggressive behaviors displayed during the ATSS task. These findings add to the literature suggesting that alcohol influences the expression of IPA primarily through its pharmacological effects, rather than through aggression-related alcohol expectancies.

Another important factor that has been examined as a possible contributor to the alcohol-aggression relationship is executive cognitive functioning. Executive cognitive functioning refers to an individual's ability to use a set of mental processes, including planning, organizing, abstract reasoning, and self-monitoring, to self-regulate goal directed behavior (Giancola, 1995). In the present study there were no differences in executive cognitive functioning abilities between individuals in the alcohol and placebo conditions. As expected, individuals with an IPA perpetration history reported greater difficulties with executive cognitive functioning compared to individuals with no IPA history. Specifically, based on a self-report measure, IPA perpetrator's indicated experiencing greater difficulties with appropriately modulating their emotions and behavior, including controlling impulses. Consistent with this finding, increased difficulty with executive cognitive functioning was associated with increased aggressive verbalizations articulated during the ATSS anger-arousing scenarios, but not the neutral scenario. These findings are consistent with research demonstrating that lower executive cognitive functioning is associated with IPA perpetration history (Stanford et al., 2007), as well as increased general aggression (Lau et al., 1995) and intoxicated aggression

(Giancola et al., 2012), and suggests that individuals with lower executive cognitive functioning abilities are less likely to inhibit aggressive-responding under provocation.

Experimental tasks. The interpersonal aggression literature has theorized and demonstrated that strong provocations set the stage for the enacting of aggressive behavior (Finkel, 2007; Finkel & Eckhardt, 2013; Giancola et al., 2002; Hoaken & Phil, 2000). Further, the alcohol myopia model asserts that alcohol disrupts attentional processing, causing intoxicated individuals to focus on prominent provoking cues in the environment, while ignoring distal inhibiting cues. This narrowing of attention is believed to contribute to the expression of aggression among intoxicated individuals. Therefore, a salient provocation was introduced in the present study through the ATSS paradigm, designed to mirror real-world circumstances in which one partner is provoked by a social interaction with the other partner. As anticipated, these procedures triggered increased self-reported angry mood during anger arousal compared to the neutral scenario. Both of the ATSS anger scenarios produced similar levels of angry mood, which was expected given that both were designed around the same theme of jealousy, portraying conversations in which the participants' partner was flirting with someone of the opposite sex. Although individuals who were intoxicated exhibited greater annoyance from the neutral scenario, participants in both the alcohol and placebo conditions experienced similar levels of anger-arousal during the ATSS anger scenarios. Further, IPA status alone, or in combination with alcohol, was unrelated to self-reported anger in response to the ATSS. These findings are similar to prior experimental research showing no association between changes in the intensity of angry feelings experienced in

the moment and IPA status (Babcock, Green, Webb, & Yerington, 2005; Barbour et al., 1998; Eckhardt et al., 2002) or alcohol intoxication (Eckhardt, 2007).

An examination of the primary dependent variables suggests that the experimental tasks were successful in eliciting aggression and a distinct P300 component representing attentional processing. Regarding aggressive verbalizations, the quantity of aggressive verbalizations articulated during the ATSS task was comparable to those reported in a similar study examining the effects of alcohol intoxication among a community sample of martially violent men (Eckhardt, 2007). Regarding the P300 component, some notable differences in the P300 amplitude and latency values emerged between those found in the current study and prior work. First, the average amplitudes found for the placebo and no IPA conditions were considerably smaller than expected based on related ERP studies conducted. The P300 component is generally a relatively large positive ERP waveform that commonly peaks between 10 and 20 μV (Polich & Kok, 1995). For example, in Stanford and colleagues' (2007) ERP study that used an auditory oddball task, the P300 amplitude in the parietal region was 14.7 μV for non-violent men and 10.1 μV for convicted IPA perpetrators. When Mathias and Stanford (1999) examined impulsive aggression in college students, the P300 amplitudes elicited by a visual oddball task very similar to the one used in the current study was approximately 22 μV for non-aggressive individuals and 13 μV for aggressive individuals. Further, in a study conducted by Colrain and colleagues (1993) testing the effects of varying doses of alcohol on visual ERPs, the P300 amplitude in the parietal region was approximately 10 μV for sober individuals and 7.5 μV for highly intoxicated individuals.

There are a host of factors that can influence the P300 (Polich & Kok, 1995), one of which is the attentional burden of simultaneously completing two cognitively challenging tasks. Research shows that dual tasks produce decrements in the P300 (Kramer, Strayer, & Buckley, 1991; Kok, 2001; Nash & Fernandez, 1996; Watter, Geffen, & Geffen, 2001). It is plausible that attentional processing resources were shared between the ATSS and oddball tasks, since participants were listening to the ATSS scenario and tuning into their thoughts and feelings, while also attending to the oddball task and determining whether they should push a button in response to the visual stimuli presented on a screen. Simultaneously completing the experimental tasks likely led to reduced attentional processing of the oddball stimuli, which is reflected in the smaller than expected P300 amplitudes among the non-aggressive and sober participants.

Despite the P300 amplitudes being small, the latency of this component was consistent with prior work showing that the P300 typically peaks between 300 and 600 ms following the onset of a low-probability stimulus presentation (e.g., Euser et al., 2011; Stanford et al., 2007). No differences were found for the P300 peak latency during anger arousal between individuals with and without a history of IPA, and participants in the placebo versus alcohol conditions. This suggests that the amount of time that was required to detect and process the low-probability stimulus was the same for all participants. The lack of finding for peak latency differences as a function of IPA status is consistent with ERP research comparing male participants who had been convicted of IPA perpetrationors to non-violent individuals (Stanford et al. 2007), but contradictory to studies showing that individuals who exhibit impulsive aggressive tendencies (Mathias & Stanford, 1999) or have a history of habitual general violence (Drake et al., 1998) display

longer P300 latencies. However, in the Mathias and Stanford (1999) study, the latency differences between individuals who exhibited impulsive versus non-impulsive aggression disappeared when the standard oddball task was modified to increase the difficulty of the task. It is possible that the demands of the study (i.e., participant's simultaneously responding to the oddball task while listening to the relationship scenarios, imagining they were in these scenarios, and tuning into their thoughts and feelings) increased the difficulty of engaging in the oddball task, which contributed to this lack of finding.

The potential difficulty of completing both experimental tasks simultaneously may also be the reason for the lack of difference in the P300 peak latencies found between the alcohol and placebo condition. Research consistently shows that alcohol intoxication produces a significantly delayed P300 latency (Colrain et al., 1993; Grillon, Sinha, & O'Malley, 1995; Martin & Siddle, 2003), which is consistent with alcohol's abilities to negatively affect cognitive processing. Given that participants consumed a sufficient amount of alcohol to impair their cognitive processing, it is curious why this the current findings do not show a similar effect. To further explore this issue, the P300 peak latency elicited during the ATSS neutral scenario was examined. Interestingly, alcohol intoxication significantly delayed the P300 peak latency during the ATSS neutral scenario. Therefore, while participants were not experiencing angry mood, alcohol's role in compromising cognitive processing is evident. The reason why alcohol's effect on cognitive processing diminishes during anger-arousal is puzzling. One possibility is that these differences were affected by both intoxicated and sober participants utilizing additional cognitive resources in attempts to regulate their angry mood that was evoked

by the negative emotional provocation. A more thorough discussion of factors potentially influencing the P300 component is provided below in relation to the study hypotheses.

Regarding possible gender effects, no differences were found between women and men for the primary dependent variables. Specifically, women and men displayed similar levels of aggressive behavior during the ATSS task. This finding is consistent with the IPA literature suggesting that there are no systematic differences in IPA perpetration risk factors for women and men (e.g., O'Leary, Smith Slep, & O'Leary, 2007; White, Merrill, & Koss, 2001). Additionally, a lack of gender differences is also consistent with prior studies using the ATSS paradigm to examine partner aggression among women and men (Maldonado et al., in press; Stappenbeck & Fromme, 2014). Further, while the general aggression literature has suggested some differences among genders in levels of perpetration (e.g. Exum, 2006), research shows that these differences are no longer apparent under high levels of provocation (Giancola et al., 2002). There were also no gender differences for the P300 amplitude. Research investigating the relationship between gender and the P300 is mixed, but the prevailing belief is that the P300 is moderated by gender. Some studies have found no gender differences (Rozenkrants & Polich, 2008), while others have found that men produce larger P300 amplitudes than women (Oliver-Rodríguez, Guan, & Johnston, 1999). However, a number of studies have demonstrated that women produce larger P300 amplitudes than men (Deldin, Duncan, & Miller, 1994; Hoffman & Polich, 1999; Polich & Martin, 1992; Steffensen et al., 2008), which appears to be the leading belief in the ERP literature. The lack of gender difference in this study may be related to the reduced P300 amplitudes

elicited across participants. Although gender findings are not significant, inspection of the P300 amplitude values revealed that the P300 generally tended to be larger for women than for men across study conditions.

Alcohol intoxication, IPA, and aggressive verbalizations. A strong link between alcohol intoxication and aggression has been demonstrated in numerous laboratory studies (Giancola, 2002, 2004a; Lau et al, 1995; Leonard & Roberts, 1998; Stappenbeck & Fromme, 2014). However, the current study did not find that alcohol alone had an effect on aggressive verbalizations articulated during anger arousal across conditions. Much of the laboratory work on the effects of alcohol has focused on general aggression toward unknown individuals, which consistently shows that consuming alcohol facilitates aggressive responding (Dougherty, Bjork, Bennett, & Moeller, 1996; Duke, Giancola, Morris, Holt, & Gunn, 2011; Giancola et al., 2002). Having participants aggress towards a stranger rather than a romantic partner may have contributed to the discrepancy between these findings and the current results. The inconsistent findings between studies may also be explained by the differences in the types of provocations found between studies. In the general aggression literature, a strong shock is typically used as a provocation. This shock appears to be a very salient cue for intoxicated individuals since it instigates aggressive responding, as measured by the frequency and intensity of the shock ostensibly delivered to the participant's opponent. In the present study, a relationship conflict involving themes of jealousy was used as a provocation. Although on average participants reportedly experienced anger during the relationship conflict scenario, this provocation may not have been as relevant for some individuals to elicit partner aggression. Being provoked by a relationship conflict may only contribute

to IPA perpetration among intoxicated individuals who are already prone to engage in IPA. Accordingly, researchers have acknowledged that alcohol does not always lead to increased aggression among all individuals (Giancola, 2002). Rather, alcohol increases aggressive behavior among individuals who are already inclined to aggress (Dougherty et al., 1999; Pernanen, 1991; Eckhardt, 2007; Eckhardt & Crane, 2008; Giancola, 2002)

Individuals with a history of IPA perpetration have demonstrated strong aggressive tendencies through their past actions. Because a robust predictor of future IPA is a history of physically aggressing against an intimate partner (Mossman, 1994; Riggs & O'Leary, 1996), it was expected that IPA history alone would predict increased aggressive verbalizations during anger arousal. This prediction was not supported, however, this finding is consistent with some prior work (e.g., Eckhardt, 2007; Maldonado et al., in press) but differs from other findings linking IPA history to greater aggressive verbalizations during anger arousal (Barbour et al., 1998; Eckhardt et al., 2002). This discrepancy may be due to a shorter time frame for IPA perpetration used in the present study, which may have led to some participants being identified as non-IPA perpetrators when in fact they engaged in IPA perpetration, albeit outside the time window for assessment in the current study. The current study only assessed IPA perpetration within the past six months. However, if past year IPA perpetration were assessed, then more individuals may have been identified as IPA perpetrators. These mixed findings suggest that further study is needed to clarify whether IPA history alone is sufficient to compel individuals to generate aggressive verbalizations following provocation.

Prominent theoretical models identify IPA perpetration as a complex phenomenon that arises through the interactive process of several risk factors (Finkel & Eckhardt, 2013; Slotter & Finkel, 2011). Consistent with this conceptualization, neither alcohol intoxication nor IPA history alone predicted aggression displayed during anger arousal, but the interaction of these two factors did play a strong role in predicting IPA. Specifically, only IPA perpetrators who were intoxicated displayed increased aggressive verbalizations during anger arousal. These findings replicate and extend the work of Eckhardt (2007), which only included martially violent and non-violent men, by demonstrating that alcohol intoxication also contributes to increased aggression during anger arousal among women with a history of IPA perpetration. Additionally, these findings are consistent with the alcohol myopia model, showing that alcohol influenced the expression of aggression among IPA perpetrators, presumably by producing a shift in their attention to the provoking salient cues in the environment. Researchers have theorized that individuals who are prone to being violent engage in increased aggression when intoxicated because alcohol is especially disruptive to their cognitive and neurocognitive processing (Giancola, 2002), which is already compromised since they exhibit significant cognitive deficits when sober (Harmon-Jones et al., 1997; Mathias & Stanford, 1999; Patrick, 2008; Stanford et al., 2007). The current findings suggest that IPA perpetrators show pronounced impairments in regulating their aggressive behaviors when intoxicated. Specifically, IPA perpetrators often lack constructive communication skills that are necessary to appropriately share their angry feelings with their partners (Infante, Chandler, & Rudd, 1989; Ronan, Dreer, Dollard, & Ronan, 2004). Their ability to resolve conflict is likely further impaired by alcohol, leading them to respond in an

aggressive manner when intoxicated. These findings highlight the importance for IPA perpetrators' need to learn better ways to manage the expression of their emotions, including improving executive cognitive functioning skills particularly as they relate to behavior regulation.

Alcohol intoxication, IPA, and neurocognitive processing. Based on the vast literature suggesting that alcohol impairs neurocognitive processing, and that individuals prone to violence exhibit neurocognitive deficits, it was surprising that neither alcohol consumption, IPA status, nor its interaction affected the P300. However, as noted above, the P300 amplitudes for individuals who were sober and did not have a history of IPA were much smaller than expected, which likely contributed to the lack of differences between the study conditions. Although the effects of alcohol and IPA are not significant, examination of the P300 amplitudes were in the expected direction such that they were smaller for IPA perpetrators who were intoxicated compared to IPA perpetrators in the placebo condition and non-IPA individuals in both the alcohol and placebo conditions.

Variations of the P300 component are sensitive to a wide range of factors (Polich & Kok, 1995). For example, one factor not related to the experimental task that affects the P300 is food consumption. Specifically, the P300 is reduced when individuals had not recently consumed food (Geisler & Polich, 1992). In the present study participants were asked not to consume food four hours prior to arriving to the study session, which could have affected the size of the P300 elicited. Memory load is another factor that can attenuate the P300. The P300 has been shown to decrease as working memory demands increase (Gevins et al., 1996; McEvoy, Smith, & Gevins, 1998). Listening to the ATSS

scenarios, imagining that it is happening, and retaining one's thoughts and feelings associated with the scenarios, while also remembering to respond only to the infrequent stimuli of the oddball task likely caused a high working memory load for participants. The demands of simultaneously completing the ATSS and visual oddball paradigm are taxing and takes more effort than simply completing a standard oddball task, which is the method primarily used when examining effects of aggression or alcohol on the P300. Research shows that when an oddball task is modified to increase its difficulty, thereby requiring participants to employ more cognitive resources to engage in the task, the effect of alcohol on the P300 is no longer found (Grillon et al., 1995). Further, as indicated above, completing dual tasks simultaneously causes decrements in the P300 (Kramer et al., 1991; Kok, 2001; Nash & Fernandez, 1996; Watter et al., 2001). Dual task studies also show that the P300 for a secondary task decreases as the difficulty level of a primary task increases (see Polich, 2007, for a review). In the present study, participants may have expended a large amount of attentional processing resources to complete the ATSS task, leaving fewer resources available for the visual oddball task. This reduced attentional processing likely resulted in smaller than expected P300 amplitudes among the non-aggressive and sober participants, dampening the effects for the P300 among study conditions.

Finally, the use of a non-clinical sample of individuals who have perpetrated relatively low levels of aggression may have contributed to the lack of findings between IPA and non-IPA perpetrators. As a safety precaution, individuals who engaged in severe violence towards their partner were excluded from the study. However, many ERP studies finding that aggressive individuals show P300 decrements have examined

clinical or severely violent individuals, including convicted IPA perpetrators (Stanford et al., 2007), prison inmates (Barratt et al., 1997; Drake et al., 1998), and psychiatric patients (Harmon-Jones et al., 1997). Perhaps significant deficits in attentional processing are not as evident in individuals exhibiting very low levels of aggression. Further research is needed to delineate these findings.

Given that attention is not a unitary construct (Curtin & Fairchild, 2003), the effects of alcohol and IPA status on other aspects of attentional functioning represented by the P100, P200, and late slow wave elicited by the experimental task were explored. While differences in the P300 were not found among study conditions, some interesting findings emerged for the other ERP components that are not as affected by the attentional burden of the study procedures. First, during anger arousal, non-IPA individuals showed greater late slow waveforms in the right hemisphere compared to the left hemisphere. This finding is consistent with research showing greater activation of the late slow waveform in the right hemisphere during emotional arousal, suggesting that emotion perception is largely processed in the right hemisphere (Keil, Müller, Gruber, Wienbruch, Stolarova, & Elbert, 2001). Interestingly, IPA perpetrators showed less activation than non-IPA individuals in the right hemisphere, possibly suggesting that they have a deficit in emotional processing.

The P200 is related to postperceptual selective attention and is sensitive to the level of attention an individual engages in (Hajcak et al., 2011; Rosburg, Trautner, Elger & Kurthen, 2009). Decreases in the P200 are related to increases in levels of attentiveness (Crowley & Colrain, 2004). Findings showed that the P200 was larger during anger arousal compared to the ATSS neutral scenario for individuals in the

placebo condition. It appears the sober individuals were less attentive towards the oddball task when listening to the anger-arousing ATSS scenarios. In this study, participants' levels of attentiveness did not differ as a result of alcohol. Some work has found that the P200 is affected by alcohol (Rohrbaugh et al., 1987), but the general consensus is that alcohol does not modulate the P200 component (Colrain et al., 1993).

The P100 is believed to reflect the cost of shifting attention (Luck et al., 1994), and decrements in the P100 are found when attention is being shifted away (Mangun & Hillyard, 1991) from the stimulus that participants are supposed to be responding to (i.e., the infrequent oddball stimulus). Consistent with research showing that alcohol suppresses the P100 (Krull et al., 1994; Rhodes, Obitz, & Creel, 1975), the current study found that intoxicated individuals elicited smaller P100 waveforms compared to sober individuals. Additionally, the P100 was smaller during anger arousal. Therefore, alcohol intoxication may have caused individuals to shift their attention away from the visual oddball task more than sober individuals, presumably towards the ATSS anger provoking scenarios, which is consistent with the alcohol myopia model. Further, attention was being shifted away from the visual oddball task more so during the ATSS anger scenarios compared to the neutral scenario. This provides evidence that the ATSS task was a provoking salient cue that was capturing the participants' attention.

Mediated moderation models. Contrary to hypotheses, the current study did not find that the P300 mediated the interactive effects of alcohol and IPA on aggression. Further, although other ERP components (i.e., the P100 and P200) elicited from the oddball task displayed differences between study conditions, exploratory analyses also revealed no meditational effects for either of these components. Because of the study

demands, lack of findings for the neurocognitive variables in relation to alcohol and aggression does not necessarily indicate that deficits in attentional processing are not contributing to the relationships between alcohol, IPA, and aggression. In fact, ERP findings show some support for the alcohol myopia model by suggesting that intoxicated participants' attention shifts towards highly salient cues in the environment. That is, during intoxication, participants are paying less attention to the visual oddball task and presumably shifting their attention to the more provoking stimuli (i.e., the ATSS) in the environment. The behavioral findings of this study add further support to this theory by showing that increased aggression during anger arousal was only found among IPA perpetrators who were intoxicated. Although the study demands may have diminished the effects of alcohol and IPA on the P300 that is typically seen in the literature, this design may be more analogous to real-world conditions. That is, when engaged in a conflict with a romantic partner, individuals are likely processing multiple stimuli at once as part of the dyadic interaction, similar to completing dual tasks in a laboratory setting, which is taxing on attentional processes. It is possible that the results found here reflect the intricate processing that occurs during an actual provocation with a romantic partner. Perhaps individuals commonly exhibit decreased attentional processing when faced with multiple cues competing for their attention. In this circumstance, the dysfunctional processing of cognitive control, which interferes with an individual's ability to inhibit dysregulated behavior and is further compromised by alcohol (Casbon, Curtin, Lang, & Patrick, 2003; Curtin & Fairchild, 2003) may be more vital to the expression of IPA than attentional processing, particularly for individuals perpetrating low levels of aggression.

Limitations and directions for future research. Limitations of the present study suggest additional directions for work in this area. First, the present sample was limited in demographic diversity, with the majority of participants being European-American and all being involved in heterosexual relationships. Future research should examine these processes within more ethnically diverse samples and individuals in same-sex relationships, populations that also experience high rates of IPA (Caetano et al., 2000; Tjaden & Thoennes, 2000; Tjaden, Thoennes, Allison, 1999). Next, participants in this study were community individuals who engaged in very low levels of IPA perpetration overall. The study findings, particularly relating to neurocognitive processing, may be more pronounced for IPA perpetrators of more severe and chronic aggression. Also, this study utilized individuals in relationships (rather than couples) who responded to hypothetical vignettes; therefore, it is unclear how IPA perpetrators might respond in the face of actual partner conflict. Future work could examine this in intoxicated couples using other forms of laboratory aggression measures, such as a competitive reaction test, which is often used in general aggression research and more recently used to study partner aggression (Watkins, DiLillo, Hoffman, & Templin, in press). Additionally, the present study used only an anger-arousal as a salient provoking cue. It is important for future studies to further our understanding of the types of salient provocations that may instigate IPA. For example, participants could be provoked by receiving direct criticism from their romantic partner or by engaging in a conflict discussion with their partner that elicits other emotions associated with IPA (Dutton, van Ginkel, & Landolt, 1996) besides anger. Further, it is important for future studies to design experimental paradigms that are less demanding than the current study to further clarify the role of attentional

processing in predicting IPA when intoxicated. Finally, future work may want use an auditory oddball paradigm when examining attentional processing of IPA since this is utilized in a majority of the aggression and ERP literature. Moreover, one study examining aggressive juveniles found that reduced P300 from an auditory oddball task was more predictive of aggressive behavior than P300 decrements from a visual oddball task (Fisher et al., 2011). The authors suggested that an auditory oddball task may have a greater ability to detect abnormalities in the temporal-limbic region, which is associated with impulsive aggression (Fisher et al., 2011).

Clinical implications. This investigation appears to be the first experimental study to directly test the alcohol myopia model as it relates to alcohol intoxication and IPA perpetration. The present findings build on prior work linking aggressive verbalizations to IPA among both intoxicated women and men (e.g., Eckhardt, 2007) and, as such, have several clinical implications. The expression of aggressive verbalizations has clinical importance because of the potential for these behaviors to interfere with constructive problem solving (Cordova, Jacobson, Gottman, Rushe, & Cox, 1993; Barbour et al., 1998; Eckhardt et al., 2002). Further, aggressive verbalizations likely facilitate physical aggression among romantic partners (Ajzen, 1991; Schumacher & Leonard, 2005). The finding that only intoxicated IPA perpetrators exhibited aggression during anger arousal highlights the importance of targeting alcohol use for both women and men in the treatment of IPA. Indeed, reductions in drinking following alcohol treatment are associated with corresponding declines in IPA (O'Farrell, Fals-Stewart, Murphy, & Murphy, 2003). Further, ERP findings suggesting that alcohol causes attention to shift towards more salient provoking cues in the environment indicate that

developing interventions that attempt to increase the saliency of inhibitory cues may be particularly useful for IPA perpetrators. For example, distracting intoxicated individuals from salient provoking cues decreases general aggression (Gallagher & Parrott, 2011). Therefore, IPA interventions aimed at identifying effective inhibitory cues for individuals and learning to redirect their attention towards these non-provoking inhibitory cues (i.e., focusing on pictures of their children posted on a wall), may help to decrease the occurrence of intoxicated IPA. It would be valuable for future studies to examine whether exposing intoxicated IPA perpetrators to cues that inhibit aggression actually decreases IPA behaviors. Additionally, findings that IPA perpetrators experience deficits in appropriately regulating emotions and behaviors and have problems with emotional processing suggest that IPA interventions designed to improve behavioral regulation skills, such as emotion regulation training, may be beneficial. Research shows that both women and men IPA perpetrators are able to learn effective emotion regulation strategies to decrease aggressive verbalizations during anger arousal (Maldonado et al., in press), but future research should determine whether IPA perpetrators can successfully use these skills under the influence of alcohol to reduce IPA. Lastly, it is important for interventions to improve these skills in an integrated alcohol and IPA intervention to target the complexities of IPA for both women and men.

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Appendix A

University of Nebraska-Lincoln Institutional Review Board Approval Letter

University of Nebraska Lincoln

May 14, 2012

Rosalita Maldonado
Department of Psychology
2800 Woods Blvd Apt 911 Lincoln, NE 68502

David DiLillo
Department of Psychology
216 BURN, UNL, 68588-0308

IRB Number: 20120512549FB
Project ID: 12549
Project Title: Effects of Alcohol Intoxication and Neurocognitive Processing on Partner Violence

Dear Rosalita:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study based on the information provided. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Date of Full Board review: 03/28/2012

You are authorized to implement this study as of the Date of Final Approval: 05/14/2012. This approval is Valid Until: 03/27/2013.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events

* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

For projects which continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report form and returning it to the Institutional Review Board.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,

Julia Torquati, Ph.D.
Chair for the IRB

Appendix B

Screening Measures

Telephone Screening Interview

Say to participant*: "This study is about alcohol, neurocognitive processing, and relationships. You will need to be able to participate in a phone screen and the laboratory session in order to complete the study. Also, I will need to ask your partner questions as well to get her opinions about your relationship. Your phone screen should take 20 minutes or less. The laboratory session could take anywhere from 2 to 7 hours. During the phone screen I'm going to ask questions about your alcohol use, your medical and psychiatric history, and your relationship. Some of these questions will be about physical victimization and perpetration. This information is confidential and will only be seen by study personnel, and will not be shared with your partner. This information is used to determine whether you are eligible, and whether it is safe for you, to participate. Do you have any questions? Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled*."

"*Do you consent to the phone interview?*" Y N
(if no, stop here and thank them for their time)

Next say: "I will also need to ask your partner background questions about your relationship

"*What is your age?*":____ (exclude if under 21 or over 30)

"*Are you right or left-handed?*": R____ L____ (exclude if left-handed)

"*What is your gender?*": M____ F____
"*What is your partner's gender?*": M____ F____
(exclude if in a same-sex relationship)

"*How long have you and your partner been together?*" _____
(exclude if less than 6 months)

"*What is your height?*" _____ "*What is your weight?*" _____
(exclude if less than 6 feet tall and weigh over 250 pounds OR if over 6 feet tall and weigh over 300 pounds)

"*Where did you hear about our study?*"

_____

MEDICAL AND PSYCHIATRIC INFORMATION

1) "*Are you taking any prescription and/or nonprescription medications?*"
Y N
(if YES, what are they, how often, and doses)

Medication Name	Dosage	How often take?

(Exclude if medication is listed on harmful interactions list)

2) "*Can you drink alcohol with this medication?*" Y N
(exclude if answer is NO)

If unknown, continue with screen. At end of screening tell participant we will contact them to let them know if we can schedule. Medications will need to be run by Dr. Grant before being scheduled.

3) "*Is there any reason that you should not drink alcohol, medical or otherwise?*"
Y N
(exclude if YES)

4) "*Have you ever had, or do you currently have, any major illnesses?*"
(for example, cancer, liver cirrhosis, hepatitis, tumors, HIV/AIDS, etc.) Y N

_____

_____

(If yes, continue with screen. At end of screening tell participant we will contact them to let them know if we can schedule. Major illnesses will need to be run by Dr. Grant before being scheduled.)

5) "*Have you ever been diagnosed with a traumatic brain injury?*" Y N
(exclude if answer is YES)

6) "*Have you ever hit your head and lost consciousness for 20 minutes or longer?*"
(exclude if answer is YES) Y N

7) "*Have you ever been diagnosed with a neurological disorder?*"
(e.g. multiple sclerosis, cerebral palsy, epilepsy) Y N
(exclude if answer is YES)

8) *"Have you ever had a shrapnel injury?"*
(e.g. bomb, mine, or shell fragments) Y N
(exclude if answer is YES)

9) *"Do you have a history of having metal fragments in your eyes or skin?"*
(exclude if answer is YES) Y N

10) *"Do you have a neurostimulator?"*
(e.g. medical device used to deliver electrical stimulation to the brain) Y N
(exclude if answer is YES)

11) *"Do you have a history of seizures or currently use an anticonvulsant?"*
(exclude if answer is YES) Y N

12) *"Do you have any metal or electromagnetic implants?"* Y N

_____

_____

(If yes, continue with screen. At end of screening tell participant we will contact them to let them know if we can schedule. Any metal or electromagnetic implants will need to be run by Dr. Molfese before being scheduled.)

13) "*Have you ever been diagnosed with or received treatment for a psychiatric disorder?*" Y N

14) "*Have you ever received treatment for a psychiatric disorder?*" Y N

if either 13 or 14 yes, fill out table

Disorder Name	Age Diagnosed	Current status

(Exclude if any psychotic, paranoid, or bipolar disorders, or current major depression)

15) "*Have you ever been diagnosed with alcohol or drug abuse/dependence?*" Y N
(exclude if yes)

16) "*Have you ever been treated for alcohol or drug problems?*" Y N
(exclude if yes)

17) "*Have you ever been hospitalized due to alcohol use?*" Y N
(exclude if yes)

18) "*Do you have a physical disability?*" Y N
(exclude if necessary)

19) "*Do you have any hearing problems?*" Y N
(exclude if significant hearing loss)

20) "*Do you have any other severe sensory impairment?*" Y N
(exclude if significant sensory impairment)

21) "*Do you have a cochlear implant?*" Y N
(exclude if answer is YES)

22) "*Do you have a cardiac pacemaker?*" Y N
(exclude if answer is YES)

23) "*Do you have Asthma*" Y N
[if YES then ask the following questions]

a) "*Have you had an emergency room visit related to asthma in the past year?*" Y N
(exclude if answer is YES)

b) "*Do you use your inhaler more frequently when drinking?*" Y N
(exclude if answer is YES)

c) "*Have you used oral steroid treatments for asthma in the past year?*" Y N
(exclude if answer is YES)

IF subject reports having asthma but did not say yes to a, b, or c.
AND they can regularly tolerate 3-4 alcoholic drinks per occasion.
THEN they can participate.

24) "*Do you have any legal restrictions against your drinking (e.g. as a condition of probation or parole)?*" Y N
(exclude if answer is YES)

If Female, "*Are you currently nursing?*" Y N
(exclude if answer is YES)

If Female, "*Are you currently pregnant?*" Y N
(exclude if answer is YES)

If female: "*During the laboratory session, if you agree to participate in the study, you will undergo a pregnancy test. You will need to produce a urine sample within a half hour of arriving at the laboratory.*"

"Now I am going to ask you some questions about your drinking habits."

NIAAA Alcohol Use Questionnaire

Question 1 - (asks about frequency of past 12 month drinking)

During the last 12 months, how often did you usually have any kind of drink containing alcohol? By a drink we mean half an ounce of absolute alcohol (e.g. a 12 ounce can or glass of beer or cooler, a 5 ounce glass of wine, or a drink containing 1 shot of liquor). Choose only one.

____ Every day
____ 5 to 6 times a week
____ 3 to 4 times a week
____ twice a week
____ once a week
____ 2 to 3 times a month
____ once a month
____ 3 to 11 times in the past year
____ 1 or 2 times in the past year

(IF RESPONDENT GIVES ANY OF THE ABOVE RESPONSES, GO TO QUESTION 2)

____ I did not drink any alcohol in the past year, but I did drink in the past

(GO TO QUESTION 1A)

____ I never drank any alcohol in my life

(GO TO QUESTION 1B)

1A - During your lifetime, what is the maximum number of drinks containing alcohol that you drank within a 24-hour period? (asked here only of those who did not drink any alcohol during the past 12 months)

____ 36 drinks or more
____ 24 to 35 drinks
____ 18 to 23 drinks
____ 12 to 17 drinks
____ 8 to 11 drinks
____ 5 to 7 drinks
____ 4 drinks
____ 3 drinks
____ 2 drinks
____ 1 drink

(DONE WITH ALCOHOL QUESTIONS)

1B - So you have never had a drink containing alcohol in your entire life. (asked only of those who say they never drank alcohol in their lives)

____ Yes, I never drank.

(DONE WITH ALCOHOL QUESTIONS)

____ No, I did drink

(GO BACK TO QUESTION 1 AND REPEAT)

Question 2 - (asks about number of drinks on typical drinking day in past 12 months)

During the last 12 months, how many alcoholic drinks did you have on a typical day when you drank alcohol?
____ 25 or more drinks
____ 19 to 24 drinks
____ 16 to 18 drinks
____ 12 to 15 drinks
____ 9 to 11 drinks
____ 7 to 8 drinks
____ 5 to 6 drinks
____ 3 to 4 drinks
____ 2 drinks
____ 1 drink

Question 3 - (asks about maximum drinks in a 24 hour period in past 12 months)

During the last 12 months, what is the largest number of drinks containing alcohol that you drank within a 24-hour period?
____ 36 drinks or more
____ 24 to 35 drinks
____ 18 to 23 drinks
____ 12 to 17 drinks
____ 8 to 11 drinks
____ 5 to 7 drinks
____ 4 drinks
____ 3 drinks
____ 2 drinks
____ 1 drink

Question 4 - (asks about frequency of maximum drinks in last 12 months)

During the last 12 months, how often did you drink this largest number of drinks? Choose only one.
____ Every day
____ 5 to 6 times a week
____ 3 to 4 times a week
____ twice a week
____ once a week
____ 2 to 3 times a month

____ once a month
____ 3 to 11 times in the past year
____ 1 or 2 times in the past year

Question 5 - (asks about frequency of binge drinking in past 12 months)

During the last 12 months, how often did you have 5 or more (males) or 4 or more (females) drinks containing any kind of alcohol in within a two-hour period? [That would be the equivalent of at least 5 (4) 12-ounce cans or bottles of beer, 5 (4) five ounce glasses of wine, 5 (4) drinks each containing one shot of liquor or spirits - to be provided by interviewer if asked.] Choose only one.
____ Every day
____ 5 to 6 days a week
____ 3 to 4 days a week
____ two days a week
____ one day a week
____ 2 to 3 days a month
____ one day a month
____ 3 to 11 days in the past year
____ 1 or 2 days in the past year

Question 6- (asks about maximum drinks in 24 hours in lifetime)

During your lifetime, what is the largest number of drinks containing alcohol that you drank within a 24-hour period?
____ 36 drinks or more
____ 24 to 35 drinks
____ 18 to 23 drinks
____ 12 to 17 drinks
____ 8 to 11 drinks
____ 5 to 7 drinks
____ 4 drinks
____ 3 drinks
____ 2 drinks
____ 1 drink

Question 7. About how old were you when you first started drinking, not counting small tastes or sips of alcohol? By a drink we mean half an ounce of absolute alcohol (e.g. a 12 ounce can or glass of beer or cooler, a 5 ounce glass of wine, or a drink containing 1 shot of liquor).

___Age

[ ] Never drank alcohol (Unless there is a prior screening question asking about any drinking)

THE AUDIT

Questions	0	1	2	3	4	Score
1. *How often do you have one drink containing alcohol? By a drink we mean half an ounce of absolute alcohol (e.g. a 12 ounce can or glass of beer or cooler, a 5 ounce glass of wine, or a drink containing 1 shot of liquor).*	Never exclude	Once a month or less exclude	2-4 times a month	2-3 times a week	4 or more times a week	
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have four or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often during the last year have you failed to do what was normally expected from you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured as a result of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative or friend or doctor or other health worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					Total	

Exclude if total is 10 or higher

If unknown: *"How often do you have 2 or more drinks containing alcohol?"*_____
(e.g. less than monthly, once a month, twice a month, three times a month or more)
Person must consume 2 or more drinks at least twice monthly to be eligible.

"Next I'm going to ask you about the quality of your relationship with your partner."

RELATIONSHIP ADJUSTMENT SCALE

How well does your partner meet your needs?

1	2	3	4	5
Poorly		Average		Extremely well

In general, how satisfied are you with your relationship?

1	2	3	4	5
Unsatisfied		Average		Extremely satisfied

How good is your relationship compared to most?

1	2	3	4	5
Poor		Average		Excellent

How often do you wish you hadn't gotten in this relationship?

1	2	3	4	5
Never		Average		Very often

To what extent has your relationship met your original expectations:

1	2	3	4	5
Hardly at all		Average		Completely

How much do you love your partner?

1	2	3	4	5
Not much		Average		Very much

How many problems are there in your relationship?

1	2	3	4	5
Very few		Average		Very many

"Next, I need to ask you about how you and your partner handle disagreements."

RELATIONSHIP BEHAVIORS

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other, or just have spats or fights because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. Please tell me how many times you did each of these things in the past SIX months.

WHAT DID YOUR PARTNER DO TO YOU?

1. My partner showed s/he cared for me even though we disagreed. _____
2. My partner called me stupid, worthless, or ugly. _____
3. My partner twisted my arm or hair. _____
4. I had a sprain, bruise, or small cut because of a fight with my partner. _____
5. My partner showed respect for my feelings about an issue. _____
6. My partner pushed or shoved me. _____
7. My partner used a knife or gun on me. _____
8. My partner punched or hit me with something that could hurt. _____
9. My partner became angry enough to frighten me. _____
10. My partner choked me. _____
11. My partner used threats to make me have sexual relations. _____
12. My partner stood or hovered over me during a conflict or disagreement. _____
13. My partner pushed me against a wall. _____
14. My partner beat me up. _____
15. I needed to see a doctor because of a fight with my partner. _____
16. My partner slapped me. _____
17. My partner threatened to hit me. _____

WHAT DID YOU DO TO YOUR PARTNER?

17. I threatened to hit my partner. _____
18. I showed my partner I cared even though we disagreed. _____
19. I pushed or shoved my partner. _____
20. I called my partner stupid, worthless, or ugly. _____
21. My partner had a sprain, bruise, or small cut because of a fight with me. _____
22. I became angry enough to frighten my partner. _____
23. I showed respect for my partner's feeling about an issue. _____
24. I used a knife or gun on my partner. _____
25. I slapped my partner. _____
26. I choked my partner. _____
27. I used threats to make my partner have sexual relations. _____
28. I twisted my partner's arm or hair. _____
29. I beat up my partner. _____
30. I stood or hovered over my partner during a conflict or disagreement. _____
31. I punched or hit my partner with something that could hurt. _____
32. I pushed my partner against a wall. _____
33. My partner needed to see a doctor because of a fight with me. _____

Exclude if bold items total is two or greater.

If not eligible: *"Thank you for your time. From the information you have provided, it appears that you are not eligible for this study. Please let me know if you have any questions."*

If eligible: *"Thank you for your time. That is all the questions I have for you at this time. I will contact your partner and will call you back to let you know whether you are eligible for the study. What is the best number to reach your partner?"*

<u>After you speak with the partner, and the person is still eligible:</u>

For women:

- *"You will have to undergo a pregnancy test if you decide to participate because the study may include alcohol consumption. In order to complete the pregnancy test you will have to produce a urine sample within the first ½ hour of arriving at the laboratory."*

For All Participants:

- *"Please do not drink alcohol 24 hours before coming in. If you read a positive BAC, we will not run you."*
- *"Please refrain from recreational drugs from the time of this interview."*
- *"Please, do not eat 4 hours prior to arriving at the laboratory."*
- *"Food and water will be provided."*
- *"Please bring a form of ID displaying your age. If you do not bring a picture ID, you will not be able to participate."*
- *"Do you smoke?" (IF YES), "you cannot smoke during the experimental part of the study (about 1.5 hrs). After is fine."*
- *"You can have someone come and pick you up or we will provide a taxi for you to get home. If you walk to the building, you will have to arrange to have someone escort you back."*

"Okay, you qualify for the study. Can I schedule you for an appointment to come to our laboratory?"

- Settle on a day and time for them to come in (11:30 AM or later)

Partner Telephone Screening Interview

Say to participant*: "Hello, My name is _____, and I am calling from University of Nebraska-Lincoln, in response to your partner's interest in a study that examines how alcohol use and neurocognitive processing may affect relationships. If your partner qualifies, he/she will be invited to our laboratory at UNL to complete various tasks. At this phase of the study, we are determining who qualifies to participate in the study. To determine this, I've asked your partner some questions about the quality of your relationship, and I would like to take the next 10 minutes of your time and ask you questions about how you view your relationship and how you and your partner handle conflict. Some of these questions will be quite personal and will cover otherwise private aspects of your life. In addition, it might be possible that your partner may react negatively to real or suspected information you provide during our conversation. It is important that you consider this likelihood before giving your consent to participate. Do you have any questions about that?*

It is important that you know that your responses to my screening questions are completely confidential. That is, I cannot tell your partner what you have told me, and if your partner chooses to participate in the study, I will assign an ID number to him/her and immediately destroy any information linking either of your names to your responses. If he/she does not qualify for the study, I will immediately destroy your names following this screening. The only way that I may break confidentiality is if you directly threaten to harm another person or yourself. In that case, I am required to notify law enforcement. Lastly, answering these questions is voluntary. You do not have to answer questions you object to and you may end this screening at any time by telling me that you would like this screening to stop. We will not tell your partner if you choose to end this screening. Do you have any questions about this?

Before we ask you the questions to determine if your partner is eligible to participate, it is important for us to obtain your consent to ask questions about your background and your current relationship.

"Do I have your permission to ask you these questions?" Y N
(if no, stop here and thank them for their time)

"Are you in a private place and feel comfortable answering these questions at this time?"
Y N
(if no, ask them when would be a better time to call them back)

"Next I'm going to ask you about the quality of your relationship with your partner."

RELATIONSHIP ADJUSTMENT SCALE

How well does your partner meet your needs?

1	2	3	4	5
Poorly		Average		Extremely well

In general, how satisfied are you with your relationship?

1	2	3	4	5
Unsatisfied		Average		Extremely satisfied

How good is your relationship compared to most?

1	2	3	4	5
Poor		Average		Excellent

How often do you wish you hadn't gotten in this relationship?

1	2	3	4	5
Never		Average		Very often

To what extent has your relationship met your original expectations:

1	2	3	4	5
Hardly at all		Average		Completely

How much do you love your partner?

1	2	3	4	5
Not much		Average		Very much

How many problems are there in your relationship?

1	2	3	4	5
Very few		Average		Very many

"*Next, I need to ask you about how you and your partner handle disagreements.*"

RELATIONSHIP BEHAVIORS

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other, or just have spats or fights because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. Please tell me how many times you did each of these things in the past SIX months.

WHAT DID YOUR PARTNER DO TO YOU?

1. My partner showed s/he cared for me even though we disagreed. _____
2. My partner called me stupid, worthless, or ugly. _____
3. My partner twisted my arm or hair. _____
4. I had a sprain, bruise, or small cut because of a fight with my partner. _____
5. My partner showed respect for my feelings about an issue. _____
6. My partner pushed or shoved me. _____
7. My partner used a knife or gun on me. _____
8. My partner punched or hit me with something that could hurt. _____
9. My partner became angry enough to frighten me. _____
10. My partner choked me. _____
11. My partner used threats to make me have sexual relations. _____
12. My partner stood or hovered over me during a conflict or disagreement. _____
13. My partner pushed me against a wall. _____
14. My partner beat me up. _____
15. I needed to see a doctor because of a fight with my partner. _____
16. My partner slapped me. _____
17. My partner threatened to hit me. _____

Exclude if bold items total is two or greater.

WHAT DID YOU DO TO YOUR PARTNER?

17. I threatened to hit my partner. _____
18. I showed my partner I cared even though we disagreed. _____
19. I pushed or shoved my partner. _____
20. I called my partner stupid, worthless, or ugly. _____
21. My partner had a sprain, bruise, or small cut because of a fight with me. _____
22. I became angry enough to frighten my partner. _____
23. I showed respect for my partner's feeling about an issue. _____
24. I used a knife or gun on my partner. _____
25. I slapped my partner. _____
26. I choked my partner. _____
27. I used threats to make my partner have sexual relations. _____
28. I twisted my partner's arm or hair. _____
29. I beat up my partner. _____
30. I stood or hovered over my partner during a conflict or disagreement. _____
31. I punched or hit my partner with something that could hurt. _____
32. I pushed my partner against a wall. _____
33. My partner needed to see a doctor because of a fight with me. _____

At end of screening: "*[Name of individual], thank you for your patience – we appreciate your taking the time to answer these questions. That is all the questions I have for you at this time. I will contact your partner to let him/her know if he/she is eligible.*"

HELPS Brain Injury Screening Tool

HELPS BRAIN INJURY SCREENING TOOL

Consumer Information: _____

_____

_____

Agency/Screener's Information: _____

_____

H Have you ever **H**it your **H**ead or been **H**it on the **H**ead? ☐ Yes ☐ No

Note: Prompt client to think about all incidents that may have occurred at any age, even those that did not seem serious: vehicle accidents, falls, assault, abuse, sports, etc. Screen for domestic violence and child abuse, and also for service related injuries. A TBI can also occur from violent shaking of the head, such as being shaken as a baby or child.

E Were you ever seen in the **E**mergency room, hospital, or by a doctor because of an injury to your head? ☐ Yes ☐ No

Note: Many people are seen for treatment. However, there are those who cannot afford treatment, or who do not think they require medical attention.

L Did you ever **L**ose consciousness or experience a period of being dazed and confused because of an injury to your head? ☐ Yes ☐ No

Note: People with TBI may not lose consciousness but experience an "alteration of consciousness." This may include feeling dazed, confused, or disoriented at the time of the injury, or being unable to remember the events surrounding the injury.

P Do you experience any of these **P**roblems in your daily life since you hit your head? ☐ Yes ☐ No

Note: Ask your client if s/he experiences any of the following problems, and ask when the problem presented. You are looking for a combination of two or more problems that were not present prior to the injury.

- ☐ headaches
- ☐ dizziness
- ☐ anxiety
- ☐ depression
- ☐ difficulty concentrating
- ☐ difficulty remembering
- ☐ difficulty reading, writing, calculating
- ☐ poor problem solving
- ☐ difficulty performing your job/school work
- ☐ change in relationships with others
- ☐ poor judgment (being fired from job, arrests, fights)

S Any significant **S**icknesses? ☐ Yes ☐ No

Note: Traumatic brain injury implies a physical blow to the head, but acquired brain injury may also be caused by medical conditions, such as: brain tumor, meningitis, West Nile virus, stroke, seizures. Also screen for instances of oxygen deprivation such as following a heart attack, carbon monoxide poisoning, near drowning, or near suffocation.

Scoring the HELPS Screening Tool

A HELPS screening is considered positive for a *possible* TBI when the following 3 items are identified:

1.) An event that could have caused a brain injury (yes to H, E **or** S), **and**
2.) A period of loss of consciousness or altered consciousness after the injury or another indication that the injury was severe (yes to L or E), **and**
3.) The presence of two or more chronic problems listed under P that were not present before the injury.

Note:

- A positive screening is **not sufficient to diagnose TBI** as the reason for current symptoms and difficulties - other possible causes may need to be ruled out
- **Some individuals could present exceptions** to the screening results, such as people who do have TBI-related problems but answered "no" to some questions
- Consider positive responses within the context of the person's self-report and documentation of altered behavioral and/or cognitive functioning

The original HELPS TBI screening tool was developed by M. Picard, D. Scarisbrick, R. Paluck, 9/91, International Center for the Disabled, TBI-NET, U.S. Department of Education, Rehabilitation Services Administration, Grant #H128A00022. The Helps Tool was updated by project personnel to reflect recent recommendations by the CDC on the diagnosis of TBI. See http://www.cdc.gov/ncipc/pub-res/tbi_toolkit/physicians/mtbi/diagnosis.htm.

This document was supported in part by Grant 6 H21 MC 00039-03-01 from the Department of Health and Human Services (DHHS) Health Resources and Services Administration, Maternal and Child Bureau to the Michigan Department of Community Health. The contents are the sole responsibility of the authors and do not necessarily represent the official views of DHHS.

Edinburgh Handedness Questionnaire

Please indicate your preferences in the use of hands in the following activities *by putting a check in the appropriate column*. Where the preference is so strong that you would never try to use the other hand, unless absolutely forced to, *put 2 checks*. If in any case you are really indifferent, *put a check in both columns*.

Some of the activities listed below require the use of both hands. In these cases, the part of the task, or object, for which hand preference is wanted is indicated in parentheses.

Please try and answer all of the questions, and only leave a blank if you have no experience at all with the object or task.

	Left	Right
1. Writing	☐ ☐	☐ ☐
2. Drawing	☐ ☐	☐ ☐
3. Throwing	☐ ☐	☐ ☐
4. Scissors	☐ ☐	☐ ☐
5. Toothbrush	☐ ☐	☐ ☐
6. Knife (without fork)	☐ ☐	☐ ☐
7. Spoon	☐ ☐	☐ ☐
8. Broom (upper hand)	☐ ☐	☐ ☐
9. Striking Match (match)	☐ ☐	☐ ☐
10. Opening box (lid)	☐ ☐	☐ ☐
TOTAL(count checks in both columns)		

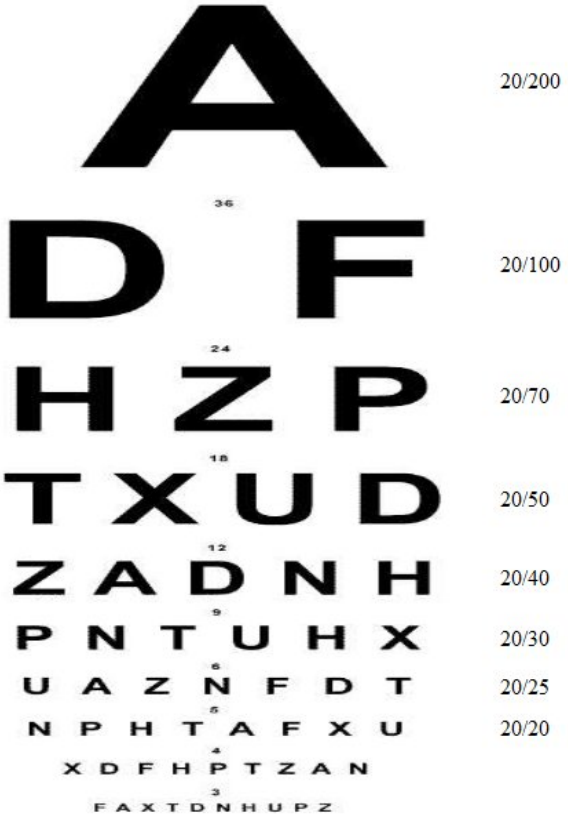
Difference	Cumulative TOTAL	Result

Auditory Acuity Test

Subject# _____ Gender M or F Date _____

Left Ear							dB	Right Ear						
~~250~~	500	~~1000~~	2000	4000	6000	~~8000~~		~~250~~	500	~~1000~~	2000	4000	6000	~~8000~~
							----------0----------							
							----------10----------							
							----------20----------							
							----------30----------							
							----------40----------							
							----------50----------							
							----------60----------							
							----------70----------							
							----------80----------							
							----------90----------							
							----------100----------							

Visual Acuity Test – Snellen Chart



Participant ID:		
Date:		
Color	Left eye	Right eye
	20/70	20/70
	20/60	20/60
	20/50	20/50
	20/40	20/40
	20/30	20/30
	20/20	20/20
	20/15	20/15
	20/13	20/13
	20/10	20/10
	20/7	20/7
	20/4	20/4
	Normal color	Red-green color blind

Appendix C

Study Informed Consent Form

University of Nebraska Lincoln

IRB#: 20120512549FB
Date Approved: 04/08/2013
Valid Until: 03/26/2014

Department of Psychology

INFORMED CONSENT FORM

Alcohol, Neurocognitive Processing, and Relationships

Purpose of the Research:

You are invited to participate in a research study investigating how alcohol use and neurocognitive processing may affect relationships. You were invited to participate because you have been in a committed heterosexual dating relationship for at least 1 month, are between the ages of 21 and 30, and are a social drinker (drink two or more alcoholic drinks twice a month).

Some of the questions may ask about sensitive information. Anyone in this study can choose to stop at any time for any reason, opt-out of any portion of the study, or choose not to participate at all.

Procedures:

If you agree to participate, the experimental portion of the study will take about 2 hours to complete. However, if you are assigned to the alcohol condition, you must stay at the location of the study until you reach a breath alcohol concentration (BAC) of .03% and pass a field sobriety test. The average sobriety period will be approximately 5 hours, though this could be longer in some people. You must remain in the lab until two separate readings on the breathalyzer indicate a level of .03% or lower and you pass a field sobriety test.

The study will take place in Nebraska Hall. Today, you will participate in the following procedures described below.

Screening Procedures

First, you will be asked to blow into a breathalyzer in order to ensure sobriety. If you have a positive BAC test, you will be given an opportunity to reschedule the study for another time. If you are a woman, you will be asked to complete a urine pregnancy test. If your test is positive, then you will not be able to participate in the rest of the study due to the harmful effects of alcohol consumption on fetuses. If you are a woman, you will also be asked if you are currently nursing. If you are nursing, you will not be able to participate in the rest of the study at this time.

Following the BAC and pregnancy tests, you will be asked to review the answers of your phone screen. To participate in the study you must ***NOT***: 1) be left-handed, 2) have current/past alcohol dependence, treatment, or hospitalization due to alcohol use, 3) be abstaining from alcohol use, 4) weigh over 250 pounds if you less than six feet or weigh over 300 pounds if you are over six feet, 5) have any past serious head injuries or lost consciousness for 20 minutes or longer, 6) have a learning disability, 7) have a condition or take any medication in which alcohol consumption would be harmful, 8) have a neurological disorder, 9) have a cochlear implant, 10) have significant hearing loss or other severe sensory impairment, 11) have a history of shrapnel or metal fragments in the eyes or skin, 12) have a neurostimulator, 13) have a fragile health condition (e.g., heart condition, auto-immune disorder, cancer, severe allergies), 14) have a history of seizures or current use of anticonvulsants, 15) currently use psychoactive medications, or 16) have any metal or electromagnetic implants. If you are eligible, you will be asked to proceed to the next part of the study.

Participant Initials _____

Experimental Procedures
First, you will be asked to complete a few questionnaires. These will ask questions about your demographics, relationship, and your emotions and behaviors.

Next, you will be randomly assigned to an alcohol or no-alcohol condition. If you are in the alcohol condition you will be asked to drink the equivalent of three to four alcoholic drinks. You will also be asked to listen and respond to audio-recorded scenarios involving various hypothetical dating situations that may cause you to feel frustrated or upset. Your verbal responses to the dating scenarios will be audio-recorded. While listening to the dating scenarios, you will also be asked to complete a simple computer task where you press a key each time you see a specific letter appear on the computer screen. While you complete this task, your brain responses will be measured using a computer and soft net of woven recording electrodes that will be placed on your scalp. The electrode net will be soaked in a mixture of water and saline (salt water) prior to application, and therefore your hair will become damp. After the electrode net is applied, two photographs will be taken of your scalp. These photographs will be used by the researchers to ensure appropriate placement of the electrodes on the scalp. Your face may be in the photos, but the images will not be released and your name will not be attached to them. You will also be asked to fill out a questionnaire about different relationship situations.

Risks and/or Discomforts:

It is possible that you might experience some discomfort (including feelings of anger and frustration) when answering questions about your relationship, or when listening and responding to the audio-recorded dating scenarios. You may refuse to answer the questions or stop at any time without penalty and for any reason.

Small to moderate doses of alcohol consumption may sometimes be associated with nausea, vomiting, headache, sadness, and mildly disinhibited behavior. There are also safety risks associated with allowing you to leave a study in a state of intoxication. For these reasons, the following are required for you to consent to the study. Specifically, if you consume alcohol, you agree to:

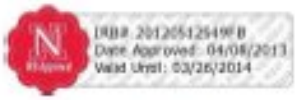
_____ (initial) Stay at the location of the study until you reach a BAC of .03% and pass a field sobriety test. You will not be allowed to leave until two separate readings on the breathalyzer indicate a level of .03% or lower and you pass a field sobriety test.

_____ (initial) Either have a friend pick you up from the study location or take a taxi that the study will provide.

_____ (initial) Refrain from consumption of alcohol or other drugs for 24 hours and to not operate dangerous equipment for 12 hours.

Despite all the precautions described above, there is still a small chance that you will have a negative physiological reaction following alcohol consumption. In the case of a non-emergency physiological reaction, you will be assisted in calling the University Health Center if you are a UNL student. If needed, you will be escorted to the campus Health Center. If you are not a UNL student, you will be assisted in calling _____ (please list preferred medical facility). If needed, _____ (please list family member or friend) will be called at _____ (phone number) to escort you to the medical facility listed above. If the physiological reaction is more serious or urgent, medical services will be called using 911. In the unlikely event that medical care is needed, you will be responsible for paying for any medical treatment received.

Participant Initials _____



There are no foreseeable risks associated with recording brain responses. The system used to record the brain responses is electrically isolated from you, eliminating the risk of any current flowing to you under all conditions, including a ground fault. In the event of a worst case equipment failure where you are grounded and current paths are reversed to move towards the participant, no current beyond point-2 (.2) microamps will pass to your body. This level is markedly lower than current hospital standards. Finally, all equipment is routinely checked for fault problems prior to each test session. Risk of infection should be eliminated through specific procedures that include washing all electrodes with soap and water five times immediately after testing and then soaking the electrode net in a cold sterilizing solution (Control III) to eliminate any contaminants that otherwise might pass from participant to participant. Following soaking, the electrodes are again washed in a fresh sterile solution and then air-dried before their next use.

If you wish to stop your participation in the study at any time, you may do so without harming your relationship with the researcher or with the university. In the event of problems resulting from participation in the study, psychological treatment is available at the UNL Psychological Consultation Center, (402) 472-2351, 325 Burnett Hall or the University Counseling and Psychological Services for UNL students, 15th & U Streets, (402) 472-7450.

Benefits:

Although there are no known direct benefits to you, this project may provide researchers with a better understanding of how alcohol and neurocognitive processing affect relationships.

Confidentiality:

Any identifying information (e.g., names) obtained during this study will be protected and will not be disclosed unless required by law or regulation. The responses you provide will be identified only by a randomly assigned participant identification number, which will not be linked to your name or the data you provide. Your name will be required so that you can be paid for your participation in the study. However, your name, which will appear on a copy of the participant receipt, will be kept separate from all study data (i.e., it cannot be used to link you to your responses) in a locked cabinet that only study personnel will have access to.

Any paper data will be stored in a locked cabinet in the principal investigator's office and will be kept for five years after the study is complete. Any computerized data that you provide will be stored without any identifying information on a password-protected computer. Only the researchers listed at the bottom of this form and study personnel will have access to your data. The knowledge gained from this study may be published in scientific journals or presented at scientific meetings, but it will be reported only as aggregate data.

Compensation:

You will receive $10 per hour for participating in this project. If you are excluded from the study after the screening procedures, you will receive $10. If you withdraw before completing all elements of the study, you will still receive compensation for your time.

Participant Initials _____

Opportunity to Ask Questions:

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study. You may contact the investigator, Rosy Maldonado, at anytime (402- 915-1702) to ask research-related questions. You may also contact the University of Nebraska – Lincoln Research Compliance Services at 402-472-6929 if you have any questions regarding your rights as a research participant.

Freedom to Withdraw:

Participation in this study is voluntary. You can refuse to participate or withdraw at any time without harming your relationship with the researchers or the University of Nebraska-Lincoln, or in any other way receive a penalty or loss of benefits to which you are otherwise entitled.

Consent, Right to Receive a Copy:

You are voluntarily making a decision whether or not to participate in this research study. Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this consent form to keep.

_____ Initial here if you agree to be audio-recorded while verbally responding to the dating scenarios.
(initial)

Signature of Participant:

_____
Name of Research Participant

_____ _____
Signature of Research Participant *Date*

Signature of Person Obtaining Consent

In my judgment, the participant is voluntarily and knowingly giving informed consent to participate in this research study.

_____ _____
Signature of Person Obtaining Consent *Date*

Names and Phone numbers of investigators

Rosy Maldonado, M.A., Principal Investigator	(402) 915-1702
David DiLillo, Ph.D., Secondary Investigator	(402) 472-3297

Participant Initials _____

Appendix D

Lab Tasks

Articulated Thoughts in Simulated Situations (ATSS) Materials

ATSS Task Instructions

In this study, we are interested in what people think. When people go about their daily affairs, being with others and doing different things, they talk to themselves.

We are going to ask you to listen to three scenarios and to imagine that you are in the situations being described. We want you to listen to these audio recorded situations and tune into what is running through your mind, and then to say these thoughts and feelings out loud. The microphone in front of you will pick up what you say. Each tape is divided into eight parts. At the end of each part, you will hear a tone followed by a pause of thirty seconds. During these 30 seconds, we want you to say out loud what was going through your mind as you were listening to the tape. Say as much as you can until you hear another tone. Talk out loud about your thoughts and feelings throughout the 30 second period, until you hear the next tone. That will signal that the story is about to continue.

There are no right or wrong answers, so please say whatever comes to your mind. Anything you say is appropriate. The more you say, the better. Imagine as clearly as you can that it is really you in each situation that you are listening to.

After answering any questions that you may have, we will start with a practice tape to help you understand the procedure. Then, you'll have a chance to ask questions about the procedure in case there is anything that is still unclear. Your name will not be connected to the taping that we do here, so your thoughts will be kept confidential.

Remember, at the end of each segment, say out loud whatever you are thinking and feeling, as frankly and as completely as you can. The experimenter will now see if you have any questions.

ATSS Male Scenarios - Content of Control Scenario

NARRATOR: "Settle back in your chair and close your eyes. Imagine that you and your girlfriend are out to dinner with another couple, Barbara and Jim Green. You and Jim have divided the bill and you are now paying the cashier. When you return to the table, you overhear the Greens excitedly start talking to your girlfriend about a new game they want the four of you to play when you get back to the Green's house. The voices you will hear are of Barbara and Jim.

(1) **Jim**: "I think you're going to love it. It takes skill, but there's luck in it too. You know, kind of like Monopoly.
Barbara: "Jim's right. It's a great game."
----------<30 SEC>----------
(2) **Barbara**: "I know you guys'll love it. We've been playing it every chance we get. Every time we play, it seems we learn new angles."
Jim: "Even our kids are catching on. Isn't that right Barbara?"
----------<30 SEC>----------
(3) **Jim**: "After we play for a few minutes you should catch on; most people get it real fast. We had some friends over last weekend who almost caught up to us in the first round."
Barbara: "Yeah, that was unbelievable, wasn't it Jim?"
----------<30 SEC>----------
(4) **NARRATOR**: "You return to their house and they explain the rules of the game. You all begin to play. You are having a little trouble keeping the rules and tactics straight, but your girlfriend has caught on and is playing enthusiastically. She is doing very well. Better than you are at this point."
----------<30 SEC>----------
(5) **Jim**: "Say, gang, let's put some more fun in this. What can we have riding on the outcome?"
Barbara: "How's about losers take winners out to dinner? Or something like that?"
----------<30 SEC>----------
(6) **NARRATOR**: "You have gone into the kitchen to get yourself a drink of water. While you are there you hear the Greens talking to your girlfriend."
Barbara: "Before we start another round let's add up the points so far. How's about making it boyfriend/girlfriend teams?"
----------<30 SEC>----------
(7) **Jim**: "I tell you, I really love this game. I think I could play every night if I had too."
Barbara: "Yeah, the way you've been winning tonight, I can see why."
----------<30 SEC>----------
(8) **NARRATOR**: "It has gotten quite late into the night. Barbara and Jim are still having a lot of fun, but you and your girlfriend were not planning on staying so late."
Jim: "Another great round, huh? Whoa, look at the clock; I guess time really flew. But the night's still young, right? How about one more round?"
Barbara: "Good idea, Jim, let's play again. This is so much fun, isn't it?"
----------<30 SEC>----------

ATSS Male Scenarios - Content of Jealousy 1 Scenario

NARRATOR: It's Friday and you've just gotten off from work. Usually, on Friday night you go out after work with the guys, not getting home until late at night. Tonight, however, you're not really up to going out and decide to go home instead. As you arrive home, you notice a strange car in the driveway. Entering your house quietly, you hear your girlfriend talking to a man you know in your living room. They are sitting next to each other on your sofa. They did not hear you come in and do not know that you are in the next room. You decide to keep yourself hidden and listen to their conversation. Listen now as your girlfriend is talking to a male acquaintance on your sofa. Remember, you have decided to *just listen* to your girlfriend and this man, and not interrupt their conversation. Listen in as your girlfriend and another man are talking.

(1) **Girlfriend**: "I'm so glad you came over tonight!"
Man: "Me too. So what would you like to do tonight? Go get some dinner? see a movie?
Girlfriend: "You know what I was thinking? It would be so much better if we could just stay in tonight. OK?"
----------<30 SEC>----------
(2) **Man**: "Does your boyfriend go out at night a lot?"
Girlfriend: "Every now and then ... gives me some time to think things out. You know -- my future, my plans, stuff like that"
Man: "Ever think about you and me?"
Girlfriend: "Hey! [coquettishly] Don't you know I'm a taken woman?!"
----------<30 SEC>----------
(3) **Man**: "Have I told you tonight how much I love that dress?"
Girlfriend: "Only about 12 times!"
Man: "I can't help it ... you just look so amazing! You know, you're making it hard for me to be a gentleman!"
Girlfriend: "So far you're doin' just fine"
----------<30 SEC>----------
(4) **Man**: "It's really nice of you to invite me over for dinner tonight."
Girlfriend: "I love to cook for someone who appreciates good food."
Man: "This is really great."
Girlfriend: "And I've got a "special" dessert planned for you too."
----------<30 SEC>----------
(5) **Girlfriend**: "Man, was it a rough day at work!"
Man: "Can I give you a backrub?"
Girlfriend: "Oh yeah -- that feels so good. Right there! I haven't felt this relaxed in a long time."
----------<30 SEC>----------
(6) **Girlfriend**: "Oh, will you hand me the T.V. Guide?"
Man: "Yeah, sure. So what's on tonight? How about a nice romantic movie?"
Girlfriend: "A romantic movie" What would YOU know about romance?"

Man: "I think I know a few things about that area."
Girlfriend: "Oh really?"
----------<30 SEC>----------
(7) **Girlfriend**: "Damn! I can't get this stupid DVD player to work!"
Man:"Here let me take a look at it. [pause] There we go -- all set!"
Girlfriend: "I swear... I've asked my boyfriend ten times to fix this thing. Thank god you're here tonight."
----------<30 SEC>----------
(8) **Girlfriend**: "Can I get you anything to drink? Beer, wine, soda, anything?"
Man: "Beer sounds good."
Girlfriend: "[sound of beer can opening] Here you are"
Man: "Thanks a lot. Boy, I wouldn't mind this kind of attention everyday!"
Girlfriend: "Yeah? Way my relationship is going who knows what will happen."
----------<30 SEC>----------

ATSS Male Scenarios - Content of Jealousy 2 Scenario

NARRATOR: You and your girlfriend go out to a bar on a Saturday night. You have had plans all week. Because of your work schedule, you and your girlfriend don't usually go out together. You arrive at the bar and proceed to the bar to get some drinks while your girlfriend finds a table. While ordering your drinks you notice a guy that you don't know start talking to your girlfriend. You see your girlfriend smile at him and realize they know each other. You decide to make yourself not easily seen and listen to what they are talking about before giving her a drink. Listen now as your girlfriend talks with the guy that you don't know.

(1) **Girlfriend**: "Hey, how are you tonight? I didn't know you would be here."
Man: "You know I come here every weekend. Who was that guy you came in with?"
Girlfriend: "My boyfriend."
Man: "Your boyfriend!?"
----------<30 SEC>----------
(2) **Man**: "That guy you were sitting with earlier!? That's your boyfriend?! Yeah, that's surprising. So how long have you guys been dating?
Girlfriend: "Ummm….Quite a while, almost a year."
Man: "Wow! You know, once you get past that year mark it's all downhill from there."
Girlfriend: "Well, not exactly downhill, but things have definitely changed."
----------<30 SEC>----------
(3) **Man**: "Anyway, what I wanted to tell you was that I'm having some people over to my place tomorrow
night. I thought you might like to come by."
Girlfriend: "Oh that sounds fun, but I think I have plans with my boyfriend tomorrow too. He took off the entire weekend so we could spend some time together.
Man: "Well, how about you tell him that you're going out with some of your girlfriends? I'd really like it if you could come to my party."
----------<30 SEC>----------
(4) **Girlfriend**: "Hmmm…that does sounds like a lot of fun!"
Man: "I promise you'll have a great time. It'll be our little secret"
Girlfriend: (giggles)
Man: "(whispers) Hey who knows, you might have so much fun that you'll want to be single again" (laughs)"
----------<30 SEC>----------
(5) **Girlfriend:** "No, I better not this time since my boyfriend already made plans for us. Thanks for the invitation though. Definitely call me for the next party though, ok?"
Man: "Yeah, ok. Well, how about we hang out next weekend, just the two of us? Your boyfriend can't take off every weekend." (Both laugh)
Girlfriend: "That does sound tempting. And I haven't been out on a *real* date in a long time."
----------<30 SEC>----------
(6) **Man**: "I see that smile. See you want to go out with me!"
Girlfriend: "(giggles) Yea…I kinda want to. But we can't tell anyone ok?"
Man: "Promise! My lips are sealed!"
----------<30 SEC>----------

(7) **Narrator**: You notice that this guy gets up from across the table and sits right next to your girlfriend. As he's talking to her you notice that he puts his hand on her shoulder while leaning in to tell her something. Your girlfriend starts giggling. You watch for a few minutes and notice that he is writing something on a coaster and giving it to your girlfriend.

----------<30 SEC>----------

(8) **Narrator:** You decide to approach the table where they are sitting. The guy sitting with your girlfriend notices you coming over and gets up from the table. As he walks by you, he says "oh hey" and smirks at your girlfriend as he says it to you.

----------<30 SEC>----------

ATSS Female Scenarios - Content of Control Scenario

NARRATOR: "Settle back in your chair and close your eyes. Imagine that you and your boyfriend are out to dinner with another couple, Barbara and Jim Green. Your boyfriend and Jim have divided the bill, and you excuse yourself to the restroom. When you return to the table, you overhear the Greens excitedly start talking to your boyfriend about a new game they want the four of you to play when you get back to the Greens' house. The voices you will hear are of Barbara and Jim."

(1) **Jim:** "I think you're going to love it. It takes skill, but there's luck in it too. You know, kind of like Monopoly.
Barbara: "Jim's right. It's a great game."
----------<30 SEC>----------
(2) **Barbara:** "I know you guys'll love it. We've been playing it every chance we get. Every time we play, it seems we learn new angles."
Jim: "Even our kids are catching on. Isn't that right Barbara?"
----------<30 SEC>----------
(3) **Jim** "After we play for a few minutes you should catch on; most people get it real fast. We had some friends over last weekend who almost caught up to us in the first round."
Barbara: "Yeah, that was unbelievable, wasn't it Jim?"
----------<30 SEC>----------
(4) **Narrator:** "You return to their house and they explain the rules of the game. You all begin to play. You are having a little trouble keeping the rules and tactics straight, but your boyfriend has caught on and is playing enthusiastically. He is doing very well. Better than you are at this point."
----------<30 SEC>----------
(5) **Jim:** "Say, gang, let's put some more fun in this. What can we have riding on the outcome?"
Barbara: "How's about losers take winners out to dinner? Or something like that?"
----------<30 SEC>----------
(6) **Narrator:** "You have gone into the kitchen to get yourself a drink of water. While you are there you hear the Greens talking to your boyfriend."
Barbara: "Before we start another round let's add up the points so far. How's about making it boyfriend/girlfriend teams?"
----------<30 SEC>----------
(7) **Jim:** "I tell you, I really love this game. I think I could play every night if I had too."
Barbara: "Yeah, the way you've been winning tonight, I can see why."
----------<30 SEC>----------
(8) **Narrator:** "It has gotten quite late into the night. Barbara and Jim are still having a lot of fun, but you and your boyfriend were not planning on staying so late."
Jim: "Another great round, huh? Whoa, look at the clock; I guess time really flew. But the night's still young, right? How about one more round?"
Barbara: "Good idea, Jim, let's play again. This is so much fun, isn't it?"
----------<30 SEC>----------

ATSS Female Scenarios - Content of Jealousy 1 Scenario

Narrator: It's Friday and you've just gotten off from work. Usually, on Friday night you go out after work with your friends, not getting home until late at night. Tonight, however, you're not really up to going out and decide to go home instead. As you arrive home, you notice a strange car in the driveway. Entering your house quietly, you hear your boyfriend talking to a woman you know in your living room. They are sitting next to each other on your sofa. They did not hear you come in and do not know that you are in the next room. You decide to keep yourself hidden and listen to their conversation. Listen now as your boyfriend is talking to a female acquaintance on your sofa. Remember, you have decided to *just listen* to your boyfriend and this woman, and not interrupt their conversation. Listen in as your boyfriend and another woman are talking.

(1) **Boyfriend:** "I'm so glad you came over tonight!"
Woman: "Me too. So what would you like to do tonight? Go get some dinner? See a movie?
Boyfriend: "You know what? Let's think of something we can do here tonight. Alright?"
----------<30 SEC>----------
(2) **Woman:** "So what time do I have to get out of here tonight?"
Boyfriend: "Don't worry. We've got plenty of time -- she usually doesn't get back 'til after midnight."
Woman: "Hmmm -- I've got some ideas about what we could do until then!"
Boyfriend: "I like a woman with a dirty mind!"
----------<30 SEC>----------
(3) **Woman:** "That's a great shirt you're wearing."
Boyfriend: "Yeah? You think so?"
Woman: "Definitely. It shows off your muscles."
Boyfriend: "That's a big compliment, coming from someone with a body like yours."
----------<30 SEC>----------
(4) **Woman:** "It's really nice of you to invite me over for dinner tonight."
Boyfriend: "It's a rare occasion that I have such a lovely guest."
Woman: "This is really great."
Boyfriend: "And I've got a 'special' dessert planned for you too."
----------<30 SEC>----------
(5) **Boyfriend:** "Man, was it a rough day at work!"
Woman: "Can I give you a backrub?"
Boyfriend: "Oh yeah -- that feels so good. Right there! I haven't felt this relaxed in a long time."
----------<30 SEC>----------
(6) **Woman:** "I picked us up a movie on my way over."
Boyfriend: "Let me see what you got… aw man, that's my favorite movie!"
Woman: "I know, that's why I picked it up."
Boyfriend: "Why can't my girlfriend remember stuff like that?"
----------<30 SEC>----------
(7) **Woman:** "I should be the one making you dinner since you fixed my car the other day."

Boyfriend: “”I didn’t want all those guys at the repair shop gawking at you. Besides, it’s another excuse to spend time with you.”
Woman: “Well, lucky for me then.”
----------<30 SEC>----------
(8) **Boyfriend:** “Can I get you anything to drink? Beer, wine, soda, anything?”
Woman: “Wine sounds good.”
Boyfriend: “There you go.”
Woman: “Thanks a lot. I could get used to this kind of attention everyday!”
Boyfriend: “Yeah? Well, who knows what will happen.”
----------<30 SEC>----------

ATSS Female Scenarios - Content of Jealousy 2 Scenario

NARRATOR: You and your boyfriend go out to a bar on a Saturday night. You have had plans all week. Because of your work schedule, you and your boyfriend don't usually go out together. You arrive at the bar and proceed to the bar to get some drinks while your boyfriend finds a table. While ordering your drinks you notice a woman that you don't know start talking to your boyfriend. You see your boyfriend smile at her and realize they know each other. You decide to make yourself not easily seen and listen to what they are talking about before giving him a drink. Listen now as your boyfriend talks with the woman that you don't know.

(1) **Boyfriend**: "Hey, how are you tonight? I didn't know you would be here."
Woman: "You know I come here every weekend. Who was that girl you came in with?"
Boyfriend: "My girlfriend."
Woman: "Your girlfriend!?"
----------<30 SEC>----------
(2) **Woman**: "That girl you were sitting with earlier!? That's your girlfriend?! Yeah, that's surprising. So how long have you guys been dating?
Boyfriend: "Ummm….Quite a while, almost a year."
Woman: "Wow! You know, once you get past that year mark it's all downhill from there."
Boyfriend: "Well, not exactly downhill, but things have definitely changed."
----------<30 SEC>----------
(3) **Woman**: "Anyway, what I wanted to tell you was that I'm having some people over to my place tomorrow
night. I thought you might like to come by."
Boyfriend: "Oh that sounds fun, but I think I have plans with my girlfriend tomorrow too. She took off the entire weekend so we could spend some time together.
Woman: "Well, how about you tell her that you're going out with some of your guy friends? I'd really like it if you could come to my party."
----------<30 SEC>----------
(4) **Boyfriend**: "Hmmm…that does sounds like a lot of fun!"
Woman: "I promise you'll have a great time. It'll be our little secret"
Boyfriend: (laughs)
Woman: "(whispers) Hey who knows, you might have so much fun that you'll want to be single again" (laughs)"
----------<30 SEC>----------
(5) **Boyfriend:** "No, I better not this time since my girlfriend already made plans for us. Thanks for the invitation though. Definitely call me for the next party though, ok?"
Woman: "Yeah, ok. Well, how about we hang out next weekend, just the two of us? Your girlfriend can't take off every weekend." (Both laugh)
Boyfriend: "That does sound tempting. And I haven't been out on a *fun* date in a long time."
----------<30 SEC>----------
(6) **Woman**: "I see that smile. See you want to go out with me!"
Boyfriend: "(laughs) Yea…I kinda want to. But we can't tell anyone ok?"

Woman: “Promise! My lips are sealed!”

----------<30 SEC>----------

(7) **Narrator**: You notice that this woman gets up from across the table and sits right next to your boyfriend. As she’s talking to him you notice that she puts her hand on his shoulder while leaning in to tell him something. Your boyfriend starts smiling and laughing. You watch for a few minutes and notice that she is writing something on a coaster and giving it to your boyfriend.

----------<30 SEC>----------

(8) **Narrator:** You decide to approach the table where they are sitting. The woman sitting with your boyfriend notices you coming over and gets up from the table. As she walks by you, she says “oh hey” and smirks at your boyfriend as she says it to you.

----------<30 SEC>----------

Visual Oddball Paradigm Instructions

While listening to each audio-recorded dating scenario, please keep your eyes on the dot in the middle of the computer screen (*point to dot in the middle of the screen*). Throughout the task, either an "X" or an "O" will be shown where this dot is. Please ignore all "X's," but press the spacebar each time you see an "O" appear on the computer screen.

Appendix E

Self-Report Measures

CTS2

CTS2

No matter how well a couple gets along, there are times when they disagree, get annoyed with the other person, want different things from each other or just have spats or fights because they are in a bad mood, are tired, or for some other reason. Couples also have many different ways of trying to settle their differences. This is a list of things that might happen when you have differences. Please circle how many times you did each of these things in the past six months, and how many times your partner did them in the past six months. If you or your partner did not do one of these things in the past six months, but it happened before that, circle "7".

HOW OFTEN DID THIS HAPPEN?

1 = Once in the past 6 months
2 = Twice in the past 6 mo.
3 = 3-5 times in the past 6 mo.
4 = 6–10 times in the past 6 mo.
5 = 11-20 times in the past 6 mo.
6 = More than 20 times in the past 6 mo.
7 = Not in the past 6 mo., but it did happen before
0 = This has never happened

1. I insulted or swore at my partner.	1	2	3	4	5	6	7	0
2. My partner did this to me.	1	2	3	4	5	6	7	0
3. I threw something at my partner that could hurt.	1	2	3	4	5	6	7	0
4. My partner did this to me.	1	2	3	4	5	6	7	0
5. I twisted my partner's arm or hair.	1	2	3	4	5	6	7	0
6. My partner did this to me.	1	2	3	4	5	6	7	0
7. I made my partner have sex without a condom.	1	2	3	4	5	6	7	0
8. My partner did this to me.	1	2	3	4	5	6	7	0
9. I pushed or shoved my partner.	1	2	3	4	5	6	7	0
10. My partner did this to me.	1	2	3	4	5	6	7	0
11. I used force (like hitting, holding down, or using a weapon) to make my partner have oral or anal sex with me.	1	2	3	4	5	6	7	0
12. My partner did this to me.	1	2	3	4	5	6	7	0
13. I used a knife or gun on my partner.	1	2	3	4	5	6	7	0
14. My partner did this to me.	1	2	3	4	5	6	7	0
15. I called my partner fat or ugly.	1	2	3	4	5	6	7	0
16. My partner called me fat or ugly.	1	2	3	4	5	6	7	0
17. I punched or hit my partner with something that could hurt.	1	2	3	4	5	6	7	0
18. My partner did this to me.	1	2	3	4	5	6	7	0
19. I destroyed something belonging to my partner.	1	2	3	4	5	6	7	0
20. My partner did this to me.	1	2	3	4	5	6	7	0
21. I choked my partner.	1	2	3	4	5	6	7	0

22. My partner did this to me.	1	2	3	4	5	6	7	0
23. I shouted or yelled at my partner.	1	2	3	4	5	6	7	0
24. My partner did this to me.	1	2	3	4	5	6	7	0
25. I slammed my partner against a wall.	1	2	3	4	5	6	7	0
26. My partner did this to me.	1	2	3	4	5	6	7	0
27. I beat up my partner.	1	2	3	4	5	6	7	0
28. My partner did this to me.	1	2	3	4	5	6	7	0
29. I grabbed my partner.	1	2	3	4	5	6	7	0
30. My partner did this to me.	1	2	3	4	5	6	7	0
31. I used force (like hitting holding down, or using a weapon) to make my partner have sex with me.	1	2	3	4	5	6	7	0
32. My partner did this to me.	1	2	3	4	5	6	7	0
33. I stomped out of the room, house, or yard during a disagreement.	1	2	3	4	5	6	7	0
34. My partner did this to me.	1	2	3	4	5	6	7	0
35. I insisted on sex when my partner didn't want to (but did not use physical force).	1	2	3	4	5	6	7	0
36. My partner did this to me.	1	2	3	4	5	6	7	0
37. I slapped my partner.	1	2	3	4	5	6	7	0
38. My partner did this to me.	1	2	3	4	5	6	7	0
39. I used threats to make my partner have oral or anal sex.	1	2	3	4	5	6	7	0
40. My partner did this to me.	1	2	3	4	5	6	7	0
41. I burned or scalded my partner on purpose.	1	2	3	4	5	6	7	0
42. My partner did this to me.	1	2	3	4	5	6	7	0
43. I insisted that my partner have oral or anal sex (but did not use physical force).	1	2	3	4	5	6	7	0
44. My partner did this to me.	1	2	3	4	5	6	7	0
45. I accused my partner of being a lousy lover.	1	2	3	4	5	6	7	0
46. My partner accused me of this.	1	2	3	4	5	6	7	0
47. I did something to spite my partner.	1	2	3	4	5	6	7	0
48. My partner did this to me.	1	2	3	4	5	6	7	0
49. I threatened to hit or throw something at my partner.	1	2	3	4	5	6	7	0
50. My partner did this to me.	1	2	3	4	5	6	7	0
51. I kicked my partner.	1	2	3	4	5	6	7	0
52. My partner did this to me.	1	2	3	4	5	6	7	0
53. I used threats to make my partner have sex.	1	2	3	4	5	6	7	0
54. My partner did this to me.	1	2	3	4	5	6	7	0

MRS

Directions: This scale consists of a number of words that describe different feelings and emotions. Indicated to what extent you feel this way RIGHT NOW.

Use the following scale to record your answers.

(1) = Very slightly or not at all
(2) = A little
(3) = Moderately
(4) = Quite a bit
(5) = Extremely

	Please circle one:				
1. Cheerful	1	2	3	4	5
2. Disgusted	1	2	3	4	5
3. Relaxed	1	2	3	4	5
4. Irritable	1	2	3	4	5
5. Angry	1	2	3	4	5
6. Enthusiastic	1	2	3	4	5
7. Anxious	1	2	3	4	5
8. Upset	1	2	3	4	5
9. Happy	1	2	3	4	5
10. Hostile	1	2	3	4	5
11. Nervous	1	2	3	4	5
12. Calm	1	2	3	4	5
13. Annoyed	1	2	3	4	5
14. Creative	1	2	3	4	5
15. Distressed	1	2	3	4	5
16. Jealous	1	2	3	4	5

Demographics

1. What is your sex?
   1 = Female
   2 = Male

2. What is your age (in years)? _____

3. Years of Education including kindergarten: _____

4. What is your ethnicity?
   1 = White/Caucasian
   2 = Hispanic/Latino
   3 = African American
   4 = Asian/Pacific Islander
   5 = Native American/Alaskan Native
   6 = Other, please specify _____

5. Please indicate your sexual preference:

   ____ I prefer to date men.
   ____ I prefer to date women.
   ____ I prefer to date both men and women.

6. How long have you and your partner been dating (in months)? _____

7. How would you describe your relationship with your partner?
   1 = Dating
   2 = Dating and living together
   3 = Engaged
   4 = Married

8. YOUR average yearly income if you support yourself or your parents' average yearly income if they support you (please check one).

   ___ $0-$5,000
   ___ $5,000-$10,000
   ___ $10,000-$20,000
   ___ $20,000-$30,000
   ___ $30,000-$40,000
   ____ $40,000-$50,000
   ____ $50,000-$60,000
   ____ $60,000-$70,000
   ____ $70,000+

Perceived Level of Drunkenness

1. On a scale of 1 through 10, where 1 equals “not drunk at all,” 5 equals “moderately drunk,” and 10 equals “the most drunk I’ve ever been”, how drunk are you right now?

Comprehensive Effects of Alcohol (CEOA)

This questionnaire assesses what you would expect to happen if you were under the influence of alcohol. Mark a response from (1) for disagree to (4) for agree, depending on whether or not you would expect the effect to happen to you if you were under the influence of alcohol. These effects will vary, depending upon the amount of alcohol you typically consume.

This is not a personality assessment. We want to know what you would expect to happen if you were to drink alcohol, not how you are when you are sober. Example: If you are always emotional, you would not mark agree as your answer for the statement "I would be emotional" unless you expected to become more emotional if you drank.

Please place an 'X' in the appropriate box.

If I were under the influence of alcohol:

1. I would be outgoing.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

2. My sense would be dulled.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

3. I would be humorous.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

4. My problems would seem worse.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

5. It would be easier to express my feelings.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

6. My writing would be impaired.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

7. I would feel sexy.

_____	_____	_____	_____
Disagree	Slightly disagree	Slightly agree	Agree

8. I would have difficulty thinking.

Disagree	Slightly disagree	Slightly agree	Agree

9. I would neglect my obligations.

Disagree	Slightly disagree	Slightly agree	Agree

10. I would be dominant.

Disagree	Slightly disagree	Slightly agree	Agree

11. My head would feel fuzzy.

Disagree	Slightly disagree	Slightly agree	Agree

12. I would enjoy sex more.

Disagree	Slightly disagree	Slightly agree	Agree

13. I would feel dizzy.

Disagree	Slightly disagree	Slightly agree	Agree

14. I would be friendly.

Disagree	Slightly disagree	Slightly agree	Agree

15. I would be clumsy.

Disagree	Slightly disagree	Slightly agree	Agree

16. It would be easier to act out my fantasies.

Disagree	Slightly disagree	Slightly agree	Agree

17. I would be loud, boisterous, or noisy.

Disagree	Slightly disagree	Slightly agree	Agree

18. I would feel peaceful.

Disagree	Slightly disagree	Slightly agree	Agree

19. I would be brave and daring.

Disagree	Slightly disagree	Slightly agree	Agree

20. I would feel unafraid.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

21. I would feed creative.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

22. I would be courageous.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

23. I would feel shaky or jittery the next day.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

24. I would feel energetic.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

25. I would act aggressively.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

26. My responses would be slow.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

27. My body would be relaxed.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

28. I would feel guilty.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

29. I would feel calm.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

30. I would feel moody.

_____ Disagree	_____ Slightly disagree	_____ Slightly agree	_____ Agree

31. It would be easier to talk to people.

Disagree	Slightly disagree	Slightly agree	Agree

32. I would be a better lover.

Disagree	Slightly disagree	Slightly agree	Agree

33. I would fee self-critical

Disagree	Slightly disagree	Slightly agree	Agree

34. I would be talkative.

Disagree	Slightly disagree	Slightly agree	Agree

35. I would act tough.

Disagree	Slightly disagree	Slightly agree	Agree

36. I would take risks

Disagree	Slightly disagree	Slightly agree	Agree

37. I would feel powerful

Disagree	Slightly disagree	Slightly agree	Agree

38. I would act sociable.

Disagree	Slightly disagree	Slightly agree	Agree

The next part of the questionnaire assesses whether you think each effect, which may result from drinking alcohol, is bad or good.

Mark an 'X' in the box which corresponds to number 1 for bad to 5 for good depending on whether you think this particular effect is bad, neutral, or good, etc. we want to know if you think a particular effect is bad or good, REGARDLESS of whether you expect it to happen to you personally when you drink alcohol.

This effect of alcohol is:

1. Being outgoing

Bad	Slightly bad	Neutral	Slightly good	Good

2. Dulled senses

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

3. Being humorous

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

4. Problems seeming worse

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

5. Expressing feelings more easily

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

6. Impaired writing

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

7. Feeling sexy

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

8. Having difficulty thinking

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

9. Neglecting obligations

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

10. Being dominant

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

11. Head feeling fuzzy

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

12. Enjoying sex more

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

13. Feeling dizzy

_____	_____	_____	_____	_____

Bad	Slightly bad	Neutral	Slightly good	Good

14. Being friendly

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

15. Being clumsy

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

16. Easier to act out fantasies

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

17. Being loud, boisterous, or noisy

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

18. Feeling peaceful

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

19. Being brave and daring

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

20. Feeling unafraid

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

21. Feeling creative

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

22. Being courageous

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

23. Feeling shaky or jittery the next day

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

24. Feeling energetic

_____ Bad	_____ Slightly bad	_____ Neutral	_____ Slightly good	_____ Good

25. Acting aggressively

Bad	Slightly bad	Neutral	Slightly good	Good

26. Having slow responses

Bad	Slightly bad	Neutral	Slightly good	Good

27. Having a relaxed body

Bad	Slightly bad	Neutral	Slightly good	Good

28. Feeling guilty

Bad	Slightly bad	Neutral	Slightly good	Good

29. Feeling calm

Bad	Slightly bad	Neutral	Slightly good	Good

30. Feeling moody

Bad	Slightly bad	Neutral	Slightly good	Good

31. Being easier to talk to people

Bad	Slightly bad	Neutral	Slightly good	Good

32. Being a better lover

Bad	Slightly bad	Neutral	Slightly good	Good

33. Feeling self-critical

Bad	Slightly bad	Neutral	Slightly good	Good

34. Being talkative

Bad	Slightly bad	Neutral	Slightly good	Good

35. Acting tough

Bad	Slightly bad	Neutral	Slightly good	Good

36. Taking risks

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

37. Feeling powerful

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

38. Acting sociable

_____	_____	_____	_____	_____
Bad	Slightly bad	Neutral	Slightly good	Good

Appendix F

Study Debriefing Form

Alcohol, Neurocognitive Processing, and Relationships
Debriefing Form

Thank you for participating in the Alcohol, Neurocognitive Processing, and Relationships study!
The goal of this study was to examine the influence of alcohol consumption and neurocognitive processing on the verbalizations you made in response to the audio recorded dating scenarios.

Prior to listening and responding to the imaginary dating scenarios, you either received an alcoholic beverage (approximately 3 to 4 mixed drinks at a bar) or a placebo beverage (the rim of the glass was sprayed with alcohol). While you were listening to the dating scenarios, you also completed a task where you were asked to press a key when you saw an "o" appear on the screen. During these tasks, your electrical brain activity was recorded. We are interested in whether alcohol consumption affect's one's electrical brain activity and/or one's verbal responses during the imaginary dating scenarios.

Second, we are interested in how past life events and current events affect your reactions and responses to dating situations.

Finally, because the study depends on people not knowing about the study prior to participating, we ask that you please refrain from discussing the study with others.

If you experience any distress after you leave the study, there are two mental health facilities you can contact: the UNL Psychological Consultation Center, 325 Burnett Hall, telephone (402) 472-2351, which offers affordable services based on a sliding fee scale; and the University Counseling and Psychological Services, 15th & U, telephone (402) 472-7450, which offers three free clinic visits to UNL students enrolled in more than seven credits.

If you have questions and/or concerns about this study, you may contact the principal investigator, Rosy Maldonado, at (402) 915-1702 or rosymal@gmail.com.

Thank you!

Appendix G

Field Sobriety Test

Standardized Field Sobriety Testing

The Standardized Field Sobriety Test (SFST) is a battery of three tests administered and evaluated in a standardized manner to obtain validated indicators of impairment and establish probable cause for arrest. These tests were developed as a result of research sponsored by the National Highway Traffic Safety Administration (NHTSA) and conducted by the Southern California Research Institute. A formal program of training was developed and is available through NHTSA to help law enforcement officers become more skillful at detecting DWI suspects, describing the behavior of these suspects, and presenting effective testimony in court. Formal administration and accreditation of the program is provided through the International Association of Chiefs of Police (IACP). The three tests of the SFST are:

- Horizontal Gaze Nystagmus (HGN),
- Walk-and-Turn (WAT),
- and One-Leg Stand (OLS).

These tests are administered systematically and are evaluated according to measured responses of the suspect.

HGN Testing

Horizontal Gaze Nystagmus is an involuntary jerking of the eye that occurs naturally as the eyes gaze to the side. Under normal circumstances, nystagmus occurs when the eyes are rotated at high peripheral angles. However, when a person is impaired by alcohol, nystagmus is exaggerated and may occur at lesser angles. An alcohol-impaired person will also often have difficulty smoothly tracking a moving object. In the HGN test, the officer observes the eyes of a suspect as the suspect follows a slowly moving object such as a pen or small flashlight, horizontally with his or her eyes. The examiner looks for three indicators of impairment in each eye: if the eye cannot follow a moving object smoothly, if jerking is distinct when the eye is at maximum deviation, and if the angle of onset of jerking is within 45 degrees of center. If, between the two eyes, four or more clues appear, the suspect likely has a BAC of 0.08 or greater. NHTSA research found that this test allows proper classification of approximately 88 percent of suspects (Stuster and Burns, 1998). HGN may also indicate consumption of seizure medications, phencyclidine, a variety of inhalants, barbiturates, and other depressants.

Walk and Turn

The Walk-and-Turn test and One-Leg Stand test are "divided attention" tests that are easily performed by most unimpaired people. They require a suspect to listen to and follow instructions while performing simple physical movements. Impaired persons have difficulty with tasks requiring their attention to be divided between simple mental and physical exercises.

In the Walk-and-Turn test, the subject is directed to take nine steps, heel-to-toe, along a straight line. After taking the steps, the suspect must turn on one foot and return in the same manner in the opposite direction. The examiner looks for eight indicators of impairment: if the suspect cannot keep balance while listening to the instructions, begins before the instructions are finished, stops while walking to regain balance, does not touch heel-to-toe, steps off the line, uses arms to balance, makes an improper turn, or takes an incorrect number of steps. NHTSA research indicates that 79 percent of individuals who exhibit two or more indicators in the performance of the test will have a BAC of 0.08 or greater (Stuster and Burns, 1998).

One Leg Stand

In the One-Leg Stand test, the suspect is instructed to stand with one foot approximately six inches off the ground and count aloud by thousands (One thousand-one, one thousand-two, etc.) until told to put the foot down. The officer times the subject for 30 seconds. The officer looks for four indicators of impairment, including swaying while balancing, using arms to balance, hopping to maintain balance, and putting the foot down. NHTSA research indicates that 83 percent of individuals who exhibit two or more such indicators in the performance of the test will have a BAC of 0.08 of greater (Stuster and Burns, 1998).

Combined Measures

When the component tests of the SFST battery are combined, officers are accurate in 91 percent of cases, overall, and in 94 percent of cases if explanations for some of the false positives are accepted (Stuster and Burns, 1998).

The original NHTSA research found different accuracies for the SFST Battery than reported in the more recent study. Tharp, Burns, and Moskowitz (1981) reported accuracies of 77 percent for the HGN, 68 percent for the Walk and Turn, and 65 percent for the One Leg Stand components; 81 percent of officers' arrest decisions at 0.10 BAC were correct when all three measures were combined. In contrast, Stuster and Burns (1998) found greater accuracies in making arrest decisions on the basis of SFST results in their study at 0.08 percent BAC, as described previously and summarized in the following table.

Participant ID # _____ Date: _____

Field Sobriety Test

Horizontal Gaze Nystagmus (HGN)

Right eye does not follow moving object smoothly	Yes	No
Left eye does not follow moving object smoothly	Yes	No
Right: jerking distinct when eye at max deviation	Yes	No
Left: jerking distinct when eye at max deviation	Yes	No
Right: angle of onset of jerking is within 45 degrees of center	Yes	No
Left: angle of onset of jerking is within 45 degrees of center	Yes	No

Walk and Turn

Did not keep balance while listening to the instructions	Yes	No
Began before the instructions were finished	Yes	No
Stopped while walking to regain balance	Yes	No
Did not touch heel-to-toe	Yes	No
Stepped off the line	Yes	No
Used arms to balance	Yes	No
Made an improper turn	Yes	No
Took an incorrect number of steps	Yes	No

One Leg Stand

Swayed while balancing	Yes	No
Used arms to balance	Yes	No
Hopped to maintain balance	Yes	No
Put the foot down	Yes	No

Finger to Nose (if participant is in wheelchair)

Right Hand (circle one)

Right on Touched but off Face Ear Missed head

Left Hand (circle one)

Right on Touched but off Face Ear Missed head

Numbers Backward Testing (if participant is in wheelchair)

"Count back from 100 by 5 until I say stop."

100 ___ 95___ 90___ 85___ 80___

75___ 70___