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Running head: DISTRESS, SOCIAL ANXIETY, DRINKING CONSEQUENCES

DISTRESS TOLERANCE, SOCIAL ANXIETY,  
AND DRINKING CONSEQUENCES IN A COLLEGE  
STUDENT SAMPLE

By:

Catherine Lorraine Williams

A thesis  
submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science in the Department of Psychology  
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## **Committee Approval**

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of Catherine L. Williams find it satisfactory and recommend that it be accepted.

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May 14, 2013

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RE: Your application dated 5/10/2013 regarding study number 3915M: Exploring Distress Tolerance and Alcohol-Related Problems in College Students

Dear Ms. Williams:

Thank you for your response to requests from a prior review of your application for the new study listed above.

You are granted permission to conduct your study as most recently described effective immediately. The study is subject to continuing review on or before 5/14/2014, unless closed before that date.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

Submit progress reports on your project in six months. You should report how many subjects have participated in the project and verify that you are following the methods and procedures outlined in your approved protocol. Then, report to the Human Subjects Committee when your project has been completed. Reporting forms are available on-line.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Patricia Hunter (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CJP  
Human Subjects Chair

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## Abstract

The respective relationships between distress tolerance and alcohol-related problems and social anxiety and alcohol-related problems have been mixed in the literature, with some studies supporting the ability of low distress tolerance to predict alcohol-related problems and other studies finding that high social anxiety predicts alcohol-related problems. To help clarify these relationships among college students, these variables were included in a study that also assessed drinking motives and depression. One hundred and one students participated for college credit. They completed a series of questionnaires that investigated their drinking patterns, their history of drinking consequences, their drinking motives, expectancies, depression, social anxiety, and distress tolerance. Students also completed three trials of the Paced Auditory Serial Addition Test (PASAT), a behavioral measure previously used in studies of distress tolerance and substance abuse. A significant relationship between distress tolerance and drinking consequences was not found, nor did social anxiety significantly interact with distress tolerance to predict drinking consequences. Coping motives significantly predicted drinking consequences, and depression and distress tolerance significantly interacted to predict more progressed consequences when using the PASAT. A mediation model whereby distress tolerance was linked to alcohol-related consequences through drinking motives was also supported, although only when assessing distress tolerance via self-report measures. Indirect pathways (i.e., mediation and moderation) between distress tolerance and drinking consequences were explored.

## CHAPTER ONE

College students' drinking patterns have been the subject of considerable study, in part because the amount and frequency of alcohol use by college students makes them a demographic particularly susceptible to problematic drinking behaviors. Compared to their same-aged peers not enrolled full-time (e.g., part-time students and individuals not enrolled in school), college students were more likely to have drunk within the past month, to drink heavily, and engage in binge drinking (Substance Abuse and Mental Health Services Administration [SAMHSA], 2010; 2012). In addition, approximately two-thirds of surveyed college students endorsed current drinking, approximately 40% endorsed heavy episodic use, and approximately 15% endorsed binge drinking. Binge drinking is associated with increased risk for alcohol-related problems (Christiansen, Vik, & Jarchow, 2002; Vik, Carrello, Tate, & Field, 2000), and collegiate binge drinking has widely been identified as a problematic substance use behavior (Wechsler et al., 2002).

Reducing binge drinking in college students is a national health objective (U.S. Department of Health and Human Services, 2012). However, while most students drink alcohol and many consume large quantities, not all encounter severe consequences due to their drinking. Given the potential risk and amount of exposure college students have to hazardous alcohol use, it is important to understand factors beyond mere consumption that increase a student's risk of experiencing serious consequences due to drinking.

This study seeks to better understand potential mediators or moderators of the relationship between alcohol use and alcohol-related problems in college students.

Distress tolerance has been proposed as a potential contributor to problematic drinking in

clinical populations. Among college students, distress tolerance may be a means of defining those most at risk for alcohol-related problems. Likewise, as collegiate drinking is predominantly a social activity (Christiansen et al., 2002; Vik, Carrello, & Nathan, 1999), anxiety evoked by social contexts may influence consumption patterns and subsequent adverse consequences. This study will examine how social anxiety, drinking motives, and distress tolerance combine to predict negative consequences encountered by college drinkers.

### **Defining Drinking Motives and Expectancies**

Although historically separate concepts with varying degrees of supporting research (Kuntsche, Wiers, Janssen, & Gmel, 2010), drinking motives and expectancies have recently been studied together to determine how they relate to negative drinking consequences in adolescents and college students (Hasking, Lyvers, & Carlopio, 2011; Van Tyne et al., 2012). Alcohol outcome expectancies reflect the anticipation of reinforcing consequences of drinking (Jones, Corbin, & Fromme, 2001; Vik, Brown, & Myers, 1997), and they predict the frequency of use (Coleman and Cater, 2004), certain risky drinking behaviors (e.g., drinking games; Zamboanga, Bean, Pietras, & Pabón, 2005), and negative consequences related to alcohol use (Brown, 1985; 1993). While positive outcome expectancies are associated with risky drinking, negative alcohol outcome expectancies have been shown to protect against negative alcohol-related outcomes (Jones et al., 2001), highlighting the importance of alcohol expectancies in predicting the health and safety of college drinkers.

While drinking expectancies may help predict drinking behavior, drinking motives have been explored as potential mediators between expectancies and alcohol-

related consequences (Kuntsche, Knibbe, Engels, & Gmel, 2007). Research has supported the separation of motives and expectancies as related but distinct constructs (Kuntsche et al., 2010). For example, alcohol expectancies can be assessed regardless of whether or not someone has tried alcohol, but motivations must precede a subsequent attempt to drink or the actual consumption of alcohol (Van Tyne et al., 2012). Motivations, it is argued, serve as the reason why someone chooses to drink, incorporating information about alcohol expectancies with the individual's current emotions, desires, and environmental cues (Cooper, 1994). Motivations are an important component of alcohol use on their own, and they have been used to predict risky alcohol consumption independent from alcohol expectancies (Coskunpinar & Cyders, 2012). A large portion of motivation research has outlined drinking motives as the ultimate mediator, "the final, common pathway to alcohol use" (Cox & Klinger, 1988; Kuntsche et al., 2010) through which alcohol expectancies can be linked to negative drinking consequences.

Alcohol-related motivations have typically been grouped into four general categories based on whether they are related to factors internal to or external to the individual and whether they are related to positive or negative reinforcement (Cooper, 1994). A motivation to drink for social enhancement, for example, would reflect concerns external to the individual as well as a desire to be positively reinforced by alcohol use. On the other hand, drinking to cope with negative affect would reflect an internal-negative reinforcement motivation. Previous structural equation modeling has found that, of these groups, enhancement motivations and coping motivations are the strongest mediators between motivation-contingent expectancies and alcohol-related

problems for adolescents (Kuntsche et al., 2010). Whereas one study suggested that both enhancement and coping motives predicted large amounts of recent alcohol consumption (Hesselbrock, O'Brien, Weinstein, & Carter-Menendez, 1987), another study found that social enhancement expectancies are good predictors of large amounts of alcohol consumption per se, whereas coping motivations are good predictors of alcohol-related problems (Kuntsche et al., 2010). Hesselbrock and colleagues (1987) and Kuntsche and colleagues (2010) provide additional research that young adult drinking primarily takes place in social circumstances (Holyfield, Ducharme, & Martin, 1995). Negative drinking consequences seem to be related to solitary drinking and coping expectations (Christiansen et al., 2002); however, the relationship between drinking context and motives is not as clear. Given the link between certain motivations and negative alcohol-related consequences, it is important to define these motivations and determine what makes certain students susceptible to a particular motivation over another.

### **Motivation to Cope and Distress Tolerance**

Since the inception of models about drinking motives, many studies have sought to understand how motives mediate or moderate drinking outcomes, problematic behaviors, and alcohol use disorders among college students and other populations. Research has generally supported the idea that motivations to drink to cope with negative affect tend to predict more solitary and problematic drinking than many other motivations and expectancies (e.g., enhancement motives; Cooper, 1994; Cooper, Russell, Skinner, & Windle, 1992; Gonzales, Collins, & Bradizza, 2009; Holyfield et al., 1995; Kuntsche, Knibbe, Gmel, & Engels, 2005; Rafnsson, Jonsson, & Windle, 2006).

One particularly important component of coping with negative affect is distress tolerance. Distress tolerance is a broad construct that encompasses the likelihood of enduring, attending to, and alleviating perceived discomfort (Simons & Gaher, 2005). Increasing emotional distress has been shown to upset self-control mechanisms and increase impulsive compensatory behaviors such as overeating, financial self-gratification, and procrastination (Tice, Bratslavsky, & Baumeister, 2001). Therefore, the capacity to tolerate distress may be an important determinant in the development of mental health issues putatively regulated by self-control (Baumeister, Heatherton, & Tice, 1994). Indeed, distress tolerance has been shown to mediate between certain psychopathologies (e.g., PTSD) and coping motives for alcohol and other drugs among adults in the general population (Potter et al., 2011; Vujanovic, Marshall-Berenz, & Zvolensky, 2011). It has also been implicated as an important component of psychopathology in certain clinical populations, and it has been incorporated into the treatments of several psychological disorders characterized by impulsivity, poor affect regulation, or impaired judgment. Distress tolerance has been examined within the context of borderline personality disorder, (Linehan, 1993), eating disorders (Telch, Agras, & Linehan, 2001), and substance use disorders (Bornovalova et al., 2012). For individuals diagnosed with a substance use disorder or gambling addiction, for example, distress tolerance was associated with more depressive symptoms (Brown, Lejuez, Kahler, & Strong, 2012; Daughters et al., 2005b).

There are many means by which researchers have been studying distress tolerance over the past decade, using a variety of both self-report (i.e., correlational) and behavioral (i.e., experimental) measures (Leyro, Zvolensky, & Bernstein, 2010). Intriguingly, while

both types of measures have been linked to alcohol-related problems (Daughters et al., 2005a; Simons & Gaher, 2005), the literature is mixed on their efficacy at predicting problems (Howell et al., 2010), and the measures do not seem to show significant associations with each other and thus may be addressing different aspects of distress (e.g., perceptions of how one will respond to distress versus measured responses during physiological discomfort; McHugh et al., 2011). The array of self-report and behavioral measures has also left researchers without a “gold standard” of distress tolerance (McHugh and Otto, 2012).

Although there have been some studies that have examined distress tolerance as a predictor of alcohol-related consequences among college students (Howell et al., 2010; Simons & Gaher, 2005), much of the research on distress tolerance has focused on clinical populations. College students may be particularly vulnerable to distress due to multiple major life changes and thus deserve additional study, especially with behavioral measures – which have not yet been used to predict alcohol-related consequences in college students – and the most empirically supported self-report measures of distress intolerance (McHugh & Otto, 2012). Understanding the incidence and risks related to low distress tolerance in this population may serve multiple purposes: distress tolerance could serve as a screening method to help detect which students are most vulnerable to alcohol misuse, and interventions that incorporate distress tolerance could assist at-risk college students to develop safer and healthier coping processes (Scott-Sheldon et al., 2012).

This study proposes that a multimodal assessment of distress tolerance will be significantly related to self-reported problematic drinking. In addition, distress tolerance



has been shown to be related to the motivation to cope with alcohol (Howell et al., 2010), as well as mediate the relationship between psychopathology and motivation to cope with substances (Potter et al., 2011; Vujanovic et al., 2011). The specific nature of the relationship between motivation to cope, distress tolerance, and alcohol-related problems lacks robust empirical support (Howell et al., 2010). Furthermore, there is no theoretical model predicting the interaction of motivations to cope and distress tolerance. For example, motivations to cope may mediate a relationship between low levels of distress tolerance and alcohol-related problems; however, distress tolerance may moderate the relationship between coping motivations and problematic drinking, such that when distress tolerance is low versus high, alcohol-related problems increase. Therefore, this study proposes the exploratory analyses of different mediation and moderation models that link motivation to cope and distress tolerance with alcohol-related problems.

### **Heavy Drinking, Social Anxiety, and Distress Tolerance**

Some studies have noted that risky drinking varies with context. Although most college drinking seems to occur in the presence of at least one other individual (O'Hare, 1990), heavy drinking while alone has been related to an increased likelihood of alcohol-related problems and depression (Christiansen et al., 2002), suicidal ideation (Gonzalez et al., 2009), and suicide attempts (Gonzalez, 2012) over heavy drinking in social situations. Over the course of adolescence to young adulthood, the development of poorer health, greater substance use problems, and lower educational attainment has been associated more with solitary than strictly social alcohol and other drug use (Tucker, Ellickson, Collins, & Klein, 2006). Previous research has examined the characteristics of adolescents who engage in risky solitary drinking (Kuntsche & Gmel, 2004), but

relatively little is known about solitary college drinkers. What little is known seems to suggest that solitary drinkers endorse stronger coping motivations than social college drinkers (Gonzalez et al., 2009). Distress may be one potential intervening factor between solitary drinking context and alcohol-related problems because, as has also been noted, distress tolerance serves as a mediator between stress and motivation to cope with alcohol.

Social stress is one important dimension to consider with regard to motivation to cope and distress tolerance. Most drinking occurs in social contexts (Holyfield et al., 1995; O'Hare, 1990), but stress related to the social environment – or, rather, social anxiety – may prompt an individual to avoid social situations. While the avoidance of social situations might limit college students' access to alcohol, it would not necessarily decrease the willingness or motivation to drink, particularly if a student is using alcohol to cope with negative affect. For example, Mohr and colleagues (2001) demonstrated that negative interpersonal experiences predicted subsequent drinking in isolated contexts, whereas positive interpersonal experiences predicted heavier drinking in social contexts. Social anxiety, therefore, may moderate the relationship between distress tolerance and alcohol-related problems.

The question of whether and how social distress (or, more specifically, social anxiety) relates to problematic drinking is not a new one. It is a complicated question, however, as the literature seems to be mixed with respect to the impact of social anxiety on problematic drinking (Morris, Stewart, & Ham, 2005). At first blush, social anxiety and the associated coping motivations may seem like likely impetuses for uninhibited alcohol consumption in college students (Burke & Stephens, 1999); many studies support

evidence to the contrary, however, explaining that the relationship between social anxiety and problematic drinking is likely curvilinear and related to alcohol expectancies as well. Low levels of social anxiety may lead to increased drinking if the individual endorses coping expectancies, but high levels of social anxiety may prevent students from entering into social situations in which drinking occurs (Eggelston, Woolaway-Bickel, & Schmidt, 2004). Still others have found that social anxiety does not predict alcohol consumption as well as it predicts alcohol-related problems (Lewis et al., 2008). Lewis and colleagues (2008) suggested that while anxiety may prevent students from entering social situations, socially anxious students who do drink in public settings experience greater negative consequences than their non-anxious peers due to greater coping motives and expectations. Perhaps socially anxious individuals also end up drinking heavily at home, partially explaining the demographic of isolated heavy drinkers found by Christiansen et al. (2002).

While the relationship between social anxiety and alcohol-related problems may lack conclusive strength and direction, this study proposes that distress tolerance and coping motivations may serve as mediators or moderators of the relationship between social anxiety and alcohol-related consequences. Socially anxious individuals with a greater motivation to cope may be less likely to drink in social situations but more likely to experience negative drinking-related outcomes than non-anxious drinkers (Ham, Zamboanga, Bacon, & Garcia, 2009), so low distress tolerance is expected to interact with social anxiety to produce negative drinking consequences. At the same time, drinking motives should also moderate the relationship between social anxiety and

alcohol-related consequences such that certain motives (e.g., motives to cope) will result in greater alcohol-related consequences than other motives (e.g., conformity motives).

It is worth noting that this distinction may be tempered by the fact that it is the social situation that inspires anxiety for socially anxious individuals. Therefore, coping motivations may be attenuated in isolated drinking situations. Nevertheless, given the previously supported positive relationship between isolated binge drinking and alcohol problems, it is still likely that relationships among social anxiety, distress tolerance, coping motivations, and alcohol-related problems will be found.

### **Behavioral Measures of Distress Tolerance**

As mentioned above, distress tolerance is a broad construct that attempts to unify multiple cognitive and behavioral phenomena, such as the willingness to withstand perceived discomfort or the tendency to attend to perceived discomfort. It has been identified as a construct worth measuring apart from related constructs such as distress intensity, individual impulsivity, and negative affect (McHugh & Otto, 2012). Despite, or perhaps due to, its broad definition, researchers have attempted to measure distress tolerance on multiple scales, some of which refer to divergent psychological constructs (such as anxiety intolerance) and some of which measure physiological rather than psychological distress (Daughters et al., 2005a). There are multiple self-report scales for distress tolerance (Leyro et al., 2010), and a recent latent-factor analysis has identified 10 content items with strong distress tolerance factor loadings that will be of use in this study (McHugh & Otto, 2012).

Due to the nature of self-report instruments, however, this self-report scale is necessarily retrospective and requires an individual's disclosure of his or her subjective

response to distress. Behavioral measures, on the other hand, are direct analogues of stressful situations that are less susceptible to faults in memory and individual variation in perceived sensitivity to distress. The appropriate behavioral measures can also serve as a proxy for negative reinforcement behavior indicative of varying levels of distress tolerance; that is, certain measures, such as the Paced Auditory Serial Addition Test (PASAT), have been used to categorize distress tolerance by assessing the time it takes before someone disengages from an unpleasant task (Gorka, Ali, & Daughters, 2012; Leyro et al., 2010). Using a behavioral measure of distress tolerance in conjunction with a self-report measure would provide more validity and insight into the utility of behaviorally measuring distress tolerance within college students.

The PASAT is a commonly used behavioral measure of distress tolerance, but few studies have used behavioral measures such as the PASAT to demonstrate the relationship between distress tolerance and alcohol use. Of those that exist, one has examined the relationship between PASAT performance and persistence within a drug and alcohol treatment facility (Gorka et al., 2012). The Behavioral Indicator of Resiliency to Distress (BIRD) is a form of the PASAT that has been adapted for children and adolescents; one study found that poorer persistence on the BIRD correlated with increased alcohol use among Caucasian (but not ethnic minority) youths aged 9-13 (Daughters et al., 2009). The PASAT has yet to be assessed on college students who endorse risky drinking behaviors, and it is likely to confirm previous self-report distress tolerance research, support theories uniting distress tolerance with motivations to cope with alcohol, and determine whether a self-report measure can robustly and reliably predict behavior relevant to distress tolerance.

### **Summary and Hypotheses**

The current study explored the combined contributions of distress tolerance, social anxiety, and drinking motives to alcohol-related consequences among college students using both behavioral and self-report measures of distress tolerance. Specific hypotheses regarding distress tolerance and social anxiety are listed below. Additional exploratory analyses are described regarding distress tolerance as a mediator and as a moderator between motivation to cope and alcohol use in college students. Specific mediation and moderation hypotheses were not proposed given the limited literature regarding the relationship between drinking motivations, distress tolerance, and alcohol-related problems. The PASAT has not yet been used to predict alcohol-related problems per se, but given its previously established correlations with alcohol-use disorders (Gorka et al., 2012), it is expected to be a good predictor of negative drinking consequences among college students.

#### Hypotheses

Hypothesis 1: Distress tolerance will correlate with collegiate problematic drinking.

Hypothesis 2: Distress tolerance will moderate the relationship between social anxiety and problematic drinking.

Hypothesis 3: Drinking motives will moderate the relationship between social anxiety and problematic drinking.

Exploratory Analyses: The combined effects of distress tolerance and drinking motives as predictors of problematic drinking will be explored. Two possible models will be examined: (a) drinking motives as a mediator between distress tolerance and

problematic drinking, and (b) a moderating effect such that distress tolerance and coping motivations interact to predict alcohol-related consequences.

## CHAPTER TWO

### **Method**

#### Power Considerations

As no prior study has examined the direct relationship between the PASAT and alcohol-related problems in college students per se, effect sizes for estimating power are not available. In part, this study will provide pilot data for generating such estimates. However, based on similar work using the PASAT, 150 subjects would be needed to obtain a statistical power of .80 using a conservative estimate of a minimum reported effect size ( $R^2 = .05$ ). Since this was a pilot study that was (at least partially) intended to explore the relationships between various indicators of distress tolerance (e.g., self-report measure and PASAT) and collegiate problematic drinking, the current study was based on 100 current college age drinkers.

#### Participants

The sample included 101 undergraduates (71.3% women) with an average age of 23.58 (SD = 5.99, range 18-42). Most were Caucasian (72.3%) or Latino/Latina (16.8%). The rest were African-American (N = 4), Asian (N=2), Native American (N=1), or “other” (N=4). Two-thirds (68.3% ) were either Freshmen or Sophomores. Over half did not attend church at this time (59.4%) while only 15.8% reported regular church attendance. Nearly half worked part time (44.5%), and the remainder either did not work (31.7%) or worked full time (23.7%). Two-thirds (65.3%) were single, 32.7% either married or living in a committed relationship, and two were divorced or separated.

#### Procedure



College students were recruited from lower-division psychology classes via an on-line (SONA System) research volunteer managing system. Eligibility was restricted to students aged 18 and older, and the study advertisement requested only students who acknowledged drinking alcohol at least once during the past year. As compensation, participants received research credit for psychology courses. In some previous distress tolerance studies involving the PASAT, participants were told that they could either earn money or a prize based on their performance on the PASAT (Daughters et al., 2005a, 2009; Gorka, Ali, & Daughters, 2012). Another study involving the PASAT provided a set amount of financial compensation and did not use contingency-related rewards (Daughters et al., 2005b). The presence or absence of contingency-related rewards did not affect the outcome of PASAT performance in these studies, so contingency-related rewards were not incorporated into this study. Participants were informed during the consent that the PASAT was sometimes perceived as “tedious or frustrating,” that they could terminate the PASAT trials at any time by notifying the researcher, and that they could still expect to receive full research credit for their psychology courses regardless of whether or not they terminated the PASAT prior to completion of the third trial.

Upon the participant’s arrival at the research lab, a research team member explained the study, reviewed the informed consent, and answered any questions. Participants who consented to participate were randomly assigned to begin with either the PASAT or the self-report measures to counterbalance the administration order. Regardless of assignment, participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) immediately prior to the first trial

of the PASAT to assess their baseline anxiety, irritability, frustration, and other emotions. This measure was administered again following the completion of the final PASAT trial.

Participants were presented up to three PASAT trials. The trials consisted of a list of aurally presented numbers, and participants were instructed to add every two numbers and provide the research team member with the correct sum. The first trial (“easy” condition) lasted three minutes and consisted of 3-second latencies between numbers. The second trial (“medium” condition) lasted five minutes and had 2-second latencies between numbers. The final trial (“difficult” condition) lasted up to 10 minutes and had a 1-second latency between numbers. After the second trial of the PASAT, participants were reminded that they could stop the trial at any time and still receive full course compensation for participation. These procedures and conditions have been used in a previous study of distress tolerance (Daughters et al., 2005b) and were expected to facilitate frustration and the contemplation of PASAT termination. Behaviorally-assessed distress tolerance data, therefore, reflected the latency to PASAT termination. Total PASAT administration time lasted approximately 25 minutes.

Participants were asked to complete the following self-report measures: a Background and Drinking Questionnaire, the Distress Intolerance Self-Report (DISR), the Liebowitz Social Anxiety Scale Self-Report (LSAS), and the Center for Epidemiologic Studies Depression Scale (CES-D). For more information on this list of measures, see below. The entire process of informed consent and protocol completion was approximately one hour. Participants were debriefed at the conclusion of the experiment.

### Measures

Background and Drinking Questionnaire. This self-report measure was composed of three basic components, including demographics, consumption, and consequences. The instrument first inquired about basic demographic data (e.g., age, race, ethnicity, and place of residence). Next, history of alcohol use and recent (past 3 months) drinking behavior was collected. Items from the Customary Drinking and Drug Use Record (CDDR) were modified for self-report format in earlier studies (Vik et al., 1999; Vik, Carrello et al., 2000; Vik, Tate, & Carrello, 2000) to estimate the quantity and frequency of alcohol use during the previous three months. The CDDR has demonstrated reliability and validity (Brown et al., 1998) and psychometric strength with respect to internal consistency (Cronbach alphas range from .80 to .90, with replications ranging from .74 to .92), one-week test-retest reliability (coefficients ranged from .70 to .92), and inter-rater reliability. Additional questions assessed age of first drink and heavy drinking during high school. These additional items were developed and used by Vik and colleagues (2003) in studies of reduced consumption between high school and college (Vik, Cellucci, & Ivers, 2003). Finally, the questionnaire assessed alcohol-use consequences experienced during the prior 12 months. The list of consequences was compiled from seminal studies of alcohol-use problems by Berkowitz and Perkins (1986) and Wechsler and colleagues (Wechsler, et al., 1994; Wechsler Dowdall, Davenport, & Castillo. 1995). This list of problems has been used in prior studies by Vik and colleagues (Christiansen et al., 2002; Vik, Carrello et al., 2000; Vik et al., 2003; Vik, Tate et al., 2000) to reveal conceptual clusters and progressive severity of consequences. When completing these questions, students checked a box to indicate whether or not they had engaged in or experienced a certain consequence due to alcohol use in the past year; the consequences

ranged from relatively minor (e.g., “Missed a Class”) to risky or reckless (e.g., “Engaged in Unplanned Sexual Activity”).

Center for Epidemiologic Studies Depression Scale. The Center for Epidemiologic Studies Depression Scale (CES-D Scale; Radloff, 1977) was used to assess severity of depressive symptoms experienced during the past week. It is a 20-item Likert-type scale that can be used for screening purposes among clinical and nonclinical populations. The questions assess physiological symptoms of depression (e.g., “I did not feel like eating; my appetite was poor”) as well as emotional and cognitive symptoms (e.g., “I was bothered by things that don’t usually bother me”) It has demonstrated very good internal consistency among the general population ( $\alpha = .85$ ) and among patients ( $\alpha = .90$ ; Radloff, 1977).

Distress Intolerance Self-Report. The Distress Intolerance Self-Report scale (DISR; McHugh & Otto, 2012) is a novel, 10-item measure of distress tolerance that incorporates questions from three different self-report measures of anxiety and distress tolerance: the Anxiety Sensitivity Index (Peterson & Reiss, 1992), the Distress Tolerance Scale (Simons & Gather, 2005), and the Frustration Discomfort Scale (Harrington, 2005). The items drawn from these measures had the highest loadings on their respective scales and were judged to be the most representative of the construct of distress tolerance; (McHugh & Otto, 2012). Participants were asked to rate the extent to which they agreed or disagreed with a series of distress tolerance items (e.g., “It scares me when I am nervous”) on a Likert-type scale that ranged from Strongly Disagree to Strongly Agree. Reliability coefficients for these items were demonstrated to be excellent, with alphas

ranging from .92 to .93 in both community samples and samples recruited from an outpatient mental health clinic (McHugh & Otto, 2012).

Drinking Motives Questionnaire-Revised. The Drinking Motives Questionnaire-Revised (DMQ-R) included 20 psychological and emotional scenarios, and respondents were asked to rate the frequency with which they believe the motivation behind a certain scenario precedes their drinking behavior. The rating scale ranged from *never/almost never* (1) to *always/almost always* (4). The DMQ-R separated motivations into a 4-factor model (Social Motives, Coping Motives, Enhancement Motives, and Conformity Motives; Cooper, 1994), and this measure has shown cross-cultural stability in predicting alcohol-related problems (Kuntsche, Stewart, & Cooper, 2008). Some sample items related to social and coping motives were, “[I drink] Because it makes social gatherings more fun,” and “[I drink] To cheer up when you are in a bad mood,” respectively. Reliability coefficients ranged from .84 to .88 across the four motives.

Liebowitz Social Anxiety Scale. The Liebowitz Social Anxiety Scale (LSAS-SR; Fresco et al., 2001) is a 24-item self-report measure of perceived anxiety during social interaction and performance situations. It was originally developed to assist in the diagnosis of social anxiety disorder, and thus it contains items that assess situations which typically provoke anxiety in a socially anxious sample (e.g., “Eating in public”). The 24-items yield a single score, and the measure includes cut-off values that are particularly useful in the diagnosis of social anxiety. Among individuals with social anxiety disorder and among non-clinical samples, the measure has demonstrated high internal consistency ( $\alpha$ s = .95 and .94, respectively).

Paced Auditory Serial Addition Test. A computerized version of the Paced Auditory Serial Addition Test (Gronwall & Sampson, 1974; PASAT-C) was used in this study. During the PASAT, participants hear a series of numbers, and they are instructed to add the number immediately presented to them to the number just previously presented, providing what they believe to be the correct sum of the two numbers before they are exposed to the next number in the series. For example, if the participant heard “2, 5,” then she or he would answer “7.” If the next number presented was 4, then the participant would respond “9.” The numbers are presented at consistent intervals (e.g., 3 seconds) until a trial is completed. In this study, participants were presented with three PASAT trials that increased in difficulty by (a) decreasing the interval latency between numbers (i.e., 3 seconds, 2 seconds, 1 second) and (b) extending the lengths of the trials (i.e., 3, 5, and 10 minutes respectively). PASAT has been shown to generate anxiety and frustration in participants (Tombaugh, 2006), and as such it has previously been used to estimate distress tolerance by assessing the point at which respondents choose to stop participating in the task: the sooner the individual “gives up,” the lower his or her distress tolerance.

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a brief, 20-item questionnaire that assesses current mood. For this study, it was administered immediately prior to the first trial of the PASAT-C and subsequent to the completion of the second trial of the PASAT-C so as to serve as a mood manipulation check. The PANAS assesses dimensions of positive affect, specifically with respect to energy and enthusiasm, whereas the negative affect scale questions feelings of distress, fear, and irritability, and it tends to assess difficulty

adjusting to everyday frustrations (Watson et al., 1988). Both subscales have demonstrated good internal consistency with alphas that ranged from .84 to .90 across the two scales and across multiple measured time points (e.g., “Today” versus “Past Few Weeks;” Watson et al., 1988).

## CHAPTER THREE

### **Planned Analyses**

#### Variables

Variables used to test this study's hypotheses were as follows:

Alcohol Related Consequences (ARC). ARC was defined by the number of alcohol-related consequences that a student reported experiencing in the previous 12 months. Two ARC scores were computed: (a) Total ARC ( $ARC_{TOT}$ ) is the total number of problems reported, and (b) Progressed ARC ( $ARC_{PROG}$ ) includes only those problems previously identified as Risky/Reckless or as Problems with Authority in previous alcohol-consequences research (Vik et al., 2000).

Depressed Affect (CES-D). Depressive symptoms were estimated using CES-D scores.

Distress Tolerance (DT). Two DT variables were planned for this study: the score on the DISR and PASAT performance: that is, whether or not participants chose to terminate the PASAT early.

Drinking Motives (CM). The DMQ-R yielded scores on four dimensions of motivation: Social, Enhancement, Coping, and Conformity. Since the primary focus of this study was the interaction of distress tolerance and social anxiety with coping motivations, the hypotheses were tested using only the Coping Motivation (CM) scale from the DMQ-R.

Mood Manipulation (PANAS). The PANAS was divided into two total scores: an overall positive affect score and an overall negative affect score (Watson & Tellegen,



1988). The scores for each scale were compared before and after administration of the PASAT to serve as a mood manipulation check.

Social Anxiety (SA). The LSAS-SR contains two subscales specific fear of a social situation and avoidance of a social situation, respectively (Fresco et al., 2001). However, because instructions for the LSAS-SR were not stated nor explicitly written for the participant, approximately six percent of participants completed the fear but not the avoidance subscale. To prevent a significant loss of power for both subscales, the LSAS-SR was divided into two overall scores: “SA<sub>FEAR</sub>,” which refers to the fear subscale of the LSAS-SR and “SA<sub>AVOIDANCE</sub>,” which refers to the avoidance subscale of the LSAS-SR.

### Hypotheses and Analyses

Hypothesis 1: Distress tolerance (either DISR or PASAT) was hypothesized to predict all categories of drinking consequences (ARC<sub>TOT</sub>, and ARC<sub>PROG</sub>).

Multiple regression models were used to test the relationship between DT and ARC while controlling for depression (CES-D). Four regression models were tested in order to assess two ARC predictors and two DT predictors. Models are as follows:

- a.  $ARC_{TOT} = \beta_0 + Z_i(CES-D) + \beta_1(DISR) + \epsilon_i$
- b.  $ARC_{TOT} = \beta_0 + Z_i(CES-D) + \beta_1(PASAT) + \epsilon_i$
- c.  $ARC_{PROG} = \beta_0 + Z_i(CES-D) + \beta_1(DISR) + \epsilon_i$
- d.  $ARC_{PROG} = \beta_0 + Z_i(CES-D) + \beta_1(PASAT) + \epsilon_i$

Hypothesis 2: Distress tolerance (estimated from either the DISR or PASAT) was hypothesized to moderate the relationship between social anxiety and problematic drinking.

To test for a moderating relationship between DT and SA as predictors of ARC, the cross products between DT and SA (both  $SA_{FEAR}$  and  $SA_{AVOIDANCE}$ ) were computed and entered into a regression model. Prior to computing the cross product, both predictors were centered (mean deviated) around zero. Because the DISR and social avoidance variables are continuous, centering predictor variables allows the beta coefficient for a predictor variable to be intuitively interpreted as the effect of that variable on drinking problems at the mean level of that variable (Vik, 2014). The two alternative outcome scores ( $ARC_{TOT}$  and  $ARC_{PROG}$ ) and the two alternative DT predictors (DISR and PASAT) required four linear regressions to test this hypothesis. The regression equations also controlled for depression (CES-D).

$$a. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(DISR') + \beta_2(SA_{FEAR}') + \beta_3(DISR' * SA_{FEAR}') + \varepsilon_i$$

$$b. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(DISR') + \beta_2(SA_{AVOIDANCE}') + \beta_3(DISR' * SA_{AVOIDANCE}') + \varepsilon_i$$

$$c. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(PASAT') + \beta_2(SA_{FEAR}') + \beta_3(PASAT' * SA_{FEAR}') + \varepsilon_i$$

$$d. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(PASAT') + \beta_2(SA_{AVOIDANCE}') + \beta_3(PASAT' * SA_{AVOIDANCE}') + \varepsilon_i$$

$$e. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(DISR') + \beta_2(SA_{FEAR}') + \beta_3(DISR' * SA_{FEAR}') + \varepsilon_i$$

$$f. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(DISR') + \beta_2(SA_{AVOIDANCE}') + \beta_3(DISR' * SA_{AVOIDANCE}') + \varepsilon_i$$

$$g. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(PASAT') + \beta_2(SA_{FEAR}') + \beta_3(PASAT' * SA_{FEAR}') + \varepsilon_i$$

$$h. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(PASAT') + \beta_2(SA_{AVOIDANCE}') + \beta_3(PASAT' * SA_{AVOIDANCE}') + \epsilon_i$$

Hypothesis 3: Drinking motives (specifically, drinking to cope with negative affect) was hypothesized to moderate the relationship between social anxiety and problematic drinking.

To test for a moderating relationship between DM and SA as predictors of ARC, the cross products between DM and SA (both  $SA_{FEAR}$  and  $SA_{AVOIDANCE}$ ) were computed and entered into a regression model. The same mean deviation procedure used in Hypothesis 2 was used in Hypothesis 3. As in Hypothesis 2, the dependent variable consisted of two alternative outcome scores ( $ARC_{TOT}$  and  $ARC_{PROG}$ ). The regression equations controlled for depression (CES-D).

$$a. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(CM') + \beta_2(SA_{FEAR}') + \beta_3(CM' * SA_{FEAR}') + \epsilon_i$$

$$b. \quad ARC_{TOT} = \beta_0 + Z_i(CES-D') + \beta_1(CM') + \beta_2(SA_{FEAR}') + \beta_3(CM' * SA_{FEAR}') + \epsilon_i$$

$$c. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(CM') + \beta_2(SA_{AVOIDANCE}') + \beta_3(CM' * SA_{AVOIDANCE}') + \epsilon_i$$

$$d. \quad ARC_{PROG} = \beta_0 + Z_i(CES-D') + \beta_1(CM') + \beta_2(SA_{AVOIDANCE}') + \beta_3(CM' * SA_{AVOIDANCE}') + \epsilon_i$$

Exploratory Analyses: The drinking to cope motive (CM) was explored as a mediator, then as a moderator of the relationship between distress tolerance and alcohol-related consequences. That is, distress tolerance (both DISR and PASAT) measures were entered into the mediation models as the IV, and alcohol-related consequences was entered into the model at the DV. Drinking to cope was entered into the model as a mediator, and therefore it was tested first for its relationship to alcohol-related problems

using Baron and Kenny (1986) procedures. These procedures were used to establish that: (1) distress tolerance and alcohol-related consequences were related, (2) distress tolerance and drinking motives were related, and (3) with distress tolerance and drinking motives entered into a regression equation, drinking motives continued to predict alcohol-related consequences, but distress tolerance no longer predicted drinking consequences. A Sobel test of mediation was also used to supplement the Baron and Kenny approach because the Sobel test is generally more accurate at determining a successful mediation than the Baron and Kenny approach, although it generally has lower power.

In the moderation model, the interaction of distress tolerance (both DISR and PASAT) measures with drinking to cope was entered into the second step of a sequential regression model. These moderation analyses are similar to those described in Hypotheses 2 and 3 above. To explore a moderation model between drinking motives and distress tolerance when predicting alcohol-related consequences, similar moderating analysis were performed as described in Hypotheses 2 and 3 above.

## CHAPTER FOUR

### Results

Data collection lasted approximately six months and entailed the recruitment of one hundred and one participants from a pool of college undergraduates participating in psychology courses. All students received either course credit or extra credit for participating. The study was advertised to these courses via an online bulletin board. The age of participants ranged from 18 to 42, with an average age of 23.6. Seventy-one percent were female. Seventy-two percent identified as Caucasian, 17% identified as Latino/a, four percent identified as African-American, and the remaining six percent identified as Native American, Asian or Asian-American, or Other. To determine if there was any need to control for age or gender effects in our outcome, Pearson's correlations were calculated between age, gender, and all levels of consequences (careless problems, risky/authority problems, and total problems). None of the correlations with age ( $p > .05$ ) and gender ( $p > .10$ ) were significant. Therefore, age and sex were not included in the subsequent analyses.

Additional analyses were conducted to determine if there were significant differences in consequences across ethnic groups. Due to low numbers in certain ethnic groups, three groups were created by maintaining the Caucasian and Latino/a groups and combining the remaining four groups into an "Other Ethnicity" category. One-way ANOVA revealed that careless consequences significantly varied across ethnic groups such that students who identified as "Other" reported significantly more total and risky/reckless consequences than Caucasian students (Fisher's LSD = -2.16 and -1.11

with  $p = .009$  and  $p = .001$ , respectively). “Other” students also reported significantly more total and risky/reckless consequences than Latino/a students (Fisher’s LSD = 2.01 and 0.995 with  $p = .042$  and  $p = .011$ , respectively). Caucasian and Latino/a students did not significantly differ in their self-reported total or risky/reckless problems. Given these significant differences, ethnicity was controlled for in all subsequent analyses. To include ethnicity in the regression analyses, it was again recoded as a dichotomous variable, with majority (i.e., Caucasians) ethnicity in one group and minority (i.e., Latino/a and all other groups) coded in another group.

Due to the low incidence rate of items in the Risky/Reckless and Problems with Authority problem categories, items from these two categories were combined to form a single consequence score. As these two categories reflect consequences that appear more progressed than the cluster of careless behaviors (see Vik et al., 2000), this score was called the Progressed Alcohol Related Consequences (ARC<sub>PROG</sub>) variable to distinguish it from the total ARC (ARC<sub>TOT</sub>). Cronbach’s alpha for ARC<sub>PROG</sub> was .534; although a statistic of .7 or higher is considered acceptable conventionally, this category was not expected to be a completely homogenous group (Vik et al., 2000). This category was maintained due to a low incidence rate within the Problems with Authority category, and it was maintained to increase overall statistical power when predicted advanced drinking consequences. Cronbach’s alphas were calculated for each of the other measures used in this study. Alpha level was .713 for careless drinking consequences, .786 for total drinking consequences, .792 for coping motives, .922 for the DISR, .687 for the CES-D, .907 for LSAS Fear (see below), and .891 for LSAS Avoidance, suggesting that most scales had reliability estimates within the acceptable to excellent ranges.

With respect to the social anxiety measure (LSAS-SR), two distinct constructs of social anxiety (fear and avoidance) were created. This was done because the LSAS-SR assesses both fear and avoidance in a variety of social situations, and it was hypothesized that self-reported social avoidance might be a stronger proxy than fear for behavioral avoidance. Social avoidance might increase solitary binge drinking, which has been associated with increased rates of alcohol-related consequences (Christiansen et al., 2002).

Mean substitution was used for two individuals who each omitted one item out of 24 in the LSAS-SR Fear subscale. The average score for the subject's overall LSAS-SR Fear subscale was computed for these two individuals and used to replace the missing data point. One other individual was omitted from analysis due to not answering items on the LSAS-SR Fear subscale. Mean substitution was used for three individuals who omitted LSAS-SR Avoidance subscale items; one individual omitted two items, and two individuals omitted one item. Six individuals did not complete any items from the LSAS-SR Avoidance subscale, so their information was omitted in relevant analyses via listwise deletion. Mean substitution was also used for 19 participants' CES-D scores who each omitted one of the 20 CES-D items. Despite the bias in mean substitution, these omitted items were replaced with the participant's mean score using the procedure described above because, across participants, the individual item omitted was sufficiently varied among the total CES-D items. (That is, no one individual item was disproportionately missing data.) Finally, an analysis of skewness of the DISR scores revealed that they were significantly positively skewed (skewness statistic divided by

standard error = 2.167). DISR scores were subjected to a square root transformation, which reduced skew to an acceptable level.

Table 1 presents the descriptive data for the primary study variables.

### Hypothesis One

For hypothesis one, hierarchical regression tested the relationship between distress tolerance and alcohol-related consequences (ARC). The model was tested first using the self-report measure of distress tolerance (DISR). CES-D total score and ethnicity were entered as the first step of the model to control for depressed affect and ethnic group. Results showed that DISR score did not significantly predict  $ARC_{TOT}$  ( $F(3, 97) = 0.0034, p = .954$ ) or  $ARC_{PROG}$  ( $F(3, 97) = .403, p = .537$ ).

An interaction term was computed by centering and then multiplying DISR and CES-D scores. Adding this interaction term tested whether the relationship between distress tolerance (DISR) and ARC depended on a person's depression level (CES-D). The DISR x CES-D interaction did not improve model fit for either  $ARC_{TOT}$  ( $F(4, 96) = .022, p = .882$ ) or  $ARC_{PROG}$  ( $F(4, 96) = 0.041, p = .840$ ).

The model was tested again using perseverance on the PASAT to predict  $ARC_{TOT}$  and  $ARC_{PROG}$ . Following previous procedures to accommodate for the large skew of participants who terminated the PASAT early in the third trial (Daughters et al., 2009), PASAT performance was transformed to a binary variable of those who terminated the PASAT prematurely (low PASAT tolerance) versus those who completed the PASAT (high PASAT tolerance). Hierarchical regression was again used to predict problems



while controlling for depressed affect (i.e., CES-D scores). PASAT perseverance failed to predict  $ARC_{TOT}$  ( $F(3, 97) = .850, p = .359$ ) or  $ARC_{PROG}$  ( $F(3,97) = 0.079, p = .780$ ).

An interaction term was computed by multiplying the PASAT groups (coded -1 for low distress tolerance and +1 for high distress tolerance) and a CES-D score centered around zero (CES-D'). Adding this interaction term improved the omnibus model's prediction of  $ARC_{PROG}$  ( $F(4, 96) = 3.054, p = .020$ ). The interaction term was significant,  $F(4, 96) = 4.248, p = .042$ , such that as depressive symptoms (CES-D') increased, alcohol consequences ( $ARC_{PROG}$ ) was evident among those with low distress (PASAT) tolerance (see Figure 1). In contrast, there was no relationship between depressive symptoms and alcohol consequences among students with better distress (PASAT) tolerance.

The interaction term did not improve the model's fit for predicting  $ARC_{TOT}$  ( $F(4, 96) = 1.145, p = .288$ ). All unstandardized betas and standard errors are reported in Table 3 and Table 7.

### Hypothesis Two

The second hypothesis proposed that distress tolerance would moderate the relationship between social anxiety and drinking consequences. A total of eight variations of the DT X SA model were used to assess whether a relationship between social anxiety (fear or avoidance) and ARC (total or progressed) was moderated by distress tolerance (DISR or PASAT). The first four regression analyses tested the model using the self-reported measure of distress tolerance (DISR). In Model 1, CES-D total, ethnicity, DISR total, and  $SA_{FEAR}$  were entered into the first step, and the DISR' X  $SA_{FEAR}$ ' interaction term was entered in the second step to predict  $ARC_{TOT}$ . Neither the

interaction term,  $F(5, 94) = 0.025, p = .875$ , the DISR main effect,  $F(5, 94) = 0.021, p = .885$ , nor the  $SA_{FEAR}$  main effect  $F(5, 94) = 0.839, p = .362$ , significantly contributed to the overall variance. In Model 2, the same variables were used to predict  $ARC_{PROG}$ . As before, none were statistically significant: interaction term,  $F(5, 94) = .070, p = .793$ ; DISR,  $F(5, 94) = 0.370, p = .545$ ; and  $SA_{FEAR}$ ,  $F(5, 94) = 0.088, p = .767$ . These results indicated that distress tolerance (self-reported) did not significantly moderate between fear of social situations and alcohol-related consequences.

The social anxiety avoidance subscale ( $SA_{AVOIDANCE}$ ) and the DISR were next used to predict overall drinking consequences (Model 3). When predicting  $ARC_{PROG}$ , neither the interaction term,  $F(5, 89) = 0.0004, p = .984$ , the main effect for DISR,  $F(5, 89) = 1.134, p = .290$ , nor the main effect for  $SA_{AVOIDANCE}$ ,  $F(5, 89) = 0.143, p = .707$ , significantly contributed to the overall variance. Model 4 used the same variables to predict  $ARC_{TOT}$ . Again, neither the interaction term,  $F(5, 89) = .009, p = .925$ , the DISR,  $F(5, 89) = .250, p = .618$ , nor  $SA_{AVOIDANCE}$ ,  $F(5, 89) = 0.464, p = .498$ , significantly contributed to the overall variance. These results suggest that distress tolerance (self-reported) did not moderate between avoidance of social situations and alcohol-related consequences.

The next two models of hypothesis two tested the interaction between SA subscales and distress tolerance as assessed by the PASAT. Model 5 tested  $SA_{FEAR}$ , PASAT perseverance groups, and their interaction as predictors of  $ARC_{TOT}$ , after controlling for CES-D and ethnicity. Neither  $SA_{FEAR}$  ( $F(5, 94) = .569, p = .453$ ), PASAT ( $F(5, 94) = 0.933, p = .336$ ), nor their interaction ( $F(5, 94) = .434, p = .512$ ) improved the fit of the model. Using the same variables in Model 6 to predict  $ARC_{PROG}$  again did not

significantly improve the model ( $SA_{FEAR}$ ,  $F(5, 94) = .084$ ,  $p = 0.773$ ; PASAT,  $F(5, 94) = 0.123$ ,  $p = .726$ ; interaction  $F(5, 94) = 2.202$ ,  $p = .141$ ). These results suggest that distress tolerance (PASAT perseverance) did not moderate between fear of social situations and alcohol-related consequences.

The final two models tested the  $SA_{AVOIDANCE}$  subscale's ability to predict  $ARC_{TOT}$  and  $ARC_{PROG}$  when interacting with distress tolerance. In Model 7, CES-D (as covariate), PASAT perseverance,  $SA_{AVOIDANCE}$ , and the  $SA_{AVOIDANCE} \times PASAT$  interaction were entered as predictors of  $ARC_{TOT}$ . Neither  $SA_{AVOIDANCE}$  ( $F(5, 89) = 0.630$ ,  $p = .429$ ), PASAT ( $F(5, 89) = .190$ ,  $p = .664$ ), nor the interaction term ( $F(5, 89) = .025$ ,  $p = .874$ ) predicted  $ARC_{TOT}$ . Model 8 used the same variables to predict  $ARC_{PROG}$ , with similar results:  $SA_{AVOIDANCE}$ ,  $F(5, 89) = .573$ ,  $p = .451$ ; PASAT,  $F(5, 89) = .024$ ,  $p = .876$ ;  $SA_{AVOIDANCE} \times PASAT$ ,  $F(5, 89) = .674$ ,  $p = .414$ . These results suggest that distress tolerance (PASAT perseverance) did not moderate between avoidance of social situations and alcohol-related consequences. All unstandardized beta coefficients and their respective standard errors are presented in Table 4.

### Hypothesis Three

Hypothesis three predicted that the relationship between social anxiety and problematic drinking would be moderated by a motivation to drink to cope with negative affect. Hypothesis three was tested with four models that assessed the influence of the two subscales of LSAS-SR (Fear and Avoidance) on the motivation to cope (CM) in predicting  $ARC_{TOT}$  and  $ARC_{PROG}$ . Hierarchical regression was used to test this hypothesis by including the total coping motives score of the DMQ, the respective Fear

and Avoidance subscale scores of the LSAS-SR, and the total score for the CES-D in the first step. The second step included the interaction term for the DMQ and the respective LSAS subscale score.

Model 1 regressed  $ARC_{TOT}$  on CES-D', CM',  $SA_{FEAR}$ ', and CM' X  $SA_{FEAR}$ '. The omnibus model was significant,  $F(5, 94) = 3.206, p = .01$ . Of the predictors, only CM was significant,  $F(5, 94) = 8.916, p = .004$ .  $SA_{FEAR}$  was not significant,  $F(5, 94) = 2.301, p = .133$ , nor was the interaction term,  $F(5, 94) = 0.001, p = .970$ . A similar pattern emerged in Model 2 when predicting  $ARC_{PROG}$ . The omnibus ANOVA was significant,  $F(5, 94) = 2.515, p = .035$ . CM was the only significant variable,  $F(5, 94) = 4.310, p = .041$ .  $SA_{FEAR}$  ( $F(5, 94) = 0.692, p = .408$ ) and the interaction ( $F(5, 94) = 0.049, p = .944$ ) were not statistically significant.

When using  $SA_{AVOIDANCE}$ , the omnibus Model 3 was significant when predicting  $ARC_{TOT}$ ,  $F(5, 89) = 3.571, p = .005$ , with CM,  $F(5, 89) = 7.513, p = .007$ , as the only significant predictor within the model.  $SA_{AVOIDANCE}$ ,  $F(5, 89) = 2.696, p = .104$ , and the interaction term,  $F(5, 89) = .824, p = .366$ , were not significant. When predicting  $ARC_{PROG}$ , the omnibus Model 4 was again significant,  $F(5, 89) = 2.796, p = .022$ , but only ethnicity significantly predicted consequences,  $F(5, 89) = 4.507, p = .036$ . CM was a not significant predictor within that model,  $F(5, 89) = 3.312, p = .072$ .  $SA_{AVOIDANCE}$  ( $F(5, 89) = 1.374, p = .244$ ) and the interaction term ( $F(5, 89) = 0.473, p = .493$ ) were also not significant. All unstandardized beta coefficients and their respective standard errors are reported in Table 5.

### Exploratory Analyses

The proposed exploratory analysis of CM as a mediator between distress tolerance and alcohol consequences failed to meet the first assumption of Baron and Kenny (1986), so the Baron and Kenny (1986) mediation test was not conducted. That is, the relationship between either distress tolerance measure (DISR or PASAT) and alcohol-related consequences was not significant. However, a Sobel test was able to test the ability of CM to mediate the relationship between the DISR and PASAT, respectively, with ARC<sub>PROG</sub> and ARC<sub>TOT</sub>. The Sobel test revealed a significant mediation of CM between the DISR and both ARC<sub>TOT</sub>, Sobel statistic = 2.405,  $p = .016$ , and ARC<sub>PROG</sub>, Sobel statistic = 2.089,  $p = 0.037$ . However, the Sobel test failed to find a significant mediation of CM between PASAT performance and either ARC<sub>TOT</sub>, Sobel statistic = -0.054,  $p = .957$ , or ARC<sub>PROG</sub>, Sobel statistic = -0.054,  $p = .957$ .

Mediation was also tested using MacKinnon's asymmetric confidence interval program PRODCLIN (MacKinnon, Fritz, Williams, & Lockwood, 2007), as the asymmetric confidence interval test is a more liberal test than the Sobel that corrects for non-normally distributed products of coefficients. The results of these analyses also supported a significant mediation between DISR and ARC<sub>TOT</sub> via CM at the  $p < .05$  level (LL = .012, UL = .736). It was similarly significant when predicting a mediation between DISR and ARC<sub>PROG</sub> at the  $p < .05$  level (LL = 0.025, UL = 0.257). However, as with the Sobel test, the asymmetric confidence interval test failed to support a significant mediation between PASAT performance and either ARC<sub>TOT</sub> (LL = -.015, UL = .008) or ARC<sub>PROG</sub> (LL = -.010, UL = .008).

The proposed exploratory moderation test of the interaction between CM and distress tolerance (DISR scores) was conducted with hierarchical regression in which CES-D scores, ethnicity, DISR, and CM were entered into the first step and the DISR' X CM' interaction entered into the second step. While the omnibus ANOVA was significant when predicting  $ARC_{TOT}$ ,  $F(5, 95) = 2.998, p = .015$ , only ethnicity,  $F(1, 95) = 4.182, p = .044$ , and CM,  $F(1, 95) = 6.574, p = .012$ , were significant predictors. The interaction did not significantly contribute to the overall fit of the model,  $F(1, 95) = .012, p = .914$ . The omnibus ANOVA was significant when predicting  $ARC_{PROG}$ ,  $F(5, 95) = 3.572, p = .005$ , but again, only ethnicity,  $F(1, 95) = 8.026, p = .005$ , and CM,  $F(1, 95) = 4.653, p = .033$ , significantly predicted  $ARC_{PROG}$ . DISR,  $F(1, 95) = 1.560, p = .215$ , and the interaction term,  $F(1, 95) = .757, p = .386$ , were not significant. When the PASAT replaced the DISR and a model was run predicting  $ARC_{TOT}$ , the omnibus ANOVA was significant,  $F(5, 95) = 3.207, p = .010$ , again due to CM,  $F(1, 95) = 6.729, p = .011$ , and ethnicity,  $F(1, 95) = 4.170, p = .044$ . The interaction term was not significant,  $F(1, 95) = .047, p = .829$ . When predicting  $ARC_{PROG}$ , the omnibus ANOVA was significant,  $F(5, 95) = 3.112, p = .012$ , but only due to ethnicity,  $F(1, 95) = 7.645, p = .007$ . CM approached significance,  $F(1, 95) = 3.229, p = .076$ , but PASAT performance,  $F(1, 95) = 0.228, p = .635$ , and the interaction,  $F(1, 95) = 0.032, p = .858$ , were not significant. Unstandardized beta values and their respective standard errors are recorded in Table 6.

### Summary of Findings

Hypothesis 1, which tested the association between distress tolerance (DT) and alcohol-related consequences ( $ARC_{TOT}$  and  $ARC_{PROG}$ ) received little support. That is,

there were no main effects of either DISR or PASAT on alcohol-related consequences.

Only an interaction between CES-D and PASAT perseverance predicted  $ARC_{PROG}$ .

Hypothesis 2, which tested DT as a moderator of a relationship between  $SA_{FEAR}$ ,  $SA_{AVOIDANCE}$ , and drinking consequences ( $ARC_{TOT}$  and  $ARC_{PROG}$ ) had no support.

Neither the social anxiety nor distress tolerance measures (i.e., DISR or PASAT) were significantly related to drinking consequences, and their interaction was not significantly related to drinking consequences, either.

Hypothesis 3 predicted that a motivation for drinking to cope (CM) would moderate a relationship between social anxiety ( $SA_{FEAR}$  and  $SA_{AVOIDANCE}$ ) and drinking consequences ( $ARC_{TOT}$  and  $ARC_{PROG}$ ). While there was a main effect for drinking to cope when predicting drinking consequences, support for the moderating hypothesis was not found.

The exploratory analyses relating drinking to cope and distress tolerance produced no support for either a mediating or a moderating relationship between predictors.

## CHAPTER FIVE

### Discussion

Previous research has linked low distress tolerance with a host of negative outcomes that range from alcohol-related consequences (Simons & Gaher, 2005) to symptoms of depression (Brown, Lejuez, Kahler, & Strong, 2012), urgency, smoking, risky sexual behaviors, and suicide attempts (Weitzman, McHugh, & Otto, 2011). Distress tolerance has been measured with both self-report and behavioral measures, although results are mixed with respect to their predictive validity and shared variance (McHugh et al., 2011). Previous research has also been mixed with respect to the utility of distress tolerance to predict alcohol-related consequences in college students (Howell et al., 2010; Simons & Gaher, 2005), so this study proposed a multimodal assessment of distress tolerance using both a self-report and a behavioral measure to further examine the relationship between distress tolerance and alcohol-related problems in college students.

A significant relationship between distress tolerance (both self-report and PASAT) and alcohol-related consequences (both “careless/less severe” and “risky/more severe”) was not found after controlling for depressed mood. While the relationship between the DISR and drinking consequences was in the expected direction, the relationship between the PASAT and drinking consequences was not. This raises the possibility that the PASAT did not assess distress tolerance per se. Previous studies that have utilized the PASAT to assess distress (Daughters et al. 2005a; 2005b; 2009) were designed such that an individual completing the PASAT would earn an additional reward



(e.g., money) the longer he or she persevered on the task. If an individual terminated the PASAT prior to the trial's completion, he or she would simultaneously forfeit the potential to earn additional reward. In this study, students were informed in the consent that they had already received their award to the fullest amount possible (i.e., two SONA credits), which would not be reduced regardless of whether or not they chose to terminate the PASAT early. Therefore, students who chose to terminate the PASAT early may not have been demonstrating low distress tolerance as much as they were demonstrating other, unrelated constructs such as a lack of motivation or boredom.

The DISR's non-significant relationship with drinking consequences seemed to contrast the results of Simons and Gaher (2005), who found a significant relationship between their self-report distress tolerance measure and alcohol-related consequences in a sample of college students. Some caveats of their findings are important to note and may clarify the conflicting results. First, after controlling for prior alcohol-related problems, frequency of alcohol use, and negative affect (but not depression symptoms as was assessed in this study), the unique variance predicted by Simons and Gaher's self-report measure of distress tolerance (the DTS) dropped substantially ( $\Delta R^2 = .01$ ). Second, after controlling for the above-mentioned factors, distress tolerance significantly predicted alcohol-related problems in men only.

At the same time, the strength of the relationship between the DTS and alcohol-related problems ( $r_s = .17-.23$ ; Simons & Gaher, 2005) was larger than that between the DISR and alcohol-related problems found in the current study ( $r = .097$ ). This suggests that the DTS may be a more appropriate measure for predicting drinking consequences in college students than the DISR. The discrepancy between the two measures could be

accounted for by differences in the specific questions of the DTS and the DISR or the relative sensitivity or appropriateness of the drinking consequence measures used in the two studies (i.e., Wechsler versus the Rutgers Alcohol Problem Index).

### Depression and Distress Tolerance

Among college students, the relationships between distress tolerance and alcohol consequences might be more nuanced than direct, moderating the relationship between depressed affect and alcohol-related problems. The present study found an interaction between PASAT perseverance and depression scores when predicting the relatively progressed alcohol consequences score (risky/reckless and authority-related). The number of progressed drinking consequences increased as depression scores increased, but only for individuals who terminated the PASAT early (Figure 1). Others have found similar evidence that distress tolerance moderates the influence of other predictors on problem drinking. Ali and colleagues recently reported a similar moderating effect in which distress tolerance moderated a relationship between trait aggression and drinking consequences among college students (Ali, Ryan, Beck, & Daughters, 2013). Daughters and colleagues also found that distress tolerance moderated the relationship between negative affect and gambling relapse in a community sample (2005b). When combined, these results and the result of the current study suggest that perhaps among college students, distress tolerance changes the relationship between certain variables and drinking consequences.

The present results may suggest that poor tolerance of distressing contexts, combined with depressed mood, are associated with a greater likelihood to get into

trouble when drinking. That is, depressed mood may increase the likelihood to make impulsive or reckless choices while drinking for students who are less able to tolerate distressing contexts. These reckless choices may then contribute to the likelihood of experiencing a negative alcohol-related consequence (e.g., drinking and driving, fights, risky sexual decisions). The temporal limitations and the correlational design of the study, however, restrict definitive causal inferences. An alternative explanation may be that students who have experienced more serious alcohol-related consequences subsequently may become depressed and distressed.

It is worth noting that this interaction was not found when using the self-report measure of distress tolerance (DISR). An important revelation from this study was that the self-report and behavioral assessments of distress tolerance were unrelated. Further, as evidenced by Table 1, most statistically significant correlations occurred among the self-report measures (DISR, LSAS-SR, DMQ), which raises the possibility that shared method variance accounted (at least in part) for the positive associations between self-report distress tolerance, social anxiety, and drinking motives. This observation supports previous findings that behavioral and self-reported measures of distress tolerance assess separate but related components of distress (McHugh et al., 2011), underscoring the importance of multimodal methods of distress tolerance among college students.

### Social Anxiety and Distress Tolerance

Howell and colleagues (2010) found that anxiety sensitivity and distress tolerance were significantly related to each other, but only anxiety sensitivity significantly predicted alcohol-related problems. Prior to this study, however, the relationship

between social anxiety and distress tolerance had not yet been assessed. Given the literature's mixed relationship between social anxiety and alcohol-related problems (Morris et al., 2005), this study proposed an interaction between social anxiety and distress tolerance in the prediction of alcohol-related consequences. It was proposed that distress tolerance might moderate the relationship between the two; as distress tolerance decreased, social anxiety was hypothesized to predict a greater number of experienced consequences. Such a moderation model might have clarified some of the mixed findings regarding social anxiety in the problematic drinking literature.

In this study, the LSAS-SR social anxiety measure was divided into separate constructs: social anxiety as assessed by fear per se, and social anxiety as assessed by avoidance behaviors. Neither social fear nor social avoidance significantly interacted with either the self-report or behavioral measures of distress tolerance to predict overall (total) or relatively progressed (e.g., risky/authority) alcohol-related consequences. Therefore, at least for this sample, social anxiety did not significantly contribute to alcohol-related problems, even when moderated by distress tolerance. Perhaps social anxiety becomes more problematic for alcohol use and alcohol-related consequences as it becomes more of a clinically significant concern, presenting with depression and more complex psychopathology (Cooper, Hildebrandt, & Gerlach, 2014). Of note, students in this sample seldom met cutoff criteria for clinically significant social anxiety according to the LSAS-SR, suggesting that most students were not bothered by serious psychopathology.

Alternatively, the relationship between social anxiety and drinking consequences may not be moderated by distress tolerance. As previous research on the relationship

between social anxiety and problematic drinking has been mixed (Lewis et al., 2008; Morris et al., 2005), it may be that distress tolerance is the wrong mediating variable to explain why only certain socially anxious individuals experience negative drinking consequences. Future potential mediators (e.g., quality of friendships, self-esteem, or number of social commitments such as clubs) should perhaps be focused on the factors that prompt socially anxious individuals to attend a social situation, not the factors that moderate perceived distress subsequent to a social situation per se.

#### Social Anxiety and Drinking to Cope

The final hypothesis examined the possibility that drinking-to-cope motives and social anxiety would interact to predict alcohol-related consequences. These relationships were significant, but subsequent analysis revealed that almost all of the model's predictive power could be attributed to drinking-to-cope motives, not social anxiety. Both social anxiety factors (Fear and Avoidance) approached significance when predicting total drinking consequences, but none of the moderations between social anxiety and drinking to cope were significant. While appearing to contrast the hypothesized model that more social anxiety should predict more alcohol-related consequences, the relationship between social anxiety and alcohol problems has been notoriously mixed (Lewis et al., 2008). As stated in the section above, it may be that individuals who are more socially anxious are more likely than other individuals to avoid drinking situations altogether, thus preventing the need to drink to cope and subsequent alcohol-related consequences.

### Distress Tolerance and Drinking to Cope

Exploratory analyses examined the relationship between distress tolerance and drinking to cope as these constructs have been separately identified related to drinking consequences (Gonzales, Collins, & Bradizza, 2009; Simons & Gaher, 2005) and have been shown to be related to each other (Howell et al., 2010). Analyses within this study found that coping motives mediated the relationship between scores on the DISR – but not the PASAT – and alcohol-related problems. Given the lack of significant main findings between the DISR and drinking problems, this suggests that students who perceive themselves as having lower levels of distress tolerance are more likely to end up with alcohol-related problems if they have greater motivations to use alcohol to cope with negative affect.

This finding is additionally intriguing as the moderation between distress tolerance measures and the motivation to cope was not significant when predicting alcohol-related problems. This suggests that coping motives do not interact with low distress tolerance to result in drinking consequences; rather, perceived distress tolerance (but not behavioral distress tolerance) can only predict a history of alcohol-related consequences by acting through the motivation to cope with negative affect using alcohol. Furthermore, this finding was true for both total consequences (which consists of careless consequences) and more progressive or reckless consequences, suggesting that a student may experience more comprehensive and serious impairment if he or she is sufficiently distressed and desires to cope with this distress by consuming alcohol.

### Summary of Findings

Overall, this study failed to find significant evidence for the ability of either a self-report or behavioral assessment of distress tolerance to directly predict alcohol-related consequences in college students. Nevertheless, the results of this study suggest some important implications.

First, it is noteworthy that while direct significant effects were not found for any of our proposed hypotheses, this project provided pilot data that could (a) guide further investigations of behavioral indices of distress tolerance and drinking by estimating the effect size between the PASAT and alcohol-related problems in general, and (b) specifically explore potential moderating roles for distress tolerance with regard to drinking consequences. As noted, others have obtained similar moderating effects between extremes of affect and temperament and alcohol-related consequences among both college students (Ali et al., 2013) and community samples (Daughters et al., 2005b). This study's moderating effect between depressed affect and PASAT performance points to an intriguing direction for some future research. Specifically, although distress tolerance by itself may have limited utility to predict drinking consequences, distress tolerance in combination with depressed affect or other dispositional characteristics may elevate a student's risk for negative drinking consequences. This finding warrants further research to replicate the effect and to explore potential mechanisms that would explain the elevated risk. For example, a recent study has demonstrated that social cognitive limitations may elevate risk for drinking consequences (Vik, Williams, Dasher, & Van Wyk, 2014). Quite possibly, distress tolerance and depressed affect could cloud social judgment and thereby increase risk for negative drinking consequences.

Of note, this study collected correlational data which makes it difficult to establish the sequence of events related to depression, distress tolerance, and drinking consequences. The background questionnaire's instructions requested that subjects limit their recall of drinking consequences to only those experienced within the past year, and the DISR questions were worded such that subjects were expected to recall an "average," trait-like quality of distress tolerance. Even so, different types of biases inherent in self-report measures, such as recency effects, may limit the veracity of subjects' claims. This study did not provide the control necessary to objectively determine causality between distress tolerance, depression, and alcohol-related consequences, and as such the nature of these relationships remains an area worthy of future study.

Second, a critical consideration of the nature of distress tolerance among college students seems appropriate. In particular, it is worth examining whether college students experience a sufficient range of distress tolerance. In this sample, for example, DISR scores and PASAT performance were positively skewed and required a square root transformation and binary coding, respectively. When compared to the general population, it may be that students are more resilient to distressing circumstances despite the multitude of changes associated with this significant transition. Reduced variability of distress tolerance might account for low correlations between the two distress tolerance measures and the outcome variables.

Third, the correlations found between the PASAT and alcohol-related consequences, although not significant, were curiously in the direction opposite of what was hypothesized (that is, individuals who chose to terminate the PASAT early had fewer problems than students who completed the PASAT;  $r = -.104$ ). In contrast to the PASAT



results, the DISR correlated positively (although still not significantly) with alcohol-related problems. Although non-significant results should not be interpreted as meaningful, if these data trends are nevertheless true and representative of small relationships in this sample, they might shed some light on the differences in variance accounted for by self-report and behavioral measures of distress tolerance (McHugh et al., 2011). Perhaps the PASAT assesses constructs more similar to the experience of social anxiety than the DISR, such that when it is used in this context, the PASAT is a better estimate of students who are risk-averse and who avoid risky-drinking situations where they might encounter more alcohol-related problems. Along these lines, the PASAT was found to correlate more strongly with the Social Avoidance ( $r = .118, p = .255$ ) than the Social Fear Subscale ( $r = .082, p = .418$ ; Table 1). Furthermore, perhaps an individual's perception of his or her distress tolerance is a better estimate of previously experienced alcohol-related consequences because the DISR has greater face validity than the PASAT; that is, remembering one's experience of alcohol-related consequences prompts the individual to infer a relationship between drinking problems and the distressing situations leading up to them. Certainly, the nature of the PASAT and DISR as measures of distress tolerance is complex and deserves further exploration. At the same time, as there were no significant relationships between either measure of distress tolerance and alcohol-related problems, these conjectures are purely speculative and purely fodder for future research.

Lastly, exploratory analyses revealed a significant mediation model whereby self-reported distress tolerance predicted alcohol-related problems, but only by acting through the motivation to cope with negative affect by using alcohol. This finding offers some

important implications about the relationship between distress tolerance and drinking to cope, which has previously only been correlational in nature (Howell et al., 2010). This pathway also offers at least two points for intervention in students who are at high risk for negative drinking consequences: targeting affect regulation mechanisms that likely underlie the impact of distress on the individual, and targeting unhelpful cognitions that accompany one's decision to drink alcohol to cope with negative affect. Future research could be designed to address the profitability of addressing one or both of these key mechanisms in at-risk students.

In summary, the findings from the present study failed to find any direct relationship between distress tolerance and drinking consequences. Findings did suggest that distress tolerance exerts a moderating influence by interacting with depressed mood, and its relationship with drinking consequences may also be mediated by the motivation to cope with alcohol. These results, in combination with findings by others, support the role of distress tolerance as a contributor to problematic collegiate drinking and justify the need for further research to explore how distress tolerance influences drinking consequences.

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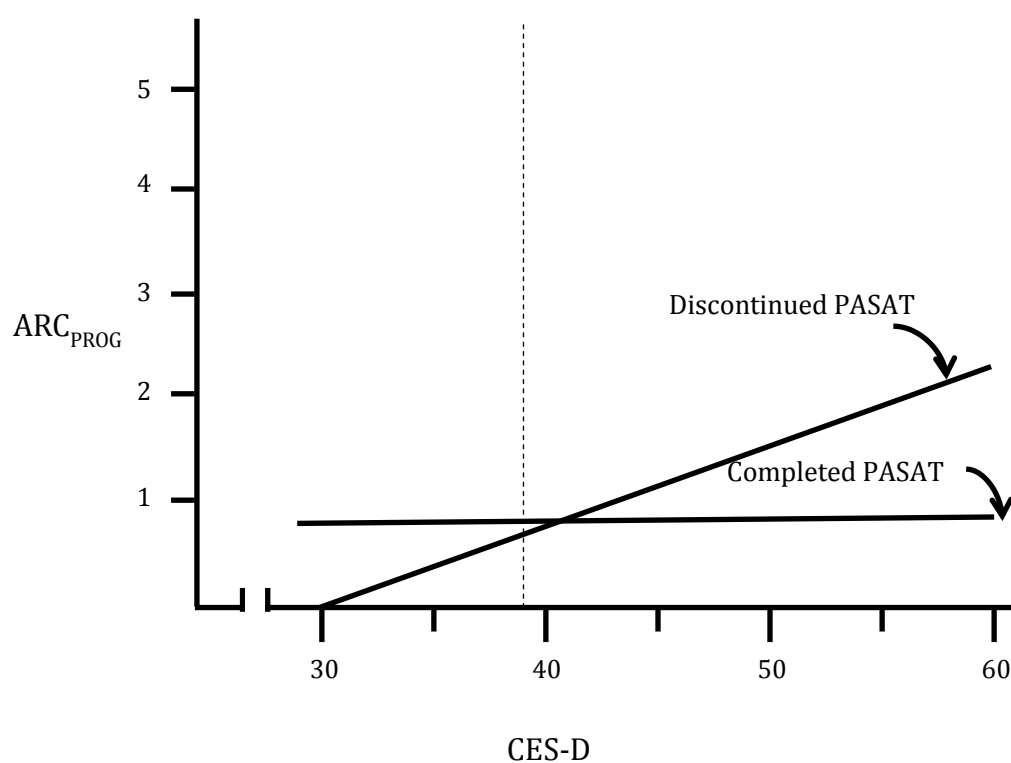
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## Appendix A: Tables and Figures



**Figure 1.** PASAT performance interacted with CES-D scores to predict total number of risky and authority-related consequences experienced in the past year. However, this interaction failed to remain significant when ethnicity was controlled.

**Table 1.** Descriptive statistics for primary study variables

| <u>Variable</u>                          | <u>Mean</u> | <u>Standard<br/>Deviation</u> | <u>Range</u> | <u>Skew</u> |
|--|-------------|-------------------------------|--------------|-------------|
| ARC <sub>TOT</sub>                       | 2.47        | 2.58                          | 0 – 10       | 1.00        |
| ARC <sub>PROG</sub>                      | .85         | 1.04                          | 0 – 4        | 1.18        |
| DISR                                     | 19.59       | 6.32                          | 10 – 36      | .52         |
| Social Anxiety (SA) <sub>FEAR</sub>      | 22.62       | 12.59                         | 3 – 64       | .70         |
| Social Anxiety (SA) <sub>AVOIDANCE</sub> | 22.39       | 12.99                         | 3 – 59       | .65         |
| DMQ Coping                               | 8.66        | 3.25                          | 5 – 19       | .66         |
| CES-D                                    | 38.67       | 6.59                          | 28 – 59      | 1.00        |
| PASAT<br>(percentage quit)               | 38.6%       |                               |              |             |

**Table 2.** Correlations between total consequences ( $ARC_{TOT}$ ), progressed consequences ( $ARC_{PROG}$ ), DISR, PASAT, LSAS-SR Fear ( $SA_{FEAR}$ ), LSAS-SR Avoidance ( $SA_{AVOIDANCE}$ ), and DMQ Coping.

|                     | 1      | 2     | 3      | 4     | 5      | 6      | 7      | 8  |
|---------------------|--------|-------|--------|-------|--------|--------|--------|----|
| 1. $ARC_{TOT}$      | --     |       |        |       |        |        |        |    |
| 2. $ARC_{PROG}$     | .851** | --    |        |       |        |        |        |    |
| 3. DISR             | .091   | .040  | --     |       |        |        |        |    |
| 4. PASAT            | -.104  | -.043 | .056   | --    |        |        |        |    |
| 5. $SA_{FEAR}$      | -.033  | .006  | .353** | .082  | --     |        |        |    |
| 6. $SA_{AVOIDANCE}$ | -.019  | -.005 | .374** | .118  | .833** | --     |        |    |
| 7. DMQ Coping       | .306** | .248* | .344** | -.005 | .305** | .320** | --     |    |
| 8. CES-D            | .161   | .174  | .453** | -.051 | .414** | .407** | .363** | -- |

\* =  $p \leq .05$ ; \*\* =  $p \leq .01$



**Table 3.** Unstandardized beta coefficient values and their respective standard errors (in parenthesis) for all variables in Hypothesis 1.

|   | <b>CES-D</b> | <b>Distress Tolerance Measure</b> |
|---|--------------|-----------------------------------|
| <b>Predicting ARC<sub>TOT</sub> using DISR</b>  | .385(.286)   | .024 (.405)                       |
| <b>Predicting ARC<sub>TOT</sub> using PASAT</b> | .381(.255)   | -.240(.260)                       |
| <b>Predicting ARC<sub>ADV</sub> using DISR</b>  | .201(.114)   | -.103(.161)                       |
| <b>Predicting ARC<sub>ADV</sub> using PASAT</b> | .167(.102)   | -.029(.104)                       |

**Table 4.** Unstandardized beta coefficient values and their respective standard errors (in parenthesis) for all variables in Hypothesis 2.

|  | <b>CES-D</b> | <b>Social Anxiety</b> | <b>Distress Tolerance</b> | <b>Interaction</b> |
|--|--------------|-----------------------|---------------------------|--------------------|
| <b>Predicting ARC<sub>TOT</sub> using<br/>DISR and SA<sub>FEAR</sub></b>   | .503(.312)   | -.271(.296)           | -.044(.300)               | .035(.218)         |
| <b>Predicting ARC<sub>TOT</sub> using<br/>DISR and SA<sub>AVOID</sub></b>  | .666(.321)   | -.205(.301)           | -.154(.309)               | -.023(.241)        |
| <b>Predicting ARC<sub>TOT</sub> using<br/>PASAT and SA<sub>FEAR</sub></b>  | .543(.290)   | -.217(.288)           | -.251(.260)               | .184(.279)         |
| <b>Predicting ARC<sub>TOT</sub> using<br/>PASAT and SA<sub>AVOID</sub></b> | .598(.303)   | -.232(.292)           | -.116(.267)               | .044(.278)         |
| <b>Predicting ARC<sub>ADV</sub> using<br/>DISR and SA<sub>FEAR</sub></b>   | .216(.125)   | -.035(.119)           | -.073(.120)               | .023(.088)         |
| <b>Predicting ARC<sub>ADV</sub> using<br/>DISR and SA<sub>AVOID</sub></b>  | .287(.130)   | -.046(.122)           | -.133(.125)               | .002(.098)         |
| <b>Predicting ARC<sub>ADV</sub> using<br/>PASAT and SA<sub>FEAR</sub></b>  | .225(.116)   | -.033(.115)           | -.036(.104)               | .165(.111)         |
| <b>Predicting ARC<sub>ADV</sub> using<br/>PASAT and SA<sub>AVOID</sub></b> | .265(.123)   | -.090(.119)           | .017(.109)                | .093(.113)         |

**Table 5.** Unstandardized beta coefficient values and their respective standard errors (in parenthesis) for all variables in Hypothesis 3.

|   | <b>CES-D</b> | <b>Coping Motives</b> | <b>Social Anxiety</b> | <b>Interaction</b> |
|---|--------------|-----------------------|-----------------------|--------------------|
| <b>ARC<sub>TOT</sub> using<br/>SA<sub>FEAR</sub></b>  | .310(.283)   | .820(.274)            | -.424(.280)           | -.008(.223)        |
| <b>ARC<sub>TOT</sub> using<br/>SA<sub>AVOID</sub></b> | .338(.283)   | .756(.276)            | -.467(.285)           | .200(.220)         |
| <b>ARC<sub>ADV</sub> using<br/>SA<sub>FEAR</sub></b>  | .133(.116)   | .235(.113)            | -.096(.115)           | -.006(.092)        |
| <b>ARC<sub>ADV</sub> using<br/>SA<sub>AVOID</sub></b> | .174(.119)   | .210(.116)            | -.140(.119)           | .064(.092)         |

**Table 6.** Unstandardized beta coefficients and their respective standard errors (in parentheses) for the exploratory mediation and moderation analyses between distress tolerance and coping motives.

**Mediation Model (Sobel) and MacKinnon's Asymmetric CI Values**

|                                      | <b>a</b>     | <b>b</b>    | <b>Z statistic</b> | <b>p-value</b> | <b>UL</b> | <b>LL</b> |
|--------------------------------------|--------------|-------------|--------------------|----------------|-----------|-----------|
| <b>ARC<sub>TOT</sub> using DISR</b>  | 1.576 (.432) | .243 (.076) | 2.405              | .016           | .736      | .012      |
| <b>ARC<sub>TOT</sub> using PASAT</b> | .018(.334)   | .243(.076)  | 0.054              | .957           | .008      | -.015     |
| <b>ARC<sub>ADV</sub> using DISR</b>  | 1.576 (.432) | .079(.031)  | 2.089              | .037           | .257      | .025      |
| <b>ARC<sub>ADV</sub> using PASAT</b> | .018(.334)   | .079(.031)  | 0.054              | .957           | .008      | -.010     |

**Moderation Model**

|  | <b>CES-D</b> | <b>Distress<br/>Tolerance</b> | <b>Coping<br/>Motives</b> | <b>Interaction</b> |
|--|--------------|-------------------------------|---------------------------|--------------------|
| <b>ARC<sub>TOT</sub> using<br/>DISR</b>  | .182(.294)   | -.148(.286)                   | .737(.279)                | .041(.276)         |
| <b>ARC<sub>TOT</sub> using<br/>PASAT</b> | .120(.266)   | -.246(.249)                   | .719(.266)                | -.041(.250)        |
| <b>ARC<sub>ADV</sub> using<br/>DISR</b>  | .161(.119)   | -.128(.115)                   | .254(.112)                | -.089(.111)        |
| <b>ARC<sub>ADV</sub> using<br/>PASAT</b> | .092(.109)   | -.032(.101)                   | .211(.109)                | .025(.102)         |

**Table 7.** Unstandardized beta coefficients and their respective standard errors for post-hoc moderation analyses examining the moderating effect of depression on distress tolerance when predicting alcohol-related consequences.

|                                      | <b>CES-D</b> | <b>Distress Tolerance</b> | <b>Interaction</b> |
|--------------------------------------|--------------|---------------------------|--------------------|
| <b>ARC<sub>TOT</sub> using DISR</b>  | .352(.355)   | .015(.289)                | .042(.275)         |
| <b>ARC<sub>TOT</sub> using PASAT</b> | .409(.256)   | -.229(.255)               | .284(.265)         |
| <b>ARC<sub>ADV</sub> using DISR</b>  | .217(.142)   | -.072(.115)               | -.021(.110)        |
| <b>ARC<sub>ADV</sub> using PASAT</b> | .189(.101)   | -.024(.101)               | .216(.105)         |

## Appendix B: Forms and Measures

## Consent Form

### ***Exploring Factors Associated with the Alcohol Consumption Patterns of College Students***

We are asking you to be in a research study.

You do not have to be in this study.

If you say yes, you may quit the study at any time.

Please take as much time as you want to make your choice.

#### **Why is this study being done?**

We want to understand what factors are related to alcohol consumption patterns in college students. This information could ultimately help create a safer campus environment. We are asking students who have consumed alcohol in the past 12 months, like you, to participate.

#### **What happens if I say yes, I want to be in the study?**

If you say yes, we will:

- Ask you to answer a series of questions related to your demographics, your personal history, and your previous drinking patterns. This should take approximately 20 minutes.
- Ask you to participate in a computer program called the Paced Auditory Serial Addition Test (PASAT). The PASAT requires you to perform simple addition quickly. This should take approximately 20 minutes.

#### **How long will the study take?**

Including the time for informed consent, this study will take about 50 minutes.

**Where will the study take place?**

This study will take place in a research lab at ISU: Garrison Hall, room 505.

**What happens if I say no, I do not want to be in the study?**

No one will treat you any differently. You will not be penalized by the SONA system. However, if you do not at least start the study, you will not receive SONA research credit (which can be applied to your psychology courses, if applicable).

**What happens if I say yes, but change my mind later?**

You may stop being in the study at any time. You will not be penalized, and you WILL receive SONA research credit. Your relationship with the SONA system and this research team will not change.

**Who will see my answers?**

The only people who will see your answers will be the people who work on the study (e.g., Catherine Williams, the primary investigator) and those legally required to supervise our study (Dr. Peter Vik).

[If the study sponsor or others will have access to data, state that here.]

Your demographic information and answers to all survey questions will be locked in our files; these files will also be kept in a locked office. Your performance on the PASAT will be kept on one of two computers in our locked office.

There is the potential that the results of this study could be published. If or when we share the results of our study (e.g., in professional



journals, at conferences) we will not include your name. We will do our best to make sure no one outside the study will know that you are a part of the study.

**Will it cost me anything to be in the study?**

No.

**Will being in this study help me in any way?**

Being in this study will not provide any tangible benefits to you, but the results of the study may help to create safer college campuses in the future.

**Will I be paid for my time?**

No. You will, however, receive two (2) SONA research credits if you participate in the study.

**Is there any way being in this study could be bad for me?**

Yes, there is a chance that:

- Some questions may be perceived as private, personal information. Disclosing this information could make you uncomfortable or upset.
- The PASAT could be perceived as tedious or frustrating, which could make you upset.
- Someone could find out that you were in this study and learn something about you that you do not want them to know.
- You could have a legal problem if you told us about a crime such as child abuse or neglect or elder abuse or neglect. The experimenter would have to report this information. Similarly, if you informed us of intent to harm yourself or someone else, we would have to report this information.

We will do our best to protect your privacy.

**What if I have questions?**

Please call the head of the study, Peter Vik (282-2462) if you:

- Have questions about the study.
- Have questions about your rights.
- Feel you have been injured in any way by being in this study.

You can also call the Idaho State University Human Subjects Committee office at 208-282-2179 to ask questions about your rights as a research subject.

**Do I have to sign this document?**

No. You only sign this document if you want to be in the study.

**What should I do if I want to be in the study?**

You sign this document. We will give you a copy of this document to keep.

By signing this document you are saying:

- You agree to be in the study.
- We talked with you about the information in this document and answered all your questions.

---

Your Name (please print)

---

Your Signature

---

Date

**Background Questionnaire**

The following questions ask you about your use of alcohol, and alcohol use by your friends and family members. Your responses to these questions are **COMPLETELY CONFIDENTIAL** and are for research purposes only. Please answer honestly as we will not share this information with anyone.

1. How old are you? \_\_\_\_\_ years
2. Male or female? (circle one) \_\_\_\_\_ M \_\_\_\_\_ F
3. Year in college: (circle one) \_\_\_\_\_ Freshman Sophomore \_\_\_\_\_ Junior \_\_\_\_\_ Senior (4+)
4. What is your current weight? \_\_\_\_\_ lbs
5. Where do you currently live?
  1. At home with family [parent(s) and/or siblings]
  2. In dormitories
  3. On own with roommates
  4. On own without roommates
  5. At home with family [spouse and/or children]
  6. Fraternity or Sorority
6. Do you currently attend church?
  1. Never or Not applicable
  2. No, not at the present time
  3. Yes, but not regularly
  4. Yes, regularly
7. What do you consider your main cultural background?
  1. Caucasian
  2. Latino/Latina
  3. Native American
  4. Asian or Asian-American
  5. African-American
  6. Other
8. Marital Status:
 

\_\_\_\_\_ single

\_\_\_\_\_ living with romantic partner: Age when you moved in together \_\_\_\_\_

\_\_\_\_\_ married: Age when you got married \_\_\_\_\_

\_\_\_\_\_ separated/divorced: Age when you got separated or divorced \_\_\_\_\_
9. How many children do you have? \_\_\_\_\_
 

How old is your youngest child? \_\_\_\_\_

How old is your oldest child? \_\_\_\_\_
10. Employment status:
 

\_\_\_\_\_ not currently working

\_\_\_\_\_ part-time, non-career position; had job since age \_\_\_\_\_

\_\_\_\_\_ part-time, career position; had job since age \_\_\_\_\_

\_\_\_\_\_ full-time, non-career position; had job since age \_\_\_\_\_

\_\_\_\_\_ full-time, career position; had job since age \_\_\_\_\_
11. How old were you when you graduated from high school? \_\_\_\_\_
12. How old were you when you began college? \_\_\_\_\_
13. Approximately how many close, trusted friends do you have? \_\_\_\_\_
14. Of your close trusted friends, how many have tried alcohol? \_\_\_\_\_
15. Of your close trusted friends, how many drink alcohol at least once a week? \_\_\_\_\_
16. Of your close trusted friends, how many have tried drugs other than alcohol? \_\_\_\_\_
17. Of your close trusted friends, how many use drugs other than alcohol at least once a week? \_\_\_\_\_
18. How old were you when you began **SMOKING**?
 

Age \_\_\_\_\_ I've never smoked \_\_\_\_\_

- HAVE YOU EVER USED ANY OF THE FOLLOWING DRUGS? (If so, please indicate how old you were the first time you tried each, and how old you were the most recent time you used the drug.)

30. For each day of the week, please indicate:

- (a) the usual number of drinks you currently have, and
- (b) how much time you spend drinking.

[illegible]

Hours spent drinking each day \_\_\_\_\_

31. Approximately how many days during the past 3 months did you drink alcohol? \_\_\_\_\_ days
32. Over the past 3 months, **on the days you were drinking**, how many drinks did you typically have?  
\_\_\_\_\_ number of drinks
33. How long does it take you to drink your typical amount (from question 32 above)? \_\_\_\_\_ hours
34. Over the past 3 months, what is the most alcohol (beer, wine, or hard liquor) you have consumed at one time?  
\_\_\_\_\_ number of drinks
35. How long does it take you to drink your maximum amount (from question 34 above)? \_\_\_\_\_ hours
36. Think back over the past **two weeks**. How many times have you had **FIVE or more** drinks in a row?  
\_\_\_\_\_ number of times
37. Think back over the past **three months**. How many times have you had **FIVE or more** drinks in a row?  
\_\_\_\_\_ number of times
38. How old were you the first time you had **FIVE or more** drinks in a row?
39. Have you ever had **FIVE or more** drinks in a row when you were by yourself or you were the only person in the situation who was drinking?  
\_\_\_\_\_ No \_\_\_\_\_ By myself \_\_\_\_\_ I was the only person who was drinking
40. How long ago (in weeks) did you last drink **FIVE or more** drinks in a row? \_\_\_\_\_ weeks
41. Think back over the last **two weeks**. How many times did you have **four** drinks in a row (but no more than that)?  
\_\_\_\_\_ number of times
42. Think back over the last **three months**. How many times did you have **four** drinks in a row (but no more than that)?  
\_\_\_\_\_ number of times
43. How old were you the first time you had **FOUR** drinks in a row? \_\_\_\_\_
44. Have you ever had **FOUR** drinks in a row when you were by yourself or you were the only person in the situation who was drinking?  
\_\_\_\_\_ No \_\_\_\_\_ By myself \_\_\_\_\_ I was the only person who was drinking
45. How long ago (in weeks) did you last drink **FOUR or more** drinks in a row? \_\_\_\_\_ weeks

#### DMQ-R

Listed below are twenty possible reasons for consuming alcohol. Mark the response that best describes the frequency with which you have consumed alcohol for that reason **in the past year**.

46. To forget your worries.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|
47. Because your friends pressure you to drink.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|
48. Because it helps you enjoy a party.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|
49. Because it helps when you feel depressed or nervous.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|
50. To be sociable.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|
51. To cheer up when you are in a bad mood.
- |   |                    |   |        |   |            |   |                 |
|---|--------------------|---|--------|---|------------|---|-----------------|
| 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
|---|--------------------|---|--------|---|------------|---|-----------------|

|  |   |                    |   |        |   |            |   |                 |
|--|---|--------------------|---|--------|---|------------|---|-----------------|
| 52. Because you like the feeling.                              | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 53. So that others won't kid you about <i>not</i> drinking.    | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 54. Because it's exciting.                                     | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 55. To get high.   | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 56. Because it makes social gatherings more fun.               | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 57. To fit in with a group you like.                           | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 58. Because it gives you a pleasant feeling.                   | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 59. Because it improves parties and celebrations.              | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 60. Because you feel more self-confident and sure of yourself. | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 61. To celebrate special occasions with friends.               | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 62. To forget about your problems.                             | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 63. Because it's fun.  | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 64. To be liked.   | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |
| 65. So you won't feel left out.                                | 1 | Almost never/never | 2 | Rarely | 3 | Frequently | 4 | Very Frequently |

Please indicate which of these problems has occurred to you **in the past year** because of your own alcohol or drug use.

|  |        |       |
|--|--------|-------|
| 66. Missed a class.....                          | ___Yes | ___No |
| 67. Got behind in schoolwork.....                | ___Yes | ___No |
| 68. Did something you later regretted.....       | ___Yes | ___No |
| 69. Forgot where you were or what you did.....   | ___Yes | ___No |
| 70. Argued with friends.....                     | ___Yes | ___No |
| 71. Engaged in unplanned sexual activity.....    | ___Yes | ___No |
| 72. Did not use protection when you had sex..... | ___Yes | ___No |
| 73. Damaged property.....                        | ___Yes | ___No |

74. Got into trouble with campus or local police..... ☐ Yes ☐ No
75. Got injured or hurt..... ☐ Yes ☐ No
76. Marital problems because of your alcohol or drug use..... ☐ Yes ☐ No
77. Laid off/fired from work because of your alcohol or drug use... ☐ Yes ☐ No
78. Two or more arrests because of your alcohol or drug use..... ☐ Yes ☐ No
79. Treated in an alcohol/drug treatment program..... ☐ Yes ☐ No
80. Suspended/expelled from school 2 or more times because  
of your alcohol or drug use..... ☐ Yes ☐ No
81. Asked to move because of your alcohol/drug use..... ☐ Yes ☐ No
82. Gotten into a fight at a bar..... ☐ Yes ☐ No
83. Have you driven while intoxicated?..... ☐ Yes ☐ No

Indicate at what age you *first* experienced each of the following:

84. You needed to drink more alcohol than you used to in order to get the same effect?  
 age first time?  Never
84. You didn't get the same effect as you used to when you drank your usual amount of alcohol?  
 age first time?  Never
85. You drank alcohol in larger amounts or over a longer period of time than you had intended?  
 age first time?  Never
86. You had a persistent desire to cut down on your drinking?  
 age first time?  Never
87. You were unsuccessful in an attempt to cut down or control your drinking?  
 age first time?  Never
88. You spent a great deal of time either obtaining alcohol, drinking alcohol, or recovering from the effects of alcohol?  
 age first time?  Never
89. Because of your drinking, you stopped social, occupational, or recreational activities that you enjoyed or were  
important to you?  
 age first time?  Never
90. You continued to drink alcohol even though you were aware that you had a physical or psychological problem due to  
(or made worse by) alcohol use?  
 age first itme?  Never

When you have NOT been drinking for several hours or several days, have you ever experienced (check all that apply):

91. ☐ sweating or rapid (>100) pulse rate?
92. ☐ hand tremors?
93. ☐ insomnia?
94. ☐ nausea/vomiting (e.g., hangover)
95. ☐ temporary visual, tactile, or auditory hallucinations?
96. ☐ physical agitation?
97. ☐ anxiety?
98. ☐ grand mal seizures?
99. ☐ Have you ever consumed alcohol to get rid of the symptoms listed in 91-98?

**DISR**

The next 10 questions are unrelated to alcohol or drug use. Please mark the response that best describes the extent to which you agree with each statement.

100. It scares me when I am nervous.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

101. I can't handle feeling distressed or upset.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

102. Other people seem to be able to tolerate feeling distressed or upset better than I can.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

103. Being distressed or upset is always a major ordeal for me.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

104. My feelings of distress or being upset scare me.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

105. I'll do anything to stop feeling distressed or upset.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

106. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

107. I must be free of disturbing feelings as quickly as possible; I can't bear if they continue.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

108. I can't stand situations where I might feel upset.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

109. I can't bear disturbing feelings.

\_\_\_\_ Strongly Disagree      \_\_\_\_ Disagree      \_\_\_\_ Agree      \_\_\_\_ Strongly Agree

The following pages contain statements about the effects of alcohol. Read each statement carefully and respond according to your own personal thoughts, feelings, and beliefs about alcohol. Please answer each question in terms of your own beliefs about alcohol. We are interested in what **you** think regardless of what other people might think. Think in terms of drinking any alcoholic beverage, such as beer, wine, whiskey, liquor, rum, scotch, vodka, gin, or various alcoholic mixed drinks.

Respond using the following scale:

|          |          |           |          |          |
|----------|----------|-----------|----------|----------|
| 1        | 2        | 3         | 4        | 5        |
| Disagree | Disagree | Uncertain | Agree    | Agree    |
| Strongly | Somewhat |           | Somewhat | Strongly |

110. Drinking adds a certain warmth to social occasions. 1 2 3 4 5

111. When I'm drinking, it is easier to open up and express my feelings. 1 2 3 4 5

112. Drinking makes me feel good. 1 2 3 4 5

113. I feel more creative after I've been drinking. 1 2 3 4 5



- |  |           |
|--|-----------|
| 114. Having a few drinks is a nice way to celebrate special occasions.                                     | 1 2 3 4 5 |
| 115. When I'm drinking, I feel freer to be myself and do whatever I want.                                  | 1 2 3 4 5 |
| 116. Drinking makes it easier to concentrate on the good feelings I have at the time.                      | 1 2 3 4 5 |
| 117. When I feel "high" from drinking, everything seems to feel better.                                    | 1 2 3 4 5 |
| 118. I find that conversing with members of the opposite sex is easier for me after I've had a few drinks. | 1 2 3 4 5 |
| 119. Drinking is pleasurable because it's enjoyable to join in with people who are enjoying themselves.    | 1 2 3 4 5 |
| 120. If I'm feeling restricted in any way, a few drinks make me feel better.                               | 1 2 3 4 5 |
| 121. If I have a couple of drinks, it is easier to express my feelings.                                    | 1 2 3 4 5 |
| 122. After a few drinks, I feel more self-reliant than usual.  | 1 2 3 4 5 |
| 123. Alcohol enables me to have a better time at parties.  | 1 2 3 4 5 |
| 124. I drink when I'm feeling mad.   | 1 2 3 4 5 |
| 125. My feelings of isolation and alienation decrease when I drink.  | 1 2 3 4 5 |
| 126. Alcohol makes me worry less.  | 1 2 3 4 5 |
| 127. A few drinks makes it easier to talk to people.   | 1 2 3 4 5 |
| 128. After a few drinks I am usually in a better mood.   | 1 2 3 4 5 |
| 129. Drinking helps me get out of a depressed mood.  | 1 2 3 4 5 |
| 130. After I've had a couple of drinks, I feel I'm more of a caring, sharing person.                       | 1 2 3 4 5 |
| 131. Alcohol decreases my feelings of guilt about not working.   | 1 2 3 4 5 |
| 132. Alcohol makes me more interesting.  | 1 2 3 4 5 |
| 133. A few drinks makes me feel less shy.  | 1 2 3 4 5 |
| 134. If I'm feeling afraid, alcohol decreases my fears.  | 1 2 3 4 5 |
| 135. I feel like more of a happy-go-lucky person when I drink.   | 1 2 3 4 5 |
| 135. Drinking makes get-togethers more fun.  | 1 2 3 4 5 |
| 136. Alcohol makes it easier to forget bad feelings.   | 1 2 3 4 5 |
| 137. A drink or two makes the humorous side of me come out.  | 1 2 3 4 5 |
| 138. At times, drinking is like permission to forget problems.   | 1 2 3 4 5 |
| 139. If I am tense or anxious, having a few drinks makes me feel better.                                   | 1 2 3 4 5 |

## Mood Scale (CES-D)

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week by checking the appropriate space.

| Questions   | Rarely or none of the time (less than 1 day) | Some or a little of the time (1-2 days) | Occasionally or a moderate amount of time (3-4 days) | All of the time (5-7 days) |
|---|--|---|--|----------------------------|
| 1. I was bothered by things that usually don't bother me.                     |  |   |  |                            |
| 2. I did not feel like eating; my appetite was poor.                          |  |   |  |                            |
| 3. I felt that I could not shake off the blues even with help from my family. |  |   |  |                            |
| 4. I felt that I was just as good as other people.                            |  |   |  |                            |
| 5. I had trouble keeping my mind on what I was doing.                         |  |   |  |                            |
| 6. I felt depressed.  |  |   |  |                            |
| 7. I felt that everything I did was an effort.                                |  |   |  |                            |
| 8. I felt hopeful about the future.   |  |   |  |                            |
| 9. I thought my life had been a failure.                                      |  |   |  |                            |
| 10. I felt fearful.   |  |   |  |                            |
| 11. My sleep was restless.  |  |   |  |                            |
| 12. I was happy.  |  |   |  |                            |
| 13. I talked less than usual.   |  |   |  |                            |
| 14. I felt lonely.  |  |   |  |                            |
| 15. People were unfriendly.   |  |   |  |                            |
| 16. I enjoyed life.   |  |   |  |                            |
| 17. I had crying spells.  |  |   |  |                            |
| 18. I felt sad.   |  |   |  |                            |
| 19. I felt that people disliked me.   |  |   |  |                            |
| 20. I could not get "going."  |  |   |  |                            |

**Liebowitz Social Anxiety Scale** Liebowitz MR. Social Phobia. Mod Probl Pharmacopsychiatry 1987;22:141-173

|          |                   |
|----------|-------------------|
| Pt Name: | Pt ID #:          |
| Date:    | Assessment point: |

Fear or Anxiety:

0 = None

1 = Mild

2 = Moderate

3 = Severe

Avoidance:

0 = Never (0%)

1 = Occasionally (1—33%)

2 = Often (33—67%)

3 = Usually (67—100%)

|  | Fear or Anxiety | Avoidance |     |
|--|-----------------|-----------|-----|
| 1. Telephoning in public. (P)  |                 |           | 1.  |
| 2. Participating in small groups. (P)  |                 |           | 2.  |
| 3. Eating in public places. (P)  |                 |           | 3.  |
| 4. Drinking with others in public places. (P)  |                 |           | 4.  |
| 5. Talking to people in authority. (S)   |                 |           | 5.  |
| 6. Acting, performing or giving a talk in front of an audience. (P)                  |                 |           | 6.  |
| 7. Going to a party. (S)   |                 |           | 7.  |
| 8. Working while being observed. (P)   |                 |           | 8.  |
| 9. Writing while being observed. (P)   |                 |           | 9.  |
| 10. Calling someone you don't know very well. (S)                                    |                 |           | 10. |
| 11. Talking with people you don't know very well. (S)                                |                 |           | 11. |
| 12. Meeting strangers. (S)   |                 |           | 12. |
| 13. Urinating in a public bathroom. (P)  |                 |           | 13. |
| 14. Entering a room when others are already seated. (P)                              |                 |           | 14. |
| 15. Being the center of attention. (S)   |                 |           | 15. |
| 16. Speaking up at a meeting. (P)  |                 |           | 16. |
| 17. Taking a test. (P)   |                 |           | 17. |
| 18. Expressing a disagreement or disapproval to people you don't know very well. (S) |                 |           | 18. |
| 19. Looking at people you don't know very well in the eyes. (S)                      |                 |           | 19. |
| 20. Giving a report to a group. (P)  |                 |           | 20. |
| 21. Trying to pick up someone. (P)   |                 |           | 21. |
| 22. Returning goods to a store. (S)  |                 |           | 22. |
| 23. Giving a party. (S)  |                 |           | 23. |
| 24. Resisting a high pressure salesperson. (S)                                       |                 |           | 24. |

## PANAS-X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you have felt this way during the past few weeks including today. Use the following scale to record your answers:

| 1   | 2   | 3                                | 4                                      | 5         |
|---|---|----------------------------------|--|-----------|
| Very slightly<br>or not at all                  | A Little                                  | Moderately                       | Quite a Bit                            | Extremely |
| <input type="checkbox"/> Cheerful               | <input type="checkbox"/> Sad              | <input type="checkbox"/> Active  | <input type="checkbox"/> Angry at self |           |
| <input type="checkbox"/> Disgusted              | <input type="checkbox"/> Calm             | <input type="checkbox"/> Guilty  | <input type="checkbox"/> Enthusiastic  |           |
| <input type="checkbox"/> Attentive              | <input type="checkbox"/> Afraid           | <input type="checkbox"/> Joyful  | <input type="checkbox"/> Downhearted   |           |
| <input type="checkbox"/> Bashful                | <input type="checkbox"/> Tired            | <input type="checkbox"/> Nervous | <input type="checkbox"/> Sheepish      |           |
| <input type="checkbox"/> Sluggish               | <input type="checkbox"/> Amazed           | <input type="checkbox"/> Lonely  | <input type="checkbox"/> Distressed    |           |
| <input type="checkbox"/> Daring                 | <input type="checkbox"/> Shaky            | <input type="checkbox"/> Sleepy  | <input type="checkbox"/> Blameworthy   |           |
| <input type="checkbox"/> Surprised              | <input type="checkbox"/> Happy            | <input type="checkbox"/> Excited | <input type="checkbox"/> Determined    |           |
| <input type="checkbox"/> Strong                 | <input type="checkbox"/> Timid            | <input type="checkbox"/> Hostile | <input type="checkbox"/> Frightened    |           |
| <input type="checkbox"/> Scornful               | <input type="checkbox"/> Alone            | <input type="checkbox"/> Proud   | <input type="checkbox"/> Astonished    |           |
| <input type="checkbox"/> Relaxed                | <input type="checkbox"/> Alert            | <input type="checkbox"/> Jittery | <input type="checkbox"/> Interested    |           |
| <input type="checkbox"/> Irritable              | <input type="checkbox"/> Upset            | <input type="checkbox"/> Lively  | <input type="checkbox"/> Loathing      |           |
| <input type="checkbox"/> Delighted              | <input type="checkbox"/> Angry            | <input type="checkbox"/> Ashamed | <input type="checkbox"/> Confident     |           |
| <input type="checkbox"/> Inspired               | <input type="checkbox"/> Bold             | <input type="checkbox"/> At ease | <input type="checkbox"/> Energetic     |           |
| <input type="checkbox"/> Fearless               | <input type="checkbox"/> Distressed       | <input type="checkbox"/> Scared  | <input type="checkbox"/> Concentrating |           |
| <input type="checkbox"/> Disgusted<br>with self | <input type="checkbox"/> Shy<br>with self | <input type="checkbox"/> Drowsy  | <input type="checkbox"/> Dissatisfied  |           |
|   | <input type="checkbox"/> Blue             |                                  |  |           |