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The Impact of Protective Behavioral Strategies on the Relationship Between the Negative Consequences of Alcohol Use and Anxiety Sensitivity

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THE IMPACT OF PROTECTIVE BEHAVIORAL STRATEGIES ON THE 
RELATIONSHIP BETWEEN THE NEGATIVE CONSEQUENCES OF 
ALCOHOL USE AND ANXIETY SENSITIVITY 

by 

Jeanne Louise Lambrecht 

Abstract of a Dissertation 
Submitted to the Graduate School 
of The University of Southern Mississippi 
in Partial Fulfillment of the Requirements 
for the Degree of Doctor of Philosophy 

December 2010
ABSTRACT

THE IMPACT OF PROTECTIVE BEHAVIORAL STRATEGIES ON THE RELATIONSHIP BETWEEN THE NEGATIVE CONSEQUENCES OF ALCOHOL USE AND ANXIETY SENSITIVITY

by Jeanne Louise Lambrecht

December 2010

Alcohol consumption among college students continues to be a concern on college campuses. It is estimated that a large majority (83%) of college students use alcohol (Johnston, O’Malley, Bachman, & Schulenberg, 2008). The negative consequences of alcohol consumption range broadly in both domain and degree of harm to the individual and society. Protective behavioral strategies (PBS) can be utilized to reduce the degree of negative consequences of alcohol consumption when people choose to drink. Many college students report that they drink to reduce anxiety they experience in social situations or to reduce the stress and anxiety they experience due to the demands of school (Novak, Burgess, Clark, Zvolensky, & Brown, 2003; Stewart & Zeitlin, 1995). Some individuals are more prone to experience anxiety and experience a greater degree of discomfort at the prospect of becoming anxious thus increasing their propensity for using alcohol to reduce this discomfort. Some individuals are more sensitive to the symptoms of anxiety than others, and are more sensitive to the fear of symptoms associated with the experience of anxiety such as somatic symptoms, social consequences, and loss of mental control from anxiety. A term that has been created in related literature is anxiety sensitivity. Anxiety sensitivity is the fear of the...
symptoms of anxiety including the fear of somatic symptoms, the fear of social consequences of anxiety, and the fear of losing control mentally (Reiss, Peterson, & Gursky, 1988). The present study examines the relationships among alcohol consumption, anxiety sensitivity, PBS and the negative consequences of alcohol consumption among college student drinkers. This study was part of a larger project examining alcohol consumption, negative consequences and protective strategies in which 706 undergraduate students at a mid-sized university in the southeastern United States completed the Daily Drinking Questionnaire, Protective Behavioral Strategies Scale, the Young Adult Alcohol Problems Screening Test – Brief Version, and the Anxiety Sensitivity Index. It was hypothesized that anxiety sensitivity would be negatively related to use of PBS. A weak positive correlation was found between anxiety sensitivity and PBS use. Further, it was hypothesized that anxiety sensitivity would moderate the relationship between alcohol consumption and negative alcohol-related consequences. Anxiety sensitivity did not moderate this relationship. Amount of alcohol consumed did emerge as a predictor of the negative consequences of alcohol consumption. Lastly, it was hypothesized that anxiety sensitivity would moderate the relationship between PBS use and alcohol-related negative consequences. Anxiety sensitivity did not moderate this relationship, however. PBS use did emerge as a predictor of the negative consequences of alcohol consumption.
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A Dissertation
Submitted to the Graduate School
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December 2010
DEDICATION

For Max, without whom so much of my life would not have been possible. Thank you so much for being my friend, my very best friend, for all the years I was blessed to share with you. I am grateful for every day I had with you. You are forever loved by me.

This work is dedicated to you, my friend. I hope I have made you proud.
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To my sisters, Cathy, Laura, and Mary, and my parents, Carl and Catherine Lambrecht, I know you are delighted that this day has finally come, and I am grateful that I am able to share it with you.

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CHAPTER I

INTRODUCTION AND REVIEW OF RELATED LITERATURE

Alcohol consumption among college students continues to be a concern on college campuses. It is estimated that a large majority (83%) of college students use alcohol (Johnston, O’Malley, Bachman, & Schulenberg, 2008). Alcohol consumption has significant and sometimes devastating consequences for young people and society at large.

For the purposes of this discussion, alcohol consumption is defined as the consumption of beverages containing ethyl alcohol, whereas problem drinking is defined as alcohol consumption that results in negative consequences. The negative consequences of problem drinking range broadly and can include academic consequences (grades suffering, dropping out of school, etc.), occupational consequences (reduced productivity, missed days, etc.), social consequences, economic consequences, legal consequences, and consequences related to physical and emotional health (National Institute on Alcohol Abuse and Alcoholism, 2004, 2007). As a result of these negative consequences, college campuses are beginning to implement various efforts aimed at reducing problem drinking among students.

Efforts to reduce problem drinking and the negative consequences of problem drinking among college students have been met with limited success (O’Malley & Johnston, 2002; Presley, Leichliter, & Meilman, 1998; Substance Abuse and Mental Health Services Administration [SAMSHA] 2008; Wechsler, Lee, Kuo, & Lee, 2000; Wechsler & Nelson, 2008). One attempt involves increasing the use of protective behavioral strategies (PBS) within the university population. PBS are a series of
behaviors that can be utilized to reduce the degree of negative consequences of alcohol consumption when people choose to drink alcohol. PBS focus on harm reduction and provide an excellent alternative to abstinence and educational strategies. The following are examples of PBS: having a designated driver, drinking more slowly as opposed to chugging or gulping alcohol, and alternating between alcoholic and non-alcoholic beverages. Given the limited efficacy of abstinence and educational approaches (Croom et al. 2009; Gintner & Choate, 2007), helping students incorporate PBS into their repertoire appears to be more realistic and has a much better chance of being well received and accepted by college students than suggesting they discontinue drinking altogether (Marlatt & Witkiewitz, 2002).

Many college students report that they drink to reduce the anxiety they experience in social situations or to reduce the stress and anxiety they experience due to the scholastic demands (Novak, Burgess, Clark, Zvolensky, & Brown, 2003; Stewart & Zeitlin, 1995). Some individuals are motivated to use alcohol to reduce anxiety and it follows that an individual who is particularly sensitive to anxiety may be more likely to use alcohol to reduce anxious symptoms (O’Connor, Farrow & Colder, 2008; Howell, Leyro, Hogan, Buckner & Zvolensky, 2010). It is important therefore to explore the connection between problem drinking and anxiety sensitivity in order to target vulnerable populations. Anxiety sensitivity is the fear of the symptoms of anxiety including the fear of bodily symptoms, the fear of social consequences of anxiety, and the fear of losing control mentally (Reiss, Peterson, & Gursky, 1988). Whereas the relationship between alcohol consumption and anxiety sensitivity has been studied, no information is known about the relationships among PBS, anxiety sensitivity, and the negative consequences of
alcohol consumption, presenting a gap in both the college alcohol consumption and PBS literature that this study aims to address.

In the present study, it was hypothesized that anxiety sensitivity would be negatively related to use of PBS. It was hypothesized that anxiety sensitivity would moderate the relationship between amount consumed and negative consequences of alcohol consumption such that the relationship would be stronger for individuals high on anxiety sensitivity as compared to individuals low on anxiety sensitivity. It was hypothesized that anxiety sensitivity would moderate the relationship between PBS use and negative consequences of alcohol consumption such that the relationship will be stronger for individuals high on anxiety sensitivity as compared to individuals low on anxiety sensitivity.

Alcohol Consumption in College Students

Heavy alcohol consumption and problem drinking on college campuses is considered a major public health concern (Ham & Hope, 2003). Students are continuing to drink at high levels despite the attempts by researchers and administrators to promote abstinence and prevent heavy use. Eighty-two percent of college students surveyed reported that they have used alcohol in the last year and 67% indicated that they had been intoxicated (American College Health Association, 2009). This finding in prevalence rates of alcohol consumption has been consistent for roughly 30 years (O’Malley & Johnston, 2002; Presley, Leichliter, & Meilman, 1998; Substance Abuse and Mental Health Services Administration [SAMSHA] 2008; Wechsler, Kelley, Weitzman, Giovanni, & Seibring, 2000; Wechsler & Nelson, 2008). Wechsler and Nelson (2008)
cautioned that heavy consumption of alcohol continues on university campuses and noted that this problem affects the broader university community as well as the individual.

What is more concerning than the high percentage of students who use alcohol is the incidence of heavy episodic drinking. Heavy episodic drinking is defined as consuming five or more standard alcoholic drinks for males and 4 or more standard alcoholic drinks for females (Johnston et al., 2008). Johnson and colleagues (2008) found that just under half of the students in their survey reported heavy episodic drinking in the past two weeks and that individuals ages 18-24 are at the highest risk for alcohol abuse. Wechsler, Lee, Kuo, Siebring, Nelson, and Lee (2002) noted that the rate of heavy episodic drinking among college students remained almost unchanged at approximately 44.4% when comparing surveys taken in 1993, 1997, and 1999 (Wechsler et al. 2002). These findings are consistent across more recent research (Colby, Colby, and Raymond, 2009; O’Malley & Johnston, 2002; Presley et al., 1998; SAMSHA, 2008; Wechsler, Kuo, Lee, & Dowdall, 2000; Wechsler & Nelson, 2008). The concern related to heavy episodic drinking was further elevated by Knight et al. (2002) who found an increased likelihood of students who met the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revision (DSM IV TR; American Psychiatric Association, 2000) diagnostic criterion for alcohol dependence and abuse. In fact, Knight and colleagues (2002) found that approximately 38% of college students meet criteria for alcohol abuse or dependence.

Although drinking among college students is relatively common, a more in-depth examination of the data reveals group differences. In reviewing five key alcohol surveys (the National Household Survey on Drug Abuse, Monitoring the Future, the Core
Institute, the National College Health Risk Behavior Survey, and the Harvard School of Public Health College Alcohol Study), O’Malley and Johnston (2002) noted that men reported higher levels of alcohol consumption than women, Caucasian students reported having the highest alcohol consumption rates followed by Hispanics, and African Americans students reported the lowest rates of alcohol consumption. Additionally, they also observed that students enrolled in college reported consuming alcohol at higher levels than their same-age peers who were not enrolled in college (O’Malley & Johnston, 2002). Regional differences in alcohol consumption have been observed since the mid-1970s (Johnston, O'Malley, Bachman, & Schulenberg, 2009). Slightly lower 30-day alcohol consumption prevalence rates as well as reduced numbers of self-reported episodes of heavy episodic drinking and drunkenness amongst 12th graders were observed in the Southern and Western regions than in the Midwestern and Northeastern United States (Johnston et al., 2009). Although the amount of alcohol consumed by college students is concerning, what seems to be more alarming are the negative consequences that are associated with higher levels of alcohol consumption among college students.

Negative Consequences Related to Alcohol Consumption among College Students

Researchers have consistently demonstrated that college students who engaged in heavy episodic drinking frequently experienced negative consequences related to their alcohol consumption (Wechsler et al., 2002; Wechsler & Nelson, 2008). Information provided by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) consistently highlights serious repercussions as a result of heavy alcohol consumption among college students such as (a) death, (b) injury, (c) violence, (d) vandalism, (e) academic problems, (f) unsafe sexual practices, and (g) sexual assaults (2004, 2007).
Thus, data from the NIAAA emphasizes that college students who engage in heavy episodic drinking often experience consequences at the personal, academic, and social levels. Hingson, Zha, and Weitzman (2009) found that there were increases across several factors when they compared their 1998 data of the repercussions of college student drinking to the 2005 data. They found a 7% increase in heavy episodic drinking, a 9% increase in incidents of driving while under the influence of alcohol, a 12% increase of alcohol related injuries, a 2% increase in physical assaults, and a 2% increase in sexual assaults (Hingson et al., 2009). Therefore, college students who engage in heavy episodic drinking are at an increased risk of experiencing the negative consequences of alcohol consumption when compared to their peers who abstain from heavy episodic drinking. Also, Hingson and colleague’s findings highlight that while universities are increasing their prevention efforts many of the problems associated with HED are on the rise.

Gender differences have also been found in relation to the consequences of problem drinking. Men seem to engage in problem drinking more frequently than women and also suffer more severe consequences when they do. Engs, Hanson, and Diebold (1996) found that men experienced more negative academic consequences as a result of their alcohol consumption when compared to women. Engs and colleagues’ findings were supported by Nolan-Hoecksema (2004), who found in her review of the literature that women consume less alcohol and also experience fewer of the negative consequences of alcohol consumption than men. She noted various elements that lend themselves to these observed differences (Nolan-Hoecksema, 2004). Such elements include increased social sanctions against use as well as an increased likelihood of experiencing sexual assault.
and physical harm, which serve as protective factors that deter women from heavier alcohol consumption (Nolan-Hoecksema, 2004).

On an individual level, negative consequences related to alcohol consumption among college students include serious injury and death, health problems, and unwanted sexual experiences. After reviewing data from multiple national sources including the Harvard College Alcohol Survey, the National Household Survey on Drug Abuse and National Coroner Studies, and Hingson, Heeren, Winter, and Wechsler (2005) found that alcohol consumption among students ages 18-24 resulted in about 1,700 deaths each year from unintentional injuries (including motor vehicle accidents) and that 599,000 students are injured under the influence of alcohol annually. College students surveyed indicated that in the last year as a result of their alcohol consumption: 10.7% injured themselves and 1.2% seriously considered suicide (American College Health Association, 2009). Hingson et al. (2005) also noted an increase in students driving while under the influence of alcohol, rising from 26.5% to 31.4%. The American College Health Association (2009) reported that, of the college students surveyed, 15% indicated that they had operated a motor vehicle after using any amount of alcohol and 2% indicated that they operated a motor vehicle after heavy episodic drinking within the last thirty days. Beyond death and injury, heavy consumption of alcohol may result in health problems such as weight gain, liver disease, and digestive problems among college students (Hingson et al., 2005). It is clear that negative alcohol related consequences present a wide range of serious problems that are impactful to the college student population and society at large.
As researchers have shown that alcohol consumption lowers both inhibition levels and one’s ability to make sound judgments, sexual decision making seems to be one of the areas in which college students are vulnerable when under the influence of alcohol. Impaired students may be more inclined to be careless in their actions and engage in risky sexual behaviors. In a 2000 study, Vik, Carello, Tate, and Field found that 92.7% of heavy episodic drinkers reported engaging in careless behavior that they attributed to their consumption of alcohol. Additionally, 60.2% of heavy episodic drinkers reported engaging in a risky or reckless behavior (Vik et al., 2000). Cooper (2002) explored the relationship between alcohol consumption and risky sexual practices among adolescents and college students on both a global as well as more specific levels and found a strong relationship between the decision to engage in sexual activity, promiscuity, and alcohol consumption. Heavy episodic drinking also puts students in jeopardy for risky sexual activity and sexual assaults. College students surveyed by the American College Health Association (2009) indicated that in the last year as a result of their alcohol consumption: 10.8% engaged in unprotected sex, 1.5% had sex without having provided their consent, and 0.3% had sex without receiving their partner’s consent. In a study conducted by Abbey (2002), alcohol was consumed by one or both parties for at least half of sexual assaults reported by participants. In addition, Hingson and colleagues (2005) found that roughly 400,000 young people surveyed aged 18-24 engaged in unprotected sex while intoxicated. The NIAAA (2007) reported that annually over 97,000 college students are sexually assaulted in situations involving the consumption of alcohol. Problem drinking seems to play a critical role in the facilitation of unsafe sexual practices and sexual assault among college students. Finding ways to decrease negative alcohol-related
consequences among college students by supporting the use of PBS while they drink would likely make significant strides towards decreasing unwanted sexual experiences and unsafe sexual practices within the university population.

It has been argued that the negative impact problem drinking has on college students’ academic performance is an important factor that can effect students both in the immediate and long term. The strong relationship between problem drinking and adverse academic consequences has received broad support over time (Porter & Pryor, 2007; Powell, Williams, & Wechsler, 2004; Rau & Durand, 2000; Romosz, 2009) with problem drinking having a significant impact on grade point averages among college students (Engs et al., 1996; National Center on Addiction and Substance Abuse, 1994; Porter & Pryor, 2007; Presley, Meilman, Cashin & Lyerla, 1996; Rau & Durand, 2000). Academic consequences that may be experienced by students who abuse alcohol can include missing classes, decreased performance on tests and assignments, and diminished grade performance. Roughly one quarter of college students indicate that they have suffered academic problems as a result of their alcohol consumption including poor performance on exams and class assignments as well as missed classes (Hingson et al., 2005). College students who engage in problem drinking often miss classes and work, causing their grades to fall and focus on academics to suffer (Hingson et al., 2005). There is a negative correlation between hours spent studying for classes and amount of alcohol consumed by college students (Williams, Powell, & Wechsler, 2003; Wolaver, 2002). For some, the abuse of alcohol can cause students to fail classes, be dismissed from their university, or drop out of college (Hingson et al, 2005). In fact, the National Center on Addiction and Substance Abuse (1994) indicated that alcohol is a factor in almost a third of the cases of
students dropping out of college. It may seem that academic consequences are not as severe or immediate as other consequences previously discussed, but they have the potential to be significantly damaging to students’ ability to function and thrive in both the short and long term. It is important that we better understand negative consequences of problem drinking given their clear impact on students’ academic functioning and potential. It is also important to examine the negative consequences of problem drinking that extend beyond the students’ campus experiences, turning into potential social and even legal consequences.

The social and legal consequences of problem drinking have short term and long term (in some cases lifelong) implications for college students and society at large. College students may experience negative social and legal consequences as a result of alcohol consumption, and legal consequences can have social ramifications as well (Hingson et al., 2005). Alcohol-fueled exploits can result in legal charges of assault, driving while under the influence of alcohol, minor in possession, and public intoxication (Hingson et al., 2005). College students surveyed in 2010 indicated that in the last year as a result of their alcohol consumption: 2.6% reported problems with law enforcement and 1.8% injured another person (American College Health Association, 2009). In 2007, over 696,000 college students reported having been physically assaulted by a fellow student who had been using alcohol (NIAAA, 2007). Legal ramifications can be severe, and, of students surveyed by the NIAAA in 2007, 32.6% indicated that they had driven a motor vehicle while under the influence of alcohol in the previous year and 14.1% indicated that they had had interactions with law enforcement (Presley et al., 1998). Further, Wechsler et al. (2002) suggested that students on college campuses are affected by problem
drinking whether they consume alcohol or not because of social issues such as vandalism and noise pollution. A better understanding of the negative consequences of heavy episodic drinking and prevention of negative alcohol related consequences would advance the cause of promoting the safety and welfare of both college students and the community.

The sustained high prevalence rates of problem drinking on college campuses have been considered a public health concern that need to be addressed because of potential negative consequences to the individual, the college environment, and the surrounding community (Ham & Hope, 2003). Wechsler and Nelson (2008) suggested that prevention programs on college campuses needed to increase their focus on harm reduction methods that address a student’s use patterns, reasons for use, and that incorporates strategies to reduce negative drinking-related consequences in lieu of traditional education and abstinence programs. It may be helpful to explore the reasons why college students choose to drink in order to understand the context in which these behaviors and consequences occur. Knowing the motivations for alcohol abuse for college students may inform the development of strategies to prevent abuse and negative alcohol related consequences. It is also important to know what behaviors students are using to prevent negative drinking-related consequences when they consume alcohol. Such behaviors are called harm reduction strategies. PBS are among those behaviors that can reduce the negative consequences of alcohol abuse and therefore warrant discussion and examination. Additionally, more information is needed about how unique personality-related variables may impact an individual’s willingness to use harm
reduction strategies as well as their affect their vulnerability to experiencing negative alcohol related consequences.

Anxiety Sensitivity

Neuroticism, of which anxiety sensitivity is a facet, is the tendency to be relatively easily aroused and to experience impulsivity, depression, vulnerability, hostility, and anxiety more readily than others (Costa & McCrae, 1992; Craske, 1999; Eysenck, 1967). Several researchers have examined the relationship between neuroticism and alcohol consumption. Results of several studies suggest that there is a positive relationship between neuroticism and alcohol use. It is possible that alcohol consumption contributes to neuroticism, or alternatively that neuroticism contributes to alcohol consumption (Koskenvuo, Langinvainio, Kaprio, & Sarna, 1984; Martin & Sher, 1994; Ruiz, Pincus, & Dickinson, 2003). It has been suggested that people who demonstrate high levels of neuroticism use greater amounts of alcohol to reduce negative affect (Cooper, Frone, Russell, & Mudar, 1995) and that individuals high in neuroticism are pre-disposed to engage in risk-taking behavior with respect to their alcohol consumption (Cooper, Agocha, and Sheldon, 2000). However there has been some research that seems to conflict with regards to the relationship between neuroticism and alcohol use. In studies by Read and O’Connor (2005) and Littlefield, Sher, and Wood (2010), neuroticism was negatively related to alcohol abuse. This negative relationship, however, was mediated by positive expectations of alcohol use and changes in motivation to consume alcohol. This suggests that there may be a negative relationship between neuroticism and alcohol use unless there are positive expectations of alcohol use. Perhaps the positive expectations of alcohol use being beneficial in some way (reducing tension
or facilitating social interactions for example), may be a significant motivation for individuals higher in neuroticism to use alcohol. Knowing that research suggests a relationship between neuroticism and alcohol use, it would be beneficial to continue to look at various factors of neuroticism in relation to alcohol use in order to better understand what facets of neuroticism predict this relationship.

Anxiety sensitivity, which is the fear of the symptoms of anxiety, is one facet of neuroticism (Reiss et al., 1988). Elements of anxiety sensitivity include the fear of bodily symptoms, the fear of social consequences of anxiety, and the fear of losing control mentally. People with elevated anxiety sensitivity focus on elements of possible anxiety symptoms including physical concerns, social concerns, and mental incapacitation concerns (Zinbarg, Barlow, & Brown, 1997). Anxiety sensitivity has been found to be linked to substance abuse (Reiss, 1991).

In the present study, anxiety sensitivity was selected as a particular facet of interest because it has been demonstrated in previous research to be particularly predictive of individuals’ alcohol consumption (Schmidt, Buckner, & Keough, 2007; Stewart, Zvolensky, & Eifert, 2001) as well as predictive of individuals’ use of alcohol as a method of coping with their anxiety (Novak et al., 2003; Stewart & Zeitlin, 1995). Anxiety sensitivity plays an important role in understanding alcohol consumption and individuals’ motivation to drink.

Anxiety sensitivity has been linked to alcohol consumption in that it influences the motivation for use as well as the degree. In several studies (Stewart, Peterson, & Pihl, 1995; Stewart, Samoluk, & MacDonald, 1999; Samoluk & Stewart, 1996), individuals with low anxiety sensitivity indicated that they consumed significantly less alcohol and
drank to excess less often when compared to high anxiety sensitivity participants. Those with high levels of anxiety sensitivity have been found to engage in more frequent and heavier alcohol consumption than those with low anxiety sensitivity (Stewart et al., 1995).

Previous studies have also indicated that there is a relationship between anxiety sensitivity and individuals’ motives to use alcohol (Novak et al., 2003). Some studies have arrived at conflicting results. Novak et al. (2003) found that coping-related motives for using alcohol were directly related to anxiety sensitivity, but that anxiety sensitivity was unrelated to amount of alcohol consumption. The authors suggested that these results may be due to the young age of the sample compared to samples of other studies that yielded different results. The Novak et al. (2003) study utilized a sample very similar to the ages that were used in the present study and therefore may be relevant as a similar finding that the relationship between anxiety sensitivity and alcohol use may be impacted by age.

What motivates individuals to consume alcohol may be of particular importance in predicting the relationship between anxiety sensitivity and alcohol use. When comparing a group of substance users without a diagnosed anxiety disorder to a group of substance abusers with anxiety disorders, DeHaas, Calamari, Bair, and Martin (2001) found that that anxiety sensitivity was positively related to situations involving negative emotions. Even when researchers controlled for trait anxiety, the observed relationship between anxiety sensitivity and situations involving negative emotions remained intact (DeHaas et al. 2001). Anxiety sensitivity predicted alcohol use when participants with anxiety disorders experienced negative emotions. The association between anxiety
sensitivity and alcohol consumption involving negative emotions would suggest that those with high anxiety sensitivity are motivated to use alcohol as a coping mechanism. Support has been found for the hypothesis that alcohol is negatively reinforcing for individuals who suffer from anxiety sensitivity. DeHaas, Calamari, and Bair (2002) found that use of depressant substances such as alcohol in contexts involving negative reinforcement was strongly associated with anxiety sensitivity. Lawyer, Karg, Murphy, and McGlynn (2002) found that positively and negatively reinforced alcohol consumption was related to anxiety sensitivity. They noted that anxiety sensitivity was most clearly a component in negatively reinforced alcohol consumption (i.e., alcohol consumption followed by a reduction in tension) and that the observed relationship between anxiety sensitivity and negatively reinforced alcohol consumption was stronger among male participants. Reyno, Stewart, Brown, Horvath and Wiens (2006) found that anxiety sensitivity predicted both negatively reinforcing and temptation-motivated situations (i.e., use in situations that test personal control and involve urges) alcohol consumption (Reyno et al., 2006). They also found that anxiety sensitivity predicted alcohol consumption in situations that involved conflict with others (Reyno et al., 2006). Cox, Swinson, Shulman, and Kuch (1993) found in their study of adults who had panic disorder with agoraphobia that men indicated a significantly greater amount of alcohol consumption in addition to viewing alcohol consumption as an effective way of coping with anxiety. These studies underscore the link between anxiety sensitivity and the consumption of alcohol to cope. They also suggest that there may be gender differences with respect to use and situational motivation among those with higher levels of anxiety sensitivity.
Živcic-Becirevic and Ažic (2008) found that women exhibited higher levels of physical anxiety sensitivity than men but that there was no difference in alcohol consumption between the genders. As previous research has indicated that men in the college student population consume more alcohol than women (O’Malley & Johnston, 2002), the similarity in alcohol consumption and difference in anxiety sensitivity between the genders would suggest that perhaps college student women who are higher in anxiety sensitivity consume more alcohol than college student women overall. More research is needed to see if this lack of gender difference is attributable to anxiety sensitivity or merely unique to Živcic-Becirevic and Ažic’s sample. The present study addresses this question.

As anxiety sensitivity has implications for alcohol consumption and abuse, interventions that address anxiety sensitivity are important to consider when developing interventions related to alcohol consumption. Given that there is a relationship between alcohol consumption and anxiety sensitivity, it is surprising that there is not more research exploring the previously discussed detrimental impact of the negative consequences of alcohol consumption among college students. Relationships have been found between alcohol consumption, related consequences, and stress coping (Simpson & Arroyo, 1998). Further, the specific anxiety disorder of social anxiety appears to have a solid relationship with alcohol consumption and related negative consequences (Ham, 2009; Ham, Bonin & Hope, 2007; Ham & Hope, 2006; Lewis et al., 2008). Anxiety in social situations has been found to have a relationship with alcohol related negative consequences (LaBrie, Pederson, Neighbors, & Hummer, 2008). It seems that alcohol is used to cope or manage symptoms in individuals with various forms of anxiety and that
negative consequences related to alcohol consumption are prevalent among those with psychological vulnerability (Ham, 2009; Ham, Bonin & Hope, 2007; Ham & Hope, 2006; Lewis et al., 2008). Given the potential for anxiety sensitivity to influence the negative consequences of alcohol consumption, it seems clear that further research is needed to better understand their relationships. There are methods, however, that individuals use in order to reduce the negative consequences of alcohol use when they drink, regardless of the motivations for use. Behaviors that are used to reduce the negative consequences sometimes associated with alcohol use are called harm reduction strategies. The next section will discuss PBS which are among those behaviors that can reduce the negative consequences of alcohol abuse.

Protective Behavioral Strategies

Recently, researchers have highlighted the importance of examining the role PBS play in reducing the negative consequences related to problem drinking (Araas & Adams, 2008; Benton et al., 2004; Delva et al., 2004; Haines, Barker, & Rice, 2006; Howard, Griffin, Boekeloo, Lake, & Bellows, 2007; Luebbe, Varvel, & Dude, 2009; Martens et al., 2004; Schmidt, 2003; Walters, Roudsari, Vader, & Harris, 2007). Given that alcohol consumption among college students is so prevalent, efforts at promoting abstinence have been met with limited success (Hingson et al. 2005; NIAA, 2004, 2007; Wechsler et al. 2002; Wechsler & Nelson, 2008). PBS are behaviors students can use when drinking alcohol to reduce the potential consequences related to alcohol abuse, be that occupational, social, economic, or legal consequences, or consequences related to physical or emotional health. Examples of PBS include: having a designated driver, alternating alcoholic and non-alcoholic drinks, and drinking slowly.
Given the limited efficacy of abstinence and educational approaches (Croom et al. 2009; Gintner & Choate, 2007), helping students incorporate PBS into their repertoire would seem to be an effective form of harm reduction (Marlatt & Witkiewitz, 2002). Many students may engage in harm reduction strategies rather than follow abstinence plans because a number of students do not see their alcohol consumption as a concern (Fromme & Orrick, 2004). Croom et al. (2009) found that, although college freshman who took an online alcohol education course were more knowledgeable about the risks of alcohol consumption, they were just as likely to engage in high-risk alcohol related behaviors. A focus on PBS versus abstinence seems sensible for meeting the objective of reducing the negative consequences of problem drinking among the college student population. Larimer and Cronce (2002) agreed and suggested that the best approach for most efficiently dealing with college alcohol problems would be to focus their attention on the highest risk members of the student population and to utilize brief interventions that target skill enhancement such as use of PBS.

It appears that students are motivated to use harm reduction strategies and that PBS are being used on college campuses as students attempt to reduce the negative consequences of alcohol use and abuse. Haines et al. (2006) found that over 75% of college students who use alcohol reported using at least one PBS when they drink and over 50% use two or more. Further, they found that use of PBS strongly predicted both safety as well as the reduction of negative consequences of problem drinking (Haines et al., 2006). These results confirm PBS as effective forms of harm reduction. Further evidence that students who drink are attempting to protect themselves was found by Howard et al. (2007). Through the use of qualitative methods, they found that students
had a number of strategies that they would use to help protect themselves as well as their peers when drinking alcohol. Strategies reported include: taking care of peers who consumed too much alcohol or became intoxicated, utilizing measures to decrease risk when consuming alcohol, and making for preparations ahead of time to drink alcohol in a safe environment (Howard et al., 2007).

College students differ in how they utilize PBS when drinking alcohol, and there are some individual characteristics such as gender that contribute to these differences. Walters et al. (2007) found that college students who indicated drinking more heavily were less likely to use PBS. They also found that males and students who perceived that a parent abused alcohol predicted less use of PBS. Despite gender differences, PBS appears to be supported in research for men and women, as Martens et al. (2004) found that college students experience a higher degree of negative consequences of alcohol consumption the less frequently they used PBS even when controlling for the influence of amount of alcohol consumed and gender.

Research supports the relationship between increased use of PBS and reduced negative consequences. Schmidt (2003) found that college students who used PBS consumed less alcohol overall and experienced fewer negative consequences of alcohol use. This result was more distinct for women than for men. These results were supported by Delva et al. (2004) and Benton et al. (2004), as these researchers also found that participants who drank at least six alcoholic beverages but also used PBS had a decreased likelihood of experiencing negative behavioral consequences. These studies also specifically that women were more likely to use PBS, consumed less alcohol than males, and were less likely to experience the negative consequences of alcohol consumption.
When reviewing the literature on the relationship of PBS and negative consequences, the research consistently supports an inverse relationship in that the increased use of PBS relates to a decrease in negative consequences experienced by student drinkers. Among this research, Araas and Adams (2008) explored the relationships between the negative consequences of problem drinking and PBS and found that decreased negative consequences of alcohol abuse were associated with increased use of PBS. Luebbe et al. (2009) found that greater negative consequences of alcohol use were predicted for college students who engaged in risky behaviors and did not use PBS. Researchers have also suggested that there is a need for studies that explore gender differences, elements contributing to these gender differences, and how men can be encouraged to use more PBS more often (Benton, Downey, Glider, & Benton, 2008; Schmidt, 2003; Walters et al., 2007). It would be helpful to better understand what factors impact amount and frequency of PBS use as well as what motivates college students to abuse alcohol so as to direct and refine intervention strategies aimed at increasing both the amount and frequency of PBS use and decreasing problem drinking among college students.

In an effort to understand what leads to the use of PBS by college students, Benton, Downey, Glider, and Benton (2008) examined whether the variability of use of PBS among college students could be explained by their perceptions of the norms related to PBS. The authors observed that students, especially women, underestimated how much their peers used PBS and that student perceptions of norms, specifically, how often PBS are utilized by peers as well as what type of PBS their peers were using, explained a significant amount of the variance of use of PBS strategies and (Benton et al. 2008). Similarly, Lewis, Rees, and Lee (2009) found that college students, particularly men,
tended to underestimate the use of PBS by their fellow students. They also found that perceptions of use of PBS for students of the same gender were related to personal use of PBS (Lewis et al., 2009). Similar to alcohol consumption and negative consequences, college students tend to have inaccurate perceptions of their peers’ use of PBS, which impacts their own use of PBS (Lewis et al., 2009).

It is possible that certain personality characteristics influence whether someone uses PBS. Martens, Karakashian, Fleming, Fowler, Hatchett & Cimini (2009) were the first to examine the relationship between PBS and personality variables by examining the relationship of PBS use and the personality variable of conscientiousness. They found that PBS use was a mediator in the relationship between alcohol related problems and consumption of alcohol and conscientiousness. Donovan (2009) also investigated the relationship between personality variables and PBS and found that PBS mediated the relationship between both impulsivity and conscientiousness and alcohol consumption; however, no relationship was found between neuroticism, alcohol consumption, and PBS. Donovan (2009) emphasized that this finding was inconsistent with previous research (Cooper et al., 1995; Cooper et al., 2001; Read & O'Connor, 2005; Ruiz et al., 2003). As such Donovan (2009) suggested that it may behoove researchers to examine personality variables on a more specific level by exploring the relationship between alcohol consumption, PBS and particular facets that make up the larger personality structures such as neuroticism. As the literature related to this area grows, exploring other personality variables with more diverse samples will give a more in-depth understanding of the relationship between PBS use and individual characteristics. The current study
attempts to add to this growing body of literature in part by examining the personality-related variable of anxiety sensitivity.

In an effort to understand other factors beyond personality that influence the use of PBS, motives and mental health concerns should be considered. There are few studies in this area. Martens, Ferrier et al. (2007) found that PBS partially mediated the relationship between alcohol consumption, negative alcohol related consequences, and positively reinforcing motives such as the pharmacological properties and the social experience that frequently accompanies the consumption of alcohol. Dams-O’Connor et al. (2006) found that participants who engaged in eating disorder behavior had a significantly increased likelihood of experiencing negative consequences of alcohol consumption and that those participants who used PBS experienced fewer negative consequences related to alcohol consumption. PBS use seems to reduce to the likelihood of negative consequences of alcohol consumption experienced by individuals who are at a greater risk for alcohol related problems as a result of their engagement in eating disorder behavior.

Related to psychological problems, Martens et al. (2008) examined the relationship between PBS, depression, and negative alcohol-related consequences. It was found that use of PBS partially explained the relationship between depression and the negative consequences of problem drinking. Alcohol seems to be used by some to deal with underlying psychological issues and as a way to self-treat an array of psychological symptoms such as those of eating disorders, depression, or anxiety (Dams-O’Connor et al., 2006; Ham et al., 2007; Martens et al., 2008). As anxiety can occur often in social settings for college students, alcohol can be used to reduce social anxiety and ease the
challenges of adjusting to a new social climate (Ham, 2009; Ham et al., 2007; Ham & Hope, 2006; Lewis et al., 2008). As anxiety is one of the most common psychological issues faced by college students, it is important to learn more about the relationship between problem drinking, use of PBS, and anxiety (Gallagher, 2009). The current study will contribute to our understanding of the relationship between these variables. Several studies have found an inverse relationship between the negative consequences of alcohol use and PBS, and it has been suggested that there be future research to examine more factors that may influence this relationship including motives and psychological problems (Araas & Adams, 2008; Benton et al., 2008; Luebbe et al., 2009; Schmidt, 2003; Walters et al., 2007).

PBS seem to be an important part of helping students avoid the negative consequences of problem drinking, and interventions designed to increase the use of PBS may be beneficial to implement on college campuses. Researchers have recently examined efficacy of interventions aimed at enhancing the use of PBS on college campuses. Martens, Pederson, LaBrie, Ferrier, and Cimini (2007) found that college students who had been screened and received a brief motivational intervention which focused on alcohol-related harm reduction indicated that they used alcohol less, used PBS more, and had more accurate perceptions of their fellow students’ alcohol consumption after the intervention. Larimer et al. (2007) sought to assess the efficacy of a mailing sent to college students containing tips about avoiding negative consequences from drinking alcohol and that gave information about participants’ patterns of alcohol use. Participants who received feedback about alcohol consumption were less likely to engage in heavy episodic drinking, more likely to abstain from alcohol consumption, and more likely to
use PBS such as limiting the number of drinks they consumed in a night and alternating alcoholic and non-alcoholic beverages. This demonstrates that education about PBS is effective for limiting alcohol consumption as well as for reducing the negative consequences of alcohol abuse among college students.

It is apparent that utilizing interventions that include skill building in relation to PBS may be particularly useful in working with the populations most at risk for experiencing harm as a result of their consumption of alcohol. Research suggests that use of PBS in part influences the relationship between depression and negative consequences as well as between motives to drink and negative alcohol-related consequences. It is important to examine factors that contribute to problem drinking behaviors in addition to those contributing to use of PBS when drinking in order to create programs that increase use of PBS and decrease problem drinking behaviors.

The Present Study

Researchers have demonstrated a relationship between negative alcohol related consequences and that this relationship is influenced by gender (i.e., men consume more and experience more negative consequences than women; Benton et al., 2008; Delva et al., 2004; Lewis et al., 2009; Nolan-Hoeksema, 2004; O’Malley & Johnson, 2002; Schmidt, 2003). Researchers have also emphasized the need for continued investigation of variables that may influence the impact of these relationships with the goal of reducing alcohol abuse and preventing negative alcohol-related consequences among college students (Ham & Hope, 2003). More recently, PBS have been shown to influence the relationship between negative alcohol related consequences and variables such as consumption, mood problems, and drinking motives (Araas & Adams, 2008; Benton et
al., 2004; Haines et al., 2006; Howard et al. 2007; Luebbe et al., 2009; Martens et al., 2008; Martens et al., 2004; Martens, Ferrier, & Cimini, 2007; Walters et al., 2007; Schmidt, 2003). Lewis and colleagues (2009) highlighted that gender differences have also been shown to influence PBS use (i.e., women use more PBS then men). To date, only two previous studies have examined the role of personality variables in relation to PBS, alcohol consumption, and negative consequences, and no study has examined anxiety-related constructs in relation to these variables (Donovan, 2009; Martens et al., 2009). Martens et al. (2009) made it clear that more research is needed to increase our understanding of how personality variables impact prevention and treatment efforts among the college student population. As PBS continues to grow in its importance as a harm reduction approach, a better understanding its strengths and limitations is needed.

Anxiety sensitivity is a particularly important variable to investigate given its demonstrated relationship with increased alcohol consumption, and increased alcohol consumption has a solid link with negative consequences (Stewart et al., 1995; Stewart et al., 1999; Samoluk & Stewart, 1996). Research is needed that examines the relationships among anxiety sensitivity, alcohol consumption, and negative consequences among college students. Specifically, research is needed that explores the relationship between anxiety sensitivity and PBS and how the interaction between anxiety sensitivity and PBS may influence negative consequences related to alcohol consumption among college students. Given that gender differences consistently exist in relation to the variables in this study multiple regression analyses for men and women were conducted independently. The following questions were explored:

1. Does anxiety sensitivity relate to the use of PBS among college students?
Hypothesis 1: It was hypothesized that anxiety sensitivity would be negatively related to use of PBS.

2. Does anxiety sensitivity moderate the relationship between alcohol consumption and negative consequences of alcohol consumption?

Hypothesis 2: It was hypothesized that anxiety sensitivity would moderate the relationship between amount consumed and negative consequences of alcohol consumption such that the relationship between amount consumed and negative consequences will be stronger for individuals high on anxiety sensitivity as compared to individuals low on anxiety sensitivity.

3. Does the anxiety sensitivity moderate the relationship between PBS use and negative consequences among college students?

Hypothesis 3: It was hypothesized that anxiety sensitivity would moderate the relationship between PBS use and negative consequences of alcohol consumption such that the relationship between PBS use and negative consequences will be stronger for individuals high on anxiety sensitivity as compared to individuals low on anxiety sensitivity.
CHAPTER II

METHOD

Participants

This study was part of a larger research project conducted exploring alcohol consumption, PBS, and the negative consequences of alcohol consumption among college students. Participants for this study consisted of 720 undergraduate college students attending a university in the Southeastern United States. All participants were between ages 18-25 and had consumed alcohol within the past 30 days prior to participation. The sample was 80% female and 20% male. The majority of participants identified as White Non-Hispanic (62%) or African American (33%). All academic levels were represented with 31% freshman, 26% sophomores, 20%, juniors, and 21% seniors. A small minority (11%) of participants indicated that they were members of a university athletic team and 34% identified as members of the Greek system. The majority of participants either lived in a dorm (47%) or in an off campus apartment (38%). All cases lacking 25% of their total data or in which the participant failed to meet the criteria for inclusion (i.e, aged 18-25, consumed alcohol in the last 30 days) were omitted. No statistically significant gender, racial, or alcohol consumption differences were found when independent samples t-tests were performed comparing participants who were included to the participants that were excluded because of missing data. A total of 15% of the cases from the original sample were omitted from the final analysis, resulting to an N of 609 from an N of 720. A power analysis using the G Power program indicated that a minimum of 107 participants were needed to detect $R^2$ change at a .05 alpha level to detect a moderate effect size (.15), a minimum of 309 participants were
required to needed to detect $R^2$ change at a .05 alpha level to detect a small effect size (.05), and a minimum of 776 participants were required to needed to detect $R^2$ change at a .05 alpha level to detect a very small effect size (.02) (Buchner, Erdfelder, & Faul, 1997). Therefore, there was more than sufficient power to detect a moderate effect size in the analyses.

Instruments

Demographic Questionnaire

Participants were given a questionnaire that asks for demographic information. The information requested included gender, age, employment status, part-time or full time status, sex, race, and year in school (see Appendix A).

Daily Drinking Questionnaire (DDQ)

Amount of alcohol consumed over the prior month was measured by the Daily Drinking Questionnaire (DDQ) developed by Collins, Parks, and Marlatt (1985). The DDQ is a commonly used self-report measure that takes approximately three minutes to complete and provides information about quantity and frequency of alcohol consumption (Martens et al., 2005; Walters & Baer, 2006). The DDQ includes two items: (a) Number of drinks, and (b) Number of hours spent drinking. Participants identified the specific number of drinks they have in a week during an average drinking week. A table of what is a standard drink for each type of alcohol (beer, wine, spirits) is provided. Number of hours drinking each day is asked as well. Standard alcoholic beverages consumed over the last month were calculated by multiplying the total number of drinks per week during a typical drinking week by 4.3 (Walters & Baer, 2006). This total number of standard
alcohol drinks consumed in the past month was the variable of interest from the DDQ for this study.

The DDQ demonstrated convergent validity ($r = 0.52$, $p < .05$) with other quantity and frequency measures (Collins et al., 1985). See Appendix B.

*Young Adult Alcohol Problems Screening Test – Brief Version (YAAPST)*

The YAAPST is a 20-item self-report measure that was developed by Hurlbut and Sher (1992) in order to evaluate the negative consequences of alcohol consumption experienced by college students during the past 12 months. Examples of negative consequences assessed include: (a) impaired self-esteem, (b) legal difficulties, (c) tolerance of alcohol, (d) symptoms of withdrawal from alcohol, (e) social and interpersonal difficulties, (f) exposure to dangerous situations, (g) failure to meet role expectations, and (h) symptoms of heavy episodes of alcohol consumption. For items 1-6, respondents select their response to the individual questions using a nine-point scale that ranges from one (*never*) to nine (*yes, 40 or more times*). For items 7-20, respondents select their response to the individual questions using a five-point scale that ranges from one (*never*) to five (*yes, 3 or more times*). Summed total scores can range from 0 to 115, with higher scores indicating more alcohol-related negative consequences (Devos-Comby & Lange, 2008). It takes approximately 3-5 minutes to complete the YAAPST (Walters & Baer, 2006).

Internal consistency estimates for the YAAPST have ranged from .87 for lifetime negative consequences of alcohol consumption to .83 for negative consequences of alcohol consumption in the year prior (Devos-Comby & Lange, 2008). For the present study, the YAAPST demonstrated good internal consistency ($\alpha = .88$). The YAAPST has
demonstrated good criterion validity (criterion used was interview-based alcohol abuse/dependence diagnoses), concurrent validity (which was assessed by comparing the YAAPST to other measures of alcohol consumption), and construct validity (which was assessed by correlating the YAAPST with peer influence, personality, and motivational variables) (Hurlbut & Sher, 1992). See Appendix C.

Protective Behavioral Strategies Scale (PBSS)

Use of Protective Behavioral Strategies (PBS) was measured by the Protective Behavioral Strategies Scale (PBSS) developed by Martens et al. (2005). The PBSS is a 15-item self-report measure. Respondents select their response to the individual questions using a six-point scale that ranges from one (never) to six (always). Sample items include: “Drink slowly, rather than gulp or chug;” “Avoid drinking games;” “Use a designated driver.” Item nine on the scale “drink shots of liquor” is reverse scored. The individual items are summed to obtain a total score ranging from 15-90, with higher total scores indicating greater use of PBS. The PBSS takes approximately 15 minutes to complete. See Appendix D.

The construct validity of the scale of the PBSS has been supported and validated across various groups of students (Martens et al. 2005; Martens et al. 2007). The overall reliability was found to be good ($\alpha = .86$) (Martens et al., 2007; Walters et al., 2007). For the present study, the PBSS yielded excellent reliability ($\alpha = .92$). For the purposes of this study, the PBSS total score was used.

Anxiety Sensitivity Index (ASI)

Anxiety sensitivity was measured by the Anxiety Sensitivity Index (ASI) developed by Peterson and Reiss (1992). The ASI is a 16-item self-report instrument that
measures the fear of physical sensations associated with arousal. Sample items include: “It is important to me not to appear nervous;” “It is important to me to stay in control of my emotions;” “Other people notice when I feel shaky.” Respondents are asked to indicate to what degree each statement best describes them using a five point scale ranging from zero (very little) to four (very much). Total scores range from 0 to 64 with higher scores indicating greater anxiety sensitivity. The ASI takes approximately five minutes to complete.

In reviewing anxiety sensitivity measures, Peterson and Plehn (1999) reported that the ASI was the most frequently used measure with sound psychometric support. The ASI demonstrated acceptable test-retest reliability for over a 3-year time period ($r = .75$; Maller & Reiss, 1992; Peterson & Heilbronner, 1987; Peterson & Reiss, 1992; Reiss Peterson, Gursky, & McNally, 1986). Similarly, acceptable internal consistency findings were found using the ASI ($\alpha = .75$) (Reiss et al. 1986). For this study, the ASI demonstrated excellent internal consistency ($\alpha = .91$). The ASI has demonstrated adequate criterion validity and good construct validity (Taylor & Cox, 1998; Vujanovic, Arrindell, Bernstein, Norton, & Zvolensky, 2007). Vujanovic et al.’s (2007) findings supported a hierarchical structure with four lower-order factors and one broad higher-order factor. Vujanovic et al. also found that discriminant and convergent associations between the ASI and panic-specific and mood variables were in agreement with anxiety sensitivity theory. Taylor and Cox (1998) noted the same structure in an earlier study and found that each factor of the ASI correlated with anxiety and depression measures. They also indicated that anxiety sensitivity is the result of a general factor, to which the independent lower order factors (fear of respiratory symptoms, fear of cognitive
dyscontrol, fear of gastrointestinal symptoms, and fear of cardiac symptoms) contribute (Taylor & Cox, 1998). Given these findings that anxiety sensitivity is the result of a single general factor to which the lower order factors only contribute, for the purposes of this study, participants’ total scores on the ASI were used (see Appendix F).

Procedures and Data Collection

Participants were able to participate voluntarily in exchange for course credit by using the research website belonging to the Department of Psychology (http://usm.sona-systems.com) or for a drawing for monetary incentives. A recruitment email that included a link to the research website was also sent through the listservs for university announcements. Participation was open to undergraduates within the traditional 18 to 25 age range who had consumed alcohol within 30 days prior to taking the survey. The study was reviewed by and received the approval of The University of Southern Mississippi Internal Review Board (Protocol Number #C29070704). See Appendix G for IRB approval.

All data were collected via an online survey conducted through the SurveyMonkey.com website and was accessed through either a link on the research website from the Department of Psychology (http://usm.sona-systems.com) or via the link included in the recruitment email. Once students clicked on a link they went to an informed consent page that described the study, gave instructions, and included disclaimers (Appendix F). Consent was provided through electronic signature using university identification number prior to taking the questionnaire. The researchers’ contact information was provided to participants.
CHAPTER III

RESULTS

Preliminary Analyses

The survey data were electronically transferred from the Survey Monkey website and the file was converted from Microsoft Excel format to SPSS. The raw data were reviewed to identify errors by looking at item-level frequency distributions in order to ensure all values were within the permissible ranges. Linear interpolation was used for items missing on the ASI (n = 13), the YAAPST (n = 6), and the PBSS (n = 20). All cases lacking 25% of their total data were omitted. A total of 15.4% of the cases from the original sample were omitted from the final analysis, resulting in an N of 609 from an N of 720. The variables were examined and their distributions were analyzed at the scale level for possible coding errors.

For all variables of interest, means, standard deviations, skewness indices, and kurtosis indices were calculated (see Table 1). Additionally, to examine the reliability, internal consistencies were calculated by means of coefficient alpha. All measures yielded coefficient alpha terms greater than the .70 (see Table 1).

Table 1

Means, Standard Deviations, Ranges and Cronbach’s Alpha for all Variables of Interest

<table>
<thead>
<tr>
<th>Instrument</th>
<th>M</th>
<th>SD</th>
<th>Range of Observed Scores</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBSS</td>
<td>53.89</td>
<td>20.54</td>
<td>15-90</td>
<td>.922</td>
</tr>
<tr>
<td>DDQ Drinks per Month</td>
<td>42.24</td>
<td>51.93</td>
<td>4.3-430</td>
<td>n/a</td>
</tr>
<tr>
<td>ASI</td>
<td>23.75</td>
<td>12.72</td>
<td>0-64</td>
<td>.911</td>
</tr>
<tr>
<td>YAAPST</td>
<td>12.05</td>
<td>10.50</td>
<td>0-71</td>
<td>.883</td>
</tr>
</tbody>
</table>

Note: N = 609
Independent samples t-tests were performed to compare differences among variables by gender to determine its effect on the variables of interest. Statistically significant differences were found between males and females for number of alcoholic beverages consumed per month ($t [607] = 5.51, p < 0.01, 95\% \text{ CI} [18.23, 38.40]$) as measured by the DDQ, the amount of negative consequences of alcohol consumption ($t [607] = 3.93, p < 0.01, 95\% \text{ CI} [2.07, 6.19]$) as measured by the YAAPST, the level of anxiety sensitivity ($t [607] = -2.15, p < 0.05, 95\% \text{ CI} [-5.29, -.24]$) as measured by the ASI, and PBS use ($t [607] = -6.44, p < 0.01, 95\% \text{ CI} [-16.91, -9.00]$) as measured by the PBSS. Males ($M = 15.35, S.D. = 12.56$) reported higher levels of negative consequences of alcohol consumption than females ($M = 11.22, S.D. = 9.76$). Males also ($M = 64.88, S.D. = 69.43$) reported a higher number of alcoholic beverages consumed per month than females ($M = 36.57, S.D. = 44.86$). Females ($M = 116.49, S.D. = 19.87$) reported higher levels of PBS use than males ($M = 103.53, S.D. = 19.94$). Females also ($M = 40.31, S.D. = 13.06$) reported higher levels of anxiety sensitivity than males ($M = 37.54, S.D. = 11.05$). These results were consistent with previous research showing gender differences in related variables (Benton et al., 2004; Engs et al., 1996; Delva et al., 2004; Lewis et al., 2009; Martens et al., 2004; Nolan-Hoecksema, 2004; O’Malley & Johnston, 2002; Schmidt, 2003; Walters et al., 2007; Živcic-Becirevic & Ažic, 2008), and served as further evidence to suggest performing separate analyses for males and females.

Independent samples t-tests were performed in order to compare differences among variables by race. Statistically significant differences were found between White non-Hispanics and African Americans for level of anxiety sensitivity ($t [575] = 2.86, p < 0.05, 95\% \text{ CI} [.99, 5.33]$) as measured by the ASI, number of alcoholic beverages
consumed per month ($t [575] = -3.66, \ p < 0.05, 95\% \ CI [-25.56, -7.69]$) as measured by the DDQ, and amount of negative consequences of alcohol consumption ($t [575] = -5.97, \ p < 0.01, 95\% \ CI [-7.12, -3.59]$) as measured by the YAAPST. No statistically significant differences were found between White non-Hispanics and African-Americans for PBS use as measured by the PBSS. African Americans ($M = 41.88, S.D. = 13.79$) reported higher levels of anxiety sensitivity than White non-Hispanics ($M = 38.72, S.D. = 11.97$). White non-Hispanics ($M = 14.03, S.D. = 10.97$) reported higher levels of negative consequences of alcohol consumption than African Americans ($M = 8.68, S.D. = 8.82$). White non-Hispanics also ($M = 48.66, S.D. = 55.12$) reported a higher number of alcoholic beverages consumed per month than African Americans ($M = 32.03, S.D. = 46.01$). As there were statistically non-significant results for PBS differences, a key variable of interest in the present study, further analyses were not conducted with respect to race. The option of running the regression analyses independently by race was decided against because of concerns over the reduction of power that would result from further parsing out the sample. The decision to control for race rather than separately analyze it was further supported by the findings of the a priori t-tests as there were statistically significant results for only three out of the four variables of interest. Therefore race was entered as a control variable in the multiple regression analyses to prevent any effects of race from altering the results of interest (Table 2).
Table 2

Results of Bivariate Correlations for Race

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. YAAPST</td>
<td>----</td>
<td>-0.395**</td>
<td>0.257**</td>
<td>0.013</td>
</tr>
<tr>
<td>Table 2 (continued).</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. PBSS</td>
<td>-0.537**</td>
<td>----</td>
<td>-0.180*</td>
<td>0.047</td>
</tr>
<tr>
<td>3. DDQ</td>
<td>0.497**</td>
<td>-0.399**</td>
<td>----</td>
<td>0.073</td>
</tr>
<tr>
<td>4. ASI</td>
<td>-0.065</td>
<td>0.140**</td>
<td>-0.117*</td>
<td>----</td>
</tr>
</tbody>
</table>

Note. Intercorrelations for African-American participants (N = 122) are presented above the diagonal, and intercorrelations for White non-Hispanic participants (N = 487) are presented below the diagonal.

*p < .05; **p < .01. YAAPST = Young Adult Alcohol Problems Screening Test – Brief Version; PBSS = Protective Behavioral Strategies Scale; DDQ = Daily Drinking Questionnaire; ASI = Anxiety Sensitivity Index.

Correlations among Measures

To address Hypothesis 1, a correlation analysis was conducted to examine the relationship between anxiety sensitivity and PBS. Simple correlations were computed with the following measures: ASI total score and PBSS total score. A correlation matrix of all study variables was generated to facilitate interpretation of the data.

Hypothesis 1: It Was Hypothesized That Anxiety Sensitivity Would Be Negatively Related to Use of PBS

Overall, level of anxiety sensitivity had a weak positive correlation with the use of PBS (r = 0.100, p < 0.05). Correlation analysis conducted separately by gender further
supported hypothesis 1 for females. In females, level of anxiety had a weak positive correlation with use of PBS at \( r = .098 \) \((p < .05)\). In males, level of anxiety sensitivity was unrelated to use of PBS at \( r = .002 \) \((p > .05)\) (see Table 3).

Table 3

*Results of Bivariate Correlations for Gender*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. YAAPST</td>
<td>----</td>
<td>-.366**</td>
<td>.349**</td>
<td>.075</td>
</tr>
<tr>
<td>2. PBSS</td>
<td>-.512**</td>
<td>----</td>
<td>-.335**</td>
<td>.002</td>
</tr>
<tr>
<td>3. DDQ</td>
<td>.489**</td>
<td>-.300**</td>
<td>----</td>
<td>.194*</td>
</tr>
<tr>
<td>4. ASI</td>
<td>-.085</td>
<td>.098*</td>
<td>-.131*</td>
<td>----</td>
</tr>
</tbody>
</table>

*Note.* Intercorrelations for male participants \((N = 122)\) are presented above the diagonal, and intercorrelations for female participants \((N = 487)\) are presented below the diagonal.

*p < .05; ** p < .01. YAAPST = Young Adult Alcohol Problems Screening Test – Brief Version; PBSS = Protective Behavioral Strategies Scale; DDQ = Daily Drinking Questionnaire; ASI = Anxiety Sensitivity Index.*

**Multiple Regression**

A series of hierarchical multiple regressions were performed to address Hypotheses 2 and 3. Prior to running each regression, the assumptions of multiple regression were tested (multicollinearity, linearity, homoscedasticity, and normally distributed residual error). The studentized residuals and standardized DFFITs were examined for outliers and influential observations. Prior to each moderation analysis, the independent variables were centered by subtracting the mean from each variable to be used in the regression (e.g., PBSS total, ASI total, YAAPST total). This was done to help make the results easier to interpret and more meaningful (Keith, 2006).
Hypothesis 2: It Was Hypothesized That Anxiety Sensitivity Would Moderate The Relationship between Amount of Alcohol Consumed and Negative Consequences of Alcohol Consumption Such That the Relationship between Amount Consumed and Negative Consequences Will Be Stronger for Individuals High on Anxiety Sensitivity as Compared to Individuals Low on Anxiety Sensitivity

When the assumptions of linearity were examined for this analysis, it was determined that normality of residuals assumption and the assumption of linearity were violated. No outliers or other influential factors were observed.

Normality of Residuals

Upon generating and examining a histogram representing the spread of error within a normal distribution, it appeared as though there were issues with skewness and kurtosis. Further calculations for skewness and kurtosis were conducted that supported violation of normality. Issues with skewness were calculated by dividing the skew statistic by standard error (1.329/ .111 = 11.972). The calculated value of 11.972 indicated problems with skewness when evaluating against the +/- 3 criteria. There was a similar problem with kurtosis (4.483/ .221 = 20.285). Therefore, the assumption of normality of residuals was violated.

Linearity

When the assumption of linearity was tested, it was found that the squared term was statistically significant in the model (p < 0.05) for both the DDQ and the ASI, indicating that the assumption of linearity was violated. To adjust for this violation, the terms testing for the DDQ and the ASI were transformed. Prior to running the regression, the square root of the terms for the DDQ and the ASI were calculated, centered, and
Hierarchical multiple regression was used to explore the hypothesis that anxiety sensitivity, as measured by the ASI, moderated the relationship between amount consumed, as measured by the DDQ, and the negative consequences of alcohol use, as measured by the YAAPST for females. Variables were entered into the regression in three steps: Step 1 added the control variable (race), Step 2 added anxiety sensitivity as well as alcoholic beverages consumed per month, and in Step 3 the interaction term (the product of anxiety sensitivity and alcoholic beverages consumed per month) was added to the model. Yielding a change that is statistically significant at Step 3 is regarded as evidence of an effect of moderation (Baron & Kenny, 1986; Frazier, Barron, & Tix, 2004). After controlling for race in step 1, amount of alcohol consumed and anxiety sensitivity account for an additional 24.8% of the variance in negative consequences; $\Delta R^2 = .248$, $R^2 = .331$, $\Delta F(2,482) = 89.163$, $p < .01$. A closer look at the beta weights for these two predictors indicates that the total effect for amount of alcohol consumed is statistically significant ($\beta = .512$, $p < .01$), but the total effect for anxiety sensitivity to the model is not ($\beta = .009$, $p > .05$). As seen in Table 4, results from step 3 show that the interaction term did not account for statistically significant additional variance in negative consequences; $\Delta R^2 = .000$, $\Delta F(1,481) = .148$, $p > .05$. 

subsequently included in the analysis.
Table 4

*Summary of Hierarchical Multiple Regression ASI x DDQ for Females*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>β</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td>0.083*</td>
<td>0.083**</td>
</tr>
<tr>
<td>Control for Race</td>
<td>5.753**</td>
<td>0.289**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>0.331**</td>
<td>0.248**</td>
</tr>
<tr>
<td>DDQ</td>
<td>1.779**</td>
<td>0.512**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI</td>
<td>.085</td>
<td>.009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td>0.331**</td>
<td>0.000</td>
</tr>
<tr>
<td>ASI</td>
<td>.100</td>
<td>.011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDQ*ASI</td>
<td>.047</td>
<td>.015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=487, *p<.05, **p<.01.*

The same analysis was performed for males. When the assumptions of linearity were examined for the analysis, it was determined that the normality of residuals assumption and the assumption of linearity were violated. No outliers or other influential factors were observed.

*Normality of Residuals*

Upon generating and examining a histogram representing the spread of error within a normal distribution, it appeared as though the data were positively skewed and leptokurtic. Further calculations for skewness and kurtosis were conducted that supported violation of normality. Issues with skewness were calculated by dividing the skew statistic by standard error (1.248 / .219 = 5.699). The calculated value of 5.699 indicated problems with skewness when evaluating against the +/- 3 criteria. There was a similar problem with kurtosis (2.944 / .435 = 6.768). Therefore, the assumption of normality of residuals was violated.
**Linearity**

When the assumption of linearity was tested, it was found that the squared term was statistically significant in the model ($p < 0.05$), indicating that the assumption of linearity was violated. To adjust for this violation, the term testing for the DDQ was transformed. Prior to running the regression, the square root of the term for the DDQ was calculated, centered, and included in the analysis.

Results showed that after controlling for race in step 1, amount of alcohol consumed and anxiety sensitivity account for an additional 18.6% of the variance in negative consequences; $\Delta R^2 = .186$, $R^2 = .189$, $\Delta F(2,118) = 13.493$, $p < .01$. A closer look at the beta weights for these two predictors indicates that the total effect for amount of alcohol consumed was statistically significant ($\beta = .433$, $p < .01$), but the total effect for anxiety sensitivity to the model was not ($\beta = .001$, $p > .05$). As seen in Table 5, results from step 3 show that the interaction term did not account for statistically significant additional variance in negative consequences; $\Delta R^2 = .019$, $\Delta F(1,117) = 2.829$, $p > .05$.

Table 5

*Summary of Hierarchical Multiple Regression on ASI x DDQ Males*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control for Race</td>
<td>1.498</td>
<td>0.056</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>0.189**</td>
<td>0.186**</td>
</tr>
<tr>
<td>DDQ</td>
<td>1.453**</td>
<td>0.433**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI</td>
<td>0.001</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td>0.208**</td>
<td>0.019</td>
</tr>
<tr>
<td>DDQ</td>
<td>1.580**</td>
<td>0.471**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI</td>
<td>0.001</td>
<td>0.097</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDQ*ASI</td>
<td>-0.041</td>
<td>-0.143</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N=122 *p<.05, **p<.01.
Hypothesis 3: It Was Hypothesized That Anxiety Sensitivity Would Moderate the Relationship between PBS Use and Negative Consequences of Alcohol Consumption Such that the Relationship between PBS Use and Negative Consequences Will Be Stronger for Individuals High on Anxiety Sensitivity as Compared to Individuals Low on Anxiety Sensitivity

When the assumptions of linearity were examined for this analysis, it was determined that normality of residuals assumption was violated. No outliers or other influential factors were observed.

Normality of Residuals

Upon generating and examining a histogram representing the spread of error within a normal distribution, it appeared as though there were issues with skewness and kurtosis. Further calculations for skewness and kurtosis were conducted that supported violation of normality. Issues with skewness were calculated by dividing the skew statistic by standard error (\(0.980/0.111=8.820\)). The calculated value of 8.820 indicated problems with skewness when evaluating against the +/- 3 criteria. There was a similar problem with kurtosis (\(3.283/0.221=14.855\)). Therefore, the assumption of normality of residuals was violated.

Hierarchical multiple regression was used to explore the hypothesis that anxiety sensitivity, as measured by the ASI, moderated the relationship between PBS use, as measured by the PBSS, and the negative consequences of alcohol use, as measured by the YAAPST for females. Variables were entered into the regression in three steps: Step 1 added the control variable (race), Step 2 added anxiety sensitivity as well as PBS use, and in Step 3 the interaction term (the product of anxiety sensitivity and PBS use) was added
Yielding a change that was statistically significant at Step 3 is regarded as evidence of an effect of moderation (Baron & Kenny, 1986; Frazier et al., 2004). After controlling for race in step 1, PBS use and anxiety sensitivity account for an additional 25.2% of the variance in negative consequences; \( \Delta R^2 = .252, R^2 = .335, \Delta F (2,482) = 91.356, p < .01 \). A closer look at the beta weights for these two predictors indicated that the total effect for amount of PBS used was significant (\( \beta = -.501, p < .01 \)), but the total effect for anxiety sensitivity to the model is not (\( \beta = -.014, p > .05 \)). As seen in Table 6, results from step 3 show that the interaction term did not account for additional variance in negative consequences; \( \Delta R^2 = .001, \Delta F(1,481) = 1.041, p < .01 \).

Table 6

*Summary of Hierarchical Multiple Regression on ASI x PBSS Females*

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>( \beta )</th>
<th>( R^2 )</th>
<th>( \Delta R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td>( 0.083^{**} )</td>
<td>( 0.083^{**} )</td>
</tr>
<tr>
<td>Control for Race</td>
<td>5.573**</td>
<td>( 0.289^{**} )</td>
<td>( 0.295^{**} )</td>
<td>( 0.252^{**} )</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>( 0.335^{**} )</td>
<td>( 0.252^{**} )</td>
</tr>
<tr>
<td>PBSS</td>
<td>-0.246**</td>
<td>( -0.501^{**} )</td>
<td>( -0.501^{**} )</td>
<td>( -0.501^{**} )</td>
</tr>
<tr>
<td>ASI</td>
<td>-0.011</td>
<td>( -0.014 )</td>
<td>( -0.014 )</td>
<td>( -0.014 )</td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td>( 0.337^{**} )</td>
<td>( 0.001 )</td>
</tr>
<tr>
<td>PBSS</td>
<td>-0.146</td>
<td>( -0.197 )</td>
<td>( -0.197 )</td>
<td>( -0.197 )</td>
</tr>
<tr>
<td>ASI</td>
<td>-0.017</td>
<td>( -0.023 )</td>
<td>( -0.023 )</td>
<td>( -0.023 )</td>
</tr>
<tr>
<td>PBSS *ASI</td>
<td>0.001</td>
<td>( 0.206 )</td>
<td>( 0.206 )</td>
<td>( 0.206 )</td>
</tr>
</tbody>
</table>

*Note.* \( N=487 \) *p<.05, **p<.01

The same analysis was performed for males. When the assumptions of linearity were examined for the analysis, it was determined that normality of residuals assumption and the assumption of linearity were violated. No outliers or other influential factors were observed.
Normality of Residuals

Upon generating and examining a histogram representing the spread of error within a normal distribution, it appeared as though the data was positively skewed and leptokurtic. Further calculations for skewness and kurtosis were conducted that supported violation of normality. Issues with skewness were calculated by dividing the skew statistic by standard error (960/.219 = 4.384). The calculated value of 4.384 indicated problems with skewness when evaluating against the +/- 3 criteria. There was a similar problem with kurtosis (1.550/.435 = 3.560). Therefore, the assumption of normality of residuals was violated.

Linearity

When the assumption of linearity was tested, it was found that squared term for PBSS was statistically significant in the model (p < 0.05), indicating that the assumption of linearity was violated. To adjust for this violation, the term testing for the PBSS was transformed. Prior to running the regression, the square root of the term for the PBSS was calculated, centered, and included in the analysis.

Results showed that after controlling for race in step 1, amount of PBS used and anxiety sensitivity account for an additional 12.6% of the variance in negative consequences; $\Delta R^2 = .126$, $R^2 = .129$, $\Delta F(2,118) = 8.498$, $p < .01$. A closer look at the beta weights for these two predictors indicates that the total effect for amount of PBS used is statistically significant ($\beta = -.343$, $p < .01$), but the total effect for anxiety sensitivity to the model is not ($\beta = .092$, $p > .05$). As seen in Table 7, results from step 3 show that the interaction term did not account for statistically significant additional variance in negative consequences; $\Delta R^2 = .000$, $\Delta F(1,117) = .009$, $p > .05$. 
Table 7

Summary of Hierarchical Multiple Regression ASI x PBSS Males

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>β</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>Control for Race</td>
<td>1.498</td>
<td>0.056</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td>0.129**</td>
<td>0.126**</td>
</tr>
<tr>
<td>PBSS</td>
<td>-4.266**</td>
<td>-0.343**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI</td>
<td>0.105</td>
<td>0.092</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
<td>0.129**</td>
<td>0.000</td>
</tr>
<tr>
<td>PBSS</td>
<td>-4.248**</td>
<td>-0.342**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI</td>
<td>0.106</td>
<td>0.093</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBSS * ASI</td>
<td>0.009</td>
<td>0.009</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N=122 *p<.05, **p<.01.
CHAPTER IV

DISCUSSION

The purpose of this study was to better understand the relationships among anxiety sensitivity, the negative consequences of alcohol consumption, and PBS. Specifically, this study investigated the influence of anxiety sensitivity on PBS and sought to determine if anxiety sensitivity moderated the relationship between PBS use and the negative consequences of alcohol consumption. Lastly, this study investigated whether anxiety sensitivity moderated the relationship between alcohol consumption and the negative consequences of alcohol consumption.

As PBS has been found to be especially influential on the incidence of negative consequences of alcohol consumption, anxiety sensitivity’s relationship to PBS use was of interest in the present study. Research question 1 investigated the relationship between anxiety sensitivity and PBS use. It was believed that anxiety sensitivity would be negatively related to use of PBS. Results indicated that anxiety sensitivity had a weak, positive relationship with PBS use. This finding was an interesting contrast to Donovan’s (2009) finding that there was no relationship between neuroticism (anxiety sensitivity’s parent construct), alcohol consumption, and PBS. Though the relationship is weak, this is important because the contrast in findings underscore the possibility that anxiety sensitivity functions differently from its parent construct of neuroticism. Read and O’Connor (2006) found some support for the idea that neuroticism is a protective factor with respect to the alcohol consumption. The authors also found that neuroticism, when mediated by positive alcohol expectancies, was actually a risk factor with respect to alcohol consumption. It is possible that higher levels of anxiety sensitivity may serve as a
protective factor against experiencing the negative consequences of alcohol consumption. It is also possible that the especially cautious and perhaps even vigilant nature of individuals higher in anxiety sensitivity may foster more awareness of potential risks and support taking self-protective measures.

Previous researchers have suggested that individuals who were higher in anxiety sensitivity appeared to be drinking for negative reinforcement, or to cope with negative emotions (Cox et al., 1993; DeHaas et al., 2001; Lawyer et al., 2002; Reyno et al., 2006). Lawyer and colleagues (2002) found that anxiety sensitivity has been found to be related to both positively and negatively reinforced alcohol consumption. When considering the finding that individuals higher in anxiety sensitivity are using more PBS, it is important to note that anxiety sensitivity is a personality variable that does not necessarily denote psychopathology, even on the higher end of its continuum. That being the case, an individual’s anxiety concerns may not be distressing enough to motivate alcohol consumption for negative reinforcement. It is also possible that people higher in anxiety sensitivity are especially cautious about potential risks and use PBS to protect themselves against possible negative consequences (Reiss et al., 1988; Zinbarg et al., 1997).

Research question 2 investigated anxiety sensitivity as a possible moderator in the relationship between amount of alcohol consumed and negative consequences of alcohol consumption. It was hypothesized that the relationship between alcohol consumed and negative consequences would be stronger for individuals with high levels of anxiety sensitivity. Results did not support the moderation hypothesis; however, results replicated past findings demonstrating a relationship between amount of alcohol consumed and the negative consequences of alcohol consumption. This finding is consistent with previous
findings demonstrating that college students who engaged in binge drinking frequently experienced negative alcohol related consequences (Wechsler et al., 2002; Wechsler & Nelson, 2008). This finding is also consistent with several studies affirming the relationship between alcohol consumption and negative alcohol-related consequences (Abbey, 2002; American College Health Association, 2009; Benton et al., 2004; Cooper, 2002; Engs et al., 1996; Hingson et al., 2005; Hingson et al., 2009; NIAAA, 2007; NCASA, 1994; Porter and Pryor, 2007; Powell et al., 2004; Presley et al., 1996; Rau & Durand, 2000; Romosz, 2009; Vik et al., 2000). The sample in the present study is composed of students attending a university in the Southeastern United States, a fair amount of which identified as African American. Therefore, the replication of this finding is important because the preponderance of prior research was conducted in the Northeast and West regions of the United States and with samples lacking in diversity.

When testing moderation for the female group, amount of alcohol consumed and anxiety sensitivity accounted for 24.8% of the variance in negative consequences for the female group and 18.6% of the variance in the male group. It was interesting that amount of alcohol consumed accounted for a greater amount of the variance for the female group when compared to the male group, although amount of alcohol consumed accounted for a good deal of the variance for both. Anxiety sensitivity did not moderate the relationship between amount consumed and the negative consequences of alcohol consumption for either group. The conceptual and statistical possibilities for this finding will be investigated following the discussion of the second moderation as there were some profound similarities between the two.
Research question 3 investigated whether anxiety sensitivity moderated the relationship between PBS use and negative consequences of alcohol consumption. It was hypothesized that the relationship between PBS and negative consequences would be stronger for individuals with higher levels of anxiety sensitivity. This hypothesis was not supported. However, results did support a relationship between PBS use and the negative consequences of alcohol consumption in that greater PBS use was related to fewer negative consequences. This finding is consistent with previous studies that demonstrated the relationship between PBS use and the negative consequences related to alcohol consumption (Araas & Adams, 2008; Benton et al., 2004; Delva et al., 2004; Haines et al., 2006; Howard et al., 2007; Luebbe et al., 2009; Martens et al., 2004; Schmidt, 2003; Walters et al., 2007). The sample in the present study is composed of students attending a university in the Southeastern United States, a fair amount of which identified as African American. Therefore, the replication of this finding is important because the preponderance of prior research was conducted in the Northeast region of the United States and with samples lacking in diversity. When testing the moderation effect of anxiety sensitivity, PBS use and anxiety sensitivity accounted for 25.2% of the variance in negative consequences in the female group and 12.6% of the variance in negative consequences for the male group. The broad disparity between the genders regarding the amount of variance accounted for by PBS use in negative consequences was notable given the consistent findings that females use more PBS and subsequently experience fewer alcohol-related consequences when compared to males. Anxiety sensitivity did not moderate the relationship between PBS use and the negative consequences of alcohol consumption for either group.
In understanding why the proposed moderation effects were not supported, statistical issues as well as conceptual issues may be considered. Conceptual issues provide reasons why there may not be any true moderation effect in the population, whereas statistical issues provide reasons why moderation effects were not observed in this study (even if they exist in the population). A possible conceptual explanation for these findings is that anxiety sensitivity may not be an important enough variable alone to moderate the relationship. It is possible that anxiety sensitivity, when evaluated along with the other personality variables that compose the construct of neuroticism, may have yielded a different result.

According to Frazier et al. (2004), statistical issues which may prevent a true moderation effect from being observed include (a) reliability of measures, (b) restriction of range in responses, and (c) sensitivity of the outcome measure. Of particular interest to the current study are the second two issues, as reliability levels for all measures were above $\alpha = .80$. The issue of range restriction is pertinent to this study because of the nature of the variables of interest, especially alcohol consumption and negative consequences of alcohol consumption. Responses on both of these variables covered a wide range of values; however, the distributions of responses were heavily skewed. It is certainly possible that this uneven distribution across the range of responses limited the true power of this study to show moderation effects. The third issue identified by Frazier et al. (2004) regarding the sensitivity of the outcome measure is also potentially applicable to the present study. In both moderation analyses, negative consequences of alcohol consumption (measured by the YAAPST) was the outcome variable of interest. With evidence of the criterion-related validity of the YAAPST for predicting clinical
diagnosis of alcohol dependence (Hurlbut & Sher, 1992), it is possible that this scale is more useful for measuring the extreme end of negative consequences and less useful for the less extreme consequences. Conceivably, if a more sensitive measurement tool that accurately captured a wider range of negative consequences had been used in place of the YAAPST, the posed hypotheses may have been supported.

**Limitations**

There were several limitations in the current study. The fact that anxiety sensitivity alone was selected presented a possible limitation. Perhaps exploring at the constellation of variables that make up neuroticism and how they independently influence alcohol-related variables would have yielded different results. Also, all participants were offered reinforcers (extra credit, entry to win a gift card) in exchange for participation. It is possible that the reinforcement could have influenced participants’ orientation in responding. It is undetermined whether a socially desirable response pattern could have been a factor as there was no measure of this in the present study.

Participants were comprised of a convenience sample that was limited to a single university in a single region of the United States, thereby limiting the generalization to other regions in the United States where cultural variables may impact results. For example, rates of alcohol consumption vary by region, and as was supported by the present study, variables such as gender and race are known to differ for alcohol-related variables (Johnston et al., 2009).

There was considerable inequivalence in the sample with respect to gender (e.g., 122 males vs. 487 females) as well as race (e.g., 202 African Americans vs. 375 White, Non-Hispanics). The moderation analyses were conducted separately by gender to
provide a clearer understanding of the impact of gender as well as to prevent the results from being adversely affected as a result of the gender inequivalence. Unfortunately, the comparatively small number of males presents some concerns, as power to detect smaller effect sizes was adversely impacted by an insufficient N of 122. Whereas the sample size was sufficient to detect a moderate effect size, it was inadequate to detect smaller effect sizes of .05 (which required N=309) or .02 (which required N=776). Additionally, the female sample (N=375) had insufficient power to detect an effect size of .02.

There was a statistically significant gender difference in anxiety sensitivity and PBS use, but the sample was composed primarily of women. As women are higher in anxiety sensitivity and use more PBS, the gender inequity could have skewed the overall results in that the directional patterns of these variables may have been over represented. None of the studies that found the relationship between anxiety sensitivity and consumption for negative reinforcement also looked at PBS use (Cox et al., 1993; DeHaas et al., 2001; Lawyer et al., 2002; Reyno et al., 2006). It is possible that since PBS strategies are geared towards use in social situations, the PBSS may be evaluating an element related to reinforcement that was not assessed previously in the studies focused on reinforcement.

Problems with skewness and kurtosis were observed for all the variables of interest, indicating the non-normality of responses from the observed sample. The moderation distributions were positively skewed, meaning that the values were concentrated to one side (the lower side) of the distribution and asymmetrical around the mean. All the distributions were leptokurtic, meaning that the distribution was peaked around the mean, indicating extreme, non-normally distributed values. While the non-
normality of observed response data does not necessarily indicate poor sampling
techniques, it does create potential limitations in the validity of the statistical techniques
employed in this study (Frazier et al., 2004). In the present study, transformations were
used to address violation of the linearity assumption in correlation and regression.
However, it was hoped that the robustness of regression against minor normality
assumption violations would prevent the non-normality of the observed variables from
having any negative effect on results.

Future Research

The present study attempted to answer Martens et al.’s (2009) call for more
research to better understand how personality variables relate to prevention and treatment
efforts among the college student population. Only two previous studies investigated PBS
use and a personality variable (Donovan, 2009; Martens et al., 2009). It had been
hypothesized that anxiety sensitivity and PBS use would be negatively correlated; instead
a weak positive correlation was found. There is an evident need for more research on
those variables that relate to PBS use, as our hypotheses about them and their direction
informed by the current body of literature were not supported when tested. The
unexpected direction of the relationship between anxiety sensitivity and PBS use suggests
that more research should explore the interactions between anxiety sensitivity, PBS use
and drinking expectancies or motives to better understand the finding of the present
study. As PBS use grows in its prominence as a harm reduction approach, it behooves us
to better understand its value and limitations.

Future researchers should explore how alcohol expectancies may influence higher
anxiety sensitivity individuals’ risk of dangerous levels of alcohol consumption. Read
and O’Connor (2005) found that although neuroticism (anxiety sensitivity’s parent construct) is a protective factor with respect to the consumption of alcohol, when it is mediated by positive alcohol expectancies; it was actually a risk factor with for alcohol consumption. It is recommended that future researchers investigate if, when mediated by positive alcohol expectancies, anxiety sensitivity is a risk factor for alcohol consumption. As stated previously, none of the studies that found the relationship between anxiety sensitivity and consumption for negative reinforcement also looked at PBS use (Cox et al., 1993; DeHaas et al., 2001; Lawyer et al., 2002; Reyno et al., 2006). It was speculated that, since PBS strategies are geared towards use in social situations, the PBSS may be evaluating an element related to reinforcement that was not assessed previously in the studies focused on reinforcement. Future researchers should explore if there is in fact an underlying component here that has been yet to be discovered.

The present study yielded some unanticipated findings that suggested it would be beneficial to look at the present variables somewhat differently. It was found that anxiety sensitivity and the negative consequences of alcohol consumption were unrelated and that anxiety sensitivity did not predict the negative consequences of alcohol use. As this finding was unexpected, it might be useful to see if it is replicated with a different population. Perhaps looking the constellation of variables that compose neuroticism and how they independently influence alcohol-related variables may better serve to help us understand the nuances of these relationships. As the present study found that anxiety sensitivity relates to PBS use, future research needs to examine other variables such as impulsivity that could similarly relate to PBS use. As it is evident that individual variables impact PBS use, a closer look at demographic and cultural variables that may
impact PBS use is warranted. Given the present study’s findings of gender and racial differences on most of the variables of interest, future research should explore how race and gender together relate to these variables.

Results from the present study highlight the need to examine anxiety sensitivity, PBS use, and negative alcohol-related consequences across diverse populations. Specifically, future researchers should consider the historical and environmental factors that may support higher levels of anxiety sensitivity among African American college students. The question of why African American students are consuming significantly less alcohol and experiencing significantly lower levels of negative alcohol-related consequences, given that they are ostensibly using the same amount of PBS, begs to be explored. Again, it is possible that historical and environmental variables are at work in this equation. One possibility is that African American students are more aware and concerned about threats to their well-being and progress. This possibility would be supported by the observed higher levels of anxiety sensitivity. These possibilities are worthy of future exploration by researchers.

In the present study, there were interesting findings with respect to gender that warrant future investigation. Future researchers should consider that cultural and environmental variables (e.g., threat of sexual assault) that may support higher levels of anxiety sensitivity among female college students. The possible cultural and environmental variables (e.g., differing gender role expectations) that may contribute to the findings that males report higher levels of alcohol consumption and negative alcohol-related consequences while females report higher PBS use warrant further exploration.
The impact of regional culture on the variables of interest prompted thoughts for future investigation. The preponderance of studies on PBS and the negative consequences of alcohol consumption have been conducted in the Northeastern region of the United States. Although the present study was conducted in the Southeastern region of the United States, more research is needed in more diverse regions if we are to better understand how PBS use and the incidence of negative consequences of alcohol consumption is potentially influenced by culture. Collaborative research endeavors combining diverse samples would be ideal to explore these questions.

Summary

In summary, it was found in this study that a weak positive relationship existed between anxiety sensitivity and PBS use. Further, it was found that amount of alcohol consumed predicted negative consequences of alcohol consumption but that anxiety sensitivity did not moderate the relationship between amount consumed and the negative consequences of alcohol consumption. Also, it was found that PBS use predicted negative consequences of alcohol consumption but that anxiety sensitivity did not moderate the relationship between PBS use and the negative consequences of alcohol consumption. The present study’s findings, as well previous research, suggest that a better understanding is needed of the interplay between anxiety sensitivity and variables related to alcohol consumption including PBS use. This is important as the prominence of PBS continues to grow as an effective way of limiting the negative consequences of alcohol consumption among college students.
APPENDIX A

DEMOGRAPHICS FORM AND DESCRIPTIVE MEASURES

Demographics

Please answer each question

What is your age?

How do you identify yourself?

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>African American</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Asian American</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Eastern Indian American</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>International student</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Latina/Latino</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Middle Eastern American</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Multiracial</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Native American</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>White (non-Hispanic)</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Other (specify):</td>
<td></td>
</tr>
</tbody>
</table>

Please estimate your weight in pounds___________________

Please estimate you height in feet and inches_____________

Have you drunk alcohol in the past 30 days? YES NO

How many times have you drunk alcohol in the past 30 days? _______

Have you ever received treatment for alcohol problems? _______

Are you a member of a sorority or fraternity? YES NO

Are you a member of a university athletic team? YES NO

Did you attend a junior college before coming to USM? YES NO

Please identify your academic status

Freshman
Sophomore
Junior
Senior

What is your enrollment status?

Full time
Part time

Where do you primarily live while going to school?
Dorm
Apartment – on campus
Apartment – off campus
Greek House
With parents

What is your employment status?
Not employed
¼ time
½ time
¾ time
Full time

Have you ever gotten into trouble with the university due to your drinking alcohol? YES
NO
Have you ever gotten into legal trouble due to your drinking alcohol? YES
NO
Have you ever been diagnosed with depression YES
NO
Have you ever been diagnosed with an anxiety disorder YES
NO
Do you use illicit drugs (marijuana, cocaine) YES
NO
Do you take prescription medication YES
NO
Do you take medication not prescribed for you YES
NO
APPENDIX B

DAILY DRINKING QUESTIONNAIRE (DDQ)

Daily Drinking Questionnaire (DDQ)

INSTRUCTIONS

For each day of the week, fill in both the number of drinks consumed and the number of hours you typically drink.

For the past month, please fill in a number for each day of the week indicating the typical number of STANDARD drinks you usually consume on that day, and the typical number of hours you usually drink on that day.

One standard drink equals

<table>
<thead>
<tr>
<th>Number of Drinks</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Answer the following questions as they apply to your drinking.

1. Have you driven a car when you knew you had too much to drink to drive safely?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 times
   Yes, 4-6 times
   Yes, 7-11 times
   Yes, 12-20 times
   Yes, 21-39 times
   Yes, 40 or more times

2. Have you had a headache (hangover) the morning after you had been drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 times
   Yes, 4-6 times
   Yes, 7-11 times
   Yes, 12-20 times
   Yes, 21-39 times
   Yes, 40 or more times

3. Have you felt very sick to your stomach or thrown up after drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 times
   Yes, 4-6 times
   Yes, 7-11 times
   Yes, 12-20 times
   Yes, 21-39 times
   Yes, 40 or more times

4. Have you gotten into physical fights when drinking?
   Never
Yes, but not in past year
Yes, 1 time
Yes, 2 times
Yes, 3 times
Yes, 4-6 times
Yes, 7-11 times
Yes, 12-20 times
Yes, 21-39 times
Yes, 40 or more times

5. Have you gotten in trouble at work or school because of drinking?
Never
Yes, but not in past year
Yes, 1 time
Yes, 2 times
Yes, 3 times
Yes, 4-6 times
Yes, 7-11 times
Yes, 12-20 times
Yes, 21-39 times
Yes, 40 or more times

6. Have you been fired from a job or suspended or expelled from school because of your drinking?
Never
Yes, but not in past year
Yes, 1 time
Yes, 2 times
Yes, 3 times
Yes, 4-6 times
Yes, 7-11 times
Yes, 12-20 times
Yes, 21-39 times
Yes, 40 or more times

7. Has your drinking created problems between you and your boyfriend/girlfriend (or spouse), or another near relative?
Never
8. Have you lost friends (including boyfriends or girlfriends) because of your drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

9. Have you neglected your obligations, your family, your work, or school work for 2 or more days in a row because of your drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

10. Has your drinking gotten you into sexual situations which you later regretted?
    Never
    Yes, but not in past year
    Yes, 1 time
    Yes, 2 times
    Yes, 3 or more times

11. Have you been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcohol?
    Never
    Yes, but not in past year
    Yes, 1 time
    Yes, 2 times
    Yes, 3 or more times

12. Have you had the "shakes" after stopping or cutting down on drinking (for example, your hands shake so that your coffee cup rattles in the saucer or you have trouble lighting a cigarette)?
    Never
    Yes, but not in past year
    Yes, 1 time
    Yes, 2 times
    Yes, 3 or more times

13. Have you felt like you needed a drink just after you'd gotten up (that is, before breakfast)?
    Never
14. Have you found you needed larger amounts of alcohol to feel any effect, or that you could no longer get high or drunk on the amount that used to get you high or drunk?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

15. Have you felt that you needed alcohol or were dependent on alcohol?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

16. Have you felt guilty about your drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

17. Has a doctor told you that your drinking was harming your health?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

18. Have you gone to anyone for help to control your drinking?
   Never
   Yes, but not in past year
   Yes, 1 time
   Yes, 2 times
   Yes, 3 or more times

19. Have you attended a meeting of Alcoholics Anonymous because of concern about your drinking?
   Never
   Yes, but not in past year
Yes, 1 time
Yes, 2 times
Yes, 3 or more times

20. Have you sought professional help for your drinking (for example, spoken to a physician, psychologist, psychiatrist, alcoholism counselor, clergyman about your drinking)?
Never
Yes, but not in past year
Yes, 1 time
Yes, 2 times
Yes, 3 or more times
APPENDIX D.

PROTECTIVE BEHAVIORAL STRATEGIES SCALE (PBSS)

Protective Behavioral Strategies Scale

**Instructions:** Please indicate the degree to which you engage in the following behaviors when using alcohol or "partying."

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Sometimes</th>
<th>Usually</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use a designated driver</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. Determine not to exceed a set number of drinks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. Alternate alcoholic and nonalcoholic drinks</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. Have a friend let you know when you have had enough to drink</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. Avoid drinking games</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6. Leave the bar/party at a predetermined time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7. Make sure that you go home with a friend</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8. Know where your drink has been at all times</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. Drink shots of liquor</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10. Stop drinking at a predetermined time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11. Drink water while drinking alcohol</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12. Put extra ice in your drink</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>13. Avoid mixing different types of alcohol</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>14. Drink slowly, rather than gulp or chug</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>15. Avoid trying to &quot;keep up&quot; or &quot;out-drink&quot; others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
APPENDIX E

ANXIETY SENSITIVITY INDEX

Anxiety Sensitivity Index

Directions: For each question below, circle the response which best describes you. Please be sure to answer every question and to mark only one response per question.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Very little</th>
<th>A little</th>
<th>Some</th>
<th>Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It is important to me not to appear nervous</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>When I cannot keep my mind on a task, I worry that I might be going crazy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>It scares me when I feel shaky</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>It scares me when I feel faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>It is important to me to stay in control of my emotions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>It scares me when my heart beats rapidly</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>It embarrasses me when my stomach growls</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>It scares me when I am nauseous</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>When I notice that my heart is beating rapidly, I worry that I might have a heart attack</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>It scares me when I become short of breath</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Anxiety Sensitivity Index (Continued)

<table>
<thead>
<tr>
<th></th>
<th>Very little</th>
<th>A little</th>
<th>Some</th>
<th>Much</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. When my stomach is upset, I worry that I might be seriously ill</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. It scares me when I am unable to keep my mind on a task</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. Other people notice when I feel shaky</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. Unusual body sensations scare me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. When I am nervous, I worry that I might be mentally ill</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. It scares me when I am nervous</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX F

CONSENT FORM

The University of Southern Mississippi
Authorization to Participate in Research Project

Consent is hereby given to participate in the study titled: Examination of alcohol use, consequences, and protective strategies.

1. **Purpose:**
   I understand that the purpose of this survey study is to gain further information about alcohol use, related consequences and use of protective strategies when actively consuming alcohol.

2. **Description of Study:**
   I understand that in this study I will be asked to complete a demographic form and a 143-item questionnaire on-line. I understand that these data will be aggregated and exported into a computer database program and appropriately analyzed. I understand that this on-line survey does not incorporate any invasive procedures.

3. **Benefits:**
   I understand that I may benefit from completing this survey by becoming aware of strategies I may use while consuming alcohol in order to reduce negative consequences that may occur as a result of drinking.

4. **Risks:**
   I understand that this is a minimal risk survey study that does not ask significantly personal questions and as a result there do not appear to be any major risks related to my completion of the survey. I understand that I can discontinue from further participation in the study at any time without any consequence. Further, I understand that I will be able to contact the principle investigator, Michael B. Madson, Ph.D., at any time throughout the study. Finally, I understand that if I need to I should visit my campus counseling services or other counseling services although this need is not anticipated.

   USM Student Counseling Services
   Community Counseling and Assessment Center
   Kennard-Washington Hall, Room 200 Owings-McQuagge Hall
   601-266-4829 601-266-4601

5. **Confidentiality:**
   I understand that all survey and demographic information will be completed anonymously on-line. I understand that this on-line survey has security measures to protect my responses. Further, I understand that each survey will be given an identification number upon receipt and that the survey will be separated from the informed consent. I understand that as this is an on-line survey there will be no hard copies of information. I understand that demographic and survey information will be exported into statistical software, will be aggregated, and will be stored on a password protected computer.

6. **Alternative procedures:**
I understand that I may discontinue participation in this study at any time without consequence.

7. **Subject’s assurance:**
I understand that whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted) the researcher will take every precaution consistent with the best scientific practice. Participation in this project is completely voluntary, and subjects may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to Michael B. Madson, Ph.D., at (601) 266-4546 or Michael.madson@usm.edu. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. A copy of this form will be given to the participant.

8. **Signatures:**
In conformance with the federal guidelines, the signature of the subject must appear on all written consent documents. The University also requires that the date and the signature of the subject appear on the consent form. I understand that in providing my University ID number, I am electronically signing this consent form, and that by completing this survey, I am consenting to participate.
APPENDIX G

INSTITUTIONAL REVIEW BOARD APPROVAL

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board
118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: C29070704
PROJECT TITLE: Examination of Alcohol Use, Consequences and Protective Strategies
PROPOSED PROJECT DATES: 08/01/09 to 08/01/10
PROJECT TYPE: Previously Approved Project
PRINCIPAL INVESTIGATORS: Michael B. Madson, Ph.D.
COLLEGE/DIVISION: College of Education & Psychology
DEPARTMENT: Psychology
FUNDING AGENCY: N/A
HSPRC COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 08/20/09 to 08/19/10

\[Signature\]
Lawrence A. Hosman, Ph.D.
HSPRC Chair

\[Signature\]
Date
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conformity motives for alcohol use and alcohol use problems among young adult drinkers. *Addictive Behaviors*, 35, 1144-1147.


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