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The Effect of Alcohol Outcome Expectancies on the Relationship of Social Anxiety and Desirability of Alcohol

The Effect of Alcohol Outcome Expectancies on the Relationship of Social Anxiety and Desirability of Alcohol

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Psychology

by

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Abstract

The comorbidity of social anxiety disorder and alcohol use disorders is well-documented in the research literature. However, conflicting findings have been noted in cross-sectional investigations of this link; some studies indicate that individuals with social anxiety disorder are more likely to engage in problematic alcohol use, while others suggest that social anxiety may serve as a protective factor against heavy drinking. Alcohol outcome expectancies (AOEs), the beliefs one holds about the effects of alcohol consumption, have been identified as an important variable in the consideration of the social anxiety-alcohol use link. The current study tested the effect of an expectancy generation task for social, positive, and negative AOEs and social anxiety level on alcohol desirability among 299 college students (mean age 19.30 [*SD* =1.40]; 58.9% women) who completed an online study. No significant differences in alcohol desirability were noted between the AOE conditions or high and low social anxiety groups. However, sex, baseline desire for alcohol, quantity and frequency of alcohol use, and participants' endorsement of AOEs were associated with alcohol desirability, consistent with the research literature. While the expectancy generation task failed to affect participant reports of alcohol desirability, the results of the current study support the use of the alcohol desirability measures in assessing level of desire to consume alcohol.

Acknowledgments

I would like to especially thank Dr. Lindsay S. Ham for her scientific, clinical, professional, and personal mentorship, encouragement, and continual good humor. Special thanks are also due to dissertation committee members Dr. Matthew Feldner and Dr. Ellen Leen-Feldner, and the entire faculty of the Department of Psychological Science, for their dedication to excellent graduate student training.

Dedication

This dissertation is dedicated to my husband, Matthew Casner, without whose tireless physical, mental, and emotional support none of this would have been possible.

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The Effect of Alcohol Outcome Expectancies on the Relationship of Social Anxiety and Desirability of Alcohol

Symptoms of social anxiety and alcohol use are often comorbid and prospective studies have determined that social anxiety can contribute to the development of alcohol use disorders (Buckner & Schmidt, 2009; Buckner & Turner, 2009). One step in understanding this overlap is to identify the cognitive process that takes place prior to choosing to engage in alcohol use. Alcohol outcome expectancies (AOEs) have been identified as one such variable that contributes to the decision to use alcohol (Goldman, Del Boca, & Darkes, 1999; Patel & Fromme, 2011). Up to this point, many correlational studies have been conducted that investigated the relationships between social anxiety, alcohol use, and expectancies, but little experimental research exists in the literature to assist in identifying causal relationships among these variables. The purpose of the current study was to experimentally investigate the interrelations of social anxiety and AOEs in determining desire to consume alcohol.

Social Anxiety and Alcohol Use

Feelings of social anxiety are often adaptive in that the emotion serves to draw attention to a social situation that may have positive or negative consequences for the individual. A common example is a feeling of nervousness on a first date. This anxiety, if occurring at tolerable levels, will likely prompt the individual to take special care with their appearance and behavior so as to make a positive impression on their date, and these actions help tip the odds in favor of success in developing a relationship. Mild or situation-specific social anxiety may cause an individual to experience uncomfortable nervousness at parties where they know few people, or sweating and shaking during a formal presentation, for example. While uncomfortable at the time, if the distress experienced is low and the anxiety passes as the

individual becomes more comfortable in the situation, these levels of social anxiety are unlikely to result in significant problems in daily living. At moderate to severe levels of social anxiety, an individual may avoid many social situations, leading to impairment in daily functioning, or suffer a distressing level of fear, resulting in significant symptoms of anxiety and even situation-bound panic attacks. A moderate to severe level of social anxiety that causes clinically significant distress or impairments in daily functioning are often indicative of social anxiety disorder.

Social anxiety disorder is one of the most common anxiety disorders, with lifetime prevalence rates reaching 12.1% in one U.S. epidemiological study (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Kessler, Chiu, Demler, & Walters, 2005). The clinical syndrome of social anxiety disorder is associated with disruption and impairment in multiple areas of functioning, resulting in a lack of social support and reduced educational and occupational attainment (Book & Randall, 2002). Impairment in functioning is heightened when additional diagnoses are present. A comorbid diagnosis of alcohol dependence is common in adults with social anxiety disorder; 48% of individuals with a lifetime diagnosis of social anxiety disorder also meet criteria for an alcohol use disorder at some point in their lives (Grant et al., 2005).

Researchers and clinicians alike have proposed that social anxiety disorder may play a causal role in the development of alcohol use disorders. Indeed, sub-clinical levels of social anxiety and social anxiety disorder have been identified as specific risk factors for the development of alcohol use disorders in prospective longitudinal studies (Buckner & Schmidt, 2009; Buckner & Turner, 2009). Buckner and Schmidt (2009) examined both social interaction anxiety and fear of being scrutinized and evaluated. These two forms of social anxiety may

occur together, or an individual may experience only a fear of interacting with others or being evaluated (e.g., Mattick & Clarke, 1998). The researchers found that fear of being scrutinized, not fear of social interactions, predicted the development of alcohol use disorders (Buckner & Schmidt, 2009). Based on these findings, it appears that levels of social anxiety that are sufficiently high to warrant a diagnosis of social anxiety disorder play a causal role in comorbid social anxiety disorder and alcohol dependence.

While social anxiety disorder may directly confer risk for later development of an alcohol use disorder, the relationship of subclinical social anxiety or social anxiety disorder and current alcohol use variables is unclear. The relation of social anxiety and alcohol use, particularly among college students, has been the subject of much study in recent years. Some studies have revealed that as levels of social anxiety increased, alcohol consumption and problematic alcohol use likewise increased (Buckner, Schmidt, & Eggleston, 2006; Kidorf & Lang, 1999; Lewis & O'Neill, 2000). However, other researchers have found a negative association between social anxiety and alcohol use, such that higher social anxiety predicted lower alcohol consumption (Eggleston, Woolaway-Bickel, & Schmidt, 2004; Ham, Bonin, & Hope, 2007; Ham & Hope, 2005). Finally, further confusing the issue, some have found no relation between social anxiety and alcohol use (Ham & Hope, 2006; Ham, Hope, White, & Rivers, 2002) or problems due to alcohol use (Ham et al., 2007). In attempting to explain these findings, researchers have proposed that other variables likely contribute to the relation of social anxiety and alcohol use, including AOEs.

Alcohol Outcome Expectancies

AOEs are based on one's knowledge of and experiences with the effects of alcohol (Goldman et al., 1999; Patel & Fromme, 2011). Based on this information, individuals develop

specific behavioral, cognitive, and affective expectations about the consequences of alcohol use, which are all encoded closely together in memory (Kramer & Goldman, 2003; Stacy, 1995). A given stimulus, such as a fraternity party, lousy day, or romantic date, increases the likelihood of a response, such as drinking to enjoy the party, improve the bad day, or calm one's nerves, if one has reason to believe that such effects will occur (Bolles, 1972). Indeed, research indicates that manipulation of AOEs outside of participants' conscious awareness will impact the likelihood of drinking (Carter, McNair, Corbin, & Black, 1998; Friedman, McCarthy, Pedersen, & Hicks, 2009; Fromme & Dunn, 1992; Roehrich & Goldman, 1995; Stein, Goldman, & Del Boca, 2000). Theoretically, negative expectancies should inhibit alcohol consumption, as the drinker expects an aversive outcome, while positive expectancies should facilitate drinking, due to expectations of enjoyable outcomes (Patel & Fromme, 2011). In support of this assumption, studies report strong, positive associations between self-reported positive expectancies and alcohol use (Armeli, Todd, & Mohr, 2005; Cooper, Russell, & Frone, 1990; Reis & Trockel, 2003; Stacy, Widaman, & Marlatt, 1990), but the relation between negative expectancies and drinking is more complex. Some studies report negative associations between negative expectancies and drinking (Leigh & Stacy, 1993; Stacy et al., 1990; Valdivia & Stewart, 2005; Werner, Walker, & Greene, 1995), while others report positive relations or no relation at all (Fromme, Stroot, & Kaplan, 1993; Ham & Hope, 2006; Ham, Carrigan, Moak, & Randall, 2005; Zamboanga & Ham, 2008). Nicolai, Demmel, and Moshagen (2010) found that negative AOEs were unrelated to frequency of drinking occasions and amount consumed during drinking for alcohol dependent individuals. It may be the case that more frequent drinkers endorse both positive and negative AOEs due to a wider variety of experiences with alcohol, leading to positive or null associations for heavy-drinking samples.

Consideration of specific AOEs may assist researchers in understanding the role expectancies play in the social anxiety-alcohol use relation. Burke and Stephens (1999) proposed in their review of the available literature that expectancies related to social functioning and anxiety reduction moderate the relationship between social anxiety and drinking in college students. Indeed, research indicates that expectancies related to sociability, assertiveness, and increased confidence are consistently positively related to social anxiety (Carrigan, Ham, Thomas, & Randall, 2008; Eggleston et al., 2004; Ham et al., 2002; 2005; Ham, Zamboanga, Olthuis, Casner, & Bui, 2010; O'Hare, 1990; Tran & Haaga, 2002), and may act as moderators in the relation of social anxiety and alcohol use (Gilles, Turk, & Fresco, 2006; Tran, Haaga, & Chambless, 1997). In addition, expectancies related to alleviation of negative emotion, tension reduction, and relaxation are often positively associated with social anxiety (Carrigan et al., 2008; O'Hare, 1990; Tran & Haaga, 2002), though some studies found no relation between social anxiety and tension reduction expectancies (Ham, 2009; Ham et al., 2005; Tran et al., 1997).

Few experimental studies incorporating the examination of AOEs in the social anxiety-alcohol use link among college students have been conducted. Those including expectancies did not specifically manipulate the accessibility of expectancies per se; rather, these studies manipulated other factors and assessed the relation of self-reports of expectancies to other study variables. The first incorporated two laboratory sessions: a baseline session in which participants completed questionnaires and consumed a large glass of their preferred alcoholic beverage at their own pace, and a second session on a later date that incorporated a social anxiety manipulation (Kidorf & Lang, 1999). During the second session, participants were informed they would be taped while giving a speech about their most undesirable characteristic and that

the tape would later be rated by faculty members and students. Before the speech, participants were given an opportunity to consume the same type of alcoholic beverage as in the first session; the dependent variable was the difference between the amount of alcohol consumed in the first and second sessions. Results showed that participants consumed more alcohol in the speech session than in the control session. Those with high trait social anxiety and men, but not women, who held greater social assertiveness expectancies consumed the most alcohol in the speech session relative to the amount they consumed in the control session.

The second study of expectancies in the social-anxiety alcohol use link included a sample of participants with social anxiety disorder (Abrams & Kushner, 2004). After a speech task, participants were allowed to drink as little or as much as they wished of either a placebo beverage that they were told contained alcohol or a control beverage that they knew did not contain alcohol prior to a second speech task. The researchers found that men (but not women) with social anxiety disorder who were in the placebo condition and who reported relatively stronger tension reduction expectancies experienced a greater reduction in mental distress and fear of negative evaluation compared to men who reported weaker tension reduction expectancies. Taken together, the findings of Kidorf and Lang (1999) and Abrams and Kushner (2004) provide support for the role of social facilitation and tension reduction expectancies in the social anxiety-alcohol use association among college students in laboratory-based studies.

While no experimental studies investigating the social anxiety-alcohol use link to date have directly manipulated expectancies, researchers have conducted studies with non-selected college student participants in which AOEs have been directly manipulated through a variety of means (e.g., Goldstein, Wall, McKee, & Hinson, 2004; Wall, McKee, Hinson, and Goldstein, 2001). Some of these studies also examined subsequent drinking behavior in a laboratory setting

(Carter et al., 1998; Friedman et al., 2009; Roehrich and Goldman (1995)). These studies have focused on identifying methods to bring positive or negative effects of alcohol into the unconscious without participants' awareness that their expectations about the effects of alcohol were manipulated, and then examining the resulting effects on alcohol consumption in a controlled environment. Such studies feature the AOE manipulation first, followed by an alcohol "taste task" that participants are led to believe is unrelated to the initial portion of the study. Participants unfamiliar with such paradigms are unlikely to be aware of a connection between the two parts of the study until they have been debriefed. Thus, participants' alcohol consumption behavior as a result of AOE manipulation can be observed first-hand in a laboratory setting rather than reported retrospectively.

A variety of AOE manipulation methods have been developed and utilized in well-controlled experimental designs. Goldstein and colleagues (2004) used pieces of music shown to elicit negative, positive, or no (neutral) emotional responses. Several groups of researchers have utilized a modified Stroop task in which participants are asked to report the color of words from one of two (positive or negative) or three (positive, negative, or neutral) conditions (Carter et al., 1998; Friedman et al., 2009; Roehrich & Goldman, 1995). At times, researchers have used visual or contextual cues to manipulate particular AOEs. For example, Roehrich and Goldman (1995) incorporated a condition in which participants watched a clip of a television show featuring the characters either drinking coffee in a home or drinking beer in a bar. Wall et al. (2001) conducted a study in which participants completed a measure of AOEs in either a classroom setting or a restaurant known to the participants to serve alcohol. A limited number of studies have incorporated both an expectancy manipulation and measurement of *in-vivo* alcohol consumption in the laboratory, however.

In one study in which participant alcohol consumption was measured in the laboratory, participants were ostensibly randomly assigned to either a cola-tasting or beer-tasting condition; in reality, all participants were assigned to the beer-tasting condition (Carter et al., 1998). Participants completed the modified Stroop task described above followed by the taste-testing task, in which they were asked to rate the flavor of three different non-alcoholic beers. The participants were not aware of the alcohol content or brand name of the beers, and were asked to rate various aspects of each beer while sitting alone at a computer. Controlling for body weight, the researchers found that participants in the positive expectancy priming condition consumed the most alcohol, followed by the neutral condition, and those in the negative priming condition drank the least. In fact, participants in the negative priming condition drank significantly less than participants in the neutral and positive priming conditions, while the difference in alcohol consumed between the neutral and positive priming groups was not significant. The finding that priming negative expectancies resulted in significantly less alcohol consumption is informative, given the contradicting findings regarding self-reported alcohol use and negative expectancies. The researchers suggested that manipulating negative expectancies may have not only brought to mind the less-desirable effects of alcohol use for participants in that condition, but that the priming may have inhibited positive expectancies, resulting in decreased consumption (Carter et al., 1998).

In another study that utilized a modified Stroop task, Friedman and colleagues (2009) told participants they would be completing several unrelated studies when they entered the laboratory. They were not informed that they would be asked to consume alcohol until just before that portion of the study. Before appearing at the laboratory for their session, each participant completed the sexual enhancement, social assertiveness, and relaxation scales of the

Alcohol Expectancy Questionnaire (AEQ) (Brown, Goldman, Inn, & Anderson, 1980) and the Sociability scale of the Comprehensive Effects of Alcohol (CEOA) scale (Fromme et al., 1993). Once in the laboratory, participants engaged in the modified Stroop task, in which the experimental condition was designed to manipulate sociability expectancy specifically (e.g., *friendly, talkative*) and the control condition featured words unrelated to AOEs (e.g., *loveseat, bookshelf*). After completing the Stroop task, participants were invited by another experimenter to a different laboratory to complete what was introduced as a marketing study. They were told they would be evaluating both beer and chips, and were provided with cups of (non-alcoholic) beer and a questionnaire asking various questions to evaluate each beer (Friedman et al., 2009).

The researchers found a positive relationship between scores on the Sociability subscale of the CEOA and alcohol consumption for the sociability expectancy condition, but not for the control condition (Friedman et al., 2009). There was also a trend toward the same finding for the social assertiveness scale of the AEQ. Thus, the relationship between social functioning expectancies and drinking was present for individuals who endorsed and had been exposed to those expectancies without their knowledge. Both of these findings were unaffected by the inclusion of typical alcohol consumption as a covariate, indicating that the combination of matching endorsement and manipulation of social expectancies played a role in motivating alcohol consumption, regardless of routine alcohol use (Friedman et al., 2009).

Roehrich and Goldman (1995) incorporated both a modified Stroop task and contextual cues (i.e., videotaped segments of television shows) in their design. The contextual cues consisted of television show segments of either characters in a bar drinking alcohol or a home drinking coffee, while the Stroop words were either positive expectancy words (e.g., *funny*, *talkative*) or neutral words (e.g., *citizen*, *river*). During a supposed break in the study,

participants were invited to participate in another study being conducted in a nearby laboratory. Those who agreed were escorted to the other laboratory, which contained comfortable seating, low tables, and a bar displaying various alcoholic beverages and other drinks, including sodas. Participants were led to believe that they were participating in a consumer study rating various beverages, and that they would be taste-testing various beers. Three non-alcoholic beers were provided to each participant, with identifying labels removed, and the participants were asked to rate them across various dimensions. Participants were not informed that the beers were non-alcoholic. The researchers found that participants who were either exposed to the clip of people in a bar drinking alcohol or who had completed the positive expectancy Stroop task consumed more alcohol than participants exposed to either the clip of coffee-drinkers or the neutral Stroop task. The television clip had a stronger effect on alcohol consumption than the Stroop task (Roehrich & Goldman, 1995).

Taken together, the results of these studies support the manipulability of AOEs. In addition, support was found for the prediction that manipulating positive expectancies results in increased alcohol consumption relative to control conditions (Roehrich & Goldman, 1995) and manipulating negative expectancies appears to reduce consumption relative to positive expectancy and control conditions (Carter et al., 1998). Also, the relationship between social expectancy activation and alcohol use appears to be particularly strong for individuals who endorse social AOEs (Friedman et al., 2009). As individuals with heightened social anxiety and social anxiety disorder often endorse social AOEs (Carrigan et al., 2008; Eggleston et al., 2004; Ham et al., 2002; 2005; 2010; O'Hare, 1990; Tran & Haaga, 2002), a specifically focused manipulation of social AOEs for socially anxious individuals in particular would seem likely to

lead to increased alcohol consumption as well as more positive thoughts and feelings about alcohol in general.

Among the types of experimental manipulations of expectancies described in the studies discussed in this section, the modified Stroop task was used the most often. Other methods, such as exposure to different contexts, also proved effective. Goldstein and colleagues (2004) used an expectancy generation task in which participants were asked to list as many possible outcomes of alcohol use as they could as a measure of expectancy manipulation for positive and negative AOEs. While these researchers used the expectancy generation task as an outcome variable, current knowledge of the nature of memory associations suggests that verbalizing specific types of AOEs would likely also activate the stimulus-response expectancy path between an alcohol cue and increased motivation to drink (see Bolles, 1972). The expectancy generation task could serve as a stimulus that may cause specific thoughts and feelings about alcohol to be more readily accessible, therefore resulting in differences in desirability of alcohol and subsequently alcohol consumption. An experimental investigation of the effect of manipulating positive, negative, and social AOEs on variables related to alcohol consumption is a logical next step, and the focus of the current study.

The Current Study

The aim of the current study was to manipulate the accessibility of positive, negative, and social AOEs in participants experiencing either high or low levels of social anxiety, and determine the effect of this manipulation on alcohol desirability (i.e., current desire to drink assessed with a validated measure of craving for alcohol and desirability ratings of different types of alcohol depicted in photos). Self-report correlational studies of the AOE-social anxiety association often do not assess the drinking setting a participant is picturing when completing an

expectancy measure, which may have an impact on the AOEs he or she reports (Ham, Zamboanga, & Bacon, 2011). Thus, self-report measurement of AOEs broadly may not provide the most useful information in understanding how social anxiety and AOEs interact to elicit drinking behavior. The current study addressed this concern by using an *in-vivo* manipulation of the accessibility of specific types of AOEs as measured by observable differences in participant responding across conditions, rather than self-report measurement.

A small number of studies include experimental investigations of the causal effect of AOEs and social anxiety on observed alcohol consumption (Abrams & Kushner, 2004; Kidorf & Lang, 1999). Abrams and Kushner (2004) were the only researchers to include a sample of participants with social anxiety disorder; however, their manipulation of social anxiety was performance-based and did not include a social interaction component. While manipulation of social anxiety was not one of the aims of the current study, both trait social interaction anxiety and trait performance anxiety were measured and participants were grouped according to their scores on these measures. Measurement of self-reported anxiety across a variety of evaluation and social interaction situations provided a more complete picture of the presence or absence of social anxiety and allowed the researcher to divide participants with higher social interaction, performance, or both types of social anxiety from participants with relatively low levels of any social anxiety in analyses.

While laboratory-based experiments offer a variety of opportunities to observe *in-vivo* behaviors, such as alcohol consumption, such study designs are also often time-consuming and costly. Research assistants and experimenters must be highly responsible and thoroughly trained in the event that a participant experiences a negative reaction to the consumption of alcohol or induction of social anxiety during the study. Paper-and-pencil or computer-based self-report

data collection methods are much quicker and cheaper and often require fewer research assistants with less training, though they lack the ability to provide data for direct observations of drinking behavior. However, risk to participants is much lower in studies not involving *in-vivo* alcohol consumption and/or anxiety-provoking tasks. The current study sought to test a proposed causal relationship between an AOE activation task and changes in alcohol desirability, with social anxiety as a grouping variable, while incorporating the efficiency of a computer-based design.

Internet-based studies are becoming increasingly popular as software for designing correlational and experimental studies improves. Studies of similarities and differences between data collected via paper-and-pencil questionnaires and via the Internet demonstrate that participation in an Internet study does not negatively impact the quality of the data nor does it alter the findings of the study (Birnbaum, 2004; Buchanan, 2000; Meyerson & Tryon, 2003). Obviously, *in-vivo* observations of the amount of alcohol consumed following an alcohol expectancy activation task would not be possible in an Internet-based study with current technology. However, it is possible to measure a wide variety of other variables related to changes in the attractiveness of alcohol or alcohol-related cues in an online study, including ratings of desire for alcohol at the moment as well as desirability of various types of alcoholic beverages. The current study utilized online data collection software to investigate the effects of social anxiety level and a manipulation of AOE accessibility on alcohol desirability. Participants completed a series of questionnaires including a measure of desire or craving for alcohol; an expectancy generation task in which they were instructed to provide social, positive, or negative outcomes of alcohol consumption; an alcohol cue rating task in which they viewed photographs of beer, wine, mixed drinks, and liquor and ranked how pleasant they found the images; and the alcohol desire measure a second time. The dependent variables of interest in the current study

included change from pre- to post-manipulation on scores of the alcohol desire measure and mean alcohol cue ratings.

It was hypothesized that: 1) participants will rate alcohol cues more positively after generating social or positive expectancies than negative expectancies; 2) participants will report greater desire to consume alcohol after generating social or positive expectancies compared to negative expectancies; 3) participants with relatively high levels of social anxiety will rate alcohol cues more positively in the social expectancy generation condition than participants in the social expectancy condition with lower levels of social anxiety; 4) for participants in the low social anxiety group, alcohol cue ratings will be highest in the positive condition, followed by the social condition and then the negative condition; for participants in the high social anxiety group, alcohol cue ratings will be highest in the social condition, followed by the positive and then negative condition; 5) high social anxiety participants will report a greater increase in desire to consume alcohol after the social expectancy generation task than low social anxiety participants; 6) for participants in the low social anxiety group, increase in desire to consume alcohol will be greatest in the positive condition, followed by the social condition and then the negative condition; for participants in the high social anxiety group, increase in desire to consume alcohol will be greatest in the social condition, followed by the positive and then negative condition.

There are strong, well-established differences in alcohol use behaviors between men and women. Men tend to consume more alcohol overall and drink more frequently than women, and there is evidence that the relations between social anxiety and alcohol use appears to differ across the sexes (Abrams & Kushner, 2004; DeMartini & Carey, 2012; LaBrie, Lac, Kenney, & Mirza, 2011). In order to increase power to find effects of expectancy generation condition and

social anxiety level, sex was not included as a moderating variable in the specified hypotheses for the current study. However, sex was included as a covariate because of the well-documented effects of this demographic variable on alcohol use behaviors, and its effect as a moderating variable was investigated in follow-up analyses.

Method

Participants

Participants were 299 undergraduate students from the Psychology Subject Pool recruited via Experimetrix at the University of Arkansas. The average age of participants was 19.30 (*SD* = 1.40) and 58.9% and 38.8% of the sample reported their sex as female and male, respectively. Seven participants (2.3%) did not report their sex. The majority of the sample was Caucasian non-Hispanic (84.3%), followed by Hispanic (5.0%), African-American (3.3%), those who endorsed "other" (3.3%), Asian American (1.3%), and Pacific Islander (0.3%). Seven participants (2.3%) did not report their race/ethnicity.

Participants were recruited via Experimetrix, a website that allows researchers to post descriptions of their studies. The description of the study informed potential participants that the purpose of the current study was to gain a better understanding of the relationships among alcohol use and various personality variables and that they would be compensated for their time with required course credit. This study was approved by the Institutional Review Board of the University of Arkansas.

Measures and Stimuli

Baseline desire for alcohol. The Desire for Alcohol Questionnaire (DAQ) (Kramer et al., 2010) is a 14-item questionnaire that assesses one's current desire to consume alcohol. Responses range from 1 (*not at all likely*) to 7 (*extremely likely*) on a Likert-type scale. The

DAQ has demonstrated concurrent validity with measures of severity of alcohol use disorder symptoms and demonstrated excellent reliability among individuals with an alcohol use disorder and good reliability among individuals without an alcohol use disorder (Kramer et al., 2010). The DAQ has good internal consistency with a Cronbach alpha coefficient reported of .93 (Kramer et al., 2010). In the current study, the Cronbach alpha coefficient was .87.

Social anxiety. The 19-item Social Interaction Anxiety Scale (SIAS) and the 20-item Social Phobia Scale (SPS) are two self-report questionnaires that were developed as companion scales to assess multiple aspects of social anxiety (Mattick & Clarke, 1998). The SIAS is used to assess fears of social interactions, whereas the SPS is used to assess fear of the observations of others. The SIAS and SPS have demonstrated adequate to good reliability and validity among college-aged samples and good discriminant and convergent validity (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998). The SIAS and SPS have good internal consistency with a Cronbach alpha of .94 for both (Mattick & Clarke, 1998); the alpha coefficients in the current study were .91 for the SIAS and .90 for the SPS.

Social anxiety status (high vs. low social anxiety) was calculated based on a mean split for both the SIAS and SPS. Because social anxiety may manifest as anxiety in social interactions, anxiety in performance situations, or both, individuals above the mean on either or both the SIAS and SPS were included in the "high" social anxiety group; those who fell below the mean on *both* of the SPS and SIAS were included in the "low" social anxiety group.

Alcohol outcome expectancies. The 38-item Comprehensive Effects of Alcohol (CEOA) scale is a self-report measure of a variety of different types of alcohol outcome expectancies, including Sociability, Tension Reduction, Liquid Courage, Sexuality, Impairment, Risk and Aggression, and Self-Perception (Fromme, et al., 1993). For the purposes of the

current study, the Sociability subscale; the negative scale combining the Impairment, Risk and Aggression, and Self-Perception subscales; and the positive scale combining the Tension Reduction, Liquid Courage, and Sexuality subscales were used. The CEOA has demonstrated adequate test-retest reliability and internal consistency in college students who reported a range of alcohol use from no to heavy alcohol consumption (Fromme et al., 1993). The Cronbach alpha coefficients for subscales ranged from .63 to .83 in an examination of the psychometric properties of the CEOA (Valdivia & Stewart, 2005). In the current study the alpha coefficients for the Sociability, negative, and positive subscales were .85, .84, and .87, respectively.

Alcohol use. The 10-item Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was used to assess drinking behaviors. The AUDIT includes items assessing alcohol use quantity and frequency, alcohol problems, and symptoms of alcohol dependence. This measure can be used to identify problem drinkers as well as drinkers with alcohol use disorders. The AUDIT has adequate to good reliability and validity among college-aged samples (Kokotailo et al., 2004; DeMartini & Carey, 2012; Lennings, 1999). The Chronbach alpha coefficient was .94 in the initial validation study (Saunders et al., 1993) and .82 in the current sample.

Expectancy manipulation. Expectancies were manipulated via a modified expectancy generation task (e.g., Goldstein et al., 2004). Following a series of questionnaires was a form asking participants to list up to ten specific effects of alcohol, ostensibly for the creation of a new AOE measure. The instructions on the form stated, *"The researchers in this laboratory are attempting to create a new questionnaire that will measure the outcomes one expects as a result of alcohol consumption. In particular, we are interested in the positive outcomes associated with alcohol consumption, both short- and long-term. To create items for this questionnaire we*

would appreciate it if you would write out at least ten (10) positive (negative, social) outcomes of drinking alcohol below, including both short- and long-term effects. For example, one positive (negative, social) short-term effect of drinking alcohol might be laughing more (feeling nauseous, being more outgoing), while a positive (negative, social) long-term effect of drinking alcohol might be having pleasant memories (doing poorly on an exam the next day, making a new friend) because you had been drinking the night before. Please try to write out at least ten (10) positive (negative, social) effects of drinking below. If you cannot think of ten, that is all right – just try your best." Participants typed their responses into open text boxes and indicated that they were done with the task by clicking on a "next" arrow button in the lower left corner of the screen.

Alcohol cues. Color photographs of a variety of types of alcohol, including beer, red and white wine, mixed drinks, and light and dark liquors, were presented to participants. These alcohol cues were developed in the Laboratory for Anxiety and Substance Abuse Research at the University of Arkansas (Lovett, 2012). Each photograph featured the beverage being poured into a beer glass, wine glass, "hurricane" glass, or shot glass, depending on which glass was appropriate for the beverage. These photographs were selected from a larger variety of photographs including pictures of the beverages already poured. The photographs featuring the pouring of the alcoholic beverage were used in the current study because past research indicates that the appetitive value of substance-use related photographs featuring depictions of use is higher than that of photographs featuring the substance without indications of use (Carter et al., 2006).

Alcohol cue ratings. Self-Assessment Manikin (SAM) (Bradley & Lang, 1994) visual scales were used for rating affective responses to each alcohol cue. The SAM is composed of

three nine-point pictorial scales measuring arousal, valence, and dominance; the arousal scale, measuring emotional arousal and the valence scale, measuring internal emotional experience of happiness, were administered in the current study. The valence scale ranges from an unhappy, frowning manikin at one end to a happy, smiling manikin at the other, and the arousal scale ranges from a completely calm manikin at one end to a very emotionally aroused manikin at the other. In quantitative analyses, the figure at the far left of the scale is equal to a value of one (i.e., unhappiest/calmest in the current study), while the figure furthest right is equal to a value of nine (i.e., happiest/most aroused). For the valence SAM scale, the image in the fifth position features a neutral expression and is equal to a value of five. The fifth position on the valence scale features the manikin with no expression, and for the arousal scale is a figure depicting an arousal level at the midpoint between very calm and very aroused. The SAM has demonstrated high reliability and is an efficient and validated assessment tool for affective responding (Bradley & Lang, 1994).

Procedure

Participants were recruited from the Psychology Subject Pool at the University of Arkansas via Experimetrix. Upon signing up for the study, participants were automatically provided with a link to the study on Qualtrics ® (2013), an online research program. Qualtrics provides a high level of security and meets standards for both the Health Insurance Portability and Accountability Act (HIPAA) and Family Educational Rights and Privacy Act (FERPA). Participants were first directed to a consent form that explained the purpose of the study, costs and benefits associated with participation, and contact information for the researcher. Participants were asked to enter their names into a text box and click the "next/forward" button if they read and understood the purpose of the study and agreed to participate. If they did so, they

were automatically directed to another link containing the current study. Identifiable participant information was kept separate from responses to study items and was deleted immediately after the end of the semester in which participation occurred. The names of participants were never connected to their responses and no other identifiable information was collected that could connect a participant's identity to their responses.

The DAQ, SIAS, SPS, CEOA, and AUDIT were completed first, followed by a cognitive distraction task designed to allow any alcohol outcome expectancies for which accessibility may have been affected by completing the CEOA to decay from memory. This cognitive distraction task was an anagram featuring scrambled words related to a common theme that the participant is asked to unscramble. Anagrams have been used to distract participants from information previously presented as well as to allow sufficient time for previously presented information to decay in memory (e.g., Lassiter, Apple, & Slaw, 1996). The anagram used in the current study featured ten words related to construction (e.g., *hammer, paint, nails*) and was rated in piloting as somewhat difficult by undergraduate research assistants. This was an appropriate level of difficulty as the goal was for the anagram to be sufficiently engaging to be distracting, but not so difficult that it produced feelings of frustration or failure.

Next, the expectancy generation task was presented, followed by the DAQ and the alcohol cue rating task. Participants were introduced to the SAM and practiced using it before moving on to rating affective responses to the alcohol cues. To help ensure that participants stayed on task, a time limit of 30 seconds per alcohol cue was given to respond to both ratings for each alcohol beverage photograph. A countdown timer was displayed under each alcohol photograph and if participants did not make both ratings within the 30 seconds, they were prompted to work more quickly before the study moved on to the next photograph. Photographs

were presented in random order for each participant. A demographic questionnaire asking about age, sex, year in college, marital status, and living situation followed the alcohol cue rating task. Finally, participants were debriefed about the study aims and use of deception in the description of the study. Participants were assigned course credit for their participation within 72 hours after completing the study.

Results

Data Cleaning and Preliminary Analyses

Thirteen participants, representing 4.3% of the total sample, did not respond to the expectancy generation task, and one participant, representing 0.3% of the sample, discontinued participation prior to the alcohol cue rating task. These participants were excluded from all analyses. The final sample included 285 participants, 59.6% of whom identified as female. The average age of the sample was 19.28 (*SD* = 1.40) years. The predominant racial/ethnic group was Caucasian non-Hispanic (86%), followed by Hispanic (5.3%), African American and mixed race (3.5% each), Asian American (1.1%), and Pacific Islander (0.4%).

Missing data ranged from 0.3% to 3.1% of responses, and no significant differences were noted for categorical variables and missing data. With the large sample size and small percentages of missing data, it is unlikely that this missing information would adversely affect planned analyses. However, in the interest of maximizing power to avoid a Type II error, linear interpolation of missing data points was used to replace missing values for items on the CEOA, AUDIT, DAQ, SIAS, and SPS. Data were not imputed and replaced for ratings of alcohol cues due to the small number of data points missing (0.4-1.4% of ratings). When one or more ratings for one of the alcohol cue sets were missing, the overall average was taken from the existing data points. For example, a missing average for one of the five beer cues would result in the overall

beer cue rating average being drawn from the ratings of the four rated cues, excluding the missing data point.

Alcohol cue ratings. Mean valence ratings for beer, wine, mixed drink, and liquor cues were averaged, resulting in overall ratings for each of the categories of beverage. The range of responses for all ratings was 1 to 9. Mean valence ratings for beer cues was 5.22 (*SD* = 1.90); for wine ratings it was 5.33 (*SD* = 1.83); for mixed drink ratings it was 5.54 (*SD* = 1.62); and for liquor ratings it was 4.88 (*SD* = 1.68). Means and standard deviations for alcohol cue ratings in each expectancy condition and social anxiety group are shown in Tables 1 and 2. Examination of standardized values indicated no univariate outliers.

Social anxiety. The range of scores on the SPS was 0 to 57, *M* = 13.51, *SD* = 10.46, and the range of scores on the SIAS was 0 to 59, *M* = 21.14, *SD* = 11.76. Participants scoring above the mean on either the SPS or SIAS, or both, were grouped separately from participants who scored below the mean on both the SPS and SIAS. This resulted in the identification of those in the sample that were relatively more socially anxious in either or both interpersonal interactions and social performance situations. Of the sample, 55.1% were in the high social anxiety group and 44.9% were in the low social anxiety group. In the high social anxiety group, the mean SIAS score was 28.58 (*SD* = 10.26) and the mean SPS score was 19.52 (*SD* = 10.40). In the low social anxiety group, the mean SIAS score was 12.01 (*SD* = 5.27) and the mean SPS score was 6.15 (*SD* = 3.57). No univariate outliers were identified via examination of standardized scores. Chi-square analysis revealed no significant differences in percentage of high vs. low social anxiety participants across conditions, χ^2 (2, *n* = 285) = 2.16, *p* > .05. No significant difference in percentage of men and women in each of the social anxiety groups was found, χ^2 (1, *n* = 285) = 1.26, *p* > .05.

Quantity and frequency of alcohol use. Quantity and frequency of alcohol use was calculated based on summed responses to three items from the AUDIT that ask specifically about how often participants drink alcohol and how much they typically consume. This possible range of this subscale is from 0 to 12. The overall sample mean was 4.07 (SD = 2.94) and the range was 0 to 10. No univariate outliers were identified via examination of standardized scores. A one-way ANOVA was conducted to compare mean ratings on the AUDIT subscale across conditions. The overall significance test for the ANOVA indicated a significant difference between at least two of the conditions, $F(2,282) = 3.67$, $p = .03$. Post-hoc Bonferroni comparisons were conducted, with the significance level reduced to .016 to adjust for the higher likelihood of a Type I error with multiple comparisons. The difference in quantity and frequency of alcohol use for participants in the social expectancy generation condition approached, but did not exceed, this alpha level, $F(2,282) = 3.67$, $p = .024$. The mean score for participants in the social expectancy condition was 4.69 (SD = 2.98), higher than the mean for the positive expectancy condition, M = 3.57 (SD = 2.81) and the negative expectancy condition, M = 3.96 (SD = 2.94). The scores of participants in the social expectancy condition were not significantly different from those in the negative expectancy condition, $F(2,282) = 3.67$, $p > .016$. Finally, the positive and negative conditions were not significantly different from each other, $F(2,282) = 3.67$, $p > .016$.

The social anxiety groups were compared via one-way ANOVA and a significant difference in quantity and frequency of alcohol consumption was found, $F(1,283) = 15.10$, $p < .001$. Examination of mean scores revealed that participants in the socially anxious group reported drinking less often and consuming less when they did drink compared to participants in the non-socially anxious group. The effect of sex on the average quantity and frequency of

alcohol consumed was also investigated via one-way ANOVA; men reported significantly higher scores than women, $F(1,282) = 14.01$, $p < .001$.

Desire for alcohol. The mean score on the pre-manipulation DAQ was 40.37 (SD = 13.94, range = 14-98). No univariate outliers were noted for baseline DAQ score. No significant differences were found in pre-manipulation DAQ total score across the three conditions, $F(2,282) = 1.05$, $p > .05$ or across social anxiety group, $F(1,283) = .03$, $p > .05$. Men scored significantly higher than women on the pre-manipulation DAQ, $F(1,282) = 10.45$, $p = .001$.

Five univariate outliers were discovered for post-manipulation DAQ scores, representing 1.8% of the data. Outliers were adjusted using a Winsorizing procedure in which upper and lower bounds for each variable are identified and outliers above or below these bounds are adjusted to meet the respective bound (Tukey, 1962). This procedure allows these data points to remain at extreme low or high levels for the variable without adversely affecting statistical analyses or requiring data to be deleted. The mean score on the Winsorized post-manipulation DAQ was 38.61 (SD = 15.32, range = 14-84.5). No significant differences were found in post-manipulation DAQ total score across the three conditions, $F(2,282) = 1.44$, $p > .05$, or social anxiety status, $F(1,283) = 1.49$, $p > .05$. Men reported significantly higher post-manipulation desire to consume alcohol than women, $F(1,282) = 12.89$, $p < .001$. A repeated measures ANOVA was conducted to determine if the decrease in DAQ total scores from pre- to post-experimental manipulation was significant. Results indicated that desire to consume alcohol declined significantly from pre- to post- manipulation, $F(1,284) = 10.17$, $p = .002$.

Baseline AOEs. CEOA subscale scores can be divided and averaged into overall positive and negative expectancy scales. The Sociability, Tension Reduction, Liquid Courage, and Sexuality subscales form the positive AOE scale, while Impairment, Risk and Aggression,

and Negative Self-Perception form the negative AOE scale (Fromme et al., 1993). As one of the major aims of the current study was to compare a social expectancy generation condition to both positive and negative expectancy generation conditions, three CEOA scales were used as covariates: the negative expectancies scale (range = 1.36 to 3.78, M = 2.58, SD = 0.50), the Sociability subscale, (range 1.87 to 4.00, M = 3.30, SD = 0.51), and the positive expectancies scale with the Sociability subscale excluded, (range = 1.32 to 3.83, M = 2.66, SD = .53). Univariate outliers were identified and Winsorized to prevent these datapoints from affecting hypothesis-driven analyses. Five were identified and adjusted on the positive AOE scale, five on the negative AOE scale, and five on the Sociability subscale. A one-way ANOVA was conducted to determine if any significant differences in scores on any of these AOE scale scores was present between conditions. No significant differences were found, $F(2,282)$ = 0.30-.59, ps > .05.

Scores on the negative, positive, and Sociability scales of the CEOA were compared across social anxiety status. A significant difference was found between the social anxiety groups for the negative AOE scale, $F(1,283) = 6.75$, $p = .01$, with participants in the socially anxious group reporting significantly higher negative AOEs, M = 2.65 (SD = .48), than those in the non-socially anxious group, M = 2.49 (SD = .51). No significant differences were found for the social, $F(1,283) = .01$, $p > .05$, or positive, $F(1.283) = 1.00$, $p > .05$), AOE scales.

Men reported significantly greater positive AOEs than women, $F(1,282) = 10.87$, p = .001. No significant differences across sex were found for scores on the Sociability, $F(1,282)$ = .002, $p < .05$, or negative, $F(1,282) = .11$, $p > .05$) AOE scales.

Hypothesis-Driven Analyses

A 2 (low vs high social anxiety) x 3 (expectancy condition) MANCOVA controlling for baseline DAQ score, quantity and frequency of alcohol use, and CEOA Sociability, positive, and negative subscales was conducted to investigate the multivariate effects of social anxiety and expectancy condition on mean valence ratings for beer, wine, mixed drink, and liquor cues. The Box's M statistic was significant, indicating a violation of the assumption of equal observed covariance matrices of dependent variables across groups. In addition, moderate to high correlations were noted between the four categories of alcohol beverage (see Table 2). Therefore, interpretation of MANCOVA results did not proceed. Instead, all ratings of alcoholic beverages were averaged into a single score for each participant (see Table 1 for means and standard deviations across conditions and social anxiety groups) and ANCOVAs were conducted.

Hypothesis 1: participants will rate alcohol cues more positively after generating social or positive expectancies than negative expectancies. A one-way ANCOVA comparing valence ratings across expectancy generation condition controlling for sex, baseline desire for alcohol, quantity and frequency of alcohol use, and Sociability, positive, and negative AOEs was conducted to test Hypothesis 1. No significant effect of condition was found, $F(2,275) = .05$, $p > .05$, partial $\eta^2 < .001$. Four of the covariates were significantly associated with alcohol cue ratings. Significant relations were found for baseline desire for alcohol, $F(1,275) = 9.40$, $p = .002$, partial $\eta^2 = .03$, quantity and frequency of alcohol use, $F(1,275) = 14.50$, $p < .001$, partial $\eta^2 = .05$, positive AOEs, $F(1,275) = 8.25$, $p = .004$, partial $\eta^2 = .03$, and negative AOEs, $F(1,277) = 5.08$, $p = .03$, partial $\eta^2 = .02$. Positive regression coefficients for baseline desire for alcohol, $B = .02$, quantity and frequency of alcohol use, $B = .14$, and positive AOEs, $B = .64$, indicated that as these covariates increased, so did valence ratings for the alcohol cues. The regression coefficient

for negative AOEs was in the opposite direction, B = -.42, indicating that as negative AOEs increased, alcohol cue ratings also decreased.

Hypothesis 2: participants will report greater desire to consume alcohol after generating social or positive expectancies compared to negative expectancies. A mixed between-within repeated measures ANCOVA testing the effects of condition and time on change in desire to consume alcohol, controlling for sex, quantity and frequency of alcohol use, and Sociability, positive, and negative AOEs was conducted to test Hypothesis 2. The interaction of condition and time was not significant, Wilks $\lambda = 1.00$, $F(2,276) = .50$, $p > .05$, partial $\eta^2 = .004$.

Three covariate variables had significant main effects on change in desire to consume alcohol: quantity and frequency of alcohol use, $F(1,276) = 48.71$, $p < .001$, partial $\eta^2 = .15$, positive AOEs, $F(1,276) = 25.53$, $p < .001$, partial $\eta^2 = .09$, and negative AOEs, $F(1,276) = 5.69$, $p = .02$, partial $\eta^2 = .02$. Regression coefficients for quantity and frequency of alcohol use over the two measurement points were $B = 2.10$, partial $\eta^2 = .19$, and $B = 1.64$, partial $\eta^2 = .09$. Thus, about 9% to 19% of the variance over the two measurement points was accounted for by quantity and frequency of alcohol use, The positive coefficients indicate that as quantity and frequency of alcohol use increased, so did alcohol desirability. Regression coefficients for positive AOEs over the two measurement points were $B = 7.91$, partial $\eta^2 = .07$, and $B = 10.26$, partial $\eta^2 = .08$, indicating that about 7% to 8% of the variance over the measurement points was accounted for by positive AOEs. Again, positive coefficients indicate that as positive AOEs increased, so did alcohol desirability. Regression coefficients for negative AOEs were B = -3.90, partial $\eta^2 = .02$, and B = -3.55, partial $\eta^2 = .01$, indicating that between 1% and 2% of the variance over the two measurement points was accounted for by negative AOEs. In this case, negative coefficients indicate that as negative AOEs increased, alcohol desirability decreased.

Hypothesis 3: participants with relatively high levels of social anxiety will rate alcohol cues more positively in the social expectancy generation condition than participants with lower levels of social anxiety; Hypothesis 4: for participants in the low social anxiety group, alcohol cue ratings will be highest in the positive condition, followed by the social condition and then the negative condition; for participants in the high social anxiety group, alcohol cue ratings will be highest in the social condition, followed by the positive and then negative condition. To test Hypotheses 3 and 4, a 2 (social anxiety group) x 3 (condition) ANCOVA on alcohol cue valence ratings controlling for sex, baseline desire to drink, quantity and frequency of alcohol use, and Sociability, positive, and negative AOEs was conducted. The significance level for Levene's test of equality of error variances was .02, below the commonly used alpha level of .05. However, it is acceptable to set an alpha level below .05 if that alpha level is used throughout the interpretation of that analysis (e.g., Tabachnick & Fidell, 2007). Therefore, the alpha level was set at .01 and interpretation of results continued. The interaction of social anxiety status and condition was not significant, $F(2,272) = 1.43$, $p > .01$, partial $\eta^2 = .01$. The main effect of social anxiety group was not significant, $F(1,272) = 3.74$, $p > .01$, partial $\eta^2 = .01$. The main effect of condition was not significant, $F(2,272) = .04$, $p > .01$, partial $\eta^2 < .001$. Three of the covariates were significantly associated with alcohol cue ratings at the .01 alpha level. Significant relations were found for baseline desire for alcohol, $F(1, 272) = 10.91$, $p = .001$, partial $\eta^2 = .04$, quantity and frequency of alcohol use, $F(1,272) = 9.94$. $p = .002$, partial $\eta^2 = .04$, and positive AOEs, $F(1,272) = 9.18$, $p = .003$, partial $\eta^2 = .03$. Positive regression coefficients for baseline desire for alcohol, $B = .03$, quantity and frequency of alcohol use, $B = .12$, and positive AOEs, $B = .67$, indicated that as these covariates increased, so did alcohol cue valence ratings.

Hypothesis 5: high social anxiety participants will report a greater increase in desire to consume alcohol after the social expectancy generation task than low social anxiety participants; Hypothesis 6: for participants in the low social anxiety group, increase in desire to consume alcohol will be greatest in the positive condition, followed by the social condition and then the negative condition; for participants in the high social anxiety group, increase in desire to consume alcohol will be greatest in the social condition, followed by the positive and then negative condition. To test Hypotheses 5 and 6, a mixed between-within repeated measures ANCOVA testing the effects of social anxiety group and condition on change in desire to consume alcohol from pre- to post-expectancy manipulation while controlling for sex, quantity and frequency of alcohol use and positive, negative, and Sociability AOEs was conducted. The three-way interaction of time, condition, and social anxiety group was not significant, Wilks $\lambda = 1.00$, $F(2,273) = 0.65$, $p > .05$, partial $\eta^2 = .01$. The interaction of time and condition was not significant, Wilks $\lambda = 1.00$, $F(2,273) = 0.66$, $p > .05$, partial $\eta^2 = .01$. The interaction of time and social anxiety was also not significant, Wilks $\lambda = .99$, $F(1,273) = 1.71$, $p > .05$, partial $\eta^2 = .006$. Social anxiety group had a significant main effect on change in desire to consume alcohol from pre- to post-manipulation, $F(1,273) = 11.77$, $p = .001$, partial $\eta^2 = .04$, such that the high social anxiety group (adjusted mean of desire to consume alcohol = 41.70, $SE_M = 0.90$) reported significantly greater desire to consume alcohol than the low social anxiety group (adjusted mean of desire to consume alcohol = 37.00, $SE_M = 1.00$).

Three covariate variables had significant main effects on change in desire to consume alcohol: quantity and frequency of alcohol use, $F(1,273) = 58.13$, $p < .001$, partial $\eta^2 = .18$, positive AOEs, $F(1,273) = 25.17$, $p < .001$, partial $\eta^2 = .08$, and negative AOEs, $F(1,273) = 8.12$, $p = .01$, partial $\eta^2 = .03$. Regression coefficients for quantity and frequency of alcohol use over

the two measurement points were $B = 2.24$, partial $\eta^2 = .21$, and $B = 1.85$, partial $\eta^2 = .11$. Thus, about 11% to 21% of the variance over the two measurement points was accounted for by quantity and frequency of alcohol use, The positive coefficients indicate that as quantity and frequency of alcohol use increased, so did alcohol desirability. Regression coefficients for positive AOEs over the two measurement points were $B = 7.80$, partial $\eta^2 = .07$, and $B = 9.97$, partial $\eta^2 = .08$, indicating that about 7% to 8% of the variance over the measurement points was accounted for by positive AOEs. Again, positive coefficients indicate that as positive AOEs increased, so did alcohol desirability. Regression coefficients for negative AOEs were $B = -4.44$, partial $\eta^2 = .03$, and $B = -4.36$, partial $\eta^2 = .02$, indicating that between 2% and 3% of the variance over the two measurement points was accounted for by negative AOEs. In this case, negative coefficients indicate that as negative AOEs increased, alcohol desirability decreased.

Arousal Ratings

Arousal ratings were gathered in addition to valence ratings for the alcohol cues. While specific hypotheses regarding arousal ratings were not made, the same analyses as those conducted for valence ratings were performed to determine if condition and social anxiety group had an impact on these ratings. Overall, the pattern of results for analyses of arousal ratings of alcohol cues was very similar to that of valence ratings. No significant interaction of condition and social anxiety on arousal ratings were found, nor were there any significant main effects of condition or social anxiety separately. As with the valence ratings, baseline desire to consume alcohol, quantity and frequency of alcohol use, and positive AOEs were significantly associated with arousal ratings of the alcohol cues used in this study. Baseline desire for alcohol, $F(1,272) = 8.68$, $p = .003$, partial $\eta^2 = .03$, quantity and frequency of alcohol use, $F(1,272) = 21.41$, $p < .001$, partial $\eta^2 = .07$, and positive AOEs, $F(1,272) = 12.82$, $p < .001$, partial $\eta^2 = .05$, were

significantly associated with arousal ratings. Positive regression coefficients for baseline desire for alcohol (B = .03), quantity and frequency of alcohol use, (B = .20), and positive AOEs, (B = .95), indicated that as these covariates increased, so did arousal ratings for the alcohol cues.

Sex

While no hypotheses were specified at the outset of the study due to concerns about low power to detect interactions involving three or more between-groups variables, follow-up analyses investigating whether sex, included as an independent categorical variable, interacted with social anxiety group, condition, both, or neither, were conducted. Results of an initial one-way ANOVA showed that men and women differed significantly in their average valence ratings for the alcohol cues, $F(1,282) = 7.23$, $p = .008$, partial $\eta^2 = .03$. Men provided more strongly positive ratings, $M = 5.54$, $SD = 1.53$, compared to women, $M = 5.04$, $SD = 1.56$. However, results of the same analysis investigating arousal ratings showed that men and women did not differ significantly for this dependent variable, $F(1,282) = 1.26$, $p > .05$, partial $\eta^2 = .004$.

A 2 (sex) x 2 (social anxiety) x 3 (expectancy condition) ANCOVA was conducted to investigate the interactions of sex with social anxiety status and expectancy condition on valence ratings, controlling for baseline desire for alcohol, quantity and frequency of alcohol use, and social, positive, and negative AOEs. No significant interactions or main effects were found. Similarly, the results of a mixed between-within repeated measures ANCOVA testing the effects of sex, time, condition, and social anxiety group on change in desire to consume alcohol from pre- to post- expectancy manipulation while controlling for quantity and frequency of alcohol use and positive, negative, and Sociability AOEs was conducted included no significant interactions. As in the hypothesis-driven analyses, there was a significant main effect for social anxiety group, $F(1,268) = 11.24$, $p = .001$, partial $\eta^2 = .04$, such that the high social anxiety

group (adjusted mean of desire to consume alcohol = 42.01, SE_M = 0.95) reported significantly greater desire to consume alcohol than the low social anxiety group (adjusted mean of desire to consume alcohol = 37.23, SE_M = 1.04).

A 2 x 2 x 3 ANCOVA examining the effects on arousal ratings of alcohol cues violated the Levene's test of equality of error variances at p = .04. In order to proceed with interpretation of these results, a significance level of α = .01 was assumed (e.g., Tabachnick & Fidell, 2007). The three-way interaction of sex, condition, and social anxiety group approached this conservative alpha level, $F(2,267) = 3.18$, p = .04, partial η^2 = .02. In the negative expectancy condition, men in the low social anxiety group rated the alcohol cues as more arousing than women in the low social anxiety group (see Table 5).

Discussion

Overall, the hypotheses identified in the current study were not supported. Participants in the positive or social expectancy generation conditions did not report significantly higher desire to drink or higher averaged valence in response to alcohol cues compared to participants in the negative expectancy condition. In fact, no significant differences in desirability ratings were noted between the three conditions. Participants in the high social anxiety group and social expectancy generation condition did not report significantly higher desirability ratings than participants in the low social anxiety group and social expectancy generation condition. However, covariates including sex, baseline desire for alcohol, endorsement of positive expectancies on the CEOA, and quantity and frequency of alcohol consumption predicted desire to drink as well as alcohol cue valence ratings. Men rated the alcohol cues significantly higher than women, and participants with higher baseline desire for alcohol, higher usual quantity and frequency of alcohol consumption, and higher positive expectancies reported higher desirability

ratings than those with lower baseline desire and lower levels of alcohol use, and those who endorsed lesser positive AOEs.

Though there was not a formal experimental manipulation check, the presence of positive relations for covariate variables in the current analyses and lack of significant differences between conditions suggest that the null findings are primarily, if not entirely, due to failure of the experimental manipulation in the current study. Possible explanations for the lack of significant effects of expectancy generation condition were explored. A visual inspection of qualitative responses to the task suggested that many students may not have understood or, for unknown reasons, chose not to comply with the instructions. The researcher examined 20 responses randomly drawn from each of the conditions and grouped them by whether the participant complied completely with the instructions (e.g., in the positive condition, all answers provided were positive outcomes) or did not fully comply with the instructions (e.g., in the social condition, a mix of positive, social, and negative expectancies were provided). Participants appeared to have the most difficulty with the social expectancy generation task; only 15% (n = 3) of participants randomly chosen from the social condition responded with a list of only social expectancies. In the positive and negative conditions, participants appear to have been much more successful at only listing expectancies that matched the instructions. In the positive expectancy condition, 90% (n = 18) of the participants provided lists that included only positive expectancies. Likewise, in the negative expectancy condition, 95% (n = 19) of the 20 randomly chosen participants provided lists of only negative expectancies.

Because of the wide variability in responses to the social expectancy generation question, additional investigative analyses were conducted to determine if shared variance among ratings due to overlap in responses between the social and positive and negative conditions could be

responsible for the null findings. To investigate this possibility, a one-way ANCOVA comparing the alcohol cue valence ratings across the positive and negative conditions controlling for sex, baseline desire to consume alcohol, quantity and frequency of alcohol use, and positive, negative, and Sociability AOEs was conducted. The positive and negative conditions did not differ significantly, $F(1,181) = .07$, $p > .05$, partial $\eta^2 < .001$. A 2 (social anxiety) x 2 (positive vs. negative condition) ANCOVA examining valence ratings while controlling for sex, baseline desire to consume alcohol, quantity and frequency of alcohol use, and positive, negative, and Sociability AOEs violated the assumption of equal variance of the dependent variable across groups at a significance level of $p = .007$, and thus was not further interpreted. To compare arousal ratings across positive and negative conditions, a one-way ANCOVA comparing the conditions while controlling for sex, baseline desire for alcohol, quantity and frequency of alcohol use, and positive, negative, and Sociability AOEs was conducted. The main effect of condition was not significant, $F(1,181) = 0.71$, $p > .05$, partial $\eta^2 = .004$. A 2 (social anxiety) x 2 (positive vs. negative condition) ANCOVA examining arousal ratings while controlling for sex, baseline desire to consume alcohol, quantity and frequency of alcohol use, and positive, negative, and Sociability AOEs was conducted; the interaction of condition and social anxiety group and the main effects of each were not significant, $F(1,179) = 0.05$-0.60, $p > .05$, partial $\eta^2 = .000$-$.003$. In addition, a mixed between-within repeated measures ANCOVA was conducted to examine desire for alcohol across pre- and post-manipulation time points and between social anxiety group and condition, controlling for quantity and frequency of alcohol use and positive, negative, and Sociability AOEs. The interaction of time, condition, and social anxiety group was not significant, Wilk's $\lambda = 0.99$, $F(1,180) = 1.15$, $p > .05$, partial $\eta^2 = .01$, nor was the interaction of time and condition, Wilk's $\lambda = 1.00$, $F(1,180) = 0.88$, $p > .05$, partial $\eta^2 = .01$, or the main

effect of condition, $F(1,180) < .001$, $p > .05$, partial $\eta^2 < .001$. Thus, it appears that the null findings in the current study were not primarily due to a difficulty in understanding or adhering to the instructions for the social expectancy condition, but rather the manipulation itself appears to have been unsuccessful. Otherwise, one would expect to see a significant difference between the two conditions in which the participants followed the directions.

The expectancy generation task used in the current study was an adaptation of a task used in Goldstein and colleagues' (2004) study. However, the researchers asked participants to generate as many AOEs as they could as an outcome measure of their expectancy manipulation, not as the manipulation itself. One purpose of the current study was to test the utility of the expectancy generation task as a method of increasing the accessibility of specific effects of alcohol and thus affecting the emotional response to alcohol cues. The modified Stroop task used by Carter et al. (1998), Friedman et al. (2009), and Roehrich and Goldman (1995) has been proven a successful approach at increasing the accessibility of specific types of AOEs, including negative, positive, and social expectancies. However, the expectancy generation task used in the present study did not achieve the same outcome. It is possible that because participants were generating AOEs only due to the request of the researcher, no unconscious priming effects were produced that affected alcohol cue ratings. Indeed, subliminal and supraliminal priming tasks often produce different results in goal-oriented paradigms, even when the same stimuli are used in both tasks (for a review, see Ferguson & Porter, 2010). As past research indicates that subliminal priming can successfully affect accessibility of AOEs, supraliminal priming in the same research paradigm may not produce any effect. Another possible explanation is that the anagram task designed to allow any priming effects of completing the CEOA to decay failed, and baseline AOEs interfered with the expectancy generation task. This explanation is supported by

the finding that positive AOEs, as measured by the CEOA, were significantly positively associated with valence ratings of the alcohol cues.

Additionally, participant mean scores on the SIAS and SPS for those in the high social anxiety group were below the clinical cutoffs that indicate the presence of social anxiety disorder (i.e., SPS $\geq$ 24; SIAS $\geq$ 34) (Heimberg et al., 1992). Only 16% (n = 45) of the sample scored above the cutoff for the SPS and 14% (n = 41) scored above the cutoff for the SIAS. It is possible that the lack of main effects of social anxiety group on alcohol desirability is due to subclinical levels of social anxiety in the high social anxiety group. Though meaningful comparisons between high and low social anxiety groups were not able to be made, a three-way interaction of social anxiety group, condition, and sex on arousal ratings did approach significance. Men in the low social anxiety group rated the alcohol cues as more arousing compared to women in the low social anxiety group. Selection of a high social anxiety group scoring above the clinical cutoff on the SIAS and/or SPS may result in significant differences between social anxiety groups in future research.

While the expectancy generation task was not successful at manipulating the accessibility of specific types of AOEs, the alcohol cues appear to have operated as a valid outcome measure of drinking quantity and frequency and baseline desire for alcohol. College men generally consume more alcohol than college women and drink more frequently (Substance Abuse and Mental Health Services Administration, 2012), and men's ratings were significantly higher than women's in the current study. Associations between alcohol cue ratings and baseline desire for alcohol, quantity and frequency of alcohol consumption, and positive AOEs were comparable to those between DAQ scores and these variables, providing evidence of convergent validity of the alcohol cue photograph set.

These findings are also consistent with the research literature examining the associations of these variables with self-reported and *in-vivo* alcohol consumption observed in the laboratory (Armeli et al., 2005; Cooper et al., 1990; Carter et al., 1998; Friedman et al., 2009; Fromme & Dunn, 1992; Reis & Trockel, 2003; Roehrich & Goldman, 1995; Stacy et al, 1993; 1990; Stein et al., 2000; Valdivia & Stewart, 2005; Werner et al., 1995). These findings support the validity of the alcohol cue set used in the current study as an inexpensive and efficient analog of participant interest in alcohol consumption, visual stimuli in alcohol studies, and in the measurement of physiological responding to alcohol cues. Further research is needed to determine whether interest in alcohol consumption using the alcohol cue ratings is related to *in-vivo* alcohol consumption in the laboratory. A validated alcohol beverage-specific set of visual alcohol cues will be an asset to the field of alcohol research.

Study Strengths and Limitations

The current study was designed to allow an experimental investigation of AOE manipulation on the desirability of alcohol in an inexpensive, time-efficient paradigm. This design serves as an ideal intermediate step between purely correlational studies and expensive and time- and energy-consuming laboratory-based experiments. Additionally, online experiments involve significantly less risk than *in-vivo* alcohol administration and induction of social anxiety. Finally, while validation of the alcohol cue set used in this study is currently underway via other studies in the researcher's laboratory, this study provides initial support for its utility as a measure of momentary desirability of alcoholic beverages. A standardized set of alcohol cues will be imminently useful to researchers interested in the effects of various manipulations on participants' interest in consuming alcohol. In addition to these notable strengths, the current study is limited in some respects.

Unfortunately, and most notably, no significant effects of condition were found, nor did condition interact with social anxiety group to affect valence or arousal ratings of alcohol cues or change in desire to consume alcohol. One methodological limitation that may have lowered the effectiveness of the expectancy generation task was in the wording of instructions for completing the alcohol cue ratings. Rather than being prompted to rate the appetitiveness of the alcohol cues specifically, participants were instructed to rate their internal emotional and arousal states. One's internal state may be affected by a variety of f actors outside of an experimental manipulation such as the one used in the current study; therefore, specific ratings of the alcohol cues may have been more sensitive to the expectancy manipulation.

In addition, Wall and colleagues (2001) and Wall, McKee, and Hinson (2000) found that the setting one is in when one considers the effects of alcohol has a significant impact on endorsement of AOEs. This, in turn, may translate into significant differences in the perceived desirability of alcohol consumption depending upon the physical context one occupies. Participants in the current study completed the study online, likely in a variety of settings including dorm rooms, libraries, coffee shops, friend's homes, etc. Some settings, such as in dorm suites where other students may have been consuming alcohol or displaying the enjoyable effects of intoxication, may have increased the desirability of alcohol, whereas settings incongruent with alcohol consumption, such as hushed university libraries, may have dampened participants' interest in drinking. Participants were not asked where they completed the study and the effects of location could therefore not be controlled for in analyses. Participants could have also themselves been intoxicated when they completed the study; they were not asked about the last time they consumed alcohol and how many drinks they consumed, so blood alcohol content could not be estimated. Finally, participants were not asked to consider what their social,

positive, or negative expectancies would be about the effects of alcohol at a particular dosage or range of dosages. The effects one expects when one's blood alcohol content has reached 0.05% , for example, are likely very different from the effects one expects after consuming enough alcohol to reach 0.15%. The level of intoxication participants were imagining was neither guided by explicit instruction in the expectancy generation task nor assessed and therefore any effects cannot be accounted for.

Future Research

Despite the null results of the experimental manipulation used in the current study, this experimental paradigm readily lends itself to a variety of opportunities for future research. Modified replication of the current study will be helpful in determining if the expectancy generation task is a valid method of AOE manipulation. Participants could complete the expectancy generation task and then a variation of the Stroop task could be used to determine if the task was effective. The Stroop task has been modified and widely used as a measure of the existence of anxiety, depression, preference for alcohol-related words, and many other constructs (for a review, see Williams, Mathews, & MacLeod, 1996). If, for example, response latencies were longer for social AOE words (e.g., *talkative*, *outgoing*) in a social expectancy generation condition compared to latencies for positive and negative expectancy conditions, the expectancy generation task could be said to be effective at manipulating which AOEs are most readily accessible. Additional instructions to participants to consider a specific level or range of levels of intoxication, such as "please list the positive (social, negative) expectations you have about when you are feeling 'buzzed' or mildly intoxicated…" will likely help reduce variation in responses due to participants perhaps considering a variety of different levels of intoxication and may allow effects of the manipulation to emerge.

Another suggested modification of the current study is to replace the expectancy generation task with the modified Stroop task used most commonly in the AOE manipulation research (Carter et al., 1998; Friedman et al., 2009; Roehrich & Goldman, 1995). This would allow the current study hypotheses related to a causal relationship between an AOE manipulation and desirability ratings of the alcohol cue set to be investigated, as well as the predicted interaction between social anxiety level and manipulation of social AOE accessibility to be tested. Directly asking participants to consider a specific level of intoxication

Assignment of participants to groups by alcoholic beverage type preference in an experimental design based on the current study is the final suggested direction for future research. Researchers investigating variables related to alcohol use are aware of the importance of beverage type preference in predicting drinking behavior (e.g., Clifasefi, Bernstein, Mantonakis, & Loftus, 2013; Jensen et al., 2002; Kidorf, Lang, & Pelham, 1990). Incorporation of this grouping variable in a replication of the current study may reveal interactions among drink type preference, social anxiety level, and AOE manipulation in determining desirability of alcohol broadly or of specific types of alcohol. A socially anxious individual who prefers to drink hard liquor and for whom social AOEs are made easily accessible in memory may report greater desirability of liquor than a matching individual for whom negative AOEs are made accessible, for example.

Lack of significant effects of the experimental manipulation in the current study does not indicate that no further investigations along these lines should be pursued; rather, a variety of possible future directions exist. Further testing of the expectancy generation task and continued use of this set of alcohol cues are warranted. Though the expectancy generation task was not successful in the current study, baseline desire for alcohol, quantity and frequency of alcohol use,

and positive AOEs were predictive of ratings of desirability for photographs of beer, wine, mixed drinks, and liquor. These findings suggest that the alcohol cue set used in the current study could serve as an effective and inexpensive measure of desire to consume alcohol in future research.

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Table 1

Means and Standard Deviations of Alcohol Photograph Valence Ratings and Post-Manipulation DAQ Scores by Condition and Social Anxiety Group

	Social Condition		Positive Condition		Negative Condition	
	High SA	Low SA	High SA	Low SA	High SA	Low SA
DAQ	42.40 (16.75)	38.96 (14.95)	38.31 (14.84)	35.25 (15.22)	38.51 (16.86)	37.75 (11.83)
Beer	5.14 (1.78)	5.92 (1.78)	5.14 (1.78)	5.19 (1.96)	4.63 (2.07)	5.39 (1.79)
Wine	5.32 (1.70)	5.54 (1.88)	5.32 (1.70)	5.54 (1.88)	4.75 (2.04)	5.79 (1.65)
Mixed Drinks	5.58 (1.52)	5.80 (1.71)	5.58 (1.52)	5.80 (1.71)	5.27 (1.78)	5.85 (1.31)
Liquor	4.73 (1.48)	5.15 (1.88)	4.73 (1.48)*	5.15 (1.88)*	4.37 (1.75)	5.39 (1.45)
Total	5.19 (1.35)	5.60 (1.72)	5.19 (1.35)	5.60 (1.72)	4.76 (1.70)	5.61 (1.29)

Note. DAQ = Desire for Alcohol Questionnaire. SA = Social Anxiety. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/18). Asterisks indicate means that differ significantly by social anxiety group.

Table 2

Means and Standard Deviations of Alcohol Photograph Arousal Ratings by Condition and Social Anxiety Group

	Social Expectancy Condition		Positive Expectancy Condition		Negative Expectancy Condition	
	High SA	Low SA	High SA	Low SA	High SA	Low SA
Beer	3.39 (2.25)	3.44 (2.19)	3.27 (2.15)	3.25 (1.82)	2.96 (1.85)	3.32 (2.18)
Wine	3.71 (2.23)	2.92 (1.88)	3.10 (2.11)	3.58 (2.20)	3.14 (2.03)	3.18 (1.80)
Mixed Drinks	3.93 (2.25)	3.41 (1.94)	3.48 (2.15)	3.67 (1.84)	3.36 (2.06)	3.77 (2.16)
Liquor	3.11 (1.91)	3.08 (1.81)	2.99 (1.91)	3.20 (1.60)	2.98 (1.84)	3.28 (2.07)
Total	3.54 (2.02)	3.21 (1.84)	3.21 (1.96)	3.42 (1.68)	3.11 (1.86)	3.39 (1.93)

Note. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/15). No significant differences were found in comparison of mean ratings across social anxiety group.

Table 3

Means, Standard Deviations, and Zero-order Correlations Among Study Variables

	Beer	Wine	Mixed Drink	Liquor	All Ratings	DAQ 2	SIAS
Beer	--	.65**	.69**	.74**	.88**	.42**	-.13*
Wine	.65**	--	.76**	.67**	.87**	.28**	-.09
Mixed Drink	.69**	.76**	--	.80**	.91**	.48**	-.08
Liquor	.74**	.67**	.80**	--	.91**	.35**	-.15*
All Ratings	.88**	.87**	.91**	.91**	--	.43**	-.13*
DAQ 2	.42**	.28**	.48**	.35**	.43**	--	.07
SIAS	-.13*	-.09	-.08	-.15*	-.13*	.07	--
SPS	-.09	-.03	.01	-.11	-.07	.20**	.66**
AUDIT	.47**	.33**	.45**	.38**	.46**	.44**	-.21**
Sociability	.19**	.14*	.24**	.17**	.21**	.29**	.03
Positive	.29**	.22**	.35**	.26**	.31**	.22**	.07
Negative	-.10	-.11	-.07	-.11	-.11	.24**	.19**
DAQ 1	.43**	.30**	.46**	.34**	.43**	.82**	-.002

Note. Beer, Wine, Mixed Drink, Liquor = valence ratings for photographs; DAQ 2 = post-manipulation Desire for Alcohol Questionnaire (DAQ); SIAS = Social Interaction Anxiety Scale; SPS = Social Performance Scale; AUDIT = quantity and frequency of alcohol use subscale of the Alcohol Use Disorders Identification Test; Sociability = Sociability subscale of the Comprehensive Effects of Alcohol (CEOA) scale; Positive = mean of CEOA positive expectancies; Negative = mean of CEOA negative expectancies; DAQ 1 = pre-manipulation DAQ . * = $p < .05$; ** = $p < .01$.

Table 3, Continued

Means, Standard Deviations, and Zero-order Correlations Among Study Variables

	SPS	AUDIT	Sociability	Positive	Negative	DAQ 1
SPS	--	-.15*	-.01	.08	.18**	.07
AUDIT	-.15*	--	.33**	.35**	-.14*	.56**
Sociability	-.01	.33**	--	.61**	.24**	.23**
Positive	.08	.35**	.61**	--	.39**	.37**
Negative	.18**	-.14*	.24**	.39**	--	-.10
DAQ 1	.07	.56**	.23**	.37**	-.10	--

Note. SPS = Social Performance Scale; AUDIT = quantity and frequency of alcohol use subscale of the Alcohol Use Disorders Identification Test; Sociability = Sociability subscale of the Comprehensive Effects of Alcohol (CEOA) scale; Positive = mean of CEOA positive expectancies; Negative = mean of CEOA negative expectancies; DAQ 1 = pre-manipulation DAQ. * = $p < .05$; ** = $p < .01$.

Table 4

Means and Standard Deviations of Alcohol Photograph Valence Ratings by Condition, Social Anxiety Group, and Sex

	Social Expectancy Condition				Positive Expectancy Condition			
	High Social Anxiety		Low Social Anxiety		High Social Anxiety		Low Social Anxiety	
	Women	Men	Women	Men	Women	Men	Women	Men
	n = 32	*n* = 15	*n* = 22	*n* = 26	*n* = 32	*n* = 20	*n* = 25	*n* = 17
Beer	4.59 (1.67)	6.32 (1.43)	4.77 (1.89)	6.88 (1.45)	4.32 (2.15)	5.06 (1.95)	5.27 (1.72)	5.57 (1.92)
Wine	5.09 (1.72)	5.79 (1.60)	5.15 (2.17)	5.87 (1.57)	5.02 (2.14)	4.28 (1.87)	5.84 (1.87)	5.71 (1.27)
Mixed Drink	5.41 (1.51)	5.93 (1.52)	5.38 (2.03)	6.15 (1.32)	5.17 (1.93)	5.43 (1.63)	5.70 (1.39)	6.08 (1.18)
Liquor	4.40 (1.39)	5.44 (1.46)	4.32 (1.93)	5.85 (1.56)	4.09 (1.74)	4.68 (1.87)	5.15 (1.70)	5.75 (0.92)
Total	4.87 (1.31)	5.87 (1.23)	4.90 (1.91)	6.19 (1.31)	4.62 (1.75)	4.86 (1.70)	5.49 (1.47)	5.78 (0.98)

Note. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/15). No significant differences were found in comparison of mean ratings across social anxiety group.

Table 4, Continued

Means and Standard Deviations of Alcohol Photograph Valence Ratings by Condition, Social Anxiety Group, and Sex

	Negative Expectancy Condition			
	High Social Anxiety		Low Social Anxiety	
	Women *n* = 34	Men *n* = 23	Women *n* = 25	Men *n* = 13
Beer	5.22 (1.78)	5.09 (2.17)	5.04 (1.30)	5.71 (1.84)
Wine	5.59 (1.89)	4.68 (1.83)	5.58 (1.85)	5.42 (1.08)
Mixed Drink	5.58 (1.87)	5.00 (1.80)	5.20 (1.24)	6.08 (1.45)
Liquor	4.81 (1.70)	4.78 (1.86)	4.62 (1.19)	5.95 (1.50)
Total	5.30 (1.63)	4.89 (1.84)	5.11 (1.67)	5.78 (1.36)

Note. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/15). No significant differences were found in comparison of mean ratings across social anxiety group.

Table 5

Means and Standard Deviations of Alcohol Photograph Arousal Ratings by Condition, Social Anxiety Group, and Sex

	Social Expectancy Condition				Positive Expectancy Condition			
	High Social Anxiety		Low Social Anxiety		High Social Anxiety		Low Social Anxiety	
	Women *n* = 32	Men *n* = 15	Women *n* = 22	Men *n* = 26	Women *n* = 32	Men *n* = 20	Women *n* = 25	Men *n* = 17
Beer	3.22 (2.14)	3.74 (2.51)	2.78 (1.92)	2.78 (1.92)	3.44 (2.43)	3.09 (1.68)	2.94 (1.61)	3.71 (2.07)
Wine	3.63 (2.10)	3.88 (2.54)	2.88 (2.14)	2.95 (1.66)	3.54 (2.43)	2.46 (1.26)	3.44 (2.19)	3.78 (2.26)
Mixed Drink	3.91 (2.21)	3.97 (2.41)	3.10 (2.13)	3.67 (1.76)	3.74 (2.40)	3.15 (1.68)	3.41 (1.80)	4.03 (1.89)
Liquor	3.06 (1.80)	3.24 (2.20)	2.83 (1.93)	3.29 (1.72)	3.14 (2.12)	2.78 (1.61)	2.86 (1.67)	3.71 (1.39)
Total	3.46 (1.91)	3.71 (2.32)	2.90 (1.97)	3.48 (1.71)	3.47 (2.21)	2.87 (1.46)	3.16 (1.69)	3.81 (1.64)

Note. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/15). No significant differences were found in comparison of mean ratings across social anxiety group.

Table 5, Continued

Means and Standard Deviations of Alcohol Photograph Arousal Ratings by Condition, Social Anxiety Group, and Sex

	Negative Expectancy Condition			
	High Social Anxiety		Low Social Anxiety	
	Women	Men	Women	Men
	n = 34	*n* = 23	*n* = 25	*n* = 13
Beer	3.09 (1.83)	2.78 (1.91)	2.61 (1.78)*	4.70 (2.26)*
Wine	3.41 (2.27)	2.76 (1.56)	2.56 (1.57)*	4.37 (1.66)*
Mixed Drink	3.73 (2.26)	2.83 (1.63)	3.02 (1.91)*	5.20 (1.92)*
Liquor	3.19 (1.96)	2.66 (1.63)	2.38 (1.53)*	5.03 (1.87)*
Total	3.35 (1.99)	2.76 (1.61)	2.64 (1.56)*	4.83 (1.82)*

Note. Due to concern about Type 1 error due to multiple comparisons, the alpha level was adjusted to .003 (i.e., .05/15). Asterisks indicate means that differ significantly for men and women.

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

April 17, 2013

MEMORANDUM

TO:	Hilary Casner Lindsay Ham
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	13-04-640
Protocol Title:	*Personality Characteristics, Thought, Emotion, and Alcohol Use*
Review Type:	☐ EXEMPT ☒ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 04/17/2013 Expiration Date: 04/11/2014

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

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

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

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