PREDICITVE AND CONVERGENT VALIDITIES OF THE IMPLICIT ASSOCIATION TEST (IAT) AND THE GO/NO-GO ASSOCIATION TASK (GNAT)

by

JOKAE AISHA INGRAM

(Under the Direction of Alan Stewart)

ABSTRACT

Heavy or problematic alcohol use among traditional college-aged youth (ages 18-24) continues to be on the rise. Thus, this study was interested in assessing the validity of implicit cognition measures: the Implicit Association Test and the Go/No-Go Association Task (GNAT). The implicit cognition measures were used to assess alcohol-related cognitions. The IAT has been used several times in assessing implicit alcohol-related cognitions. However, this is the first study that has used the GNAT in assessing implicit alcohol-related cognitions. Additionally, the current study was interested in assessing if implicit alcohol-related cognitions would predict reasons for drinking and certain personality types. Results confirmed convergent validity between the IAT and GNAT. More specifically, participants were most likely to correctly and automatically pair alcoholic drinks and bad compared to all other combinations (nonalcoholic drinks + bad, alcoholic drinks + good, and nonalcoholic drinks + good). There were no significant relationships found between the implicit alcohol-related cognition measures and reasons for drinking and personality types. Implicit and explicit measures have found to be weakly correlated in past research. Thus, future directions on methods of assessing implicit and explicit measures should be of focus. Future directions and limitations are discussed further.

INDEX WORDS: Implicit cognitions, alcohol-related implicit cognitions, implicit association test (IAT), go/no-go association task (GNAT), problem drinking, reasons for drinking, personality types, convergent validity, predictive validity

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DEDICATION

This is dedicated to my parents, brother, sister-in-law, and close friends. Parents, thank you so much for your continued encouragement, support, and tremendous strength. I am so grateful to have parents that are also my role models. To my brother, “J-Man”, I love you, you always made sure to keep me encouraged. To my sister-in-law, I look forward to spending many breaks from work with you at Gloria’s Mexican restaurant. Also, to my friends who continuously met me at coffee shops to do work and keep each other motivated, I appreciate you all.

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CHAPTER 1

INTRODUCTION

Alcohol use among the college-aged population has been a concern for many years. Heavy alcohol use commonly defined as having three or more drinks per day for males and more than one drink per day for females (Centers for Disease Control and Prevention; Alcohol and Public Health; last updated: 11/7/2012). More specifically, college students who are classified under the United States of America law as too young (under the age of 18) to use alcohol have been found to actually have heavy alcohol use. As compared to other aged groups, 18 to 25 year-olds, the age bracket of the traditional undergraduate college students, were found to be the group with the highest rates of alcohol use and the highest proportion of problem drinkers (Grant, Stewart, and Birch, 2007). Additionally, 18 to 25 year-olds were found to have prevalence's of both heavy drinking and binge drinking with a peak age of 21. Heavy drinking also has been defined as consuming five or more drinks consecutively within the past month on at least five occasions. Binge drinking is defined as consuming five or more drinks consecutively within the past month on at least one occasion (National Survey on Drug Use and Health; NSDUH and Substance Abuse and Mental Health Services Administration; SAMHSA 2004).

Heavy use of alcohol among college students certainly has caused harmful effects. In fact, Hingson and colleagues reported in 2002, that each year in the United States, approximately 500,000 college students were injured while under the influence of alcohol and 1,400 college students have died. Isaak, Perkins, and Labatut (2011) revealed in recent findings that 1,700 deaths involving alcohol use among college students and tens of thousands sexual assault cases

included date rape and binge drinking (the consumption of 5 or more drinks consecutively) was found in approximately 40% of college students studied.

Social, psychological, and biological issues still need to be addressed in heavy alcohol use among college students. O'Conner and Colder (2005) found heavy or problematic drinking in only 15%-25% of college students studied. These findings suggested that although the college-aged population has one of the highest rates of heavy and problematic alcohol use compared to other age groups, not all college students engage in heavy or problematic alcohol use. Understandably, public health concerns for those college students who do engage in heavy alcohol use or problematic drinking remain a grave concern for college administrators, policy makers and researchers. This is the focus of the current research study.

The purpose of this study is to determine convergent and predictive validities of two measures that assess unconscious influences upon alcohol use or abuse, the Implicit Association Test (IAT) and Go/No-Go Association Task (GNAT). Evaluating the validities of the IAT and GNAT will assist in determining the unconscious influences on the use and/or abuse of alcohol.

Problem Statement, Background and Significance

The assessment of heavy alcohol use or problematic drinking has been utilized to identify individuals with problematic use. Heavy alcohol use or abuse can develop from a person's perception about alcohol, that is, the effects that alcohol has on one's personality, and the faulty coping mechanism that alcohol may provide a person. Cognitive processes directly influence behavior and mediate the effect of outcome variables. Research has suggested that the way people think about the effects of alcohol can result in heavy, light, or no use of alcohol. For example, if one views alcohol positively, a person is likely to engage in heavy alcohol use, whereas if a person views alcohol negatively they most likely will engage in light use or no use

of alcohol (Reich, Below, and Goldman, 2010). Research in the area of alcohol use has recently become of interest in utilizing implicit cognition measures to assess alcohol use in individuals. Implicit cognitions can be defined as thoughts that are not deliberately accessed, that involve unconscious awareness, and that are automatically triggered. Wiers and colleagues (2002) defined implicit cognitions as "the introspectively unidentified (or inaccurately identified) trace of past experience that mediates a response". Contrary to explicit measures, the advantage of utilizing implicit cognition measures for alcohol use is that the implicit cognition measures do not permit socially desirable responses. Thus, in regards to specific topics, implicit cognition measures assess automatic thoughts of individuals.

Due to negative societal views regarding the heavy use or abuse of alcohol, explicit measures assessing for alcohol use, often involve respondents answering in socially desirable ways. For example, when presented with explicit alcohol-related cognition measures, respondents are more prone to falsely answer questions to maintain positive impressions. Implicit alcohol-related cognition measures have "tasks designed to assess judgments that reflect automatically activated evaluation or knowledge, without the performers conscious awareness or control" (Nosek and Banaji, 2001). Alcohol-related implicit cognitions were created to assist in identifying individuals who may have the propensity to develop problematic or heavy use of alcohol. Additionally, implicit alcohol-related cognitions were developed in order to control for positive impression management.

One of the most utilized implicit cognition measures adapted to measure implicit alcohol-related cognitions is the Implicit Association Test (IAT). The IAT involves computer categorization tasks that indirectly assess the strength of the relationship between concepts by assessing the speed of respondent's reaction times to stimuli presented. It is predicted that faster

reaction times indicate stronger relationships between two concepts, whereas slower reaction times indicate a weaker relationship between two concepts. For more detailed information on the IAT, see Chapter Two, section entitled Implicit Association Task (IAT).

Another implicit cognition measure that has been utilized to measure unconscious awareness is the Go/No-Go Association Task (GNAT). The GNAT, much like the IAT, assesses the strength of association between a specific concept and two extremities of an attribute dimension (Nosek and Banaji, 2001). The GNAT involves either pressing a key ('go') when an attribute is presented that describes the concept being assessed or not pressing a key ('no-go') when an attribute is presented that does not describe the concept being presented. Although to date, the GNAT has never been used to assess implicit alcohol-related cognitions, much like the IAT, the GNAT has an advantage of assessing for implicit cognitions. For more detailed information on the GNAT, see Chapter Two, section entitled Go/No-Go Association Task (GNAT).

An overarching theory that further explains these implicit cognition variables is the dual processing theory (Barrouillet, 2011). The dual processing theory postulates that there are two types of processing systems in the human mind. The first processing system is said to be more primitive, intuitive, instinctual, and automatic. The second processing system is said to be more planned, calculated, conscious, and deliberate. As such, the alcohol-related implicit cognition measures are designed to evaluate ones' automatic thoughts about alcohol in order to obtain people's perception about alcohol. Essentially, implicit cognition measures such as the IAT and GNAT assess the first processing system of the dual processing theory. The second processing system of the dual processing theory overrides the first processing system if given time with rational and logical explanations unlike the first processing system that is not dependent on

working memory. Explicit measures utilized such as measures assessing reasons for drinking and personality types are more in line with the second processing system explained by the dual processing theory. Further, these explicit measures rely on the deliberate conscious reflection of one's working memory instead of automatic and fast first responses. Thus, the dual processing theory brings the implicit and explicit variables together in explaining the two types of processing systems in which people engage. Predicting potential alcohol abuse by utilizing valid implicit cognition measures such as the IAT and GNAT would be a great benefit to society and has important utility in the field of substance abuse and psychology. Assessing the validity of both the IAT and GNAT is equally beneficial to the research community.

The relationship between items on these two measures could be utilized to assess the strengths of associations between specific items and explicit concepts that could be related to problematic drinking such as reasons for drinking and types of personality. Findings could lend additional insight into the reasons why people consume alcohol and if the aforementioned reasons have developed into problematic or heavy alcohol use. Further investigations into the motives for consuming alcohol could possibly provide data that clearly links certain aspects of implicit cognitions and specific reasons some people consume a heavy amount of alcohol. Utilizing implicit alcohol-related cognition measures in conjunction with explicit alcohol measures could more quickly identify irresponsible drinking behaviors. Additionally, studying implicit cognitions and personality types may have a predictive value in identifying and predicting those personality types that are more prone to abuse alcohol. In other words, certain types of personalities may be more likely to endorse implicit alcohol-related cognitions that lead to alcoholism.

Reasons for Drinking

Among the college-aged population, drinking excessively, responsibly, or not at all could be further explained by reasons for engagement in alcohol use. Examining the main motives that the college-aged population utilizes alcohol and assessing their implicit alcohol-related cognitions could give insight into some of the common reasons for heavy or problematic alcohol use. Within the college population, several reasons have been suggested for the heavy use of alcohol, which frequently are attributed to internal cues or cues in the environment. Cohn and colleagues (2012) suggested those who drink to cope with negative emotions might develop implicit cognitions in response to alcohol cues and emotional states. This suggests that for some individuals, negative emotions may automatically trigger the urge to consume alcohol. Furthermore, specific stimuli associated with emotional states and alcohol cues are triggered which activates thoughts regarding the intake of alcohol, more specifically urging one to drink alcohol.

There are several reasons that individuals utilize alcohol whether it is for coping reasons or social reasons. Cooper (1994) stated that alcohol intake could be due to external (social and conformity) and internal (coping and enhancement) motives. There are various reasons that people drink alcohol, however, four motives: social, conformity, coping, and enhancement are some of the most common reasons. In fact, in Cooper's (1994) study, internal motives were more predictive of heavy alcohol use and coping motives were related directly to high rates of problematic use while enhancement motives were found to be indirectly related to heavier consumption of alcohol. Moreover, those who drink because of internal reasons such as trying to cope with a negative incident or enhancing a positive emotion consume higher amounts of alcohol and may develop more problems managing the emotional effect of alcohol because of

faulty coping skills. Understanding the intersecting relationship between implicit alcohol-related cognitions and reasons for drinking alcohol could be instrumental in the evaluation of implicit alcohol-related cognitions (e.g., positive-negative; arousal-sedation) and explicit alcohol-related measures (e.g., personality types and reasons for drinking).

Types of Personality

Another variable of research interest in addition to decisions made for drinking alcohol are the types of personalities who are more likely to intake higher amounts of alcohol. Costa and McCrae (1992) proposed the five-factor model (FFM), which provides descriptions of personality types that can be grouped into five factors: Neuroticism, Extraversion, Agreeableness, Intellect (also known as Openness to Experience), and Conscientiousness. More recently, Malouff and colleagues (2007) found that the pattern of an individual with heavy or problematic alcohol involvement is commonly characterized as being low in agreeableness, low in conscientiousness, and high in neuroticism. This describes individuals who abuse alcohol as having feelings of mistrustfulness, impulsivity, careless behavior, emotional distress, and irresponsibility.

Theakston and colleagues (2004) reported a significant relationship between enhancement drinking and low conscientiousness and between neuroticism and drinking to cope. Isaak, Perkins, and Labatut (2011) suggested the aforementioned findings could be concluded as such: when one is drinking for social or enhancement reasons it often occurs in social settings such as in bars and potential behaviors that may arise are often impulsive or harmful such as physical fights. Additionally, when one is drinking for reasons to cope it is frequently in a setting that is isolating such as at home, which can involve injurious behavior. The two drinking motives, coping and enhancement, have a significant relationship with the two personality

factors, low conscientiousness and neuroticism, which appears to be an impactful finding for literature involving reasons for drinking and possible problematic alcohol use.

Purpose of Study

The purpose of the current study is to: 1) examine the convergent validity between the two implicit cognition measures, IAT and GNAT and 2) examine the predictive validity of the IAT and GNAT. More specifically, the capacity of alcohol-related implicit cognitions to predict reasons for drinking and personality traits associated with alcohol use and abuse will be examined. The implicit alcohol-related cognition measures are important in investigating and predicting alcohol abuse. Convergent and predictive validities of the IAT and GNAT have not been examined in relation to one another in regards to alcohol abuse. The findings from the current study will assist with determining if the IAT and/or GNAT are valid in the assessment of implicit alcohol-related cognitions.

Specific Hypotheses:

Hypothesis I: The IAT and the GNAT are hypothesized to be significantly positively correlated.

Hypothesis II: Negative implicit alcohol-related cognitions are hypothesized to be positively associated with external motives (social or conformity) while positive implicit alcohol-related cognitions are hypothesized to be positively associated with internal motives (coping or enhancement).

Hypothesis III: Positive implicit alcohol-related cognitions are hypothesized to be positively correlated with high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness (personality type subscales).

Limitations

Various limitations presented themselves during the course of the study, which will be discussed in further detail in Chapter 5 (Discussion). However, the results of the analyses could have been affected by the small sample size, race, and gender. Majority of the sample consisted of White female college students. Additionally, utilizing implicit cognition measures with explicit measures could yield different results due to their independence of each other. In other words, explicit measures are able to control for positive or negative impression management, but the two explicit measures used in this study did not control for positive or negative impression management. Lastly, the IAT and GNAT in this study forced participants to choose between two extremities and did not offer participants a neutral choice, which could have been a factor when assessing the correlation between implicit and explicit measures.

CHAPTER TWO

REVIEW OF LITERATURE

Over the past two decades, the Implicit Association Test (IAT) and Go/No-Go Association Task (GNAT) have been researched. Often research questions assess the strength of association between cognitive variables (Nosek and Banaji, 2001; Wiers et al., 2002). For example, the IAT is a popular measure of implicit cognition which is a computerized categorization task that measures the relative strength of associations between two concepts (Cohn, et al., 2012; Wiers et al., 2002). On the other hand, the GNAT, a fairly new measure of implicit cognition, also is a computerized categorization task that measures the relative strength of an association between two concepts and two extremities of an attribute dimension, such as soft and hard.

Unlike the IAT, researchers have not previously utilized the GNAT to study alcohol-related implicit cognitions. For example, Reich, Below, and Goldman (2010) quoted "cognitive biases for addiction-related information are not simply a byproduct of a person's use of an addictive substance, instead the implicit processes fuel the motivation to use the substance and can eventuate in actual use of it". These researchers believed that implicit alcohol-related cognitions act as indirect persuasions through cues in certain environments for people who utilize alcohol. They further explained that these cognitions could lead to a cycle of consistent heavy use of alcohol. Alcohol-related implicit cognition measures and two related variables addressed below include: (a) implicit alcohol-related cognitions and implicit cognition measures;

(b) implicit association test (IAT); (c) go/no-go association task (GNAT); (d) reasons for drinking; and (c) personality types.

Implicit-Alcohol Related Cognitions and Implicit Cognitive Measures

According to the memory network model of cognitive processing, knowledge is connected through a network of pathways and saved in memory (Collins and Loftus, 1975; Goldman et al., 1999; O'Conner and Colder, 2009; and Rather et al., 1992). When knowledge about a particular subject is activated, this leads to activation of other topics associated with that particular subject, more specifically first activating topics that are most relevant to the focused subject. In other words, the stimuli that are most strongly associated with an alcohol cue will be automatically activated (Goldman et al., 1999; O'Conner and Colder, 2009; and Rather et al., 1992). The basis of this model is the strength of learned associations and the determination of which associations have formed the strongest memories. Further, alcohol-related learned associations can influence whether alcohol is viewed positively or negatively.

An individual's expectation or belief about the effects of alcohol will influence their behavior, mood, and emotion in response to alcohol (Wiers et al., 2002). In accordance with the model of cognitive processing, how one associates alcohol to positive or negative feelings leads one to the propensity to drink or not drink, respectively (O'Conner and Colder, 2009). This can be particularly explained in Wiers and colleagues (2002) study that asked participants who consisted of over 3,000 first year college students -- their automatic 'first' response that came to mind when finishing the sentence "alcohol makes one…". Wiers et al. (2002) found that more positive responses such as "happy" and "sociable" were connected more with heavier drinkers in contrast to negative responses such as "sick" and "drowsy" which were connected more with light drinkers and nondrinkers.

Attitudes differ from expectancies in that attitudes do not rely on time and is more evaluative of memory and expectancies are more anticipation of what may come (Riech, Below, and Goldman, 2010). Words such as 'pleasant', 'relaxed', 'drowsy', 'good', 'bad', 'happy', 'stupid', 'sociable' in which respondents evaluate alcohol based on their expectancies and attitudes in relation to whether they are heavy, light, and non drinkers has been found in research (Reich, Below, and Goldman, 2010; Wiers et al., 2002). Automatic processing involving attitudes and expectancies in relation to alcohol may further determine whether there is light, heavy, or non-use of alcohol.

The Implicit Cognition Theory (ICT) is an additional approach in understanding implicit cognitions in connection with alcohol and drug use motivation (Wiers et al., 2002). Implicit cognitions are defined in this study as thoughts that are triggered automatically that involve unconscious awareness and not deliberately accessed. According to the ICT theory, recurring experiences with alcohol or other drugs strengthens and establishes associations with memory (Wiers et al., 2002). In the ICT theory, it suggests that a person who has consistent positive experiences with alcohol will most likely continue to use alcohol and view alcohol in a positive light or vice versa. Wiers and colleagues (2002) stated "strong memory associations between a behavior and its outcomes (e.g., drinking beer and feeling relaxed) or between a behavior and cues (e.g., seeing a drinking buddy and drinking) are motivationally significant in drug use. Through repeated experiences with drugs, specific cues automatically activate thoughts about use". During the use of alcohol, stimuli and events being processed will likely activate implicit thoughts associated with the next use of alcohol or even a cue of obtaining alcohol in the future. Further, reinforcement of prior drinking behaviors may have an influence on automatic processes that impact drinking behavior (Maisto et al., 1999; O'Conner and Colder, 2009). The

determination of whether one will drink and how much one will drink is reinforced through either positive or negative drinking experiences.

Importance of Implicit Cognitions and Implicit Cognition Measures

Implicit cognitions involve an automatic and non-explicit introspection of ones' memory and behavior. Implicit cognitions also have been defined as "introspectively unidentified (or inaccurately identified) traces of past experience that mediates a response" (Wiers et al., 2002). The importance of implicit cognitions is that they may tap into a memory or behavior that is not controlled or reactive. According to Wiers et al. (2002), importance is found in both implicit and explicit measures in that they both assess underlying cognitive motivational processes. However, a threat to explicit measures is that a respondent may react with a positive impression (Wiers et al., 2002). In contrast to implicit measures, the respondents more easily identify the main subject being researched on explicit measures. Thus, a weakness is exhibited among explicit measures because respondents' true beliefs of how alcohol may be valued or not valued are truly not assessed.

Implicit cognition measurement is important in understanding alcohol use and abuse. Research on implicit alcohol-related cognitions essentially provides deeper understanding of underlying human motivational cognitive processing (Wiers et al., 2002). Further, implicit cognition measures may be utilized to avoid socially desirable responses and neurobiological plausibility (Wiers, Luitgaarden, Wildenberg, and Smulders, 2005). Excessive alcohol use stigmatized by society, subsequently, when asked one may respond in a socially desirable way, particularly when given choices of responses of socially appropriate to socially inappropriate.

Goldman and colleagues (1999) utilized implicit alcohol-related cognitive measures and found that heavy drinkers in their study tended to have stronger implicit associations between

arousal and alcohol in comparison to light drinkers. However, Goldman and colleagues (1999) found strong negative implicit associations for both heavy and light drinkers even though light drinkers had a slightly stronger negative implicit association. Heavy drinkers may have demonstrated negative implicit associations to use alcohol, which may be due to various negative consequences of using alcohol (O'Conner and Colder, 2009). The aforementioned finding that heavy and light drinkers both exhibited negative implicit associations may be due to the influence of social desirability of drinking less alcohol (positive) or the social stigma of excessive alcohol use (negative).

Implicit cognition measures that involve word associations are often utilized for examining the motivational-cognitive processes involved in alcohol use without ones awareness. Wiers and colleagues (2002) stated that participants who reported higher use of alcohol were more likely to report memories of alcohol use to a variety of situations and report more alcohol-related responses to ambiguous stimuli. On implicit cognition measure tasks, participants who scored higher were evidenced to exhibit behavior that is more consistent with those who tend to utilize alcohol. Increased alcohol use is likely connected to more automaticity. Alcohol-related implicit cognitive measures provide insights into the automatic cognitive processes of alcohol use (Houben and Wiers, 2009). Findings on implicit alcohol-related cognitive measure literature has been inconsistent, with some studies citing that there is supporting evidence of strong, positive implicit alcohol-related cognitions and heavy drinking, while other studies found no significant relationships between the two (O'Conner and Colder, 2009). Further, the inconsistent findings may also be an effect of researchers utilizing varying methodologies (O'Conner and Colder, 2009).

Implicit cognitive measures are used to assess memories of individuals without their actual awareness of what is initially being researched. Although, individuals may become aware of the topic of interest, the requirement of responding quickly as possible may periodically control for deliberate choices. These measures tap into how prior experiences influence current behavior. Researchers originally developed indirect measures to assess the memory processes of amnesiacs in the 1980s and 1990s (Reich, Below, and Goldman, 2010). The basis of implicit cognition measures of assessing ones underlying motivational cognitive process is the same. Studies have consistently shown that using implicit alcohol-related tasks relate to drinking. As such, those who indulge in heavy drinking are more likely to view the positive effects of alcohol in comparison with those who do not drink or are light drinkers, who are more likely to view the negative effects of alcohol (Reich, Below, and Goldman, 2010). Studies have also examined alcohol-related implicit cognitions through priming tasks involving word associations with alcohol cues. According to Houwer, Crombez, Koster, and Beul (2004), the most impertinent advantage of implicit alcohol-related cognitive measures is that these measures somehow reveal memories or experiences that are not in conscious awareness and that they have a lesser chance of involving people's self-presentation or social desirability. Additionally, implicit measures of alcohol-related cognitions are general ways of assessing underlying content (outside of conscious awareness).

Implicit Association Test (IAT)

Traditional IAT

The IAT is a computerized categorization task that has the ability to assess cognitive processes that are absent of conscious awareness through the use of examining the relative strength of the associations between targets and attributes (Wiers et al., 2002; Wiers et al., 2005). Generally,

when the IAT is utilized for the assessment of implicit alcohol-related cognitions, there are two concepts involved, alcohol and soda. In addition to the two aforementioned concepts involved in the IAT, there are two sets of attributes, valence and arousal. Attributes are the perceptions about the concepts utilized in the IAT. Thus, valence is a positive or negative perception about the concepts involved and arousal involves whether the concepts being assessed cause arousal or sedation effects according to the perception of the individual being assessed (Greenwald et al., 1998). During tasks on the IAT, respondents are first presented with instructions identifying how many rounds the participant is designated to complete. For example, if there are two rounds, there will be target categories defined immediately before the round begins. If alcohol and good are the target categories for the first round, the participant is instructed to press the 'i' key if a word appears in the middle of the screen that belongs to the target categories. If a word that does not belong to the target categories appear in the middle of the screen, the participant is instructed to press the 'e' key (Figure 1). The associative strength findings of the IAT are found from reaction times (RTs) for the two combinations of targets and attributes. The basic assumption of the effect of the IAT is that when weakly associated concepts share a response key, their RTs are impeded whereas when strongly associated concepts share a response key there RTs are quicker (Wiers et al., 2002).

Valence IAT

Greenwald and colleagues (1998) presented a modified version of the IAT, which involved a valence-IAT, assessing positive-negative dimensions. Respondents were required to sort four concepts, or three concepts in recent modifications, in two combinations utilizing two different response keys (Greenwald et al., 1998; O'Conner and Colder, 2009; and Wiers et al., 2002). The two sets of target words utilized in the IAT were: (a) for the alcohol drinks: vodka,

rum, whisky, port, wine, and beer and (b) for the soda drinks: juice, sparkling water, tonic, coke, lemonade (Wiers et al., 2002). The attribute words utilized for the valence IAT: words labeled positive were ‘sociable’, ‘enjoyable’, ‘sympathetic’, ‘pleasant’, ‘good’, ‘nice’ and words labeled negative were ‘bad’, ‘unpleasant’, ‘antisocial’, ‘tedious’, ‘stupid’. There are two categories that are specified as the target categories for each round of the task.

Participants are instructed to press the ‘i’ key as quickly as possible when they see a word belonging to the target categories. However, participants are instructed to press the ‘e’ key when they see a word that does not belong to the target categories. If respondents responded to slow (more than 3 seconds), the words “TOO SLOW” would appear. Likewise if they responded too fast (less than 150 milliseconds), the words “TOO FAST” would appear at the bottom of the screen. If the respondent responded inaccurately “ERROR” would appear at the bottom of the screen.

Arousal IAT

Greenwald and colleagues (1998) presented another modified version of the IAT, which involved an arousal-IAT, assessing arousal-sedation dimensions. Respondents sort four concepts, or three concepts in recent modifications, in two combinations utilizing two different response keys. The two sets of target words utilized in the IAT were: (a) for the alcohol drinks: vodka, rum, whisky, port, wine, and beer and (b) for the soda drinks: juice, sparkling water, tonic, coke, lemonade (Wiers et al., 2002). The attribute words utilized in the arousal IAT (arousal and sedation): words labeled active were ‘funny’, ‘cheerful’, ‘loose’, ‘lively’, ‘aroused’ and words labeled passive were ‘sleepy’, ‘woozy’, ‘relaxed’, ‘calm’, ‘listless’, ‘quiet’ (Greenwald et. al., 1998; O’Conner and Colder, 2009; Wiers et al., 2002; and Wiers et al., 2005).

Wiers and colleagues (2002) stated:

> "Each IAT consisted of nine phases that came in one of two orders. Each IAT consists of two blocks in which the order of the two combination phases is reversed. The four mixed phases necessary to generate the two IAT effects per task were given in one of two orders: CRRC or RCCR, where C stands for combination and R for reversed combination. Every phase consisted of one practice block and either a single measurement block (single-dimension discrimination phases) or two measurement blocks (R and C Phases 3, 5, 7, and 9). Each block consisted of 48 words. Words were selected randomly for each participant".

The words of the IAT are usually presented in the bottom middle of a computer screen and category words were usually positioned in the upper two quadrants of the screen. Participants were either instructed to press 'i' key if the words that appear are related to the target category words and press the 'e' key if the words are not related. Responses that were wrong caused the word "ERROR" to appear and if responses were too fast, less than 150 milliseconds, the words "TOO FAST" appeared with a warning beep. If the responses were too slow, more than 3 seconds, the words "TOO SLOW" appeared on the screen with a warning beep (Wiers et al., 2002).

Validity and Reliability of the IAT

Use of the IAT has been one of the most popular implicit measures because of its easy administration, reliable and valid assessment of implicit cognitions, and the production of large effects (Houben and Wiers, 2008). The validity of the IAT has been well published in the research literature. It has been shown that the IAT is not easily faked nor is the IAT's effect influenced by the familiarity of items utilized in the IAT, which suggest adequate internal validity (Greenwald and Nosek, 2001; Wiers et al., 2002). Further internal consistency was

found to be .65 for the valence IAT and .68 for the arousal IAT (Greenwald, Nosek, and Banaji, 2003). Discriminate validity and predictive validity have both been shown in numerous studies (Greenwald et al., 1998; Wiers et al., 2005; and Wiers et al., 2002). However, one apprehension of the IAT is the bipolar nature. Both concepts (alcohol-soda) and attribute dimensions (positive-negative or arousal-sedation) are bipolar in nature. Thus, the IAT has been criticized for its external validity due to the bipolar nature (De Houwer, 2002; Fazio and Olson, 2003).

Wiers and colleagues (2005) suggested that a possible reason some responders tend to give negative attributes to alcohol on the IAT could be due to the responders' tendency to give a positive attribute to soda. Wiers and colleagues (2005) indicated that with explicit measures, some responders apply both positive and negative attributes. Bosson, Swann, and Pennebaker (2000); Greenwald and Nosek (2001); Wiers et al. (2002), have all demonstrated that the IAT has also consistently shown good test-retest reliability, around .70 and split-half reliabilities, around .90.

Greenwald, Nosek, and Banaji (2003) proposed a new scoring algorithm for the IAT. The algorithm comprises the standardized levels of participant's results and the inclusion of practice blocks. In the aforementioned study, explicit equivalents were created for attribute words used in the two IATs (valence and arousal). There were six semantic differentials included on the explicit measure of valence utilizing the Visual Analogue Scale (Greenwald et al., 2003). The new algorithm, 'D-600', was constructed to reflect faster performance for higher scores when alcohol or soda was paired with positive or negative attributes, respectively. The other response key was assigned to neutral attributes.

Wiers and colleagues (2005) showed that when the association that produces the quicker responses is first (compatible order or CR order) the IAT effect is larger as compared to the

reverse combination (incompatible order or RC order). The previous study was able to produce two effects for CR IAT and RC IAT to control for both within and between subject factors, thus the order effects were controlled. The IAT was developed on the belief that participants would be able to respond faster to stimuli that are congruent in comparison to stimuli that are not congruent. Participants with alcohol use problems may be easily identified depending on their response speed on the IAT, based on whether they approach or avoid stimuli depending on the presentation of two different concepts, alcohol and soda. In essence, problem drinkers usually respond faster to congruent stimuli rather than incongruent stimuli (Cohn et al., 2012; Palfai and Ostafin, 2003). Further, these studies found that heavy drinking may not be primarily related to the implicit attitudes that the IAT is measuring, but also may be due to the context of the situation that influences the association between two mental concepts and approach/avoid stimuli.

The IAT has been utilized in numerous studies examining implicit alcohol-related cognitions. Various results have been shown from research when using the IAT in that associations were stronger or weaker depending on how the IAT was utilized. For example, Wiers and colleagues (2002) found that heavy drinkers paired negative words with alcohol and positive words with soft drinks and also found that heavy drinkers responded faster when alcohol was paired with arousal words and soft drinks paired with sedation words in comparison to the reverse combinations. Interestingly, light drinkers did not show this particular IAT effect, which may suggest that drinking behavior is not significantly determined by implicit attitudes towards alcohol. Findings further suggest that implicit associations between alcohol and arousal are a more important factor in determining drinking behavior than implicit attitude toward alcohol (Goldman et al., 1999; Wiers et al., 2002; Wiers et al., 2005). In other words, the aforementioned

findings showed those who viewed alcohol negatively did not necessarily suggest light or heavy drinkers. However, those who associated alcohol with arousal were more likely found to be heavier drinkers of alcohol.

Go/No-Go Association Task (GNAT)

The Go/No-Go Association Task (GNAT) is an implicit cognition measure that assesses the strength of association between attribute dimensions and a target category. However, the GNAT's strategy is based on the strength of association between category and attribute dimension. Further, the GNAT involves the accurate discrimination between the items that are associated and the distracter items (Nosek and Banaji, 2001). The basis of the GNAT is that respondents should easily choose which attribute dimension goes with the target category even in the presence of distracter items. More specifically, the GNAT focuses on signal detection theories rather than reaction times. For instance, Nosek and Banaji (2001) stated that fruit is usually associated with a positive attribute, whereas insects are usually associated with negative attributes. Thus, they stated that when a target category such as fruit is presented, it should be easy for the responder to correctly attribute only positive dimensions to fruit even if negative dimensions are presented. Accurately categorizing the concepts with the appropriate dimensions is the measure of implicit cognition or "automatic attitude" (Nosek and Banaji, 2001).

The GNAT has several major advantages one of which is that the target category can be modified to fit any topic the researcher is interested in researching. The versatility of the GNAT's use is therefore advantageous over other implicit cognition measures due to the GNAT's nature of allowing various topics to be assessed. GNAT also could be utilized to determine the strength of association between two categories and one attribute dimension. In such Nosek and Banaji (2001), exhibited that the extremities of an attribute dimension could be

effectively assessed for the strength of association with a concept. The GNAT has not been used as often as the IAT, but when used, the GNAT shows to be a powerful tool in the ability to measure various concepts. Dealing with designing a measure, the GNAT in comparison to the IAT only requires one set of stimuli representing the target category whereas the IAT requires two sets of equivalent, but contrasting stimuli.

Other advantages of the GNAT are that researchers are able to evaluate results independently and score each result utilizing signal detection parameters (William and Kaufmann, 2012). The GNAT has been utilized to study various categories, topics, and subjects. The GNAT has been used to assess implicit attitudes in relation to racial groups (Kaufmann and Johnson, 2011; Mitchell, Nosek, and Banaji, 2003; Nosek and Banaji, 2001), basic attitude groups, groups dealing with gender, and a plethora of other groups have been studied in relation to respondents implicit attitudes towards different topics. Another major advantage of the GNAT is that it can measure implicit attitudes while investigating only one target category with no equivalent-opposite category (Williams and Kaufmann, 2012). Due to this advantage of having the ability to measure implicit attitudes in regards to one target category, the GNAT has been widely used in studies investigating implicit attitudes towards oneself such as personality (Boldero, Rawlings, and Haslam, 2007), implicit self-esteem (Boucher, Peng, Shi, and Wang, 2009) and self-concept (Devos, Viera, Diaz, and Dunn, 2007; Williams and Kaufmann, 2012).

Although the GNAT has been used to study various topics, the GNAT unlike the IAT has not been utilized to assess for implicit cognitions in relation to alcohol use, this may be due to the measure being fairly new. The strategy of the GNAT involves presenting target stimuli (signal) and distracter stimuli (noise --- an actual distracter word) over brief periods of time. The signal is the target category or an attribute dimension in which the same response, pressing the

space bar to indicate "go" is required for both (Nosek and Banaji, 2001). Whereas a different response, "no-go" (not pressing the space bar) is required when there is an item that does not belong to either the target category or an attribute dimension (Figure 3).

The discrimination of signal from noise, or sensitivity, is detected by the signal detection parameters which is how the strength of association is determined on the GNAT. The idea behind the sensitivity and its determination of the strength of association on the GNAT is that respondents should be able to discriminate quicker between signal and noise when they have a strong association based on the respondents' automatic attitude (Nosek and Banaji, 2001). For example, if a respondent views fruit in a positive way, the respondent should be able to quickly discriminate by not pressing the space bar when presented with negative attributes and pressing the space bar quickly when presented with positive attributes. Subsequently, the development of a response deadline on the GNAT was developed due to the idea that respondents make more accurate discriminations when given more time to make a response (Nosek and Banaji, 2001). Further, the response deadline on the GNAT lends more of an implicit or automatic response when trying to figure out ones' association to certain target categories and attributes.

However, one cannot conclude that a respondent has a negative view of alcohol if they show a positive view of alcohol on the GNAT. By utilizing the GNAT, Capozza, Andrighetto, Falvo, and Trifiletti (2006) demonstrated that respondents who had a positive attitude toward an in-group did not necessarily mean that the respondent had a negative attitude toward the out-group.

Although the GNAT is a fairly new measure of implicit associations, it has rarely been utilized. Williams and Kaufmann (2012) proposed that they believe the GNAT is not widely utilized because of the preference of utilizing reaction time based implicit cognition measures

such as the IAT. One approach that has been considered is the possible use of reaction times instead of signal detection parameters on the GNAT, however this approach is not ideal because of the trial deadlines on the GNAT, which would essentially shorten the range of response times (Williams and Kaufmann, 2012). In an earlier study, Rudolph and colleagues (2008) utilized the GNAT and for individual blocks they had a low test-retest reliability, r <. 38, however for aggregates they found a modest test-retest reliability, r = .51. Thus, a more ideal approach in establishing quality reliability on the GNAT is to calculate split-half reliabilities for aggregates. William and Kaufmann (2012) found that a well-designed GNAT has a good reliability if measuring a clearly defined construct. Further, they found that the GNAT can also have good reliability depending on whether constructs are highly related or are abstract. William and Kaufmann (2012) found that with as few as 60 trials per block, reliabilities of .80 are obtained when assessing highly related constructs and with approximately 80 trials per block, good reliability is achieved with more abstract or complex constructs. Authors exhibited good reliabilities by "first, [calculating] split-half reliabilities using odd/even and first-half/second-half splits, and obtaining the distribution of a large number of random split half reliability estimates".

In measuring reliability, Nosek and Banaji (2001) displayed interesting results by using the GNAT to assess the strength of association between categories and attributes. Nosek and Banaji (2001) found an automatic preference by responders in regards to bugs and fruit. They found that respondents effectively discriminated and deemed fruit positive and bugs negative. Additionally, the single category had more of an effect than the superordinate context. Further, the smaller effects were found when the task only required one attribute dimension in comparison to a single category and a superordinate category. Overall, the GNAT is a new upcoming implicit measure that is able to assess simple and complex categories without the

requirement of an equivalent opposite category. The GNAT is a promising measure that assesses implicit attitudes much like the IAT, but it relies on the signal detection parameters for strength of association. Thus, the difference is that GNAT depends on respondents' ability to quickly discriminate between stimuli and whether the attribute is associated with the stimuli. If the respondents do not think there is a relationship, they are to not press a key, but if they think there is a relationship, they are to press a key. The development of how to ensure good reliability with the GNAT is important in order to assess and demonstrate findings between implicit automatic thoughts for a concept and attributes. Further, the idea of implicit alcohol-related cognitions could be effectively assessed with the GNAT if a well-designed study is at hand.

Implicit cognition measures are thus shown to be important in assisting in the detection of heavy or problematic use of alcohol. Related variables (reasons for drinking and personality types) that may be associated with implicit alcohol-related cognitions are also of interest in order to further explore the context behind problematic or heavy alcohol use. Thus, implicit alcohol-related cognitions and their related variables such as reasons for drinking and types of personality are discussed below.

Reasons For Drinking

In 1980, Farber, Khavari, and Douglas stated that two categories that capture the reasons for drinking are: negative reinforcement drinking (escape drinking) and positive reinforcement drinking (social drinking). It has been said that social drinking is not as risky in causing problems with alcohol as escape drinking. Drinking alcohol to cope was a strong determinant of the level of alcohol abuse (Cooper, Russell, and George, 1988) as well as both monthly alcohol use and frequency of heavy alcohol use than drinking for social reasons (Abbey, Smith, and

Scott, 1993). Thus, drinking alcohol to cope with negative emotions is evidenced to lead to problem use in comparison to mainly consuming alcohol in social settings.

Cooper (1994) stated that drinking enhancement, coping, social, and conformity are desired outcomes of drinking. Further, Cooper (1994) stated that the source (internal or external) and type of reinforcement (positive or negative) are what motivate and continue the use of alcohol. Alcohol use is motivated depending on the emotions of people, whether they are outgoing or shy and are in a happy or sad mood. For instance, a person can be shy and happy and consume large amounts of alcohol or a person can be outgoing and sad and consume similar amounts of alcohol. Cooper (1994) developed the concepts of enhancement motives (EM), which is drinking to enhance positive feelings and coping motives (CM), which drinking to cope with negative feelings. Research findings suggest that heavier drinking is strongly associated with internal motivations (CM or EM) rather than external motivations, social and conformity (Cooper, 1994; Grant, Stewart, and Birch, 2007). Previous research has also exhibited that CM drinking is related to alcohol use problems even after limiting customary alcohol use whereas EM drinking is related to heavy drinking and thus indirectly related to alcohol use problems (Cooper, 1994; Grant, Stewart, and Birch, 2007). O'Conner and Colder (2005) further summarized Cooper (1994) concepts by stating "drinking for enhancement reasons is considered positive and internal, drinking for coping reasons is also internal but negative, drinking for social reasons is external and positive, and drinking for conformity reasons is also external, but negative".

The cognitive-motivational model of drinking is also a frequently researched area. Cox and Klinger (2004) theorized that there are two main cognitive-motivational basis of alcohol use, which are the motivational structure of abusers of alcohol and attentional bias for alcohol-related

stimuli. Firstly, the motivational structure of those who abuse alcohol have a difficult time moderating their drinking, successfully achieving goals or finding an alternative to healthy coping. Secondly, the attentional bias for alcohol-related stimuli is based on the concept that people automatically redirect their attention to alcohol if they have a continuous concern for drinking or have an alcohol use or abuse problem. Alcohol-related cues are said to predominant the minds of those with attentional bias for alcohol-related stimuli. Once alcohol appears to become problematic, alcohol cues are constant motivations to consume alcohol. This may eventually lead to a dangerous cycle such as excessive drinking and problems eliminating or limiting the amount of alcohol (Cox and Klinger, 2004).

According to the incentive sensitization theory developed by Robinson and Berridge (2001), neural pathways in the frontal lobes and midbrain may become sensitized to alcohol-related stimuli due to the repeated use of alcohol. Further, a person may begin to crave and search for alcohol once the conditional motivational state in the sensitized brain is triggered as a result of ones' encounter with alcohol-related stimuli. Such a motivational state is often times implicitly motivated by the alcohol-related stimuli. An automatic urge for an individual to drink, whereas ones' behavior is to search for alcohol to consume, this is part of ones' conscious awareness.

People who use alcohol to cope with negative stressors may develop the unawareness between alcohol cues and their emotional states. Cohn and colleagues (2012) suggested that those who tend to drink alcohol excessively may develop implicit cognitive associations between alcohol cues and their emotional states which may unintentionally produce thoughts and urges one to drink. The implicit cognitive association is associated with being unaware. This lack of awareness paired with alcohol cues often leads to excessive drinking or alcohol use problems

(Cohn et al., 2012; Wiers et al., 2002). Further, Baker and colleagues (2004) state that the negative reinforcement model of addiction exhibits that motivational structures and urges to drink may be automatically elicited by thoughts and urges of alcohol consumption to cope with distress without conscious awareness.

Personality Types

Malouff and colleagues (2007) indicated that causation between alcohol use and personality type is unclear, however they believe that ones' involvement in heavy or problematic alcohol use could be due to a number of variables which include: a) alcohol use being a direct cause of personality traits; b) personality traits being a direct cause of alcohol use; c) genetic predisposition of alcohol or personality type; or d) combination of the aforementioned variables. Although, research is still unclear about the involvement between alcohol use and personality type, there has been research involving the relationship between certain types of personalities and problematic use. Cognitive processes are influenced depending on type of personality and ones' motivational structure to receive alcohol consumption (O'Conner and Colder, 2009). Personality type may be a predicting factor in implicit alcohol-related cognitions in the resiliency or lack thereof to consume large amounts of alcohol. Sher, Bartholow, and Wood (2000) stated that for young adults, personality has been significant in the consumption of alcohol. They suggested, assessing types of personality and alcohol use could allow researchers to create a framework in order to assess the level of alcohol consumption depending on various psychological functions. This would allow researchers to assess to what degree intoxication affects ones' psychological structures. Secondly, there is evidence to suggest that those who struggle with alcohol use have an enormous change in personality when intoxicated.

The NEO five-factor model used to understand personality types has been well researched (Isaak et al., 2011; Malouff et al., 2007; Mezquita et al., 2010). Costa and McCrae (1992) developed descriptions of personality types, which are grouped into five factors and proposed in the five-factor model (FFM): Neuroticism, Extraversion, Agreeableness, Intellect (also known as Openness to Experience), and Conscientiousness. Following are brief descriptions of the five types of personalities according to the five-factor model (FFM): Neuroticism is explained to involve 'impulsive behaviors', 'mistrust', 'self-reference', 'poor coping skills', and 'negative emotions' such as depression, anxiety, and anger; Extraversion includes being 'sociable', 'lively', 'talkative', 'friendly', 'affectionate', 'sensation seeking', and 'assertive'; Agreeableness includes being 'trustful', 'cooperative', 'nice', and 'sympathetic'; Openness to Experience includes having 'intellect' and 'openness to ones feelings'; and Conscientiousness includes being 'careful', 'thorough', 'moralistic', and 'self-controlled'. These different personality states can be utilized to assess the difference between people's sober and intoxicated states (Malouff et al., 2007).

Research has previously assessed personality types and level of alcohol use. Malouff and colleagues (2007) found that on all five FFM traits there were significant differences between sober and inebriated ratings of personality traits. There may be aspects of ones' personality that is more pronounced when under the influence of alcohol. For instance, it has been found that aspects such as "outgoingness" and being more "energetic" are more pronounced from self-reports of heavy drinkers in the Extraversion category (Malouff et al., 2007). Subsequently, extraverts are more enhanced depending on the heavy or light use of alcohol. Much like the other traits of the FFM, alcohol use causes some of the traits to be more enhanced. In fact, literature has clearly suggested that alcohol increases impulsivity and aggression and decreases cognitive

functioning (Malouff et al., 2007). Alcohol's effect on ones' personality depends on ones' propensity to be aggressive or impulsive when sober then it is likely that one may be even more prone to be aggressive or impulsive while intoxicated.

Malouff and colleagues (2007) found that those who reported intoxication scored low on conscientiousness and agreeableness and high on neuroticism. This suggests that under the influence of alcohol, this affects the nature of being self-controlled and cooperative in turn enhancing uncooperativeness, impulsivity, carelessness, and mistrust. Even more, people who do not view themselves as outgoing, lively, energetic when drunk would most likely not drink as much compared to those who do think of themselves as having these positive qualities while intoxicated (Malouff et al., 2007). The aforementioned findings exhibit that when a person is intoxicated they are more likely to enhance the feelings or ideas that they have about the thought of alcohol and how they are under the influence of alcohol.

Alcohol-related problems have not been suggestive of an extraversion type of personality (Ruiz, Pincus, & Dickinson, 2003), but has shown to be linked to numerous variables related to drinking such as frequency and quantity of drinks (Mezquita, Stewart, and Ruiperez, 2010). This suggests that if a person has an extraversion type of personality this does not necessarily determine that they will be likely to have a problem with alcohol. However, a person that has an extraversion type of personality may be more prone to drink higher amounts and frequently when in a social setting due to their social and outgoing personalities. Although Mezquita and colleagues (2010) state that people with a neuroticism personality trait were likely to drink alcohol more frequently when experiencing anxiety. Further, Ruiz et al. (2003) found that persons characterized with neuroticism had a stronger relation to alcohol-related problems than when considering the amount of alcohol consumed. This suggests that those suffering from

anxiety that have the neuroticism trait personality type may drink in excess and frequently to cope with those feelings, however the aforementioned findings suggest that the problem is more related to consistent alcohol use instead of the actual level of alcohol consumed. Interestingly, Malouff and colleagues (2007) state that individuals with low agreeableness, low conscientiousness, and high neuroticism would have a hard time trying to deal with alcohol problems. They further stated that those that are less likely to agree and be conscientious would most likely not seek professional assistance if they had problems with alcohol. Additionally, people who have more negative feelings to process most likely would have more difficult times managing their moods.

Motivations to drink as a result of internal pleasure such as coping and enhancement have been found to be more strongly associated with personality variables than motivations to drink due to external pleasures such as social and conformity (Mezquita et al., 2010). This theory suggests certain personality types are more prone to struggle internally with the use of alcohol more so than satisfying their external struggles or pursuits. Personality types may influence implicit alcohol-related cognitions. The unconscious awareness of craving alcohol and personality type may influence impulsivity and alcohol consumption.

Summary

Implicit-alcohol related cognitions have been an important area of research in how unconscious cognitions influence the consumption of frequent and heavy amounts of alcohol. Thus, it is important to continue examining the validities of implicit alcohol-related cognition measures due to their impactful research findings on the influence of alcohol use and abuse. Specifically, the IAT and GNAT, are useful to research because they can help better understand alcohol use and abuse. The present study will assess the utility of the IAT and GNAT and

identify implicit cognitions in alcohol consumption behavior. The current study assessed for an association between alcohol-related implicit cognitions and reasons for drinking alcohol. Emotional coping and enhancement are two reasons for drinking alcohol cited in the literature. For example, both reasons can be related to implicit cognitions through the automaticity of always celebrating through the use of alcohol or feeling shy and using alcohol to become talkative. The current study also assessed for an association between alcohol-related implicit cognitions and personality types.

Rationale

The IAT has been previously used to assess alcohol-related implicit cognitions. The current study will be the first to administer the GNAT to assess for implicit alcohol-related cognitions. More research is needed on the relationship between measures of implicit cognitions (IAT and GNAT) and their capacity to predict reasons for drinking alcohol and personality types. This study will investigate the convergent validity between the GNAT and the IAT. While these assessment tools use different experimental methodologies to measure alcohol-related implicit cognitions, it was hypothesized that they would have some overlap given their shared purpose. Another rationale was to investigate the predictive validity of these measures of alcohol-related implicit cognitions. The current study hypothesized that the GNAT and IAT will be associated with reasons for drinking and personality types that have been linked to heavy alcohol use in the literature.

Specific Hypotheses:

Hypothesis I: The IAT and the GNAT are hypothesized to be significantly positively correlated.

Hypothesis II: Negative implicit alcohol-related cognitions are hypothesized to be positively associated with external motives (social or conformity) while positive implicit alcohol-related cognitions are hypothesized to be positively associated with internal motives (coping or enhancement).

Hypothesis III: Positive implicit alcohol-related cognitions are hypothesized to be positively correlated with high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness (personality type subscales).

CHAPTER THREE

METHODOLOGY

Participants

Participants (n = 167) consisted of English-Speaking undergraduate students (female: 64.9%; male: 35.1%) enrolled in a psychology research pool at a large Southeastern university. The participants ranged in age from 18 to 39, with an average age of 19.5. The self-reported races included White (81.3%), Black (7.2%), Asian (5.4%), Biracial (2.4%), and other races (3.6%).

Procedure

As participants entered the Hwemudua Alcohol and Health Disparities (HAHDL) computer lab, each participant was assigned to one of six computers. After the participants reviewed the consent form and purpose of the study, they were given the opportunity to consent and participate in the study with knowledge that they could forfeit participation at any time. Upon refusing or early withdrawal from the study, participants were aware that they would not be penalized or lose benefits. Anonymity while participating was emphasized prior to beginning of study. To ensure privacy of participant's information, they were given randomized numbers at the beginning of the study. Data was excluded if the GNAT D-prime scores were below the signal detection threshold, which signifies participants who did not differentiate signal from noise. Regarding the IAT, data was excluded if average scores were extremely skewed even after the application of the conventional algorithm developed by Greenwald, Nosek, and Banaji (2003), which is used to essentially standardize data from highly skewed data to less skewed.

Data was also excluded from the study if the reasons for drinking questionnaire and/or NEO Five Factor Inventory, 3rd Edition (NEO-FFI-3) were not completed.

There were a minimum of one and a maximum of six participants in the research laboratory for each day the study was administered. Participants were asked to complete two computerized GNATs, one computerized IAT, and a battery of questionnaires on their assigned computer, which took a maximum of 60 minutes. To begin the study, the experiment was setup remotely by a PC in the HAHDL control room. The participants were instructed to read all instructions, as they would only use the keyboards at brief durations during the experiment. More specifically, participants would use keyboards when answering questions regarding the battery of assessments and completing the computerized IAT. During the IAT, participants were instructed to press the 'i' or 'e' corresponding to the presented pair (e.g., alcohol + good) in the upper left quadrant or the presented pair (e.g., nonalcoholic drink + bad) in the upper right quadrant of the computer screen when presented with stimuli in the middle of the computer screen depending on the instructions for that particular task. For example, if instructions directed one to focus on correctly categorizing alcoholic drinks and good words that appear mid-screen, then participants are to correctly hit 'i' or 'e' depending on what target category and attribute are in each upper quadrant of the computer screen. However, during the two GNAT computerized tasks, participants used a Cedrus RB-830 response pad. During the GNAT, participants were to press a green button if they saw a word associated with one of the target categories on the screen and to not press it if there was no association. The computer was set up to notify the participants once they completed the three computerized tasks followed by the battery of questionnaires. In exchange for the completion of the study, the participants received one credit hour towards their class grade for participating in the research pool study. Researchers were to keep note of

technical issues such as participants finishing quicker than expected, computer glitches (i.e., freezing), and cell phone disturbance (i.e., cell phone ringing and a participant answering).

Instrumentation

Implicit Association Test (IAT; Greenwald, McGhee, and Schwartz, 1998). The IAT is a computerized categorization test that assesses implicit attitudes regarding alcohol use. The IAT in this study assessed strength of association between the target categories (alcoholic drinks and nonalcoholic drinks) and evaluative attributes (good and bad). Each task consisted of combination blocks, which allowed the target categories (alcoholic drinks vs. nonalcoholic drinks) to be combined with each attribute (good vs. bad). Participants completed an IAT, which consisted of two blocks. Thus, various names of alcoholic and nonalcoholic drinks were randomly presented in the middle of the screen with both attribute words reflective of "good" and "bad" in opposite upper quadrants (i.e., one attribute word on right and one attribute word on left) of the computer screen for each block. A total of 96 stimulus words were used, all of which consisted of written English words. There were 24 words per category: 24 alcoholic drink words, 24 nonalcoholic drink words, 24 good words, and 24 bad words. Participants were instructed to categorize targets (alcoholic vs. nonalcoholic drinks) and attribute stimuli (good vs. bad words) as quickly and as accurately as possible using two paired keys (e.g., alcohol + good).

Each block had 20 target and attribute practice trials, 24 pairing practice trials, and 40 test trials. The practice blocks allowed participants to become familiar with the task. The target category for the block and the appointed response keys (left or right) describing the attributes of focus were described at the start of each trial block as part of the instructions. The intertrial interval was 400ms for all combination blocks. The word "ERROR" instantly replaced the stimulus word for 300ms throughout the experiment after any incorrect response. Thus, the

intertrial interval was lengthened by 300ms each time there was an incorrect response. The IAT does not have a response deadline. However, if scores fell beyond the lower (300ms) and upper (3,000ms) limits, data was excluded if the average was still beyond the limits after applying the conventional algorithm designed for the IAT.

The IAT has participants categorize stimuli where stronger associations will lead to faster response times for the target (e.g., alcohol) and attribute (e.g., good) when paired on the same key. The conventional algorithm designed for the IAT (Greenwald, Nosek, and Banaji, 2003) was used to calculate d-prime (*d*'), which is described in detail in the design and statistical approach section. The IAT uses the difference in reaction time between congruent and incongruent blocks to determine the strength of association.

The Go/No Go Association Task (GNAT; Nosek and Banaji, 2001). The GNAT is a computerized categorization task that was used in this particular study to assess unconscious thoughts about alcohol use. Particularly, implicit cognitions involving alcoholic drinks were used in comparison to nonalcoholic drinks with two attribute categories: attitude and perceived safety. Alcoholic drinks were associated with either "good" or "bad" regarding the attribute category: attitude. Likewise, alcoholic drinks were associated with either "safe" or "dangerous" regarding the attribute category: perceived safety. In both the attribute categories (attitude and perceived safety), the target category (alcoholic drinks) was incorporated with each attribute, which consisted of multiple combination blocks for each task (Nosek and Banaji, 2001). Thus, "ALCOHOLIC DRINKS" (i.e., WHISKEY, VODKA, CHAMPAGNE, BUDWEISER, GIN, etc.) were paired with "good" in one block and with bad in another block, in the related attitude construct. "ALCOHOLIC DRINKS" was paired with "safe" in one block and with "dangerous" in another block, in the perceived safety construct. Both tasks consisted of the distracter (noise)

for the target category (alcoholic drinks), which was nonalcoholic drinks (i.e., MILK, TEA, MOUNTAIN DEW, etc.) to evaluate the implicit attitudes associated with alcohol. In addition, distracters for the target attribute in each construct consisted of their polar opposites. For instance in the attitudes construct, the distracters for "good" attribute words were the "bad" attribute words, and vice versa. Likewise, in the perceived safety construct, the distracters for "safe" attribute words were the "dangerous" attribute words, and vice versa.

A total of 144 English stimulus words (i.e., presented words) were used for all "signals" (target category and attribute). There were 24 stimulus words per category: 24 variations of alcoholic drinks, 24 variations of nonalcoholic drinks, 24 good words, 24 bad words, 24 safe words, and 24 dangerous words. The attitude attributes (i.e., good and bad words) represented in this study were selected from previous research (Bellezza, Greenwald, & Banaji, 1986; Nosek & Banaji, 2001). For each task, the targets of importance (i.e., signal category and evaluative attribute) were constantly exhibited in the upper right and left corners of the computer screen as a reminder for participants. In the middle of the computer screen, randomly selected stimuli were presented. Individuals were instructed to press the green button on the response pad for "go" if the words presented were related to either the target category or attribute of interest for each block. Otherwise, individuals were to refrain from pressing the green button on the response pad for "no-go" if the presented items did not belong to either of the target stimuli (i.e., target category or attribute of interest) for each block. A green "O" was presented below the stimulus word within 100ms if signal items were accurately classified as signals (i.e., correct "Go" response) or if noise items were accurately ignored (i.e., correct "No-go" response). Contrarily, a red "X" was presented below the stimulus word within 100ms if there was failure to categorize signal items or incorrectly classifying a noise item as a signal.

Four practice blocks and two experimental blocks were included for each task. The purpose of the practice blocks was to provide participants with a chance to familiarize themselves with the task by identifying signal (target = "ALCOHOLIC DRINKS") from noise (distracter = "NONALCOHOLIC DRINKS") for each target and attribute (i.e., alcoholic drinks, good, bad, safe, and dangerous) separately. Participants were provided with a 1000ms response deadline for each practice block, which consisted of 20 trials. Thereafter, each participant completed two experimental blocks of which the first 16 trials of 76 trials were considered practice trials. A 600ms response deadline was given for each experimental block, in which the target was combined with an evaluative attribute (i.e., "ALCOHOLIC DRINK" and "good"; "ALCOHOLIC DRINK" and "bad"; "ALCOHOLIC DRINK" and "safe"; "ALCOHOLIC DRINK" and "dangerous"). Nosek and Banaji (2001) found that a response deadline of 600ms provided sufficiency in regards to quick speed to effectively minimize ceiling effects, but at the same time allowed for accurate responses to be chosen. Inquisit 3.0 was used for each task.

The conventional algorithm designed for the GNAT (Nosek and Banaji, 2001) was used to calculate d-prime (*d*'), which is described in detail in the design and statistical approach section. The ability of individuals to exhibit sensitivity through the discrimination of "signal" items (i.e., alcohol + good) from "noise" items (i.e., soda + bad) demonstrates the strength of the implicit association for individual's performance. Thus, the stronger implicit association between two "signal" items demonstrates the greater the sensitivity will be on the GNAT.

Reasons for Drinking Questionnaire (RFDQ; Zywiak, Connors, Maisto, and Westerberg, 1996). The RFDQ is a 16-item survey measure that assesses the reasons people drink alcohol. However, the RFDQ's use in this study was to assess general reasons for drinking alcohol, whether the intent is positive or negative. The RFDQ uses a Likert Scale from zero ("not at all

important") to ten ("very important"). Participants are to rate each item subjectively according to the importance that a particular item influences their reasons for drinking. Sample statements include, "I felt sad", "Someone offered me a drink", or "When I saw alcohol I just had to give in". The RFDQ consists of three subscales: negative emotions, direct or indirect social pressure, and craving and cues. The RFDQ total score can range from 0 to 176, with higher scores for each corresponding item or subscale indicating more significance for the reason to drink. Zywiak and colleagues (2003) provided confirmation for its three-factor scale. The RFDQ's test-retest reliability was found to be modest (.63). The negative effect scale (RFD-NA; *Cronbach*'s α = .91), social pressure scale (RFD-SP; *Cronbach's* α = .80), and cued craving scale (RFD-CC; *Cronbach*'s α = .70) of the RFD all produced scores with adequate reliability.

NEO Five Factor Inventory- 3 (NEO-FFI-3; Costa Jr. and McCrae, 2010). The NEO-FFI-3 is an updated version of the NEO-FFI and shorter version of the NEO Personality Inventory. This is a 60-item measure that provides an assessment of the big-five personality types: neuroticism, conscientiousness, agreeableness, openness to experience, and extraversion. The NEO-FFI-3 uses a Likert Scale from one to five points, each item ranging from Strongly Disagree to Strongly Agree. Higher scores on each subscale is an indicator of the likelihood of the corresponding personality trait. Test-retest reliability for the NEO-FFI-3 is high (.82) and its five-factor scale has been confirmed (McCrae and Costa, 2007). The neuroticism scale (Cronbach's α = .86), conscientiousness scale (Cronbach's α = .82), agreeableness scale (Cronbach's α = .79), openness to experience scale (Cronbach's α = .78), and extraversion scale (Cronbach's α = .79) of the NEO-FFI-3 all produced scores with adequate reliability in previous studies (Bosson, Swann, & Pennebaker, 2000; Greenwald & Nosek, 2001; Wiers & Woerden,

2002; and McCrae, Costa, and Martin, 2005). The construct validity for the NEO-FFI-3 self-report form utilized for adolescents and adults is .95.

Demographic questionnaire. In order to assess characteristics of the sample, a demographic questionnaire was administered to participants. Participants utilized the questionnaire as a self-report of their age, sex, and race.

Design and Statistical Analysis

The following demographic variables were examined: age, gender, and race. Chi-square analyses were utilized to determine equality among participants for gender and race. An independent samples t-test was used to determine equality among participants for age. The IAT score is calculated as a difference score between congruent and incongruent response times. For example, the response times for the two blocks (alcoholic drinks + good/nonalcoholic drinks + bad) and (alcoholic drinks + bad/nonalcoholic drinks + good) were calculated by finding the difference. Higher scores on the IAT indicate a stronger implicit association. Greenwald, Nosek, and Banaji (2003) developed a conventional algorithm designed for the IAT to calculate d-prime (*d'*). First, the first practice trial for each block was dropped. Secondly, boundary values were log transformed after latencies that fell beyond the lower (300ms) and upper (3,000ms) boundaries were recoded. Additionally, error-trial latencies were also log transformed and then averaged before data was analyzed. Participants whose data remained skewed after averaging latencies or error rates was not used in the analysis.

Nosek and Banaji (2001) developed a conventional algorithm designed for the GNAT to calculate d-prime (*d'*). First, calculation for each paired task (i.e., alcohol + good, alcohol + bad) consisted of the proportion of "Hits" or correct responses (i.e., pressing "Go" for signal items) and the proportion of "False alarms" or incorrect responses (i.e., pressing "Go" for noise items).

The calculated proportions were converted to a z-score. A *d*' for each paired task was determined by finding the difference between the z-score values for the correct and incorrect responses. Thus, z(Hit) – z(False Alarm) = *d*'. Values of 0 or below for *d'* indicate either participants inability to detect signal from noise or a participant's performance indicated excessive errors. The aforementioned participants were removed from the analysis. Overall, each GNAT resulted in two *d'* scores. For instance, Alcohol + Good yields one *d*' and Alcohol + Bad yields a separate *d*'. Likewise, Alcohol + Safe yields one *d*' and Alcohol + Dangerous yields a separate *d*'. The difference between the two *d*' values is a reflection of implicit cognitions due to *d*' capturing the sensitivity with which individuals use to discriminate signal stimuli from noise.

Correlational analyses were utilized to examine the predictive and convergent validities of the IAT and GNAT. Correlational analyses will be utilized to test if negative implicit alcohol-related cognitions are positively associated with external motives (social or conformity). Correlational analyses again were utilized to assess if positive implicit alcohol-related cognitions are positively associated with high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness (personality type subscales).

CHAPTER FOUR

RESULTS

Demographic Variables: Descriptive Analyses

A total of 167 participants consented to participate in this study. Of the 167 participants, 131 participants completed the GNAT and a total of 161 participants completed the IAT. The demographic variables for the 167 participants are presented in Table 1. Females comprised 61.1% of the sample, and males comprised the remaining 38.3%. The majority of the sample was White (81.3%), while the remaining identified as: Black (7.2%), Asian (5.4%), Biracial (2.4%), and other races (3.6%). The mean age of the sample was 19.55 years, and ranged from a minimum of 18 years old to a maximum of 39 years old.

The continuous or categorical nature of each of the demographic variables determined whether to use Chi-Square Analyses or Independent Samples T-test procedures to evaluate demographic differences among participants. There were no significant differences found among participants regarding age, t (164) = -.36, p = .72. However, significant differences were found among participants regarding gender, χ^2 (1, N = 166) = 8.70, $p < .01$ and race, χ^2 (4, N = 166) = 391.29, $p < .01$. There were significantly more females (n = 102) than males (n = 64) in the sample. In addition there were significantly more White participants (n = 135) than Black (n = 12), Asian (n = 9), Biracial (n = 4), and other racial participants (n = 6). All participants assessed in this study completed both the IAT and the GNAT. To ensure equality of demographic variables between the IAT and the GNAT, Independent samples t-tests were performed. For

gender, t (164) = -.64, p = .53, and for race, t (164) = .32, p = .75. There were no significant differences found in regards to demographic variables between the IAT and the GNAT.

Results of Hypothesis Testing

Hypothesis I: Convergent Validity between the IAT and the GNAT

To ensure validity of the IAT's assessment of implicit appraisals of alcohol, D- prime (*d'*) was calculated according to the conventional algorithm designed by Greenwald, Nosek, and Banaji (2003) previously described in the design and statistical analysis section. As expected, participants demonstrated positive implicit cognitions that were more strongly associated to NON-ALCOHOLIC DRINKS and GOOD in comparison to ALCOHOLIC DRINKS and BAD, t (160) = -11.46, $p < .001$, Cohen's d = -.91. This finding suggests that participants showed faster reaction times to pairing alcoholic drinks + bad and non-alcoholic drinks + good than pairing alcoholic drinks + good and non-alcoholic drinks + bad. To determine the validity of the GNAT in relation to the assessment of implicit judgments of alcohol, the calculation of D-prime (*d'*), aforementioned in the design and statistical analysis section, was conducted for each pairing task (i.e., alcohol + good = *d'Good*, alcohol + bad = *d'Bad*). As expected when alcoholic drinks were used as noise, participants exhibited more sensitivity when NON-ALCOHOLIC DRINKS and GOOD were signals (*d'* = 2.00) in comparison to when NON-ALCOHOLIC DRINKS and BAD were signals (*d'* = 1.10; t (130) = 13.88, $p < .001$, Cohen's d = 1.19). Due to the large effect size, this suggests that participants considered non-alcoholic drinks to be more associated with good in the presence of alcoholic drinks and bad (Figure 4). In other words, participants showed a positive automatic attitude toward non-alcoholic drinks compared to alcoholic drinks. The opposite pattern was observed, when non-alcoholic drinks were used as noise. Participants exhibited greater sensitivity to alcoholic drinks + bad (*d'* = 2.15) than to alcoholic drinks + good

(*d'* = 1.35; t (130) = -11.11, $p < .001$, Cohen's *d* = -1.10) in the presence of non-alcoholic drinks. The aforementioned findings suggest a negative automatic attitude toward alcohol when in the presence of non-alcoholic drinks.

In regards to measuring the effectiveness of the GNAT's assessment of automatic appraisals and perceived safety (Condition 2), participants demonstrated greater sensitivity when NON-ALCOHOLIC DRINKS and SAFE were signals (*d'* = 1.93) compared to when NON-ALCOHOLIC DRINKS and DANGEROUS were signals (*d'* = .94; t (123) = 14.71, $p < .001$, Cohen's *d* = 1.55) suggesting that participants found non-alcoholic drinks and safe to be more strongly associated than non-alcoholic drinks and dangerous (Figure 5). In other words, participants exhibited safer automatic attitudes to non-alcoholic drinks. The opposite pattern was observed when alcohol was the signal (target concept). Thus, participants demonstrated greater sensitivity to ALCOHOLIC DRINKS + DANGEROUS (*d'* = 2.01) than to ALCOHOLIC DRINKS + SAFE (*d'* = 1.12; t (123) = -15.30, $p < .001$, Cohen's *d* = -1.40) suggesting an automatic attitude of danger toward alcohol. Correlational analyses were conducted to assess the relationship between GNAT1 (good-bad) and GNAT2 (safe-dangerous). Significant correlations were found between GNAT1 and GNAT2. More specifically, participants who had a positive implicit appraisal of nonalcoholic drinks and good also had a positive implicit appraisal of nonalcoholic drinks and safe, *r* (153) = .52, $p = .00$. Likewise, significant correlations were found for participants who showed greater sensitivity to alcoholic drinks and bad also exhibited greater sensitivity to alcoholic drinks and dangerous, *r* (153) = .61, $p = .00$. Overall, the GNAT and the IAT, both found that participants demonstrated more negative automatic preferences towards alcoholic drinks and bad compared to other pairings (i.e., alcoholic drinks + good, non-alcoholic drinks + bad).

Correlational analyses were conducted to examine the relationship and convergent validity between the IAT and the GNAT. As seen in Table 2, the hypothesis was supported, which expected the IAT and the GNAT to be significantly positively correlated. Significant relationships were found between IAT alcoholic drinks + good and GNAT alcoholic drinks + good, r (153) = .35, $p < .01$, and there was a significant correlation between IAT alcoholic drinks + good and GNAT alcoholic drinks + safe, r (154) = .21, $p < .01$. These findings suggest that participants who automatically associated alcoholic drinks to be good on the IAT also found alcoholic drinks to be good and safe on the GNAT. Further, these findings suggest that similar conclusions of implicit associations can be reached regardless of the procedure, GNAT or IAT, used. There was a significant correlation between IAT alcoholic drinks + good and GNAT nonalcoholic drinks + good, r (154) = -.20, $p < .05$, and there was a significant relationship found between IAT alcoholic drinks + good and GNAT nonalcoholic drinks + safe, r (154) = -.27, $p < .01$. The correlation between IAT alcoholic drinks + good and GNAT nonalcoholic drinks + good/safe suggest that participants who automatically associated alcoholic drinks and good, were more likely to automatically associate nonalcoholic drinks and bad or dangerous. This could be due to not having a neutral choice, but being forced to choose between two opposing variables (i.e., good or bad, safe or dangerous).

Hypothesis II: Reasons for drinking

Prior to conducting correlational analyses to assess if there was a relationship between the IAT, GNAT, and reasons for drinking, descriptive statistics were conducted to examine the mean scores from the three subscales (social pressure, negative affect, and craving cued) on the reasons for drinking questionnaire used in this study. Thus, findings exhibited that most participants in this study were drinking for reasons due to social pressure (M = 5.16) compared

to drinking for coping with negative affect (M = 3.43) or drinking due to a cued craving (M = 3.41).

Correlational analyses were conducted to examine the relationship between IAT, GNAT, and reasons for drinking. Regarding the IAT and reasons for drinking, as seen in Table 3, the hypothesis was not supported, which expected that there would be a negative relationship between positive implicit alcohol-related associations and external motives such as drinking for social reasons or to conform. There was no significant relationship between drinking due to social pressure and positive implicit-alcohol associations found on the IAT, r (161) = -.03, p = .71. Also, the hypothesis stated that there would be a positive relationship between the positive implicit associations and drinking for internal reasons such as to cope or enhancement. There was no significant relationship between drinking to cope with negative affect and positive implicit alcohol-related associations found on the IAT, r (161) = .01, p = .91. There was no significant relationship found between drinking due to craving alcohol after a cue in the environment and positive implicit alcohol-related associations on the IAT, r (161) = .03, p = .74.

Likewise, regarding the GNAT and reasons for drinking, as seen in Table 4, the hypothesis was not supported, which expected that there would be a negative relationship between positive implicit alcohol-related associations and external motives such as drinking for social reasons or to conform. There was no significant relationship between drinking due to social pressure and positive implicit alcohol-related associations found on the GNAT, for alcoholic drinks + good, r (153) = .04, p = .66 and for alcoholic drinks + safe, r (154) = .07, p = .40. Also, it was hypothesized that there would be a positive relationship between the positive implicit associations and drinking for internal reasons such as to cope or enhancement. There were no significant relationships between drinking to cope with negative affect and positive

implicit alcohol-related associations found on the GNAT, for alcoholic drinks + good, r (153) = .08, p = .31 and for alcoholic drinks + safe, r (154) = .08, p = .34. There was also no significant relationship between drinking due to craving alcohol after a cue in the environment and positive implicit alcohol-related associations regarding the GNAT, alcoholic drinks + good, r (153) = .09, p = .26, and alcoholic drinks + safe, r (154) = .07, p = .37. These findings suggest that no significant relationships whether positive or negative exist between implicit alcohol-related associations and reasons for drinking. These findings could be due to the fact that most participants in this study were drinking for reasons due to social pressure compared to internal reasons. Further, the hypothesis was based on the expectation that participants who drink for internal reasons would exhibit positive implicit appraisals of alcohol compared to participants who drink for external reasons (i.e., social pressure).

Hypothesis III: Personality Types

Prior to conducting correlational analyses to assess if there was a relationship between the IAT, GNAT, and personality types, descriptive statistics were conducted to examine the mean scores from the five personality types (neuroticism, extraversion, openness, agreeableness, and conscientiousness) on the NEO-FFM personality questionnaire. Thus, findings exhibited that most participants in this study were categorized as extraverts (M = 65.24) based upon response patterns. The second personality type that participants mostly classified themselves as was being agreeable (M = 64.89) and thirdly as being conscientious (M = 64.86). Participants appeared to be less likely to endorse items that would classify them as open (M = 62.69) and neurotic (M = 60.47).

Correlational analyses were conducted to examine the relationship between IAT, GNAT, and personality types. Regarding the IAT and personality types, as seen in Table 5, the

hypothesis was not supported, which expected that there would be significant relationships between positive implicit alcohol-related associations and high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness. There were no significant relationships between personality types and positive implicit appraisals of alcohol based on the IAT: for neuroticism, r (78) = -.09, p = .43; extraversion, r (78) = -.07, p = .53; openness to change, r (78) = .09, p = .42; conscientiousness, r (78) = .13, p = .27; and acceptance, r (78) = .03, p = .79.

Likewise, regarding the GNAT and types of personalities, as seen in Table 6, the hypothesis was not supported, which expected that there be relationships between positive implicit alcohol-related associations and high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness. There were no significant relationships between personality types and condition 1 on the GNAT, which examined alcoholic drinks + good/bad: neuroticism, r (71) = -.07, p = .54; extraversion, r (71) = .10, p = .40; openness to change, r (71) = .00, p = .97; conscientiousness, r (71) = .19, p =.12; and acceptance, r (71) = .12, p = .33.

Regarding personality types and condition 2 on the GNAT, which examined alcoholic drinks + safe/dangerous, there also were no significant relationships found: neuroticism, r (71) = -.20, p = .10; extraversion, r (71) = .02, p = .85; openness to change, r (71) = -.21, p = .08; conscientiousness, r (71) = -.04, p = .72; and acceptance, r (71) = .23, p = .05. These findings suggest that no significant relationships, whether positive or negative, exist between implicit alcohol-related associations and personality type. These findings could be due to the fact that most participants in this study classified themselves as extraverts (M = 65.24), agreeable (64.89), and conscientious (64.86), but were least likely to classify themselves as neurotic (M = 60.47). In other words, the hypothesis was based on finding a relationship between positive implicit

appraisals of alcohol if participants were high in neuroticism, low in agreeableness, and low in conscientiousness.

CHAPTER FIVE

DISCUSSION

Previous studies (Cohn et al., 2012; Wiers et al., 2002) have demonstrated the usefulness of the Implicit Association Test (IAT) as a popular computerized categorization task to measure implicit cognitions to find relative strengths of associations between two concepts. Further, the IAT has been utilized in past studies (Wiers and Woerden, 2002) to assess implicit cognitions related to alcohol. The present study examined the assessment of alcohol-related implicit cognitions using both the IAT and the Go/No-Go Association Task (GNAT). The GNAT has never been used to study alcohol-related cognitions and thus is an innovative approach to assessing implicit alcohol-related associations. The GNAT provides flexibility in assessing paradigms related to implicit cognitions, unlike the IAT, which has a common bipolar nature of assessing alcohol (i.e., good-bad). This study was able to use the GNAT in assessing alcohol in two ways, good-bad and safe-dangerous. Researchers have utilized implicit association tasks regarding alcohol to assess participants' automatic associations to alcohol in attempts to avoid socially desirable responses and to gain a general assessment of automatic perceptions of alcohol (Wiers and Woerden, 2002).

However, others have utilized implicit cognition tasks and explicit measures to assess similarities and differences regarding their perceptions of alcohol and whether implicit cognition tasks predict those who report themselves to be light or non-alcoholic drinkers versus heavy drinkers. Thus, this study was interested in the automatic perceptions of alcohol as good or bad and safe or dangerous due to the immense negative behaviors and health outcomes that are

associated with alcohol. The purpose of this study was to assess the convergent validity between the IAT and the GNAT (Hypothesis I). Also, this study assessed whether reasons for drinking (Hypothesis 2) and personality type (Hypothesis 3) were predictive of negative and positive alcohol-related implicit cognitions in regards to the IAT and GNAT.

Demographic Variables

Of the 167 participants that consented to participate in this study, 131 participants completed the GNAT and a total of 161 participants completed the IAT. This sample is comprised of primarily White females who are traditional-aged college students, ages 18 to 25. Grant and colleagues (2007) found that 18 to 25-year-olds when compared with other age groups tended to be the group with the highest proportion of problem drinkers and have the highest rates of alcohol use.

Convergent Validity between IAT and GNAT

Both the GNAT and the IAT demonstrated that participants had more negative automatic preferences towards alcoholic drinks and bad compared to other pairings (i.e., alcoholic drinks + good, non-alcoholic drinks + bad). This suggests that the IAT and the GNAT are measuring similar constructs as was hypothesized. Furthermore, hypothesis 1 was supported and our findings found the IAT and the GNAT to have a positive significant relationship with each other. This suggests that the IAT and GNAT demonstrated similarities in assessing implicit alcohol-related cognitions. Due to the IAT and GNAT being significantly correlated, this provided evidence of convergent validity between these two implicit measures of alcohol-related cognitions. Further, these results suggest that regardless of the measurement used, the IAT or the GNAT, one would get similar results. The GNAT provided evidence that like the IAT, it is sufficient in assessing the aforementioned cognitions, with the additional capability and

flexibility of investigating various attributes without the requirement of using opposing categories (i.e., safe-dangerous, good-bad). For example, the GNAT could have been used in this study to assess alcohol-related implicit cognitions and only the attribute: safe. In contrast, the IAT requires one to use two extremities of an attribute such as good versus bad. Further, correlational analyses exhibited a significant relationship between both GNATs (good-bad; safe-dangerous) used in this study. The relationship suggested that participants who had an automatic implicit appraisal of alcoholic drinks being bad also automatically viewed alcoholic drinks as dangerous and vice versa, participants with an implicit appraisal of nonalcoholic drinks being classified as good also automatically viewed them as safe.

Participant's implicit appraisals of alcohol may have been dependent upon the opposing category (target or attribute). For example, when alcoholic drinks were compared to nonalcoholic drinks on the IAT, participants were more likely to exhibit negative attitudes towards alcoholic drinks. Likewise, on the GNAT, when nonalcoholic drinks were used as distracters (noise) in the presence of alcoholic drinks and bad as targets (signals), participants most likely exhibited negative implicit alcohol-related cognitions to alcoholic drinks. In other words, participants were found more likely to show a positive automatic association between nonalcoholic drinks and good. Thus, the GNAT also demonstrated that participants were more likely to automatically associate alcoholic drinks and dangerous when in the presence of nonalcoholic drinks and safe. For instance, alcoholic drinks may have been viewed as less dangerous or even safe if compared to illicit drugs such as methamphetamine or heroin. More specifically, the majority of participants may likely demonstrate positive implicit appraisals of alcohol if the opposing construct (or noise) is perceived to be more negative (i.e., illicit drugs).

Reasons for drinking, personality types, and implicit alcohol-related cognitions

In addition to assessing implicit alcohol-related cognitions and the convergent validity of the IAT and GNAT, this study predicted that there would be a relationship between alcohol-related implicit cognitions and reasons for drinking. There was no relationship found among the three main reasons for drinking in this study (negative affect, social pressure, and craving cued) and implicit appraisals of alcohol regarding both the IAT and GNAT. However, most people in the study endorsed drinking due to social pressure and less likely to drink for internal reasons (negative affect and craving cued). More specifically, Cooper (1994) emphasized that individuals with problematic or heavy use of alcohol usually consumed alcohol for internal reasons such as to cope. Thus, majority of the participants who endorsed drinking due to social pressure would likely not exhibit problematic drinking nor have a positive appraisal of alcohol.

Additionally, this study predicted that there would be relationships between implicit appraisals of alcohol and the five types of personality including neuroticism, extraversion, openness to change, conscientiousness, and acceptance. Previous research (Malouff et al., 2007) indicated that individuals who would have difficulty overcoming their problems with alcohol most likely would exhibit low agreeableness, low conscientiousness, and high neuroticism. This study hypothesized that alcohol-related implicit cognitions would be correlated with high neuroticism, high extraversion, low openness, low agreeableness, and low conscientiousness, which was not supported. A possible reason that the finding was not supported may be due to the fact that majority of the participants in this study endorsed items that classified them as high in extraversion, high in agreeableness, high in conscientiousness, and low in neuroticism. In other words, Malouff and colleagues (2007) found people classified as neurotic, less agreeable, and less conscientious were most likely to have problematic drinking. Thus, the current study

hypothesized those high in neuroticism, low in agreeableness, and low in conscientiousness would have a relationship with implicit alcohol-related cognitions. However, majority of the participants who endorsed items that classified them as opposite than the aforementioned statement, could be the reason that no significant relationship was found between implicit cognition and reasons for drinking in this study.

These findings of nonsignificance between reasons for drinking and implicit-alcohol associations as well as personality type and implicit alcohol associations could be due to various possibilities (Payne, Burkley, and Stokes, 2008). Firstly, this finding could be due to the nature of assessing the relationship between implicit computerized categorization task measures and explicit computerized Likert scale measures. With these types of structural differences among measures, assessing for moderating effects of implicit appraisals of alcohol in the relationship between alcohol use and reasons for drinking may have been more appropriate. For instance, explicit measures allow for more options and involve more schematics compared to implicit measures, which require concretely classifying items and involving simplistic representations (i.e., words or pictures). Further, the dual processing theory (Barrouillet, 2011) states that when utilizing explicit cognition, implicit cognition is allowed to be overridden if given adequate time. For example the automaticity of implicit cognitions is deemed independent of explicit cognition, which allows one to rationalize their choice of action. Due to past research and findings that show weak correlations between implicit and explicit cognition measures, some theorists believe that implicit and explicit cognitions are independent (Payne, Burkley, and Stokes, 2008). Additionally, explicit measures usually evaluate responses on numerical scales versus implicit measures using either response latencies or signal detections.

Secondly, previous research has demonstrated how participants may answer in socially desirable ways on explicit measures of alcohol use. For example, participants may respond in ways that are inconsistent with their actual use of alcohol on explicit measures, but the implicit alcohol-related measures may signify their realistic appraisals and uses of alcohol. Thus, those findings will most likely be nonsignificant and a relationship will not be shown. Thirdly, the aforementioned results may be due to the bipolar nature of both the IAT and the GNAT used in this study. Participants were instructed to choose nonalcoholic drinks + good/bad in comparison to or in the presence of alcoholic drinks + good/bad. Thus, this could force some who view alcoholic drinks in a more neutral category rather than good or bad. Participants may be influenced by the context of the tasks which may implicitly force them to choose good + nonalcoholic drinks versus good + alcoholic drinks.

Limitations

During the course of conducting this study, various limitations presented themselves. The results of the analyses could have been affected by the small sample size. These findings may also have been limited regarding race and gender. For example, the sample consisted of predominately White female college students. Therefore, cultural considerations may have contributed to different results, which may have been found in more racially and culturally diverse samples. To account for this possibility, future recruiting could be conducted in a variety of college and university campuses. Although the IAT and GNAT helped reduce social desirable responses, the explicit measures assessing reasons for drinking and personality types, could not account for impression management. Also, a limitation arising from both the IAT and GNAT in this study could be due to not having a neutral choice, but being forced to choose between two opposing variables (i.e., good or bad, safe or dangerous). Due to multiple trials of the GNAT in

combination with administering the IAT to every participant, issues of fatigue or practice could potentially affect response latencies and the ability to successfully detect signals in the presence of noise. However, having every participant randomly assigned to both conditions, would eliminate sampling differences.

Although there was a small sample size in the current study, significant findings showed a positive relationship between the IAT and the GNAT. This finding exhibited that the novel measurement to implicit alcohol-related cognition, the GNAT, assesses similar realms of implicit appraisals to alcohol as the IAT. Thus, convergent validity was found between the IAT and GNAT, which is useful information in the determination of which implicit measure best fits what is being studied. The flexibility of the GNAT to instill to any concept and attitude interested in being studied is a major advantage over the bipolar nature of the IAT. Although, the aforementioned finding was significant, there were nonsignificant findings for the IAT and the GNAT between reasons for drinking and personality types. There could be plethora of reasons for nonsignificant findings due to the basic difference in implicit and explicit measures. Payne and colleagues (2008) state that the structural fit between implicit and explicit measures may be a factor in the reason a weak relationship is commonly found.

Directions for Future Research

Future research could begin to focus on developing ways for implicit and explicit measures to be more structurally fit. This could lend more detailed findings and thus, help researchers and clinicians to understand the commonality between implicit and explicit cognitions in relation to alcohol. More specifically, this could help assess the reasons for drinking and personality type in relation to implicit alcohol-related cognitions. Another possibility to assess for impression management on explicit measures is to use a social

desirability scale in addition to the explicit measures of interests. This could help clarify results and potentially explain for weak or no relationships between the implicit and explicit measures used. The misuse of alcohol especially among the traditional college-aged population is alarming and causes economic, social, and health risk. Thus, understanding the reasons for drinking in relation to implicit appraisals of alcohol and individual differences could ultimately assist with development of effective programs or interventions to reduce the likelihood of heavy and/or problematic use of alcohol. There also could be an expansion on research to assess implicit alcohol-related cognitions and how they may be impacted by socio-cultural variables. Further, research in different regions of the United States as well as assessment of differences of implicit appraisals of alcohol between different countries could lend to important findings in differences in alcohol. Finally, future research could further investigate the relationship between implicit and explicit cognitions associated with alcoholic drinks and other substances and how implicit measures may be used to predict reasons for future alcohol or substance use. Implicit measures in combination with explicit measures could be instilled in more clinical (rehabilitation settings) to assess implicit and explicit appraisals upon admission and discharge to examine if differences exist pre-rehab compared to post-rehab services. Also, these measures could simply help clinicians and researchers identify those that may be more prone to develop problematic or heavy alcohol use in order to prevent or intervene future problems with alcohol.

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Figure 1

Example of the Traditional IAT

On this screen shot, participants should press the 'i' key (right) to categorize "beer" with the target category "alcohol".

On this screen shot, participants should press the 'e' key (left) to categorize "stupid" with the target category "bad".

Figure 2

Description and Illustration of the Schematics for the IAT

Based on the example used in Greenwald, McGhee, and Schwartz (1998).

Sequence	1	2	3	4
Task Description	Target Practice Trials	Attribute Practice Trials	Pairing Practice Trials	Test Trial
Task Instructions	*EtOH NonEtOH*	*Good Bad*	*EtOH *Good nonEtOH* Bad*	EtOH* *Good *nonEtOH Bad*
Sample Stimuli	*Whiskey Coke* Tea* *Vodka Sprite* *Beer *Rum Milk* *Wine	*Pleasant *Nice Stupid* Poison* *Enjoyable Disaster* *Happy Unpleasant*	*Vodka *Nice Tea* Stupid* Milk* *Happy *Beer Poison*	*Nice Whiskey* Disaster* *Tea *Pleasant Rum* Unpleasant* *Sprite

Tasks are numbered 1-4. The asterisks represent either the ‘e’ key (left) or ‘i’ key (right). Participants were introduced target concepts in the first discrimination task, followed by attributes in the second discrimination task. Depending on task instructions, participants were to press either the ‘e’ key or ‘i’ key when presented with sample stimuli to categorize either the target or attribute for that particular task. The third task included a combination of target concepts and attributes. In the fourth task, participants were presented with a reversed combination of target concepts and attributes.

Figure 3

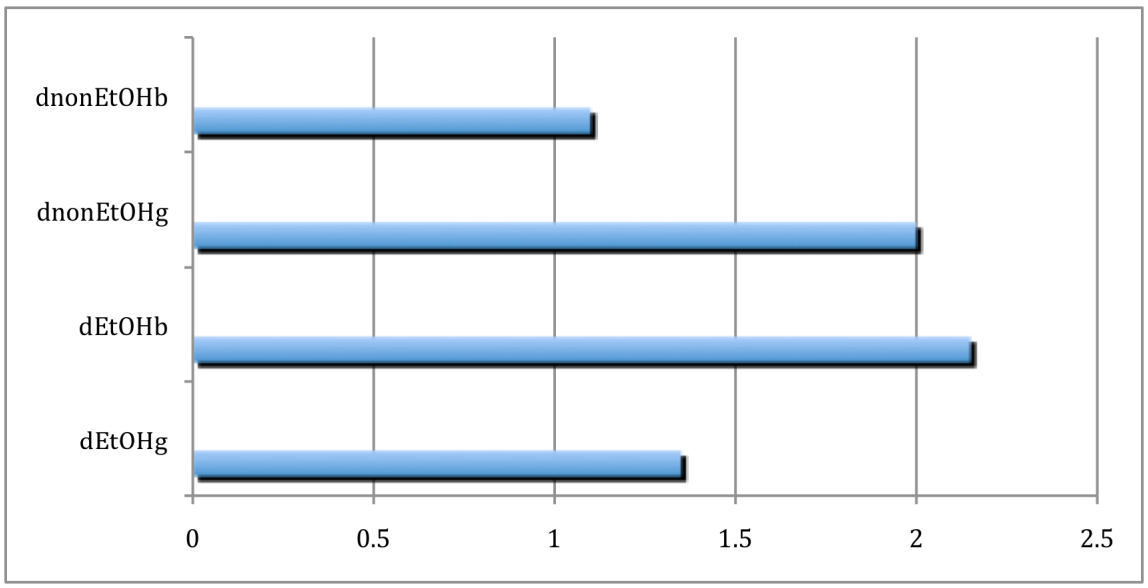
Example of the GNAT

On this screen shot, participants are supposed to press the Space Bar (‘go’).

On these screen shots, participants are NOT supposed to press the Space Bar (‘no-go’).

Figure 4

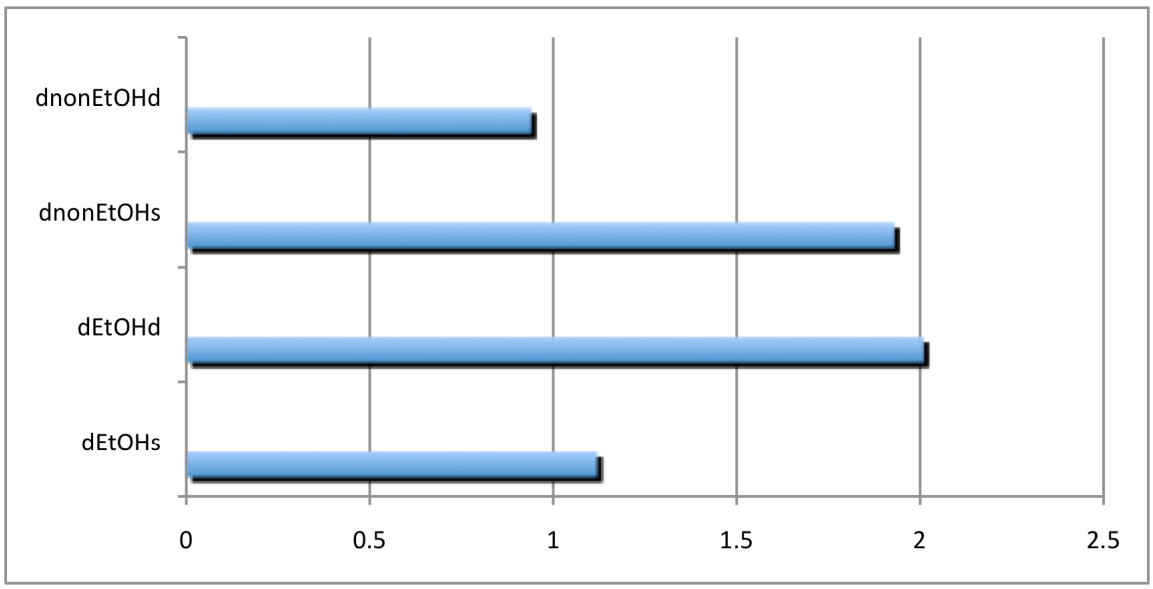
Graph of *d'* means for GNAT1



Note. dnonEtOHb = *d*' of nonalcoholic drinks + bad; dnonEtOHg = *d*' of nonalcoholic drinks + good; dEtOHb = *d*' of alcoholic drinks + bad; dEtOHg = *d*' of alcoholic drinks + good.

Figure 5

Graph of *d'* means GNAT2



Note. dnonEtOHd = *d*' of nonalcoholic drinks + dangerous; dnonEtOHs = *d*' of nonalcoholic drinks + safe; dEtOHd = *d*' of alcoholic drinks + dangerous; dEtOHs= *d*' of alcoholic drinks + safe.

Table 1

Demographic Variables of Participants

Variables	(*n*= 167)
Age:	
Mean	19.55
Range in Years	18 - 39
Gender*:	
Male	38.3%
Female	61.1%
Ethnicity*:	
White	81.3%
Black	7.2%
Asian	5.4%
Other	3.6%

*Missing data from total.

Table 2

Correlation Coefficients between the IAT and the GNAT

	1. IAT EtOH ↑(Good) ↓(Bad)	2. GNAT EtOH ↑(Good) ↓(Bad)	3. GNAT EtOH ↑ (Safe) ↓ (Dangerous)
1. IAT	---		
2. dEtOHGB	.35**	---	
3. dEtOHSD	.21**	.24**	---
4. dnonEtOHGB	-.20*	-.23**	-.18*
5. dnonEtOHSD	-.27**	-.22**	-.32**

Note. dEtOHGB = *d*' of alcoholic drinks + good; dEtOHSD = *d*' of alcoholic drinks + safe; dnonEtOHGB = *d*' of nonalcoholic drinks + good; dnonEtOHSD = *d*' of nonalcoholic drinks + safe. **p = .01, *p = .05

Table 3

Correlation Coefficients between IAT and reasons for drinking

	1. IAT EtOH ↑(Good) ↓(Bad)	2. Negative Affect	3. Social Pressure	4. Craving Cued
1. IAT	---			
2. Negative Affect	.01	---		
3. Social Pressure	-.03	.51**	---	
4. Craving Cued	.03	.69**	.63**	---

**p = .01, *p = .05

Table 4

Correlation Coefficients between GNAT and reasons for drinking

	1. Negative Affect	2. Social Pressure	3. Craving Cued
1. Negative Affect	---		
2. Social Pressure	.51**	---	
3. Craving Cued	.69**	.63**	---
2. dEtOHGB	.08	.04	.09
3. dEtOHSD	.08	.07	.07
4. dnonEtOHGB	-.20	.07	.02
5. dnonEtOHSD	.06	.06	.08

Note. dEtOHGB = *d*' of alcoholic drinks + good; dEtOHSD = *d*' of alcoholic drinks + safe; dnonEtOHGB = *d*' of nonalcoholic drinks + good; dnonEtOHSD = *d*' of nonalcoholic drinks + safe. ***p* = .01, **p* = .05

Table 5

Pearson correlations between IAT and personality types

	1. IAT EtOH ↑(Good) ↓(Bad)	2. Neuroticism	3. Extraversion	4. Openness	5. Conscientious	6. Acceptance
1. IAT	---					
2. Neuroticism	-.09	---				
3. Extraversion	-.07	-.40**	---			
4. Openness	.09	-.07	.10	---		
5. Conscientious	.13	-.24*	.25*	.19	---	
6. Acceptance	.03	-.17	.28*	.01	.15	----

**p = .01, *p = .05

Table 6

Correlation Coefficients between GNAT and personality types

	1. Neuroticism	2. Extraversion	3. Openness	4. Conscientious	5. Acceptance
1. EtOHGB	-.07	.10	.00	.19	.12
2. EtOHSD	-.20	.02	-.21	-.04	.23
3. nonEtOHGB	-.03	.11	.17	.13	-.10
4. nonEtOHSD	.03	.03	.23	.20	-.05
5. Neuroticism	---				
6. Extraversion	-.40**	---			
7. Openness	-.07	.10	---		
8. Conscientious	-.24*	.25*	.19	---	
9. Acceptance	-.17	.25*	.01	.15	---

Note. dEtOHGB = *d*' of alcoholic drinks + good; dEtOHSD = *d*' of alcoholic drinks + safe; dnonEtOHGB = *d*' of nonalcoholic drinks + good; dnonEtOHSD = *d*' of nonalcoholic drinks + safe. ***p* = .01, **p* = .05

APPENDIX A

Informed Consent

Hwemudua Alcohol and Health Disparities Laboratory (HAHDL)

The University of Georgia
Dr. Ezemenari M. Obasi

I have been asked to participate in a research project investigating personality traits, substance use, behavior, implicit social cognitions, and other health-related variables. If I choose to participate, I will be asked to complete a computerized reaction time measure along with a series of questionnaires. In addition, I will be asked to provide a saliva sample that will be used to collect biological indicators of health. The current study should take approximately one hour to complete. Upon completion of the study, I understand that I will receive one credit hour toward my class grade in return for my participation. I additionally understand that my participation in this research study is voluntary, and that I can also receive an equivalent amount of course credit for writing a two page article summary. In order to make this study a valid one, some information about (my participation or the study) will be withheld until completion of the study.

The risks and discomfort presented in this study include questions involving my use of alcohol and other potentially illegal behaviors (underage drinking). I understand that I have the option of not participating in this study or terminating my participation at any point during the session without penalty or loss of benefits to which I am otherwise entitled. I am also being asked to complete this study in a group administration format. The room has been set up to minimize any potential discomfort associated with this. In addition, I understand that the researcher will not be watching my individual responses to items.

I understand that my responses to all questionnaires and my performance on a reaction time measure will remain anonymous and will be kept on a secure and password protected server in the researcher's laboratory. I understand that the saliva sample I give will be marked with an individual number, not a name, and will be kept in a cooler in a secure and locked room in the researcher's laboratory. I understand that samples of my saliva will be used to study genetic markers (e.g. dopamine, serotonin, etc.) and will not be tested for the presence of any illnesses or diseases such as HIV or AIDS. I understand that my saliva samples for DNA assaying will be kept in the Hwemudua Alcohol and Health Disparities Laboratory (HAHDL) but will be assayed at the UGA Georgia Genomics Facility. My genetic information will only be labeled with a numeric code and will not be linked to me individually.

While my participation in this study may not benefit me directly, I understand that my participation may lead to an increased understanding of the importance of implicit and explicit cognitions regarding certain attitudes and behaviors. My participation may also lead to an increased understanding of genetic markers involved in certain behaviors.

If I have questions regarding any aspects of this study or the procedures utilized in this study, I may contact the primary investigator, Dr. Ezemenari M. Obasi at 706-542-4792 (email: obasi@uga.edu), Associate Professor in the Department of Counseling and Human Development Services, College of Education, The University of Georgia, 402 Aderhold Hall, Athens, Georgia.

My signature below indicates that the researchers have answered all of my questions to my satisfaction and that I consent to participate in the current study. I have been given a copy of this form.

Name of Participant (print)	Signature of Participant	Date
Name of Researcher (print)	Signature of Researcher	Date

706-542-6519
Phone

hwemudua@uga.edu
Email

Please sign both copies, keep one and return one to the researcher.

Additional questions of problems regarding your rights as a research participant should be addressed to: The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia, 30602-7411; Telephone (706)-542-3199; email address IRB@uga.edu

APPENDIX B

Demographic Questionnaire

TELL US ABOUT YOURSELF:

What is your gender?
1-Male
2-Female

What generation best applies to you?
1-I was born outside of the U.S.
2-I was born in the U.S.; My mother or father was born outside of the U.S.
3-My parents and I were born in the U.S.; All grandparents were born outside of the U.S.
4-My parents and I were all born in the U.S.; At least one grandmother or grandfather was born outside of the U.S. with the remainder born in the U.S.
5-All of my grandparents, both my parents, and I were born in the U.S.
6-Don't know what generation best fits since I lack some information

What is your current marital status?
1-Single, never been married
2-Not married or not partnered, but living with a significant other
3-Married or partnered, and living with spouse or partner
4-Separated or divorced, with financial support from past spouse or partner
5-Separated or divorced, without financial support from past spouse or partner
6-Widowed, with financial support from deceased spouse or partner
7-Widowed, without financial support from deceased spouse or partner

What is the highest level of education that you have obtained?
1-Less than 7th grade
2-Junior high school (8th-9th grade)
3-Some high school (10th-11th grade)
4-High school graduate
5-Some college or specialized training
6-College/university graduate
7-Graduate/professional training

What is the highest level or education that your spouse, partner, or significant other has obtained?
1-Less than 7th grade
2-Junior high school (8th-9th grade)
3-Some high school (10th-11th grade)

4-High school graduate
5-Some college or specialized training
6-College/university graduate
7-Graduate/professional training

What is the highest level of education that your mother has obtained?
1-Less than 7thgrade
2-Junior high school (8th-9th grade)
3-Some high school (10th-11th grade)
4-High school graduate
5-Some college or specialized training
6-College/university graduate
7-Graduate/professional training

What is the highest level of education that your father other has obtained?
1-Less than 7thgrade
2-Junior high school (8th-9th grade)
3-Some high school (10th-11th grade)
4-High school graduate
5-Some college or specialized training
6-College/university graduate
7-Graduate/professional training

Have you ever used professional services that were provided by a psychologist?
1-Yes
2-No

What is your race?
1-Black
2-White
3-Asian
4-Biracial
5-Other

What is your ethnicity (e.g. African American, European American, Asian American, Native American, Mexican American, Ghanian, Puerto Rican, British, etc.)?
(fill in the blank)

What is your age?
(fill in the blank)

Your current occupation is:
1-Farm Laborer; Service Worker
2-Worker without professional training
3-Machine Operator; Semiskilled Worker
4-Skilled Manual Worker; Craftsman; Tenant Farmer; Business/Farm Owner (<$25k)

5-Clerical Worker; Sales Worker; Business/Farm Owner ($25k-$50k)
6-Technician; Semiprofessional; Business/Farm Owner ($50-$75k)
7-Manager; Minor Professional; Entertainer; Artist; Business/Farm Owner ($75k-$100k)
8-Administrator; Military Officer; Professional; Business/Farm Owner ($100k-$250k)
9-Unemployed; Homemaker; Student; I don't know

The occupation of my most recent spouse, partner, or significant other is (note: if the person is retired, use their occupation before retirement. If they are deceased, use their last occupation):
1-Farm Laborer; Service Worker
2-Worker without professional training
3-Machine Operator; Semiskilled Worker
4-Skilled Manual Worker; Craftsman; Tenant Farmer; Business/Farm Owner (<$25k)
5-Clerical Worker; Sales Worker; Business/Farm Owner ($25k-$50k)
6-Technician; Semiprofessional; Business/Farm Owner ($50-$75k)
7-Manager; Minor Professional; Entertainer; Artist; Business/Farm Owner ($75k-$100k)
8-Administrator; Military Officer; Professional; Business/Farm Owner ($100k-$250k)
9-Unemployed; Homemaker; Student; I don't know

The occupation of my mother is (note: if the person is retired, use their occupation before retirement. If they are deceased, use their last occupation):
1-Farm Laborer; Service Worker
2-Worker without professional training
3-Machine Operator; Semiskilled Worker
4-Skilled Manual Worker; Craftsman; Tenant Farmer; Business/Farm Owner (<$25k)
5-Clerical Worker; Sales Worker; Business/Farm Owner ($25k-$50k)
6-Technician; Semiprofessional; Business/Farm Owner ($50-$75k)
7-Manager; Minor Professional; Entertainer; Artist; Business/Farm Owner ($75k-$100k)
8-Administrator; Military Officer; Professional; Business/Farm Owner ($100k-$250k)
9-Unemployed; Homemaker; Student; I don't know

The occupation of my father is (note: if the person is retired, use their occupation before retirement. If they are deceased, use their last occupation):
1-Farm Laborer; Service Worker
2-Worker without professional training
3-Machine Operator; Semiskilled Worker
4-Skilled Manual Worker; Craftsman; Tenant Farmer; Business/Farm Owner (<$25k)
5-Clerical Worker; Sales Worker; Business/Farm Owner ($25k-$50k)
6-Technician; Semiprofessional; Business/Farm Owner ($50-$75k)
7-Manager; Minor Professional; Entertainer; Artist; Business/Farm Owner ($75k-$100k)
8-Administrator; Military Officer; Professional; Business/Farm Owner ($100k-$250k)
9-Unemployed; Homemaker; Student; I don't know

APPENDIX C

Reasons for Drinking

Verner S. Westerberg, Ph.D., William R. Miller, Ph.D., Nick Heather, Ph.D.

The following 16 questions are a list of reasons why people may have drunk alcohol just before they drove a vehicle. Please rate each of these reasons on how important each was for you **just before** you were arrested for Driving While Intoxicated (DWI). Rate each reason on the scale provided. Zero (0) means the reason was *not at all important* for you, and ten (10) means that the reasons was *very important* for you. Circle only one number for each item.

Reasons for beginning to drink	**Not at all important**										**Very Important**
1. I felt angry or frustrated, either with myself or because things were not going my way.	0	1	2	3	4	5	6	7	8	9	10
2. I felt bored.	0	1	2	3	4	5	6	7	8	9	10
3. I felt anxious or tense.	0	1	2	3	4	5	6	7	8	9	10
4. When I saw alcohol I just had to give in.	0	1	2	3	4	5	6	7	8	9	10
5. I felt sad.	0	1	2	3	4	5	6	7	8	9	10
6. I felt ill or in pain or uncomfortable because I wanted a drink.	0	1	2	3	4	5	6	7	8	9	10
7. I was in a good mood and felt like getting high.	0	1	2	3	4	5	6	7	8	9	10
8. I wanted to see what would happen if I tried one drink.	0	1	2	3	4	5	6	7	8	9	10
9. I just felt tempted to drink out of the blue and went off to get a drink.	0	1	2	3	4	5	6	7	8	9	10
10. Someone offered me a drink.	0	1	2	3	4	5	6	7	8	9	10
11. I felt angry or frustrated because of my relationship with someone else.	0	1	2	3	4	5	6	7	8	9	10
12. I was with others having a good time and we felt like getting drunk together.	0	1	2	3	4	5	6	7	8	9	10
13. I felt worried or tense about my relationship with someone else.	0	1	2	3	4	5	6	7	8	9	10
14. I felt ill or in pain but this was not due to withdrawal from alcohol.	0	1	2	3	4	5	6	7	8	9	10
15. I felt others were being critical of me.	0	1	2	3	4	5	6	7	8	9	10
16. I saw others drinking.	0	1	2	3	4	5	6	7	8	9	10

APPENDIX D

NEO-FFI

Directions: Please circle the response that best describes **you**.

1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neutral*; 4 = *Agree*; 5 = *Strongly Agree*

1. I am not a worrier…….....1 2 3 4 5
2. I like to have a lot of people around me……1 2 3 4 5
3. I don't like to waste my time daydreaming……...1 2 3 4 5
4. I try to be courteous to everyone I meet……1 2 3 4 5
5. I keep my belongings neat and clean……1 2 3 4 5

6. I often feel inferior to others……..1 2 3 4 5
7. I laugh easily……..1 2 3 4 5
8. Once I find the right way to do something, I stick to it……1 2 3 4 5
9. I often get into arguments with my family and co-workers……...1 2 3 4 5
10. I'm pretty good about pacing myself so as to get things done on time……1 2 3 4 5

11. When I'm under a great deal of stress, sometimes I feel like I'm going to pieces……...1 2 3 4 5
12. I don't consider myself especially "light-hearted"……...1 2 3 4 5
13. I am intrigued by the patterns I find in art and nature……..1 2 3 4 5
14. Some people think I'm selfish and egotistical……..1 2 3 4 5
15. I am not a very methodical person……1 2 3 4 5

16. I rarely feel alone or blue……..1 2 3 4 5
17. I really enjoy talking to people……..1 2 3 4 5
18. I believe letting students hear controversial speakers can only confuse and mislead them……..1 2 3 4 5
19. I would rather cooperate with others than compete with them……..1 2 3 4 5
20. I try to perform all the tasks assigned to me conscientiously……1 2 3 4 5

21. I often feel tense and jittery……1 2 3 4 5
22. I like to be where the action is……1 2 3 4 5
23. Poetry has little or no effect on me……1 2 3 4 5
24. I tend to be cynical and skeptical of others' intentions……...1 2 3 4 5
25. I have a clear set of goals and work toward them in an orderly fashion……1 2 3 4 5

26. Sometimes I feel completely worthless……1 2 3 4 5
27. I usually prefer to do things alone……1 2 3 4 5
28. I often try new and foreign foods……..1 2 3 4 5
29. I believe that most people will take advantage of you if you let them……1 2 3 4 5
30. I waste a lot of time before settling down to do work……..1 2 3 4 5

31. I rarely feel fearful or anxious……..1 2 3 4 5
32. I often feel as if I'm bursting with energy……1 2 3 4 5
33. I seldom notice the moods or feelings that different environments produce……1 2 3 4 5
34. Most people I know like me…….....1 2 3 4 5
35. I work hard to accomplish my goals……1 2 3 4 5

36. I often get angry at the way people treat me.....1 2 3 4 5
37. I am a cheerful, high-spirited person.....1 2 3 4 5
38. I believe we should look to our religious authorities for decisions on moral issues.....1 2 3 4 5
39. Some people think of me as cold and calculating.....1 2 3 4 5
40. When I make a commitment, I can always be counted on to follow through.....1 2 3 4 5

41. Too often, when things go wrong, I get discouraged and feel like giving up.....1 2 3 4 5
42. I am not a cheerful optimist.....1 2 3 4 5
43. Sometimes when I am reading poetry or looking at a work of art, I feel a chill or wave of excitement.....1 2 3 4 5
44. I'm hard-headed and tough-minded in my attitudes.....1 2 3 4 5
45. Sometimes I'm not as dependable or reliable as I should be.....1 2 3 4 5

46. I am seldom sad or depressed 1 2 3 4 5
47. My life is fast-paced 1 2 3 4 5
48. I have little interest in speculating on the nature of the universe or the human condition 1 2 3 4 5
49. I generally try to be thoughtful and considerate.....1 2 3 4 5
50. I am a productive person who always gets the job done.....1 2 3 4 5

51. I often feel helpless and want someone else to solve my problems.....1 2 3 4 5
52. I am a very active person.....1 2 3 4 5
53. I have a lot of intellectual curiosity.....1 2 3 4 5
54. If I don't like people, I let them know it.....1 2 3 4 5
55. I never seem to be able to get organized 1 2 3 4 5

56. At times, I have been so ashamed I just wanted to hide.....1 2 3 4 5
57. I would rather go my own way than be a leader of others.....1 2 3 4 5
58. I often enjoy playing with theories or abstract ideas.....1 2 3 4 5
59. If necessary, I am willing to manipulate people to get what I want.....1 2 3 4 5
60. I strive for excellence in everything I do.....1 2 3 4 5

APPENDIX E

Debriefing Form

Hwemudua Alcohol and Health Disparities Laboratory

The University of Georgia
Dr. Ezemenari M. Obasi

Dear participant,

Thank you for your participation in this research project investigating the relationship between alcohol consumption, reaction time, and other health related variables that may be relevant to drinking and implicit cognitions. The purpose of this study is to investigate the influence that biological, psychological, and social environmental factors have on both alcohol use and implicit cognitions.

Any individual identifiers linking you to your data will be removed immediately following your completion of this study. Data and specimens are anonymous and therefore not individually identifiable. All results will be grouped together; therefore and your performance or responses on any of the measures will not be available. The Primary Investigator (Dr. Ezemenari M. Obasi) will maintain all research related data and protocol records for a minimum of three years after the completion of this study.

A list of relevant campus and community resources is available upon request. Should you be interested in pursuing mental health services at UGA, feel free to contact the UGA Center for Counseling (706-542-8508) or the UGA Counseling and Psychiatric Services (706-542-2273).

If you have any additional questions regarding this research protocol, please contact:

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