

ALCOHOL USE AND SOCIAL ANXIETY IN A COLLEGE STUDENT
POPULATION

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

Jennifer Marie Day

Certificate of Approval:

F. Dudley McGlynn
Professor
Psychology

Christopher J. Correia, Chair
Assistant Professor
Psychology

Adrian Thomas
Assistant Professor
Psychology

Stephen L. McFarland
Dean
Graduate School

ALCOHOL USE AND SOCIAL ANXIETY IN A COLLEGE STUDENT
POPULATION

Jennifer Marie Day

A Thesis

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

Auburn, Alabama
December 15, 2006

ALCOHOL USE AND SOCIAL ANXIETY IN A COLLEGE STUDENT

POPULATION

Jennifer Marie Day

Permission is granted to Auburn University to make copies of this thesis at its discretion, upon request of individuals or institutions and at their expense. The author reserves all publication rights.

Signature of Author

Date of Graduation

THESIS ABSTRACT

ALCOHOL USE AND SOCIAL ANXIETY IN A COLLEGE STUDENT

POPULATION

Jennifer Marie Day

Master of Science, December 15, 2006
(B.A., Texas Tech University, 2004)

57 Typed Pages

Directed by Christopher J. Correia

The results of epidemiological studies using clinical and community samples have shown a strong link between social anxiety and alcohol use. However, the results of studies that use a college student population to investigate a possible link between social anxiety and alcohol use have yielded mixed findings. Given the inconsistencies in the college student literature, several researchers have looked for variables that may moderate between social anxiety and alcohol use and related problems. The present study examined the potential moderating effects of the amount of anxiety reported in various social situations either involving or not involving alcohol using the Social Interaction Anxiety Scale (Mattick & Clarke, 1998).

The first hypothesis for this study was that the difference score should be related to a variety of alcohol measures, including alcohol-related problems, quantity of alcohol

consumed, and frequency of alcohol consumption. A positive difference score, which indicated greater anxiety in alcohol-free situations than in alcohol-related situations, should be positively correlated with both the RAPI (White & Labouvie, 1989) and the DDQ (Collins et al., 1985). The second hypothesis was that the relationship between the difference score and the alcohol measures would partially depend on the symptoms of social phobia. Participants with a positive difference score and a high score on a measure of social phobia should report the highest levels of alcohol use and problems.

From the results, we concluded that the difference in anxiety in alcohol-related situations and anxiety in alcohol-free situations as measured in the present study does not seem to impact quantity and frequency of alcohol consumption in a college sample or their reported alcohol problems. The findings presented in the current paper also suggest that the frequency and quantity of alcohol consumption appears to be fairly stable across levels of social anxiety; however, individuals with social phobia may be more vulnerable to alcohol-related problems or more likely to report these types of problems. While the present study did not find the moderator effects that we had anticipated with the difference score calculated from the anxiety in alcohol-related situations and anxiety in alcohol-free situations, the correlation between social phobia and the alcohol-related problems and the implications of this relationship may provide directions for future research.

ACKNOWLEDGEMENTS

First and foremost, the author wishes to thank Chris Correia for his guidance, support, expedient feedback, and unceasing patience. His involvement with this project helped to make it an enjoyable and rewarding experience. The author would like to thank Dudley McGlynn for his feedback regarding methodological issues and his editorial assistance. For patient and expert assistance with data analysis, the author expresses gratitude to Adrian Thomas.

The author would also like to thank the undergraduate research team for their enthusiasm and efficiency in running sessions and entering data. For continuous encouragement and support, gratitude is expressed to the author's family and friends.

Style manual or journal used APA Publication Manual (5th edition)

Computer software used Microsoft Word 2003

TABLE OF CONTENTS

LIST OF TABLES		x
I.	INTRODUCTION.....	1
	Theories on the Comorbid Relationship between Social Anxiety and Alcohol Use.....	2
	Studies that Support the Comorbid Relationship between Social Anxiety and Alcohol Use.....	3
	The Relationship between Social Anxiety and Alcohol Use in College Student Samples.....	5
	The Need for a Moderator of the Relationship between Social Anxiety and Alcohol Use.....	9
II.	METHOD.....	12
	Participants.....	12
	Measures.....	12
	Information Sheet.....	12
	Substance Use Quantity and Frequency.....	13
	Substance Use-related Problems.....	13
	Social Interaction Anxiety.....	14
	Social Phobia.....	15
	Procedures.....	15
	Data Analytic Strategy.....	16
III.	RESULTS.....	17
	Summary Of Descriptive Data for Drinkers-only Sample.....	17
	Analysis of Correlational Relationships.....	17
	Regression Analyses.....	17
	Regression Analyses by Gender.....	19
IV.	DISCUSSION.....	20
	The Social Interaction Anxiety – Difference Score.....	21
	The Social Phobia Scale and Alcohol-related Problems.....	22
	Limitation and Future Directions.....	23
V.	REFERENCES.....	26

VI.	APPENDICES.....	30
	A. TABLES.....	31
	B. INFORMED CONSENT.....	36
	C. QUESTIONAIRES.....	38

LIST OF TABLES

Summary of Descriptive Data for Drinkers-only Sample.....	31
Correlations Among Anxiety Variables and Alcohol Variables.....	31
Summary of Regression Analysis Accounting for Frequency of Alcohol Use.....	33
Summary of Regression Analysis Accounting for Quantity of Alcohol Use.....	34
Summary of Regression Analysis Accounting for Rutgers Alcohol Problems Index Scores.....	35

ALCOHOL AND SOCIAL ANXIETY IN A COLLEGE STUDENT POPULATION

Social anxiety and alcohol use are both prevalent among the general public and among college students. Comorbidity is defined as the occurrence of two or more different disorders in the same individual (Brown & Barlow, 1992). Persistent social anxiety symptoms in an individual may predispose him or her to subsequent, comorbid substance abuse (Crum & Pratt, 2001). Patients with these dual diagnoses can be a challenge to the clinician because “they may not respond as well to treatment as other patients, may have greater relapse, attrition, and readmission rates, and may manifest symptoms that are more severe, chronic, and refractory in nature” (Kessler et al., 1997).

Several epidemiological and clinical studies have pointed to an elevated rate of comorbidity between social anxiety and substance abuse, and specifically alcohol abuse (e.g., Regier et al., 1990; Kessler et al., 1997). The Epidemiologic Catchment Area (ECA) survey provided a broad view of the relationship between anxiety disorders and alcohol abuse. This survey sampled 20,291 persons who were interviewed by researchers at the National Institute of Mental Health in order to determine the incidence of comorbidity in both community and institutional populations. When compared to a norm group, the findings showed that people with any anxiety disorder showed a 50% greater likelihood of a comorbid diagnosis of an alcohol use disorder (odds ratio [OR] = 1.52) (Regier et al., 1990). The National Comorbidity Survey (NCS) provided consistent findings with regard to comorbidity, focusing on specific types of anxiety, such as social

anxiety (Kessler et al., 1997). This survey sampled 8,098 individuals from across the United States in order to provide a nationally representative sample. The risk for developing alcohol dependence was significantly elevated among individuals with social anxiety (Kessler et al., 1997). The data from both the ECA study and the NCS indicate that there are high comorbidity rates between alcohol abuse or dependence and social anxiety.

However, findings on the relationship between social anxiety and alcohol use among college students have been less clear, with some studies indicating that social anxiety may serve as a risk factor for alcohol use (e.g., Kushner, Sher, & Erickson, 1999; Kidorf & Lang, 1999) and other studies indicating that social anxiety may serve as a protective factor against alcohol use and related problems (e.g., Bruch et al., 1992). In light of these findings, Tran, Haaga, and Chambless (1997) suggested that a number of variables might moderate the relationship between social anxiety and alcohol use and related problems among college students. The present study will attempt to describe the relation between social anxiety, alcohol use, and related problems in a college sample by examining the relationship between social anxiety, reported anxiety in situations involving or not involving alcohol, and actual alcohol use and related problems.

Theories on the Comorbid Relationship between Social Anxiety and Alcohol Use

A number of theoretical models have been advanced to explain the comorbid relationship between social anxiety and alcohol use and related problems. One prevailing and well-researched theory is the Self-Medication Hypothesis (SMH). There are three main assumptions of the SMH: (1) that the psychological variables, such as social anxiety, develop prior to substance use and related problems; (2) that the substance use

provides relief from the symptoms of the psychological variables; (3) the relief from the symptoms of the psychological variables results in continued and problematic substance usage (Morris, Stewart, & Ham, 2005). Simply stated, alcohol has been shown to relieve anxiety symptoms, so anxiety can be seen as a risk factor for alcohol use and related problems among people who have expectations that alcohol will reduce their anxiety symptoms.

Studies that Support the Comorbid Relationship between Social Anxiety and Alcohol Use

In addition to the epidemiological studies that support the relationship between social anxiety and substance use, a number of other studies have been used to investigate the nature of the relationship. Many of these studies have been supportive of the notion that tasks, situations, and mood states associated with anxiety may lead to an increase in alcohol consumption. For example, a study conducted by Abrams, Kushner, Medina, and Voight (2002) tested the hypothesis that individuals with social anxiety would self-administer alcohol after a social anxiety challenge in greater quantities than after a neutral task. They also examined whether drinking increased before or after a social anxiety challenge, and the self-reported reasons that participants gave for their choices. This hypothesis was tested on 44 individuals from the Minneapolis-St. Paul area who met current American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision (DSM-IV-TR, 2000) criteria for social anxiety and who classified themselves as social drinkers. The primary measures used were the State-Trait Anxiety Inventory: State Form (STAI-S; Spielberger, 1983), three visual analogue scales designed to assess performance anxiety (Abrams, Kushner, Medina, & Voight, 2001), and exit questionnaires entitled “Reasons for Higher-Strength Drink

Choices” and “Reasons for Lower-Strength Drink Choices” that were derived from an empirically validated alcohol expectancies questionnaire (Kushner, Sher, Wood, & Wood, 1994). The results were consistent with the hypothesis, indicating that participants consumed more alcohol after the social anxiety challenge than after the neutral task. These findings are consistent with the SMH theory, indicating that participants increased their alcohol consumption in order to ease the symptoms of their anxiety. Interestingly, the results also indicated that participants tended to drink less immediately before a social anxiety challenge than before a neutral task. In a self-report of their behaviors, participants indicated that they limited their drinking before the social anxiety challenge because they did not want to impair their performance or enjoyment of the task.

A study by Swendsen et al. (2000) used the experience sampling method (ESM) to test the SMH, based on four clinical variables associated with alcohol use disorders: family history of alcohol problems, high-risk consumption, trait anxiety, and symptoms of depression. The authors hypothesized that negative mood states would predict increases in later alcohol consumption and that alcohol consumption would be cross-sectionally associated with lower levels of negative affect. The hypotheses were tested on a community sample of 100 participants who reported drinking alcohol at least three times per week and were not currently enrolled in or in need of alcohol treatment. A 30-day timeline follow-back assessment (TLFB; Sobell & Sobell, 1992), the alcohol abuse and dependence section of the Structured Clinical Interview for *DSM-IV* (SCID; First, Gibbon, Spitzer, & Williams, 1996), and sections of the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughan, Williams, & Spitzer, 1985) were administered to determine eligibility for the study. The primary measure used for the study was an

electronic interview (ELI) device that included three daily mood electronic interviews, a drinking electronic interview that was completed once per hour when the participant was drinking alcohol, and a daily report of desire to drink. The ELI was compatible with a small, portable electronic organizer that the participants used to communicate with the researchers. The results indicated that reported nervousness during the 8:00 – 9:30 pm assessment was a reliable predictor of later alcohol consumption, and that men were more likely than women to increase their alcohol consumption when nervous. Consistent with the researchers' second hypothesis, participants reported lower levels of nervousness during and after alcohol consumption than prior to alcohol consumption. These findings were also consistent with the SMH, indicating that participants' social anxiety symptoms were reported to decrease after the self-administration of alcohol.

These studies demonstrate that a variety of methodologies have consistently found a comorbid relationship between social anxiety and alcohol use and related problems. Relationships between diagnosed social anxiety and alcohol have been found, and relations have also been found between negative emotions such as nervousness and alcohol consumption. Furthermore, alcohol consumption has also been influenced by the type of task (social or non social) and the mood or nervousness of the drinker. Despite the robustness of these findings, it is important to note that several studies have failed to find a relationship between social anxiety and alcohol use (e.g., Naftolowitz, Vaughn, Ranc, & Tancer, 1994; Ham, Hope, White, & Rivers, 2002).

The Relationship between Social Anxiety and Alcohol Use in College Student Samples

The results of epidemiological studies using clinical and community samples have shown a strong link between social anxiety and alcohol use. However, the results of

studies that use a college student population to investigate a possible link between social anxiety and alcohol use have yielded mixed findings.

Alcohol expectancies have been examined as a possible moderator of the relationship between social anxiety and alcohol use and related problems. Kidorf and Lang (1999) predicted that participants with trait anxiety and expectations that alcohol would enhance their overall social assertiveness and decrease their general distress would have greater increases in drinking when under stress than participants who did not have positive expectancies of alcohol. This hypothesis was tested using 42 male and 42 female undergraduates of legal drinking age who were enrolled in an introductory psychology class. The primary measures used were the Drinking Behavior and Experience Study (DBES) which was developed specifically for this study to assess self-reported drinking behavior, the Alcohol Expectancies Questionnaire (AEQ; Brown, Goldman, Inn, & Anderson, 1980), the Social Avoidance and Distress Scale (SADS; Watson & Friend, 1969), and the Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, 1965). The participants completed two sessions: one under comfortable conditions and one under high stress conditions. During the comfortable condition, the participants filled out the MAACL in a comfortably furnished room while drinking an alcoholic beverage and were told that the purpose of the session was to evaluate the effects of routine drinking on a self-report of physiological and psychological responding. During the high stress condition, participants were taken into a room with a video camera and recording equipment and were told that after a 30-minute drinking period they would have to give a 15-minute speech before the camera on their most undesirable characteristic. To evaluate the changes in drinking under comfortable conditions and under high stress conditions, a

difference score was calculated by subtracting the amount of alcohol consumed during the comfortable condition from the alcohol consumed during the high stress condition. This difference score was positively correlated with the SADS, the AEQ, and the AEQ by Gender Interaction, indicating that the participants' expectations that alcohol would enhance their overall social assertiveness and decrease their general distress were significantly correlated with the drinking difference scores of men, but not the drinking difference scores of women. Individuals with high levels of trait social anxiety were also likely to increase their alcohol consumption in anticipation of the high stress condition.

Positive alcohol expectancies have been examined to determine whether they may predict alcohol use and related problems and whether they interact with measures of social functioning to determine which individuals may be problem drinkers. Lewis and O'Neill (2000) hypothesized that persons with alcohol-related problems would endorse a greater number of positive alcohol expectancies than those without alcohol-related problems. They also tested the interaction between alcohol expectancy subscales and social functioning scales to determine their ability to differentiate problem and non-problem drinkers. These hypotheses were tested on a college student population (N = 113). The primary measures used were the CAGE (Ewing, 1984), the Rutgers Collegiate Substance Abuse Screening Test (RCSAST; Bennett et al., 1993), the Alcohol Expectancies Questionnaire – Adolescent Form (AEQ-A; Christiansen, Goldman, & Inn, 1982), and several scales to assess social functioning and related factors including the Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969), the Shyness Scale and Sociability Scale (Cheek & Buss, 1981), and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Problem drinkers endorsed a greater number of positive alcohol

expectancies. However, the results did not indicate that alcohol expectancies and social functioning interacted to influence problem drinking status.

Research has also been conducted to determine whether alcohol expectancies moderate the relationship between shyness and alcohol use and related problems in a college sample. Bruch et al. (1992) hypothesized that positive alcohol expectancies might serve as a moderator between shyness and alcohol consumption. This hypothesis was tested on a college student population (N = 543). The primary measures used in this study were the Cheek and Buss Shyness Scale (CBSS; Cheek, 1983), the Alcohol Expectancies for Social Evaluative Situations scale (AESES; Bruch et al.), the AEQ (Brown et al., 1980), and various questions designed to assess alcohol use, religiosity, and parental and peer attitudes and behavior towards alcohol use. The results showed no linear relation between shyness and alcohol consumption, and provided no support for the hypothesis that positive alcohol expectancies might serve as a moderator. The findings even indicated that alcohol expectancies serve to suppress the relationship between shyness and alcohol use.

The suppressor effect of alcohol expectancies was also found in the relationship between social anxiety and alcohol. Tran et al. (1997) hypothesized that an interaction between social anxiety and alcohol outcome expectancies would serve as a predictor for alcohol consumption. This hypothesis was tested on a college student population (N = 229). The primary measures used were the AESES (Bruch et al., 1992), the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), the Marlowe-Crowne Social Desirability Scale – Form C (SDS-C; Crowne & Marlowe, 1960), and the AEQ Tension Reduction subscale (TRS; Brown et al., 1980). A relationship between social anxiety and

alcohol consumption was found for those individuals with low expectancies that alcohol would reduce their anxiety symptoms in social situations, but not for individuals with high expectancies. Among those with low expectations that alcohol would reduce their anxiety symptoms in social situations, those participants with high levels of social anxiety reported lower frequency and quantity of alcohol consumption than those with lower levels of social anxiety. The most notable implication from Tran et al. (1997) is that social anxiety may serve as a protective factor rather than a risk factor for alcohol-related problems. These results are consistent with those found by Bruch, et. al. (1992) and other studies reporting that social anxiety may be a protective factor (e.g., Eggleston, Woolaway-Bickel, & Schmidt, 2004). These studies stand in contrast to those that have found social anxiety to increase the risk of alcohol use (Swendsen et al., 2000; Kidorf & Lang, 1999). The mixed findings produced by studies using college student samples may indicate that the SMH alone is insufficient to predict whether social anxiety will serve as a risk factor or a protective factor for alcohol use and related problems.

The Need for a Moderator of the Relationship between Social Anxiety and Alcohol Use

Given the inconsistencies in the college student literature, several researchers have looked for variables that may moderate between social anxiety and alcohol use and related problems (Bruch et al., 1992; Eggleston et al., 2004; Tran et al., 1997). A moderator is defined as “a qualitative or quantitative variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable” (p. 1174, Baron & Kenny, 1986). Tran et al. (1997) have suggested that the relationship between social anxiety and alcohol consumption may be

moderated by multiple third variables, such as the nature of the drinking situation, severity of social anxiety, or avoidance of alcohol consumption in social situations.

The present study examined the potential moderating effects of the amount of anxiety reported in various social situations either involving or not involving alcohol. The primary measure of anxiety in various situations was the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), which was modified to examine the difference between anxiety experienced in situations with alcohol and anxiety experienced in alcohol-free situations. The original SIAS was developed in 1989 to aid in research on social anxiety, and is designed to measure various social interaction fears such as: “distress when meeting and talking with other people, be those people members of the opposite sex, strangers, or friends . . . fears of being inarticulate, boring, sounding stupid, not knowing what to say or how to respond within social interactions, and of being ignored” (Mattick & Clarke, 1998, p. 457). The items on the SIAS also address social situations that are very common to college students, such as: mixing comfortably with people from school, meeting people at parties, worrying about appearing awkward in social situations, interacting with attractive people of the opposite sex, and mixing socially with strangers, acquaintances, and friends.

We expected that the difference score calculated from this scale would serve as a moderator for the relationship between social anxiety and alcohol use and related problems. In other words, participants who were more anxious in social situations without alcohol than they were in social situations with alcohol would be more likely to report higher levels of alcohol use and related problems. Conversely, participants who were more anxious in social situations with alcohol than they were in social situations

without alcohol would be less likely to put themselves in social situations involving alcohol, and would be less likely to report high levels of alcohol use and related problems.

When trying to determine if social anxiety and alcohol use and related problems are related, it seems that an analysis of the situations that trigger the anxiety would be warranted. If college students are very anxious in social situations, the assumption is that they will drink heavily in those situations; however, it is possible that college students who are more anxious in social situations involving alcohol may simply avoid those situations entirely. Thus their social anxiety would serve as a protective factor against alcohol use and related problems. This would suggest that a more basic analysis of the situations that produce anxiety is necessary in order to understand why some people with social anxiety drink to self-medicate and others avoid alcohol in these situations or avoid social situations entirely. The current study used a modified version of the SIAS (Mattick & Clarke, 1998) to examine the relationship between social anxiety, a variety of social situations that involved or did not involve alcohol, and alcohol use and related problems.

METHOD

Participants

Participants were 361 Auburn University students who participated in the present study for extra credit in their psychology and statistics courses. The only selection criteria for the study was that all participants had to be 19 years or older. One-hundred and eleven of the students reported no alcohol consumption during the previous 28 days and were not used in the analyses, leaving 250 questionnaires for analysis. Among the 250 participants included in the sample, 76.4% were female. With regard to ethnic categories among participants sampled, 82.5% were Caucasian, 15.1% were African American, 1.8% were Asian, and 4.2% were American Indian or Alaskan Native. With regard to years of school completed among participants sampled, 22.9% were freshmen, 19.9% were sophomores, 24.1% were juniors, and 33.1% were seniors. Rutgers Alcohol Problem Index (RAPI: White & Labouvie, 1989) data was only collected for 184 out of the total sample of 250 drinkers due to a clerical error; however, correlations between the RAPI and other alcohol measures proved to be consistent with other studies.

Measures

Information sheet. All participants were asked to fill out a questionnaire stating their gender, age, years of school completed, race, and type of residence. No further identifying information was collected via the information sheet in order to keep participants' data anonymous.

Substance use quantity and frequency. We used the Daily Drinking Questionnaire (DDQ; Collins et al., 1985) to assess the average amount of alcohol each participant had consumed during the previous 28 days. Participants indicated how much alcohol they had consumed during a typical week and the maximum number of drinks they had consumed on a single occasion during the last 28 days. Extensive research supports the validity of self-reported drug use when participants' confidentiality is assured (Johnston & O'Malley, 1985).

Substance use-related problems. We assessed alcohol use-related problems with a modified version of the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The scale consisted of 23 items assessing presence or absence of specified problems with alcohol over the individual's lifetime. Ratings are provided on a 5-point Likert scale ($0 = \text{never}$, $1 = 1\text{-}2 \text{ times}$, $2 = 3\text{-}5 \text{ times}$, $3 = 6\text{-}10 \text{ times}$, $4 = \text{more than } 10 \text{ times}$). This scale was designed for individuals between the ages of 12 and 21, making it an appropriate tool for use with college students. Previous measures of internal consistency have been adequate ($\alpha = .77\text{-}.82$; White & Labouvie, 1989), and the RAPI displayed adequate 1-month test-retest reliability in a sample of college students ($r = .72$; Borsari & Carey, 2000). Predictive validity of the measure is supported by relationships with other use-related problems, such as intoxicated driving (Johnson & White, 1989). The RAPI showed adequate internal consistency in the current sample ($\alpha = .85$). Sample items include "felt physically or psychologically dependent on alcohol or other drugs," "neglected your responsibilities," and "felt that you needed more alcohol or other drugs than you used to use in order to get the same effect."

Social interaction anxiety. We assessed social interaction anxiety using the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). The original measure consisted of 19 items that assess social interaction fears. The SIAS item pool was developed using items modified from existing social anxiety inventories and newly constructed items developed from clinical interviews with socially anxious and socially phobic patients. This scale has shown high internal consistency and short-term test-retest reliability in samples of undergraduate students (Tran et al., 1997; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998).

In order to assess social interaction anxiety under different conditions, we modified the scale to include the 19 original items with the qualifier “when you *are* using or under the influence of alcohol” as well as the 19 original items with the qualifier “when you *are not* using or under the influence of alcohol.” Two of the items were slightly modified so that they relate to a college student population: question 1 was changed from “I get nervous if I have to speak with someone in authority (teacher, boss, etc.)” to “I get nervous if I have to speak with someone in authority (parent, police, teacher, boss, etc),” and question 4 was changed from “I find difficulty mixing comfortably with the people I work with” to “I have difficulty mixing comfortably with the people I go to school with or work with.” The Pleasant Events Schedule (PES; MacPhillamy & Lewinsohn, 1982) has been modified in a similar manner in several studies (Correia, Simons, Carey, & Borsari, 1998; Correia & Carey, 1999; Correia, Carey, & Borsari, 2002).

The modified scale produced two primary scores: the SIAS alcohol-free score (SIAS-B) and the SIAS alcohol-related score (SIAS-A). A difference score for each

participant was calculated as the SIAS alcohol-free total score minus the SIAS alcohol-related total score. A positive difference score indicated greater anxiety in alcohol-free situations than in alcohol-related situations. A negative difference score indicated greater anxiety in alcohol-related situations than in alcohol-free situations. The SIAS-A and SIAS-B showed adequate internal consistency in the current sample (SIAS-A, $\alpha = .90$; SIAS-B, $\alpha = .92$).

Social phobia. We assessed social phobia using the Social Phobia Scale (SPS; Mattick & Clarke, 1998). The measure consists of 20 items that assess social scrutiny fears specific to daily activities. The SPS item pool was developed using items modified from existing social anxiety inventories and newly constructed items developed from clinical interviews with social anxious and socially phobic patients. Sample items include “I get nervous that people are staring at me as I walk down the street” and “I fear I may blush when I am with others.” This scale has shown high internal consistency and short-term test-retest reliability in samples of undergraduate students (Mattick & Clarke, 1998). The SPS showed adequate internal consistency in the current sample ($\alpha = .92$).

Procedures

Participants completed a research packet containing the previously described questionnaires addressing substance use and social anxiety at one of several scheduled data-collection sessions. After providing demographic data, participants completed the measures and turned them in when completed in exchange for a voucher worth one hour of extra credit for use in their psychology or statistics courses.

Data Analytic Strategy

The first hypothesis for this study was that the difference score should be related to a variety of alcohol measures, including alcohol-related problems, quantity of alcohol consumed, and frequency of alcohol consumption. A positive difference score, which indicated greater anxiety in alcohol-free situations than in alcohol-related situations, should be positively correlated with both the RAPI (White & Labouvie, 1989) and the DDQ (Collins et al., 1985). The second hypothesis was that the relationship between the difference score and the alcohol measures would partially depend on the symptoms of social phobia. Participants with a positive difference score and a high score on a measure of social phobia should report the highest levels of alcohol use and problems.

Pearson correlations between alcohol-free (SIAS-B) and alcohol-related (SIAS-A) scales from the modified SIAS were calculated to investigate a relationship. We predicted that a positive difference score would relate to a high risk of alcohol-related problems, quantity of alcohol consumed, and frequency of alcohol consumption. Conversely, we predicted that a negative difference score would relate to a low risk of alcohol-related problems, quantity of alcohol consumed, and frequency of alcohol consumption. We used this difference score (SIAS-DS) in a series of regressions, each using a different alcohol measure as the dependent variable.

RESULTS

Summary of Descriptive Data for Drinkers-only Sample

The drinkers-only sample size, minimum, maximum, mean, and standard deviation was calculated for all measures used in this study (see Table 1). Again, RAPI data was only collected for 184 out of the total sample of 250 drinkers due to a clerical error.

Analysis of Correlational Relationships

We calculated Pearson correlations to assess relationships between anxiety variables and alcohol variables (see Table 2). The alcohol variables (RAPI and DDQ) were positively correlated with one another. The anxiety variables (SPS, SIAS-A, SIAS-B, and SIAS-DS) were also correlated with one another in the expected direction. However, the alcohol variables and anxiety variables were not correlated with one another with the exception of the RAPI and the SPS, which displayed a moderate positive correlation.

Regression Analyses

In our first regression series (see Table 3), we used the DDQ frequency score as our dependent variable. The independent variables were entered in steps. First, we introduced gender. Second, we introduced the SPS total. Third, we introduced the SIAS difference score. Fourth, we introduced the interaction term (SIAS-DS x SPS). We predicted that the SPS would not be a significant predictor of DDQ frequency, and that

both the SIAS difference score and the interaction term would be significant predictors of DDQ frequency. While all models were significant (Model 1, $F(1, 248) = 14.069, p < .001$; Models 2-4, $p < .01$), gender proved to be the only significant predictor ($p < .001$) of the frequency of alcohol use and accounted for approximately 6% of the variance in the final model ($F(2, 245) = 3.685, p < .01$). The SPS total score, the difference score calculated from the SIAS, and the interaction term did not prove to be significant predictors in this regression model.

In our second regression series (see Table 4), we used the DDQ quantity score as our dependent variable. The independent variables were entered in steps. First, we introduced gender. Second, we introduced the SPS total. Third, we introduced the SIAS difference score. Fourth, we introduced the interaction term (SIAS-DS x SPS). We predicted that the SPS would not be a significant predictor of DDQ quantity, and that both the SIAS difference score and the interaction term would be significant predictors of DDQ quantity. Similar to our first regression series, all models were significant (e.g., Model 4, $F(4, 245) = 8.638, p < .001$); however, gender proved to be the only significant predictor ($p < .001$) of the quantity of alcohol use and accounted for 12% of the variance in the final model. The SPS total score, the difference score calculated from the SIAS, and the interaction term did not prove to be significant predictors in this regression model.

In our third regression series (see Table 5), we used the RAPI score as our dependent variable. The independent variables were entered in steps. First, we introduced gender. Second, we introduced the DDQ frequency and DDQ quantity scores. Third, we introduced the SPS. Fourth, we introduced the SIAS difference score. Fifth, we

introduced the interaction term (SIAS difference score x SPS). We predicted that the SPS would not be a significant predictor of alcohol problems indicated by the RAPI, and that both the SIAS difference score and the interaction term would be significant predictors of alcohol problems indicated by the RAPI. All models were significant (Model 1, $p < .05$; Models 2-5, $p < .001$). In Model 1, gender was a significant predictor of alcohol problems ($F(1, 182) = 4.688, p < .05$) and accounted for less than 3% of the variance. In Model 2, the quantity of alcohol use ($F(3, 180) = 28.614, p < .001$) and the frequency of alcohol use ($F(3, 180) = 28.614, p < .01$) emerged as significant predictors of alcohol problems and helped account for 32% of the variance. Gender was no longer a significant predictor in this model. In Models 3-5, the quantity of alcohol use ($p < .001$) and the frequency of alcohol use ($p < .01$) remained significant predictors. Interestingly, the SPS total score was also a significant predictor of alcohol problems in these models and increased the amount of variance accounted for to 37% (Model 3, $F(4, 179) = 26.245, p < .001$). The difference score calculated by the SIAS and the interaction term were not significant predictors of alcohol problems in this regression model.

Regression Analyses by Gender

We ran the same regression analyses described above for a male-only sample (Regression series 1-2, $n = 59$; Regression series 3, $n = 39$) and a female-only sample (Regression series 1-2, $n = 191$, Regression series 3, $n = 145$). Results were similar to the original regression analyses. Neither the SIAS - DS nor the interaction term were significant predictors in these analyses.

DISCUSSION

The strong link between social anxiety and alcohol use has been identified in epidemiological studies (Regier et al., 1990; Kessler et al., 1997) and in studies that have sampled from the community (e.g. Abrams et al., 2002; Swendsen et al., 2000). However, these robust findings have not extended to the college student literature, and research in this area has produced mixed findings. Some studies have indicated that social anxiety may serve as a risk factor for alcohol use and related problems (e. g. Kidorf & Lang, 1999), while other studies have indicated that social anxiety may serve as a protective factor against alcohol use and related problems (e.g. Bruch et al., 1992). As a result of these mixed findings, the need for a variable that moderates the relationship between social anxiety and alcohol use in a college student sample has been a focus of recent research.

The search for a moderator between social anxiety and alcohol use and related problems in the college student literature has also produced mixed findings (Bruch et al., 1992; Eggleston et al., 2004; Tran et al., 1997). This search has proven to be difficult; however, much new research has been generated based upon the findings. Researchers have hypothesized that the relationship between social anxiety and alcohol consumption may be moderated by multiple third variables, such as alcohol expectancies, the nature of the drinking situation, severity of social anxiety, or avoidance of alcohol consumption in social situations (e.g. Tran et al., 1997). The present study examined the potential

moderating effects of the amount of anxiety reported in various social situations either involving or not involving alcohol using the Social Interaction Anxiety Scale (Mattick & Clarke, 1998).

Correlations between the measures used in the present study further illustrated the need to seek a potential moderator of the relationship between social anxiety and alcohol use. The alcohol measures (DDQ Quantity, DDQ Frequency, and RAPI) were all positively correlated with one another. The anxiety measures (SPS, SIAS-A, SIAS-B) were also correlated with one another in the expected direction. Despite these correlations, the alcohol measures and anxiety measures did not show any significant correlations with one another, with the exception of the positive correlation between the RAPI and the SPS. The lack of a relationship between the anxiety variables and alcohol variables necessitated the introduction of a moderator, the SIAS-DS.

The Social Interaction Anxiety Scale – Difference Score

We calculated the SIAS-DS by obtaining a difference score for each participant from the SIAS alcohol-free total score (SIAS-B) minus the SIAS alcohol-related total score (SIAS-A). A positive difference score indicated greater anxiety in alcohol-free situations than in alcohol-related situations. We expected that individuals with a positive difference score would report higher alcohol consumption and higher levels of alcohol-related problems. Conversely, a negative difference score indicated greater anxiety in alcohol-related situations than in alcohol-free situations. We expected that an individual with a negative difference score would report lower alcohol consumption and a lower level of alcohol-related problems. The SIAS-DS showed adequate internal consistency and was correlated with the SIAS-A, SIAS-B, and SPS in the expected direction (e.g.,

positively correlated with social phobia and anxiety in alcohol-free situations, negatively correlated with anxiety in alcohol-related situations)

We anticipated that the SIAS – DS and an interaction term that captured the dual influence of social phobia (the SPS) and anxiety in different social situations (SIAS-DS) would be significant predictors of the quantity and frequency of alcohol consumption; however, neither proved to be a significant predictor of the DDQ in a drinkers-only sample or in a drinkers-only sample split by gender. The standard version of the SIAS has been shown to be a poor predictor of the RAPI in previous studies (Eggleston et al., 2004); however, we had expected the modified version and the interaction term to serve as a predictor of alcohol-related problems in a drinkers-only sample. The SIAS-DS and the interaction term did not prove to be significant predictors of alcohol-related problems, as measured by the RAPI. From these findings we concluded that the difference in anxiety in alcohol-related situations and anxiety in alcohol-free situations as measured in the present study does not seem to impact quantity and frequency of alcohol consumption in a college sample or their reported alcohol problems.

The Social Phobia Scale and Alcohol-related Problems

We originally began to seek a moderator for the relationship between social anxiety and alcohol due to several findings that indicated that general measures of social phobia were not predictive of alcohol use and related problems. Based upon previous studies that did not find general measures of social phobia to be a predictor of increased alcohol consumption in a college student population (e.g. Tran et al., 1997), we did not anticipate that the SPS would be a significant predictor of the quantity and frequency of alcohol consumption or of alcohol-related problems. As predicted, the SPS did not prove

to be a significant predictor of quantity or frequency of alcohol consumption in the present study, as measured by the DDQ. Interestingly, the SPS did emerge as a significant predictor of the RAPI in the present study. The majority of research in the field does not include the RAPI in analyses of the relationship between social anxiety and alcohol consumption. Those that have included the RAPI have not found a relationship between measures of social phobia and alcohol-related problems (Eggleston et al., 2004). The findings presented in the current paper suggest that the frequency and quantity of alcohol consumption appears to be fairly stable across levels of social anxiety; however, individuals with social phobia may be more vulnerable to alcohol-related problems or more likely to report these types of problems. Perhaps social phobia may serve to moderate the relationship between quantity and frequency of alcohol consumption and alcohol-related problems. In our review of the literature there was little information available about the relationship between social phobia and alcohol-related problems, indicating a need for research that seeks to explore this relationship.

Limitations & Future Directions

There were several limitations in the present study. First, the primary method of data collection was via self-report instruments. Although all of the measures we used possess good psychometric properties, self-report measures in general are often unable to accurately capture their intended data because of their retrospective nature and the unreliability of participant's memory for past events. Second, the SIAS-DS was a variable created specifically for the present study. As such, we have no psychometric data on the measure beyond the internal reliability of the scales. Thus, it is possible that we did not adequately assess and differentiate between anxiety experienced in alcohol-

related situations and anxiety experienced in alcohol free situations. Third, the RAPI data was not collected for all participants due to a clerical error. While we do not believe that this error adversely affected the data, as the internal consistency of the measure and correlations with other alcohol variables were adequate, this may be a limiting factor.

The severity of social phobia symptoms was assessed via several measures; however, a diagnosed sample of socially phobic individuals was not used in the present study. In fact, many of our participants reported little to no social anxiety symptoms. Similarly, many of our participants reported little to no alcohol use or alcohol related problems. Perhaps the design of the present study would be more effective in a sample of diagnosed socially phobic individuals or in a sample with more abusive patterns of alcohol use. Indeed, many of the studies that have found a relationship between alcohol use and social anxiety used clinical samples or large general samples with sufficient numbers of diagnosed individuals to create meaningful clinical subgroups (e.g., Abrams et al., 2002). The addition of a screening phase would serve to provide a sample of college-student participants with these diagnoses.

Previous experimental research has indicated that social anxiety symptoms may serve as a risk factor for increased alcohol consumption (e.g., Kidorf & Lang, 1999); however, survey-based research in a college student population has indicated that social anxiety symptoms may serve as a protective factor against increased alcohol consumption (e.g., Bruch et al., 1992; Tran et al., 1997; Eggleston et al., 2004). This could be due in part to the unreliability of self-report, which indicates a need for more experimental session-based research in the future. This type of research will allow for more control over the anxiety-inducing conditions, and observation of the participant's anxiety level in

the situation may function as a more reliable measure than retrospective self-report. Similarly, an experimental design will allow for a more accurate view of alcohol consumption than is provided via retrospective self-report.

We did not predict that the SPS and the alcohol variables would be related due to previous research that indicated no relationship between general measures of social phobia and measures of alcohol use (e.g. Tran et al., 1997). Interestingly, the SPS and the RAPI were positively correlated in the present study. Upon review of the literature, we found that few studies have used a measure of alcohol-related problems in their analyses. Perhaps a measure of alcohol-related problems is better able to capture the link between alcohol and social anxiety than a measure that focuses on quantity and frequency. This was the case in the present study, as the SPS was not correlated with either the DDQ Quantity or DDQ Frequency. Perhaps individuals who endorse symptoms of social phobia are more likely to endorse alcohol-related problems. While the present study did not find the moderator effects that we had anticipated with the SIAS, the correlation between the SPS and the RAPI and the implications of this relationship may provide directions for future research.

REFERENCES

- American Psychological Association. (2000). *Diagnostic and statistical manual of mental disorders*, 4th edition, text revision. Washington, DC: American Psychiatric Press, Inc.
- Abrams, K., Kushner, M., Medina, K., & Voight, A. (2001). The expectancy and pharmacologic effects of alcohol on social anxiety in individuals with social phobia. *Drug and Alcohol Dependence*, 64, 219-231.
- Abrams, K., Kushner, M. G., Medina, K. L., Voight, A. (2002). Self-administration of alcohol before and after a public speaking challenge by individuals with social phobia. *Psychology of Addictive Behaviors*, 16, 121-128.
- Baron, C. R. & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychology research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 52, 844-863.
- Bennett, M. E., McCrady, B. S., Frankenstein, W., Laitman, L. A., Van Horn, D. H. A., & Keller, D. S. (1993). Identifying young adult substance abusers: The Rutgers Collegiate Substance Abuse Screening Test. *Journal of Studies on Alcohol*, 54, 522-527.
- Borsari, B. & Carey, K. B. (2000). Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology*, 68, 728-733.
- Brown, S., Goldman, M., Inn, A., & Anderson, L. (1980). Expectations of reinforcement from alcohol: Their domain and relation to drink patterns. *Journal of Consulting and Clinical Psychology*, 48, 419-426.
- Brown, T. A., & Barlow, D. H. (1992). Comorbidity among anxiety disorders: Implications for treatment and DSM-IV. *Journal of Consulting & Clinical Psychology*, 60, 835-844.
- Bruch, M. A., Heimberg, R. G., Harvey, C. H., McCann, M., Mahone, M., & Slavkin, S. (1992). Shyness, alcohol expectancies, and alcohol use: Discovery of a suppressor effect. *Journal of Research in Personality*, 23, 137-149.

- Cheek, J. M. (1983). *The Revised Cheek and Buss Shyness Scale (RCBS)*. Unpublished, Wellesley College, Wellesley, MA.
- Cheek, J., & Buss, A. (1981). Shyness and sociability. *Journal of Personality and Social Psychology, 41*, 330–339.
- Christiansen, B. A., Goldman, M. S., & Inn, A. (1982). Development of alcohol-related expectancies in adolescents: Separating pharmacological from social-learning influences. *Journal of Consulting and Clinical Psychology, 21*, 561–579.
- Cohen, J. (1992). *A power primer*. *American Psychologist, 112*, 115-159.
- Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology, 53*, 189-200.
- Correia, C. J. & Carey, K. B. (1999). Applying behavioral theories of choice to drug use in a sample of psychiatric outpatients. *Psychology of Addictive Behaviors, 13*, 207-212.
- Correia, C. J., Carey, K. B., & Borsari, B. (2002). Measuring substance-free and substance-related reinforcement in the natural environment. *Psychology of Addictive Behaviors, 16*, 28-34.
- Correia, C. J., Simons, K. B., Carey, K. B., & Borsari, B. E. (1998). Predicting drug use: Application of behavioral theories of choice. *Addictive Behaviors, 23*, 705-709.
- Crowne, D. P. & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349-354.
- Crum, R. M., & Pratt, L. A. (2001). Risk of heavy drinking and alcohol use disorders in social phobia: A prospective analysis. *American Journal of Psychiatry, 158*, 1693-1700.
- Eggleston, A. M., Woolaway-Bickel, K., & Schmidt, N. B. (2004). Social anxiety and alcohol use: Evaluation of the moderating and mediating effects of alcohol expectancies. *Anxiety Disorders, 18*, 33-49.
- Ewing, J. A. (1984). Detecting alcoholism: The CAGE Questionnaire. *The Journal of the American Medical Association, 252*, 1905-1907.
- First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. W. (1996). *User's guide for the Structured Clinical Interview for DSM-IV Axis I Disorders – research version*. New York: Biometrics Research.

- Ham, L. S., Hope, D. A., White, C. S., & Rivers, P. C. (2002). Alcohol expectancies and drinking behavior in adults with social anxiety disorder and dysthymia. *Cognitive Therapy and Research*, 26, 275-288.
- Heimberg, R. G., Mueller, G. P., Holt, C. S., Hope, D. A., & Liebowitz, M. R. (1992). Assessment of anxiety in social interaction and being observed by others: The Social Interaction Anxiety Scale and the Social Phobia Scale. *Behavior Therapy*, 23, 53-73.
- Johnson, V. & White H. R. (1989). An investigation of factors related to intoxicated driving behaviors among youth. *Journal of Studies on Alcohol*, 50, 20-30.
- Johnston, L.D., & O'Malley, P.M. (1985). Issues of validity and population coverage in student surveys of drug use. In B.A. Rouse, N.J. Kozel, & L.G. Richards (Eds.), *Self-report methods of estimating drug use: Meeting current challenges to validity* (National Institute on Drug Abuse Research Monograph No. 57, ADM 85-1402). Washington, DC: National Institute on Drug Abuse.
- Kessler, R. C., Crum, R. M., Warner, L. A., Nelson, C. B., Schulenberg, J., & Anthony, J. C. (1997). Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the national comorbidity survey. *Archives of General Psychiatry*, 54, 310-321.
- Kidorf, M. & Lang, A. R. (1999). Effects of social anxiety and alcohol expectancies on stress-induced drinking. *Psychology of Addictive Behaviors*, 13, 134-142.
- Kushner, M. G., Sher, K. J., & Erickson, D. J. (1999). Prospective analysis of the relation between DSM-III anxiety disorders and alcohol use disorders. *American Journal of Psychiatry*, 156, 723-732.
- Kushner, M., Sher, K., Wood, M., & Wood, P. (1994). Anxiety and drinking behavior: Moderating effects of tension-reduction alcohol outcome expectancies. *Alcoholism: Clinical and Experimental Research*, 18, 852-860.
- Lewis, B. A. & O'Neill, H. K. (2000). Alcohol expectancies and social deficits relating to problem drinking among college students. *Addictive Behavior*, 25, 295-299.
- Mattick, R. P. & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, 36, 455-470.
- MacPhillamy, D. J. & Lewinsohn, P. M. (1982). The Pleasant Events Schedule: Studies on the reliability, validity, and scale intercorrelation. *Journal of Consulting and Clinical Psychology*, 50, 363-380.

- Morris, E. P., Stewart, S. H., Ham, L. S. (2005). The relationship between social anxiety disorder and alcohol use disorders: A critical review. *Clinical Psychology Review, 25*, 734-760.
- Naftlowlowitz, D. F., Vaughn, B. V., Ranc, J., & Tancer, M. E. (1994). Response to alcohol in social phobia. *Anxiety, 1*, 96-99.
- Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse. *Journal of the American Medical Association, 264*, 2511-2518.
- Robins, L. N., Helzer, J. E., Croughan, J., Williams, J. B. W., & Spitzer, R. L. (1985). *Diagnostic Interview Schedule, Version III-A*. Public Health Service ADDM-T-42-3 (4-85), Washington, DC.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Sobell, L. & Sobell, M. B. (1992). *Timeline Follow-Back: A technique for assessing self-reported alcohol consumption*. In R. Z. Litten & J. P. Allen (Eds.), *Measuring alcohol consumption: Psychological and biomedical methods* (41-72). Totowa, NJ: Human Press.
- Spielberger, C. (1983). *Manual for the State-Trait Anxiety Inventory* (Form Y). Palo Alto, CA: Consulting Psychology Press.
- Swendsen, J. D., Tennen, H., Carney, M. A., Affleck, G., Willard, A., Hromi, A. (2000). Mood and alcohol consumption: An experience sampling test of the self-medication hypothesis. *Journal of Abnormal Psychology, 109*, 198-204.
- Tran, G. Q., Haaga, D. A. F., Chambless, D. L. (1997). Expecting that alcohol use will reduce social anxiety moderates the relation between social anxiety and alcohol consumption. *Cognitive Therapy and Research, 21*, 535-553.
- Watson, D. & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology, 33*, 448-457.
- White, H. L. & Labouvie, E. W. (1989). Towards the assessment of adolescent problem drinking. *Journal of Studies on Alcohol, 50*, 30-37.
- Zuckerman, M. & Lubin, B. (1965). *Manual for the Multiple Affect Adjective Check List*. San Diego, CA: Educational and Industrial Testing Service.

APPENDICES

APPENDIX A: TABLES

Table 1
Summary of Descriptive Data for Drinkers-only Sample

	N	Minimum	Maximum	Mean	SD
DDQ Quantity	250	0	55	9.06	10.89
DDQ Frequency	250	0	7	2.02	1.71
RAPI Total	184	0	37	8.04	7.51
SPS Total	250	0	56	17.20	11.59
SIAS-A Total	250	0	56	16.31	9.98
SIAS-B Total	250	0	58	16.82	12.12
SIAS-DS	250	-54	51	.51	13.35

Note. Total $n=250$. RAPI $n=184$.

DDQ Quantity: Daily Drinking Questionnaire; number of alcoholic beverages consumed in a typical week

DDQ Frequency: Daily Drinking Questionnaire; number of days that alcoholic beverages are consumed in a typical week

RAPI: Rutger's Alcohol Problem Index

SPS: Social Phobia Scale

SIAS – form A: Social Interaction Anxiety Scale – alcohol-related anxiety, form A

SIAS – form B: Social Interaction Anxiety Scale – alcohol-free anxiety, form B

SIAS – DS: Social Interaction Anxiety Scale – difference score calculated from Pearson correlation between SIAS – form A and SIAS – form B

Table 2
Correlations among Anxiety Variables and Alcohol Variables

Variable	DDQ-Q	DDQ-F	RAPI	SPS	SIAS-A	SIAS-B	SIAS-DS
DDQ-Q	-						
DDQ-F	.671**	-					
RAPI	.537**	.505**	-				
SPS	-.054	-.021	.207**	-			
SIAS-A	-.123	-.064	.048	.520**	-		
SIAS-B	-.061	-.040	.122	.672**	.282**	-	
SIAS-DS	.036	.012	.072	.221**	-.491**	.697**	-

Note. Total $n=250$. RAPI $n=184$.

DDQ: Daily Drinking Questionnaire; *Q-Quantity of Alcohol Use, F-Frequency of Alcohol Use*

RAPI: Rutgers' Alcohol Problem Index

SPS: Social Phobia Scale

SIAS- A: Social Interaction Anxiety Scale – alcohol-related anxiety, form A

SIAS- B: Social Interaction Anxiety Scale – alcohol-free anxiety, form B

SIAS-DS: Social Interaction Anxiety Scale – difference score calculated from Pearson correlation between SIAS – form A and SIAS – form B

** $p < .01$.

Table 3
Summary of Regression Analysis Accounting for Frequency of Alcohol Use

Variable	β	<i>SE</i> β	B	<i>t</i>	Model <i>R</i> ²
Model 1					.054***
Gender	-.692	.184	-.232	-3.751***	
Model 2					.054**
Gender	-.697	.187	-.233	-3.732***	
SPS Total	.001	.007	.011	.176	
Model 3					.054**
Gender	-.697	.187	-.233	-3.729***	
SPS Total	.001	.007	.007	.103	
SIAS Difference Score	.002	.006	.020	.318	
Model 4					.057**
Gender	-.685	.188	-.229	-3.649***	
SPS Total	.001	.007	.006	.087	
SIAS Difference Score	.012	.014	.130	.873	
SIAS DS x SPS Total	.000	.000	-.121	-.816	

Note. *n*=249.

** *p* < .01. *** *p* < .001.

Table 4
Summary of Regression Analysis Accounting for Quantity of Alcohol Use

Variable	β	<i>SE</i> β	B	<i>t</i>	Model <i>R</i> ²
Model 1					.119***
Gender	-8.829	1.526	-.345	-5.787***	
Model 2					.119***
Gender	-8.807	1.543	-.344	-5.706***	
SPS Total	-.006	.057	-.006	-.103	
Model 3					.122***
Gender	-8.825	1.544	-.345	-5.715***	
SPS Total	-.017	.058	-.018	-.296	
SIAS Difference Score	.045	.050	.055	.897	
Model 4					.124***
Gender	-8.738	1.551	-.341	-5.634***	
SPS Total	-.018	.058	-.019	-.309	
SIAS Difference Score	.118	.117	.145	1.009	
SIAS DS x SPS Total	-.003	.004	-.099	-.692	

Note. *n*=249.

*** *p* < .001.

Table 5
Summary of Regression Analysis Accounting for Rutgers Alcohol Problem Index Scores

Variable	β	<i>SE</i> β	B	<i>t</i>	Model <i>R</i> ²
Model 1					.025*
Gender	-2.906	1.342	-.158	-2.165*	
Model 2					.323***
Gender	.181	1.201	.010	.151	
DDQ Quantity	.249	.061	.364	4.095***	
DDQ Frequency	1.612	.534	.256	3.017**	
Model 3					.370***
Gender	-.315	1.170	-.017	-.270	
DDQ Quantity	.244	.059	.358	4.156***	
DDQ Frequency	1.623	.517	.258	3.140**	
SPS Total	.145	.040	.218	3.644***	
Model 4					.370***
Gender	-.315	1.173	-.017	-.269	
DDQ Quantity	.246	.059	.360	4.164***	
DDQ Frequency	1.619	.518	.257	3.124**	
SPS Total	.148	.041	.222	3.641***	
SIAS Difference Score	-.014	.036	-.023	-.385	
Model 5					.370***
Gender	-.319	1.177	-.017	-.271	
DDQ Quantity	.247	.059	.361	4.155***	
DDQ Frequency	1.619	.520	.257	3.114**	
SPS Total	.148	.041	.223	3.635***	
SIAS Difference Score	-.029	.079	-.050	-.372	
SIAS DS x SPS Total	.001	.003	.030	.222	

Note. *n*=249.

* *p* < .05. ** *p* < .01. *** *p* < .001.

APPENDIX B: INFORMATION LETTER

INFORMATION LETTER Alcohol Use and Social Anxiety Among College Students

You are invited to participate in a research study on college student alcohol use and anxiety. This study is being conducted by Jenni Day, a graduate student in the clinical psychology program at Auburn University, and Dr. Chris Correia, an assistant professor of psychology at Auburn University. We hope to learn more about the relationship between alcohol, anxiety, and social behavior. You were selected as a possible participant because you are an undergraduate at Auburn University and between the ages of 19-24. You do not have to be a user of alcohol to participate in this study.

If you decide to participate, then fill out the rest of this packet and return it to the session administrator. The packet includes several questionnaires about your use of alcohol and your level of anxiety in a variety of social situations. Completing the questionnaires will take approximately one hour. You will be given an extra credit voucher worth one hour of credit after you complete the research packet.

The risks of participating in this study are minimal. You may find answering questions about your anxiety and your use of alcohol distressing. In case you should become distressed, we will provide all students with printed information on how to contact the appropriate on-campus resources for support. You will be responsible for initiating and paying for any support. Breaches of confidentiality are highly unlikely because your identifying information will not be collected. The questionnaires will be identified by a code number. Participation in this study is completely voluntary, and you have the option to withdraw your consent to participate at any time. If you decide to withdraw from the study you will not be penalized, and will receive credit for your participation

The direct benefit to you, the participant, is 1 hour of research participation, which earns extra credit in many psychology classes. The course instructor will assign the amount of extra credit received per hour of research participation. Extra-credit earned will be in accordance with the departmental policy. Finally, you will be helping us to better understand the relationship between anxiety and alcohol use. We cannot promise you that you will receive any or all of the benefits described.

Your name and any other identifying information will not be associated with the data collected. After you have turned in your completed research packet, your completed forms will be assigned a code number. All data collected will be associated with this code number. Your name will be given to the session administrator for the purposes of receiving extra credit, but your name will not be linked to the forms you complete. Information about this study may be published in a professional journal, and/or presented at a professional meeting. If so, only group data will be presented.

Your decision whether or not to participate will not jeopardize your future relations with Auburn University, or the Department of Psychology. If you have any questions, Jenni Day (844-4889, dayjenm@auburn.edu) or Dr. Chris Correia (844-6480, correcj@auburn.edu, Department of Psychology) will be happy to answer them.

For more information regarding your rights as a research participant you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH PROJECT. YOUR COMPLETION OF THE RESEARCH PACKET INDICATES YOUR WILLINGNESS TO PARTICIPATE.

Investigator's signature

Date

Co-investigator's signature

Date

APPENDIX C: QUESTIONNAIRES

Date: _____

Subject ID#: _____

Alcohol Survey

Please use the charts below to describe your recent drinking patterns. Please report your drinking in standard drinks, where 1 standard drink equals 12 ounces of beer, 4 ounces of wine, and or a 1 ounce shot of hard liquor.

For the **past month** fill in for each calendar day the number of standard drinks you **usually drink** on that day.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Now fill in for the **past month** the **maximum number** of standard drinks you had on each calendar day.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

1) During the last 28 days, on how many days did you drink beer? _____

2) During the last 28 days, on how many days did you drink wine? _____

3) During the last 28 days, on how many days did you drink a shot of hard liquor? _____

- 4) During the last 28 days, on how many days did you drink a mixed-drink? _____

- 5) During the last 28 days, on how many days have you been drunk? _____

- 6) MALE ONLY: During the last 28 days, on how many days did you _____
_____ have 5 or more standard drinks?

FEMALES ONLY: During the last 28 days, on how many days did you _____
_____ have 4 or more standard drinks?
- 7) During the last 28 days, what is the largest number of standard drinks _____
you consumed in one night? _____
- 8) Approximately how many hours did it take you to finish the largest _____
number of drinks mentioned in #7? _____
- 9) How much do you weigh? _____

RAPI

Instructions: Indicate if any of the following have happened during the last 28 days while you were using alcohol, or because of your alcohol use. When marking your answers, use the following code:

0 = Never 1= 1-2 times 2=3-5 times 3=6-10 times 4= more than 10 times

No.	Item	Response
1.	Not able to do your homework, study for a test, or prepare for work.	0 1 2 3 4
2.	Got into fights, acted badly or did mean things.	0 1 2 3 4
3.	Missed out on other things because you spent too much money on alcohol.	0 1 2 3 4
4.	Went to work or school drunk.	0 1 2 3 4
5.	Caused shame or embarrassment to someone.	0 1 2 3 4
6.	Neglected your responsibilities.	0 1 2 3 4
7.	Relative avoided you.	0 1 2 3 4
8.	Felt that you needed MORE alcohol than you used to use in order to get the same effect.	0 1 2 3 4
9.	Tried to control your drinking by trying to use only at certain times of the day or certain places.	0 1 2 3 4
10.	Had withdrawal symptoms, that is, you felt sick because you stopped or cut down on drinking.	0 1 2 3 4
11.	Noticed a change in your personality.	0 1 2 3 4
12.	Felt you had a problem with alcohol.	0 1 2 3 4
13.	Missed a day (or part of a day) of school or work.	0 1 2 3 4
14.	Tried to cut down or quit drinking.	0 1 2 3 4
15.	Suddenly found yourself in a place you could not remember getting to.	0 1 2 3 4
16.	Passed out or fainted suddenly.	0 1 2 3 4
17.	Had a fight, argument, or bad feeling with a friend.	0 1 2 3 4
18.	Had a fight, argument, or bad feeling with a family member.	0 1 2 3 4
19.	Kept drinking when you promised yourself not to.	0 1 2 3 4
20.	Felt you were going crazy.	0 1 2 3 4
21.	Had a bad time.	0 1 2 3 4

22. Felt physically or psychologically dependent on alcohol. **0 1 2 3 4**
23. Was told by a friend or neighbor to cut down on drinking. **0 1 2 3 4**

Social Interaction Anxiety Scale – Modified Form A

Indicate the degree to which you feel the statement is characteristic or true of you **when you are using or under the influence of alcohol.**

1A. I get nervous if I have to speak with someone in authority (parent, police, teacher, boss, etc) in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

2A. I have difficulty making eye contact with others in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

3A. I become tense if I have to talk about myself or my feelings in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

4A. I have difficulty mixing comfortably with the people I go to school with or work with in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

5A. I tense-up if I meet an acquaintance in the street **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

6A. I am uncomfortable mixing socially **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

7A. I feel tense if I am alone with just one other person in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

8A. I am at ease meeting people at parties, etc. **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

9A. I have difficulty talking with other people in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

10A. I find it easy to think of things to talk about in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

11A. I worry about expressing myself in case I appear awkward in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

12A. I find it difficult to disagree with another's point of view in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

13A. I have difficulty talking to attractive persons of the opposite sex in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

14A. I find myself worrying that I won't know what to say in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

15A. I am nervous mixing with people I don't know well in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

16A. I feel I'll say something embarrassing when talking in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

17A. When mixing in a group, I find myself worrying I will be ignored **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

18A. I am tense mixing in a group in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

19A. I am unsure whether to greet someone I know only slightly in social situations **when I am using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

Social Interaction Anxiety Scale – Modified Form B

Indicate the degree to which you feel the statement is characteristic or true of you **when you are NOT using or under the influence of alcohol.**

1B. I get nervous if I have to speak with someone in authority (parent, police, teacher, boss, etc) in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

2B. I have difficulty making eye contact with others in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
---	-----------------	---------------	-----------------	-----------	----------------

3B. I become tense if I have to talk about myself or my feelings in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
---	-----------------	---------------	-----------------	-----------	----------------

4B. I have difficulty mixing comfortably with the people I go to school with or work with in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

5B. I tense-up if I meet an acquaintance in the street when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

6B. I am uncomfortable mixing socially when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

7B. I feel tense if I am alone with just one other person in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

8B. I am at ease meeting people at parties, etc. when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

9B. I have difficulty talking with other people in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
--	-----------------	---------------	-----------------	-----------	----------------

10B. I find it easy to think of things to talk about in social situations when I am NOT using or under the influence of alcohol.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
---	-----------------	---------------	-----------------	-----------	----------------

11B. I worry about expressing myself in case I appear awkward in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

12B. I find it difficult to disagree with another's point of view in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

13B. I have difficulty talking to attractive persons of the opposite sex in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

14B. I find myself worrying that I won't know what to say in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

15B. I am nervous mixing with people I don't know well in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

16B. I feel I'll say something embarrassing when talking in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

17B. When mixing in a group, I find myself worrying I will be ignored **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

18B. I am tense mixing in a group in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

19B. I am unsure whether to greet someone I know only slightly in social situations **when I am NOT using or under the influence of alcohol.**

Not at All	Slightly	Moderately	Very	Extremely
0	1	2	3	4

Social Phobia Scale

Indicate the degree to which you feel the statement is characteristic or true of you.

1. I become anxious if I have to write in front of other people.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
2. I become self-conscious when using public toilets.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
3. I can suddenly become aware of my own voice and of others listening to me.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
4. I get nervous that people are staring at me as I walk down the street.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
5. I fear I may blush when I am with others.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
6. I feel self-conscious if I have to enter a room where others are already seated.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
7. I worry about shaking or trembling when I'm watched by other people.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
8. I would get tense if I had to sit facing other people on a bus or a train.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
9. I get panicky that other might see me to be faint, sick, or ill.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
10. I would find it difficult to drink something if in a group of people.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
11. It would make me self-conscious to eat in front of a stranger in a restaurant.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
12. I am worried that people will think my behavior is odd.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4
13. I am worried I would get tense if I had to carry a tray across a crowded cafeteria.	Not at All 0	Slightly 1	Moderately 2	Very 3	Extremely 4

14. I worry I'll lose control of myself in front of other people.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

15. I worry I might do something to attract the attention of others.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

16. When in an elevator I am tense if people look at me.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

17. I can feel conspicuous standing in a line.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

18. I get tense when I speak in front of other people.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

19. I worry my head will shake or nod in front of others.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

20. I feel awkward and tense if I know people are watching me.

Not at All Slightly Moderately Very Extremely
0 1 2 3 4

