VARIATIONS IN SUICIDAL IDEATION AMONG SUBSTANCE USERS

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Research suggests that substance use is a risk factor for increased suicidal ideation. This study explored the relationship between substance use, suicidal ideation, and impulsivity in a sample of college students and individuals seeking outpatient treatment. Participants were interviewed for information on severity of suicidal ideation and substance use. Participants completed the Psychiatric Diagnostic Screening Questionnaire, the substance use section of the Structured Clinical Interview for the DSM-IV, the Alcohol Use Disorders Identification Test, the Scale for Suicide Ideation, and the UPPS-P Impulsivity Behavior Scale. These measures were used to determine the amount of variance in suicidal ideation accounted for by substance use. Variables reflecting substance use classification, frequency, and severity were used to predict severity of suicidal ideation.

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CHAPTER 1

INTRODUCTION

Suicide and Substance Use

Suicide is a worldwide phenomenon with a disturbing prevalence rate. One review by Nock, Borges, Bromet, Cha, Kessler, and Lee (2008) reported worldwide 16.7 per 100,000 persons each year commit suicide and 10.8 per 100,000 persons each year in the United States commit suicide (National Center for Injury Prevention and Control, 2008). This makes suicide the 11th leading cause of death in the United States according to Nock et al. (2008). While these suicide rates are shocking, even more disturbing is the number of individuals who have serious thoughts of suicide. A national study of college students found that one in ten students reported having seriously considered attempting suicide (Brener, Hassan, & Barrios, 1999). Nock et al. (2008) found that lifetime prevalence of adults in the United States who have experienced suicidal ideation was 5.6 to 14.3%. This information has clearly demanded the attention and action of researchers to collect more data on the risk markers for suicidal thoughts and behaviors.

Data analyzed from the National Comorbidity Survey (NCS, 1990 to 1992) found that the highest risk of suicidal ideation, plans, and attempts occurred in the early twenties and late teens (Kessler, Borges, & Walters, 1999). Another study using the same data found that suicide attempts were more prevalent for women, individuals previously married, younger individuals, and those with less education (Borges, Walters, & Kessler, 2000). An analysis of both the NCS and National Comorbidity Survey-Replication (NCS-R) data found that a majority of individuals that exhibited suicidal thoughts or behaviors met criteria for one or more *Diagnostic and Statistical Manual of Mental Disorder (DSM)* disorders within the 12 months prior to the study, over 80% of the sample (Kessler, Berglund, Borges, Nock, & Wang, 2005). While the amount of

variance each disorder contributed in predicting suicidal ideation and behaviors was not reported, prevalence of mental health diagnoses were examined and reported as a percentage of the sample. Major depression was the most frequent disorder among individuals with suicidal ideation or behaviors with 34% to 51%. Furthermore, the classification of having an anxiety disorder appeared to have the most individuals with suicidal ideation and behaviors, 52% to 81%. The prevalence of any substance use disorder ranged from 19.4% of those who experienced ideation to 49.5% of those who made an attempt. While it is clear that many disorders can influence risk for suicidal ideation, additional insight into substance use as a risk factor for suicidal ideation may prove useful in the prevention of suicidal behavior**;** in part, because of its frequent comorbidity with depression and anxiety, but also for its potentially direct effect on suicidal ideation propensity.

A group of individuals that has been shown to be especially susceptible to suicidal ideation are those diagnosed with a substance use disorder. Substance use disorders include both abuse and dependence of licit, illicit or prescribed drugs. According to the *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV)*, abuse is signified by a recurrent use that results in some form of social and/or occupational impairment (America Psychiatric Association [APA], 2000). These problems may include arguments or trouble with family, friends, co-workers, legal problems, or engaging in hazardous activities while intoxicated. Substance dependence often includes some symptoms of abuse and also likely includes evidence of tolerance, withdrawal, and/or loss of control of substance use. Substance use disorders have a high rate of comorbidity with Axis I disorders; one study found that 44% of substance abuse treatment patients had a history of major depression (Hersen, Turner, & Beidel, 2007). Since suicidal ideation is a criterion of major depression one might predict that there is an

increased risk of suicidal ideation as well.

Pfaff, Almeida, Witte, Waesche, and Joiner (2007) conducted a study examining substance use predictor variables that could potentially be used in detecting and preventing suicide among nonclinical samples. These investigators were particularly looking at the quantity and frequency of alcohol consumption as it related to suicide risk. Depressive symptoms were found to significantly predict suicidal ideation and past attempts; however, individuals who drank higher quantities of alcohol at lower frequencies tended to have a higher number of past suicide attempts. This suggests that binge drinking may be an indicator of suicide risk; however, Pfaff et al. (2007) pointed out that the direction of the correlation could not be determined and binge drinking and attempting suicide may both be better predicted by a third variable, impulsivity. However, before moving on to a discussion of impulsivity and other related topics, an objective definition of heavy episodic drinking should be established.

Articles starting in 1969 stated that heavy drinking was considered five or more drinks; however this threshold does not appear to have been derived empirically. Jackson (2008) aimed to empirically determine the threshold for heavy episodic drinking that maximally predicted proximal and distal adverse-drinking-related outcomes. Jackson recruited 115 undergraduate students who completed internet-based surveys for 8 weeks. These surveys asked about daily alcohol consumption, next day hangovers, and the negative effects of alcohol (e.g., lack of concentration, social problems). Participants were asked to fill out a follow-up survey 10 months later asking about adverse outcomes from alcohol use, including if there was increased consumption or more severe drug use. The results highlighted that the greatest predictor for negative outcomes occurred for men at 13 or more drinks and for women at 10 or more drinks as the threshold for heavy episodic drinking**.** Higher thresholds indicated greater severity of

outcomes, as in more problems from drinking. The literature is unclear as to how this increase in threshold may have developed or changed over time.

While this newer empirically determined threshold for heavy episodic drinking should not be ignored, it is also apparent that the implementation of this new threshold in current research has not been established. Maintaining the established research definition of heavy episodic drinking as 5 or more drinks in one sitting allows a comparison of results across studies. In order to assess the amount of variance in suicidal ideation accounted for by the frequency and intensity of alcohol use, the current research gathered information on heavy episodic drinking from participants.

Borges et al. (2000) looked at the associations of substance abuse, dependence, and use (without abuse or dependence) with subsequent suicidal ideation and behaviors within the participants of the National Comorbidity Survey. The results from this study revealed that the substance use predictor variables had odds ratios that ranged from 2.8 to 17.6 with respect to the suicidal ideation and behavior criterion variables. Borges et al. (2000) also controlled for comorbid mental health disorders and in this case the odds ratios ranging from 2.2 to 5.9. Nevertheless, using substances or having a substance use disorder was still a significant predictor of suicidal ideation/behavior despite the drop in odds when controlling for other disorders, indicating that the effect was not due entirely to comorbid disorders. In addition, substance use was a significant predictor of future suicide attempts across all substances and there was a trend of increasing odds ratios within each substance looking across use versus abuse and dependence. Yet, only alcohol, inhalants, and heroin indicated significant incremental effects as the severity of substance use increased. While it is unclear why these particular drug classifications had incremental effects, it may be due to common neurobiological consequences such as depression

of the central nervous system and increased dopamine levels (National Institute of Drug Abuse (NIDA), 2005; NIDA , 2010; Gilpin & Koob, 2008). Borges et al. found that current use was a stronger predictor than past use and that the number of substances used was a more valuable predictor than the type of substance. Conversely, Brener et al. (1999) found that undergraduate students who considered suicide were more likely to have used a substance in the 30 days prior to the ideation. No doubt these studies are helpful in highlighting an association between substance use and substance disorders; however, it is necessary to examine if other aspects of substance use might contribute to our understanding of risk for suicidal ideation and behaviors.

Additional studies have concluded that there is an association between substance use and suicidal ideation and behaviors. A diagnosis of a substance use disorder was found to be associated with an increase risk of suicide attempts but not death by suicide among an elderly community sample (Pfaff et al., 2007). Joiner (2005) proposed that alcohol use increases an individual's ability to engage in physically harmful behaviors. Consistent with this proposal is the fact that a person with a diagnosis of alcohol use disorder is ten times more at risk for suicide; undiagnosed heavy drinkers are three to four times more at risk (Pfaff et al., 2007). Similarly, a study of alcohol dependent and treatment seeking individuals for substance problems found that average drinking intensity and drinking frequency predicted suicidal ideation (Conner, Gunzler, Tang, Tu, & Maisto, 2011). This relationship, however, was partially mediated by depression. In contrast, a general population study found, across a three year examination of incidence and predictors of suicidal ideation, that having a substance use disorder did not predict the onset of ideation but instead predicted the age of onset of substance use which predicted the onset of ideation (Have, Graaf, Dorsselaer, Verdurmen, Land, Vollebergh, & Beekman, 2009). Finally, clinical samples of poly-substance abusers have been shown to have a higher rate of

suicide attempts than individuals with alcohol dependence alone (Landheim, Bakken, & Vaglum, 2006). Similarly, Conner, Britton, Sworts, & Joiner (2007) reported that those who seek treatment for opiate dependence are at 13.5 times greater risk for suicide than the general population. Taken together, the evidence highlights that individuals with substance use problems are more susceptible to suicidal ideation, across a diversity of sample types.

Additional **s**tudies have been focused on assessing what general factors may increase life-long risk of suicidal ideation. Unfortunately, while substance use disorders have been determined to be a risk factor for suicidal ideation, little research has been conducted to determine if a specific level of impairment, type of substance, or frequency of use may influence the frequency or severity of suicidal ideation. These areas were examined in this thesis study. Determining which factors of substance use are the strongest predictors of suicidal ideation and suicidal behaviors may assist clinicians in conducting suicide assessments and determining the risk for suicidal behavior. By examining the effects that substance use and related disorders may have on suicidal ideation, alternative prevention methods may be developed to assist in lowering the occurrence of suicidal ideation before suicidal behaviors become a problem for the individual.

Impulsivity, Substance Use, and Suicidal Ideation

It is possible that impulsivity can help understand the link between substance use and suicidal ideation. Moeller, Barratt, Dougherty, Schmitz, and Swann (2001) defined impulsivity as not considering the consequences of one's actions before reacting in a quick and unplanned manner to either an internal or external stimuli. Based on this definition, it seems intuitive to think of suicidal acts and problematic substance use as being an unplanned reaction to a stimulus for which the person may not have considered the negative consequences, such as impairing

health problems, legal problems, and social conflict. In order to study the effects of impulsivity on substance use and suicidal ideation, an understanding of both how impulsivity has been assessed and discussion of relevant previous findings in this area are necessary.

Evenden (1999) suggested that while there are many measures of impulsivity, researchers tend to agree that impulsivity is a multifactor construct. The first factor is generally failing to assess and reflect before a behavior that could be described as oblivious impulsivity. The second factor involves considering the consequences of the action but still completing the behavior, and this equates to sensation seeking. There is another line of thinking regarding the factors contributing to impulsivity that include five constructs of impulsivity that have been found to be modestly related to each other (Cyders & Smith, 2007; Cyders, Smith, Spillane, Fischer, Annus, & Peterson, 2007; Smith, Witte, Teale, King, Bender, & Joiner, 2008; Spillane, Smith, & Kahler, 2010; Whiteside & Lynam, 2001). These five traits include; negative urgency, positive urgency, sensation seeking, lack of perseverance, and lack of planning. Lack of planning equates to the concept of oblivious impulsivity described earlier, but can be more simply considered the concept of acting without thinking. Lack of perseverance is an inability to stay focused and on task. Sensation seeking is the tendency to seek out novel and exciting experiences. An individual with high negative or positive urgency signifies that they tend to act rash in response to a negative or positive mood, respectively. The construct of impulsivity applies to normal individual differences in personality and personality pathology among clinical populations (Stanford, Mathias, Dougherty, Lake, Anderson, & Patton, 2009). This study assessed impulsivity as a multi-factoral set of trait dimensions and its influence on suicidal ideation and substance use.

According to Joiner's (2005) interpersonal theory of suicide it is not state impulsivity that

causes an increased risk of suicide, but trait impulsivity that may increase the likelihood of suicide. This is due to the notion that exposure to painful and provocative experiences that may be more prevalent with someone who is impulsive would result in an acquired capability for suicide. Cherpitel (1993) indicated that trait impulsive individuals are more often injured in accidents and engage in substance use that might increase an individual's ability to endure future suicidal acts. Witte, Merrill, Stellrecht, Bernert, Hollar, Schatschneider, and Joiner (2008) compared suicidal adolescents and found that individuals who seemingly attempted suicide impulsively were less likely to have a history of impulsive behavior. Individuals with trait impulsivity were found to be more likely to have made an attempt with a plan. This suggests that trait impulsivity leads to acquired capability, but may have also made these individuals more susceptible to thoughts of suicide (Smith et al., 2008).

Swan, Dougherty, Pazzaglia, Pham, Steinberg, and Moeller (2005) studied a group of patients, both inpatient and outpatient, with bipolar disorder, and found suicide attempters were more likely to have abused alcohol than other substances. They also found that being a suicide attempter was associated with more impulsive responding on an immediate-memory task and response latency on a continuous performance task. However, Barratt Impulsiveness Scale scores (Patton, Stanford, & Barratt, 1995) were not significantly higher among attempters, though there was a trend toward self-reporting more impulsivity. Swan et al. (2005) also looked at the severity of suicide attempt based on level of injury and risk of death. They found that attempters with severe injuries had significantly more commission errors and a shorter responding time, indicating that they presented with more impulsive behavioral response styles than those who had less severe injuries. Swan et al. (2005) concluded that impulsivity was a characteristic seen among bipolar patients with a history of suicide. While these results are informative within a

sample of individuals suffering from bipolar disorder, studies involving more than one diagnostic sample are necessary to evaluate impulsivity as a risk factor for suicidal behaviors more generally. Furthermore, research on the effects of impulsivity on suicidal thoughts also needs to be explored.

Mann, Waternaux, Haas, and Malone (1999) conducted a study of inpatients that looked at risk factors for suicide attempts across disorders. They discovered that suicide attempters had significantly higher scores on measures of aggression and impulsivity as measured with the Brown-Goodwin Aggression Inventory (Brown, Goodwin, Ballenger, Goyer, & Major, 1979), Buss-Durkee Hostility Inventory (Buss & Durkee, 1957), and Barratt Impulsiveness Scale (Patton et al., 1995). Mann et al. (1999) also found that suicide attempters had higher scores on a measure of suicidal ideation as well. This suggests that individuals who have an increase of both impulsivity and suicidal ideation may be more likely to act on those thoughts. Neufeld and O'Rourke (2009) found impulsivity to be significantly correlated with suicidal ideation in a sample of older adults referred due to clinical symptoms. It was even suggested that impulsivity was more closely associated to suicidal ideation than hopelessness in this population. Taken together, there appears to be a relationship between suicidal ideation and impulsivity across a diverse set of studies, however, impulsivity also appears to play a role in substance use.

Individuals who have impulse related disorders and/or exhibit other impulsive behaviors are more likely to use substances (Brady, Myrick, & McElroy, 1998). Swann, Dougherty, Pazzaglia, Pham, and Moeller (2004) found that impulsivity is related to substance abuse. Multiple studies have found higher self-reported impulsivity scores among substance dependent individuals (Allen, Moeller, Rhoades, & Cherek, 1998; Moss, Yao, & Panzak, 1990; Patton et al., 1995). Laboratory studies looking at state dependent impulsivity have also found an increase

in impulsivity scores among those with a history of substance abuse (Kirby, Petry, & Bickel, 1999; Kruedelbach, McCormick, Schulz, & Grueneich, 1993; Madden, Petry, Badger, & Bickel, 1997; Mitchell, 1999; O'Boyle & Barratt, 1993; Vuchinich & Simpson, 1998). These studies indicated that there is a clear connection between substance use and both state and trait impulsivity.

Additional studies suggest that impulsivity may be a useful predictor of the severity and type of substance use. McCown (1988) and O'Boyle and Barratt (1993) found that individuals who use multiple substances exhibited an increase in impulsivity scores as compared to single substance users. Compared to controls, higher impulsivity scores on the Barratt Impulsiveness Scale-11 (BIS-11**;** Patton et al., 1995) were found among cocaine dependent adults (Lane, Moeller, Steinberg, Buzby, & Kosten, 2007), as well as Ecstacy users (Bond, Verheyden, Wingrove, & Curran, 2004). Dom, D'haene, Hustijn, and Sabbe (2006) found that early-onset alcohol dependent individuals scored higher on the BIS-11 than late-onset alcohol dependent individuals. BIS-11 scores were also found to be predictive of the level of an individual's cocaine and crack use (Lejuez, Bornovalova, Reynolds, Daughters, & Curtin, 2007). This suggests that impulsivity scores may be sensitive enough to identify distinctions among different types of substance use disorders (Stanford et al., 2009).

Several studies have identified characteristics of impulsivity that seem to be related to substance use and substance use problems. Magid and Colder (2007) found that lack of planning was significantly related to alcohol use in that individuals who were high in planning were predicted to have low levels of alcohol use. Sensation seeking was marginally positively correlated to alcohol use. Urgency and lack of perseverance were not related to alcohol use, but instead were significantly associated with alcohol related problems. Therefore, individuals who

tend to act impulsively in reaction to intense emotions or have a difficult time staying on task are more likely experience negative consequences due to their alcohol use. Smith, Fischer, Cyder, Annus, Spillane and McCarthy (2007) also found that urgency predicted problem drinking. They also identified sensation seeking as being correlated with drinking quantity/frequency. This indicates that urgency is a construct that demonstrates the rash actions a person may perform when distressed that may lead to risky or addictive behaviors. Spillane et al. (2010) found that individuals with higher positive urgency scores were more likely to have higher nicotine dependence scores, suggesting that they may feel the urge to smoke when experiencing positive feelings such as happiness which may occur in social and celebratory situations. Furthermore, the overall results suggest that impulsivity plays a direct role in substance use, as well as suicidal ideation.

Suicidal Ideation

Defining suicidal ideation**.** *The Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV)* uses suicidal ideation as a criterion for major depression (APA, 2000). Suicidal ideation is expressed in various levels of severity as the *DSM-IV* describes; including believing that others would be better off if the person were dead, to experiencing transient and recurrent thoughts of committing suicide, to having a specific plan in mind to commit suicide (APA, 2000). Individuals may vary in frequency and intensity of suicidal thoughts or actions. Some individuals have frequent thoughts of suicide but never act on it while others may attempt suicide several times or succeed in finalizing the act. Nock et al. (2008) reviewed cross-national data and calculated that 9.2% of individuals have experienced a lifetime prevalence of suicidal ideation and 60% of those individuals transitioned into having a suicide plan or had made an

attempt within a year of suicidal ideation onset. This data suggests that suicidal ideation and suicidal behaviors fall on a continuum whereby some individuals who have experienced suicidal ideation may be at risk of later attempting or even committing suicide.

In addition, Kessler et al. (1999) found, among individuals from a national survey who reported experiencing suicidal ideation that the probability they would later have a planned suicide attempt was 57.9% and the probability of an attempt without a plan was 25.2%. This indicates that while there may be more of a chance for those who have had suicidal ideation to develop a plan prior to an attempt, there is still the possibility that some individuals will attempt suicide without a plan. This may suggest that impulsivity plays a larger role with these individuals. In the context of levels of severity risk, it is understandable that worldwide there are between ten and twenty suicide attempts for every successful suicide (Pfaff et al., 2007). However, severity of suicidal thoughts, from ideation to more risky thoughts of planning suicide, as well as its association with depression, is extremely difficult to study.

Based on the results of a large longitudinal study, Shahar, Bareket, Rudd, and Joiner (2006) concluded that suicidal ideation, hopelessness, and depression do not necessarily have clear causal longitudinal associations. Specifically, these investigators found that these symptom domains had strong concurrent associations, but that depression and hopelessness did not cause (or lead to) future suicidal ideation. As such, the results of this study suggest that suicidal ideation could just as easily influence expression of depression and hopelessness, or all three could be influenced by another variable such as neuroticism, impulsivity, substance use, or other mental health disorders. Before additional research can be conducted on the factors influencing suicidal ideation, it is important to have a thorough definition of suicidal ideation.

In 2007, Silverman, Berman, Sanddal, O'Carrol, and Joiner re-evaluated the terminology used among suicide researchers. This was done because there was no coherence among researchers on the definition of suicide; it could indicate many varied behaviors rather than one single act. These varied definitions were a limitation on the study of suicide because the findings could not be compared across studies.

When attempting to classify individuals with respect to suicide terminology, it is important to first consider if such individuals ever intended to harm themselves. Silverman et al. (2007) discussed suicidal intent in terms of purpose or intent of the behavior. Some individuals may intend to kill themselves while others may be using self-harm for another goal (i.e. interpersonal attention). Classifying a person's intent for suicide can be challenging, especially if they do not have much insight into their emotions or motives. Silverman et al. proposed that three classifications be used regarding intent: 1) no intent, 2) uncertain intent, and 3) intent. Once a person's intent is categorized, then suicidal ideations can be placed in one of five categories: casual, transient, passive, active, and persistent. See Figure 1 for an outline of Silverman et al.'s classification for suicidal thoughts and behaviors.

Silverman et al.'s (2007) classification system is important because research in the field had previously been difficult to replicate due to a lack of transient operational definitions. Also, by using a more standardized definition of suicidal ideation and behaviors researchers are able to make comparisons across data, this may lead to a better understanding of suicide and its related components. Since the revised nomenclature by Silverman et al. was published in 2007 it has been cited in over 60 articles, suggesting that several researchers have accepted these definitions for their own work. However, no formal research has been conducted on the effectiveness of this nomenclature to improve the study of suicidal thoughts and behaviors. Silverman et al. (2007)

have provided the necessary nomenclature that can be used to assist in identifying the risk factors and warning signs that lead to these classifications of suicidal ideation.

Additional risk factors and warning signs for suicidal ideation**.** Research has identified a number of additional factors that might influence risk for suicidal ideation (Rudd, Berman, Joiner, Nock, Silverman, Mandrusiak, et al., 2006). According to Rudd et al. (2006), common symptoms that warn of suicidal ideation include thoughts of suicide or self-harm, obsessions with death, writing about death, and feelings of guilt. Some warning signs for suicidal ideation include sudden changes in personality, eating, or sleeping patterns, and impairment at school or work. Jobes, Rudd, Overholser, and Joiner (2008) included additional warning signs such as reckless behavior, increased alcohol/drug use, social withdrawal, and dramatic mood changes; and also, subjective symptoms of hopelessness, rage, feelings of being trapped, anxiety/agitation, and a lack of a sense of meaning in life. Consistent with the Jobes et al. (2008) findings, Pfaff et al. (2007) found that 36% of suicidal acts involve some alcohol intoxication while 41% of individuals were intoxicated at the time of their suicide attempts. Using these warning signs for suicidal ideation may lead to identification of individuals as being in immediate risk of committing suicide.

Clearly, the literature reveals that there are a variety of risk factors for suicide or suicide ideation. Empirical risk factors may include any factor shown to correlate to suicidal tendencies; including age, sex, psychiatric diagnosis, and previous attempts (Rudd et al., 2006). Risk factors increase the long-term probabilistic risk for suicidal ideation. In contrast, warning signs and symptoms are an immediate expression of suicidal risk. Rudd et al. (2006) reported that there are three distinct signs and/or symptoms that immediately precede a suicide attempt; a stress inducing event, an intense and unusual affective state, and a recognizable pattern of behavior

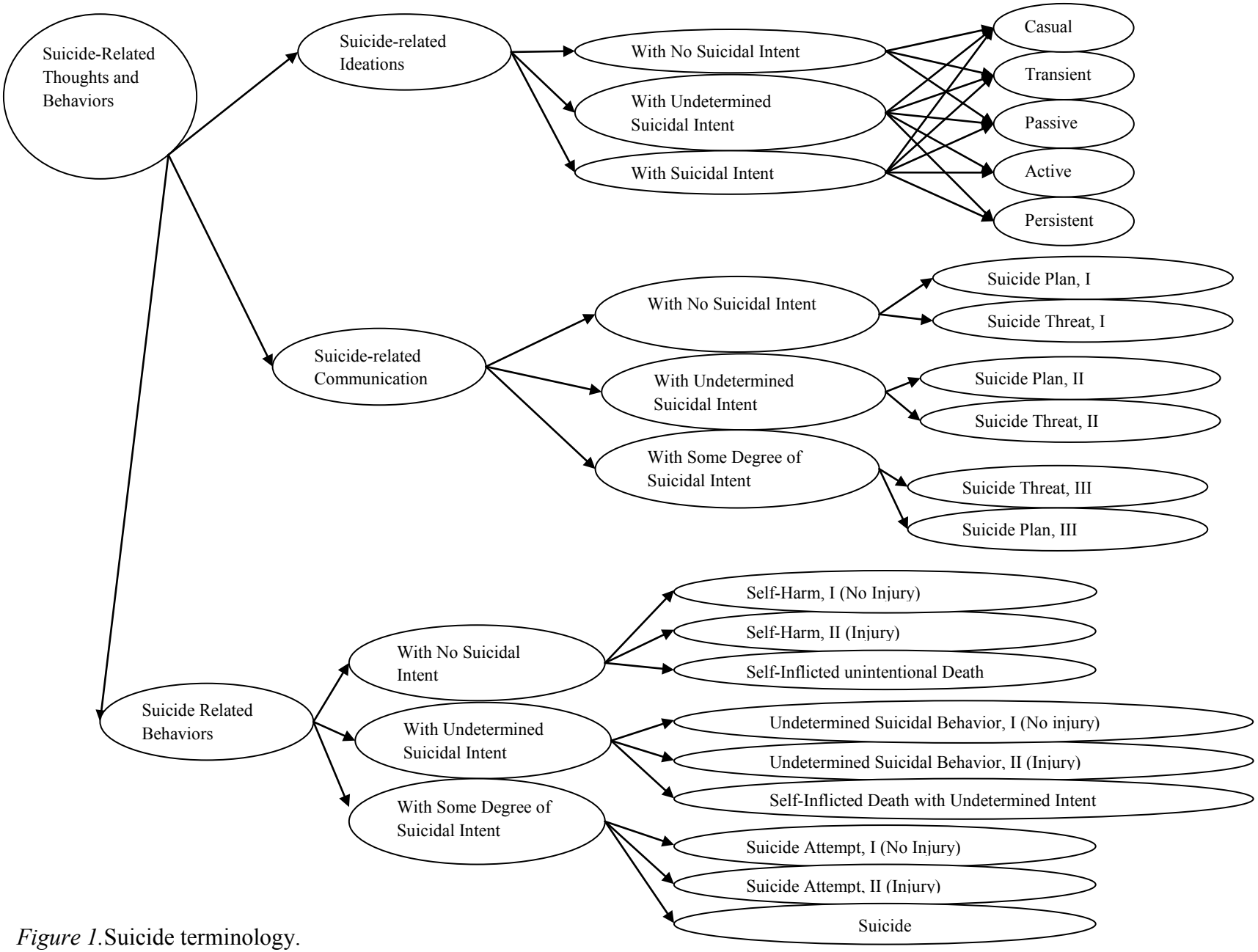

*Figure 1.*Suicide terminology.

(i.e., suggestions through speech or action of suicide, impairment in social or occupational functioning, or increased substance abuse).

One key feature to note about suicidal thoughts and actions is that it can fluctuate dramatically in intensity over periods of hours or days (Rudd et al., 2006). Witte, Fitzpatrick, Warren, Schatschneider, and Schmidt (2006) captured this variability in a study of 108 undergraduate students. This study focused on assessing the stability of suicidal ideation and its association with related constructs, including mood symptoms and the number of suicide attempts. Results indicated that individuals who attempted suicide multiple times endorsed significantly more variability in ideation than non-attempters. However, single attempters did not significantly differ from non-attempters or multiple attempters on daily variability. These results suggest that daily experiences of ideation do not follow a linear or stable course of development. This variability may prove important in determining which individuals are at risk of becoming multiple attempters. Multiple attempters also appeared to have a larger range and greater intensity of both ideation and depression over non-attempters or single attempters. As such, it is reasonable to propose that substance use/abuse and/or impulsivity may be related to this documented variability in suicidal ideation and depression. Consistent with the hypotheses proposed with the current study, Witte et al. (2006) noted that depression and hopelessness were limited in their specificity, despite being risk factors, for suicidal ideation, and instead attributed their results to differences in mood and ideation dysregulation.

In addition to the immediate risk of suicide there are also factors that increase lifetime risk of attempting suicide. Elderly individuals over the age of 65 have been found to be at higher risk of completing suicide than any other age group (Witte, Joiner, Brown, Beck, Beckman, Duberstein, et al., 2006). This could indicate that older adults are more deliberate and plan more

successful suicidal acts. Witte et al. (2006) also point out that the rates of suicidal ideation and attempts decreases across a lifespan while rates of completed suicide increase. There have been studies indicating that impulsivity tends to decrease and emotional stability tends to increase with age which may be the reason suicide attempts decline (Littlefeild, Sher, & Wood, 2009; Okun, 1976; Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006). However previous impulsive experiences (i.e. injuries and substance use) may have led to an acquired capability for self harm suggesting that those who are intent on suicide may be more likely to succeed (Smith et al., 2008).The increased rate of completed suicide may also be due to this acquired capability or the fragility of the elderly.

As reported by Landheim et al. (2006), additional risk factors for suicide attempts include being female, having attempted suicide previously, and being diagnosed with an Axis I disorder (except generalized anxiety disorder). Another study found that students who seriously considered attempting suicide, suicidal ideation without a plan or attempt, did not vary by gender, but did find that African-American or Hispanic race/ethnicity were associated with an increased consideration of suicide (Brener et al., 1999). This study also concluded that students who lived with a romantic partner were less likely to experience suicidal ideation, and similarly for those involved in college fraternity. This may support the idea that positive social interactions, or a perceived belongingness, may lower suicidal ideation. These studies indicate that there may be differences in risk factors between individuals who are only thinking about suicide versus individuals who later display suicidal behaviors, like an attempt. Thus, additional research is needed to look at the variations of outcomes related to these risk factors.

Joiner, Van Orden, Witte, and Rudd (2009) have developed the Interpersonal Theory of Suicide that highlights three factors associated with increased risk of suicidal thoughts and

behaviors. These include the individual's perceived burdensomeness, failed belongingness, and acquired capability for self-harm. Acquired capability can develop from various experiences: witnessing violence through warfare, familiarity with bodily harm through occupational experience (e.g., being a physician), and past suicide attempts or self mutilating behaviors. Interestingly, Joiner et al. (2005) also suggest that intravenous drug use may increase acquired capability for suicide due to the repeated self-inflicted injections. At least within the context of "acquired capability for self-harm," it appears that that some aspects of drug use may influence a person's experiences with suicidal thoughts and behaviors. In this case, the method of intake may be an important factor. The National College Health Risk Behavior Survey estimated that overall 1.7% of college students have used drugs by method of injection in their lifetime (Centers for Disease Control and Prevention [CDC], 1997). An outpatient study indicated that only 1% of 1,072 participants reported injection drug use (Carey, Carey, Maisto, Gordon, & Vanable, 2001). Due to the low rate of reporting intravenous drug use, it is unlikely that this thesis study would find a sufficient number of participants who engage in this behavior given the sample size and populations. Therefore, the hypothesis of injection drug use predicting suicidal ideation will not be tested at this time.

However, acquired capability may be attained through means more directly associated with suicide. A study by Joiner, Conwell, Fitzpatrick, Witte, Schmidt, Berlim, et al., (2005) looked at four populations and examined the relationship between past and current suicidality while controlling for all other relevant covariates. They discovered that past suicidal behavior proved to be the best predictor of current suicide symptoms; including ideation, plans, and intent. While this information is useful for those who have reached the point of acting on their ideation, it does not indicate what may be responsible for the increase in ideation that leads to initial

suicidal behavior. The scope of the current study only allowed for limited data collection on acquired capability and did not include exploration of perceived burdensomeness or failed belongingness.

Measuring suicidal ideation**.** Researchers focusing on the study of suicidal thoughts and behaviors are limited in ways they can examine this phenomenon. They must rely on self-reports and medical records of past or current events. Also, longitudinal studies are difficult to conduct due to the necessity to intervene should a participant express any significant suicidal intention. However, many researchers have managed to collect data on various aspects of suicidal ideation and acts including risk factors, warning signs, and comorbidity with other symptoms or disorders.

Instruments used to measure suicidal ideation include self-reports and interviews that are entirely focused on ascertaining the level and frequency of suicidal ideation and behaviors, such as the Scale for Suicide Ideation (Beck, Kovacs, & Weissman, 1979), Beck Scale for Suicide Ideation (Beck & Steer, 1991), and the Self-injurious Thoughts and Behaviors Interview (Nock, Holmber, Photos, & Michel, 2007). In contrast, some researchers and practitioners choose to use measures that have items related to suicidality, but do not focus on this as the primary construct, such as the Beck Depression Inventory (Alexopolous, Bruce, Hull, Sirey, & Kakuma, 1999; Beck & Steer, 1991: Brown, Beck, Steer, & Grisham, 2000), or simply included questions about suicide within a broader survey (Brener et al., 1999; Conner et al., 2007; Kessler et al., 1999; Landheim et al., 2006). Similarly, some investigators have employed measures that assess constructs, such as hopelessness via the Beck Hopelessness Scale, to evaluate the potential for suicidal ideation and behaviors (Beck, Brown, Berchick, Steward, & Steer 1990; Drake & Cotton, 1986; Petrie, Chamberlain, & Clarke, 1988).

Employing measures of related but nonetheless separate constructs from suicidality (i.e., The Beck Hopelessness Scale) may be useful in assessing factors that play a role in an individual's decision to attempt or complete suicide; however, such measures do not provide a systematic assessment of suicidal ideation or behaviors. For instance, measures like the Beck Depression Inventory have only one question on suicide. This may be useful for researchers who are not interested in collecting a broad range of details about suicidal thoughts or behaviors; however, for those interested in the fundamental nature of suicidal ideation this may not be sufficient. For instance, the Beck Depression Inventory may only look at suicide from a primarily cognitive framework (Conner et al., 2011). In addition, inclusion of suicide-related questions within a broader survey may not be asked in a way that is clear to the participants, and how some items are associated with the other items in these surveys remains unknown. Having varied questions within a broader survey also results in problems comparing results across studies in suicide research (Brown, 2002). Given this information, a measure intended for the detailed assessment of suicidal ideation was the most useful tool for the current study.

Joiner, Rudd, and Rajab (1999) found that clinicians tended to rate participants high on a suicide interview as compared to the participants self-report. They hypothesized that the number of previous attempts and the participants' histrionic personality style may have elevated the clinician ratings. Another study found a high level of agreement between an interview format and self-report, with the exception of current suicidal ideation which was endorsed more frequently on the self-report measure (Kaplan, Asnis, Sanderson, Keswani, De Leuona, & Joseph, 1994) According to Brown (2002), interviews may provide more flexibility in assessing suicidal thoughts and behaviors, but may be more time consuming. This includes allowing a clinician to encourage honest responses if it appears the participant is hesitant to disclose suicidal

thoughts. However, Brown acknowledges that self-report questionnaires may be insufficient for participants who are cognitively impaired or have emotional instability.

While there is not a "gold standard" instrument in the field of suicide research, the current study employed a measure that has been shown to result in valid and reliable ratings in previous research, as well as assess both current and past experiences with suicide ideation and behavior. For the purpose of this study a semi-structured interview was employed that involves ratings of the frequency and severity of suicidal ideation and behaviors. By utilizing a semi-structured interview the trained administrator was able to assess whether the person seems timid about answering questions regarding suicidal thoughts and behaviors. This behavioral observation provided a cue for the administrator to encourage an accurate response. Interview format also allowed an opportunity for the participant to disclose this information to a caring individual who was able to refer them to additional resources if necessary.

It is clear that suicide is a problem which requires more research in order to understand the risk factors that contribute to suicidal ideation and behaviors. While mental disorders, such as depression, are risk factors for suicidal ideation and behaviors it seems that even when controlling for these disorders substance use and substance use disorders still remain significant predictors. In addition, impulsivity may be related to both suicidal ideation and substance use. The current study explored these variables and their inter-relations in order to obtain a better understanding of the influences on suicidal ideation.

CHAPTER 2

RESEARCH QUESTIONS AND HYPOTHESES

Research Questions

Does substance use predict the presence of suicidal ideation above and beyond other risk factors, including depression? What is the strength of the association between substance use and suicidal ideation? Does the severity or frequency of suicidal ideation increase as the severity (abstinent, occasional use, heavy episodic use, abuse, dependence) or frequency of substance use increases? Does impulsivity account for some of the variance within both substance use and suicidal ideation?

Hypotheses

1) Based on research by Borges et al. (2000), Pfaff et al. (2007), and Joiner et al. (2005) the incremental validity of substance use will predict lifetime incidence of suicidal ideation in an undergraduate and outpatient clinical sample, over and above other factors associated with suicidal ideation, including depression.

2) Based on findings illustrating the incremental effects on suicidal ideation and behaviors as the severity of substance use increased (Borges et al., 2000), it is predicted that substance dependence will be a better predictor of lifetime prevalence of suicidal ideation than abuse or heavy episodic use.

3) According to Brener et al. (1999) it is likely that individuals with current suicidal ideation are more likely to have used a substance in the past 30 days. It is predicted that this study will support these findings.

4) Poly-substance users are more likely to have higher scores on measures of both suicidal ideation and impulsivity than individuals who have a preference for one type of substance. This would support findings that the number of substances used was a more valuable predictor than type of substance (Borges et al., 2000) and the conclusion that poly-substance users had an increased rate of suicide attempt above those with alcohol dependence alone (Landheim et al., 2006).

5) Impulsivity is a predictor of both heavy episodic drinking and lifetime incidence of suicidal ideation. This corresponds to the findings that lack of planning may be related to alcohol use (Magid & Colder, 2007) and that higher impulsivity scores were related to increased suicidal ideation in suicide attempters (Mann et al., 1999).

6) Smith et al. (2007) found that the combined impulsivity trait of urgency predicted problem drinking. The current study hypothesizes that the impulsivity facet of negative urgency in particular will predict substance use problems and the severity of the worst period of suicidal ideation above the other facets of impulsivity.

7) Both samples will show similar risk factors for suicide based on previous research. This includes age, sex, social support, substance use, and comorbidity with other possible mental health disorders (Jobes et al., 2008; Pfaff et al., 2007; Rudd et al., 2006).

8) However, the outpatient psychotherapy sample is expected to experience more suicidal ideation.

CHAPTER 3

METHOD

Participants

Power analysis**.** An a priori power analysis was conducted to calculate the number of participants within each sample required to detect a moderate effect, Cohen's $f^2 = .15$, using a multiple regression with 12 predictors and 80% power. The sample size required for this study would be 127 participants. However, due to limitations in recruitment capability and time constraints this was not achieved.

Subjects**.** This study consisted of 51 undergraduate students enrolled in psychology classes at the University of North Texas. Students were recruited through their registration with the department of psychology research participant pool, SONA system, and through summer course recruitment during which instructors agreed to allow extra credit for participation. Each student earned four to six research credits though the SONA system for his or her participation in the study.

This sample was similar in demographics to the student body found on the University of North Texas' campus (University of North Texas, Fall 2008). University demographics include approximately 63.7% European-American, 12.8% African-American, 12% Hispanic, 5.2% Asian and Pacific Islander, .8% Native American and Alaskan, and 4.6% non-resident alien. The UNT campus includes approximately 56% females and 44% males. Demographic information for the undergraduate group that participated in the study may be found in Table 1.

A second sample ($N = 31$) was obtained though a collaboration with The University of North Texas (UNT) Psychology Clinic, an outpatient facility in Denton, Texas. This facility is a training clinic which offers a sliding scale, based on household annual income, to its clients. The

outpatient services include: assessment, individual therapy, group therapy, and family therapy. Clients have a range of reasons for seeking treatment, from severe mental illness, including those with psychotic symptoms, to clients who are seeking counseling for life stressors.

Demographic information for clients who enrolled in psychotherapy and assessment services during the spring academic term of 2011 was provided by the UNT Psychology Clinic. During this time period 319 clients sought services; however, eight of these files contained some missing demographic information. Of these 56.7% were female and 42.9% were male. The average age for clients was 30.96 (*SD* = 13.09). Regarding ethnicity 65.2% self-identified as European-American, 5.3% African-American, 14.1% Hispanic, 3.8% Asian and Pacific Islander, .6% Native American and Alaskan, 6.0% biracial, .3% Middle Eastern, .6% Native African, and 1.9% indicated other. In addition, 52.4% identified "student" under occupation, suggesting that there may be some overlap between the current study subsamples. Demographic information for the clinic study participant group may also be found on Table 1.

This study consisted of 31 outpatient participants. Participants from the UNT Psychology clinic were recruited with the cooperation of the clinic director and staff. Fliers were handed to clients by the clinic staff and posted in the clinic's waiting area informing clients that this research opportunity was available. Individuals interested in participating returned the flier with their contact information and were called or e-mailed with study information and appointment times. Interested clients were given $10 for their participation in the study.

Of the total sample, including both undergraduates and clinic clients, females comprised 65.9% (*n* = 54), while males comprised the remaining 34.1% (*n* = 28). The mean age for participants in this study was 25.88 (*SD* = 9.92). Additional information about marital status, highest level of education, and ethnicity may be found on Table 1. For most analyses the two

samples were combined to increase the variability of substance use, suicidal ideation and impulsivity scores, the exception being for hypothesis eight which compares the severity of suicidal ideation between the two groups. Comparison of the correlation tables for each group (Tables 12, 13, 14, & 15) indicate that the directions of the relationships are similar between the two groups and therefore can be combined in this manner. Only one variable, sensation seeking, does not maintain this consistency and is discussed further in the results section.

Measures

The following measures described below were administered to participants in this study.

- Structured Clinical Interview for DSM-IV (SCID) substance use module**.** The SCID (First, Spitzer, Gibbon, & Williams, 1997) is a structured interview that assesses the presence of psychopathology based on the criteria found in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition. The SCID has two versions; SCID-I which covers Axis I disorders and the SCID-II which covers the personality disorders found in Axis II. The SCID-I has a research version and a clinical version. The research version goes further into the diagnostic criteria by including specifiers for many disorders. The diagnostic coverage of the SCID-I (research) includes; mood episodes, psychotic symptoms, psychotic disorders, mood disorders, substance use disorders, anxiety disorders, somatoform disorders, eating disorders, and adjustment disorders. The substance use module of the SCID-I Research Version was used for the purpose of determining the severity and frequency of substance use, including if the individual met criteria for abuse or dependence and for which substances.

A study conducted by Martin, Pollock, Bukstein, and Lynch (2000) assessed the inter-rater reliability of the SCID-I in regards to alcohol and substance use among adolescents. This

study used trained interviewers to independently rate the diagnostic criteria in the SCID. This study concluded that there were no significant differences in the 71 inter-rater interviews. The mean kappa values for agreement on alcohol use disorders (kappa = 0.97) and substance use disorders was high (kappa range of .82 to 1.0). Although this study was conducted on adolescences it supports the notion that the SCID is a measure that can be reliably administered by multiple clinicians for the purposes of assessing substance use disorders.

Inter-rater and test-retest reliability analyses were conducted by Zanarini, Skodol, Bender, Dolan, Sanislow, Morey et al. (2000). The researchers concluded that the SCID-I had excellent inter-rater reliability on six of the 10 disorders diagnosed and fair to good reliability for the remaining four disorders. Test-retest analysis found that axis I disorders ranged from having excellent reliability to poor reliability. This analysis was done by module and found three to be excellent, six fair to good, and one (dysthymia) was poor. The SCID-I will provide useful diagnostic, frequency and severity data for substance use disorders.

- Alcohol Use Disorders Inventory Test (AUDIT)**.** The goal of the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) is to identify individuals with hazardous and harmful patterns of alcohol consumption and identify individuals who would benefit from reducing or ceasing drinking. This is accomplished by screening excess drinking and assisting in brief assessment. The AUDIT also aims to provide a framework for intervention for those with problem drinking based on the level of the individual's apparent problems.

The AUDIT was developed by the World Health Organization (WHO), therefore based on the ICD-10 definitions of alcohol use disorders. It was first published in 1989. The AUDIT underwent cross-national standardization with primary healthcare patients in six countries and

has been translated into several languages. The goal was to have an alcohol screening tool that could be used across developed and developing countries.

The AUDIT consists of 10 self-report questions focused on alcohol use patterns over the past year. The participant is to respond based on a multiple choice format of four options. The AUDIT has been shown to have high internal consistency and good test re-test reliability (r = .86) (Babor et al., 2001). A cutoff score of eight points yields sensitivity for various indices of problematic drinking. However, the cut off score may be adjusted for age, weight/ body mass, national and cultural standards. This measure was used to assist in validating accurate categorization of individuals with alcohol use problems and who engage in heavy episodic drinking.

- The Scale of Suicide Ideation (SSI)**.** The SSI (Beck et al., 1979) is a semi-structured interview developed to assess the intensity of suicidal thoughts or wishes. The scale quantifies suicidal ideation by evaluating the duration and frequency of ideation, sense of self-control over an attempt, number of deterrents, amount of preparation for attempt, and incidence and frequency of a previous attempt. The SSI is a 19-item measure; however, each question is intended to be asked regarding both current ideation and the worst period of ideation. These items are rated based on descriptive criteria resulting in a score from zero to two. The first five items act as screener questions for the remainder of the interview, that is if the participant scores a 0 on all five items the interview is discontinued. Total scores are possible from 0 to 38. Individual items may yield information about active suicidal ideation, passive suicidal ideation, and past suicide attempts. The total scores for both current (SSI-C) and worst period (SSI-W) are calculated by adding the scores up for each time period. SSI-C demonstrates a current severity

rating of suicidal ideation while SSI-W represents the worst severity of suicidal ideation experienced by the participant.

Beck et al. (1979) conducted a factor analysis during the development of the SSI yielding three components. The first, active suicidal desire was characterized by 10 items. The second and third factors, preparation and passive suicidal desire, each have three items loading on them. However, a study conducted by Beck, Brown, and Steer (1997) yielded a two factor structure of preparation and motivation. Beck et al. (1979) conducted an analysis of the SSI's internal consistency among psychiatric inpatients with self-destructive ideation and found to have a coefficient alpha of .89. The interrater reliability was demonstrated at .83 (p<.001). The SSI-W was later assessed for internal consistency with a sample of 1764 outpatients with past suicidal ideation and concluded with a coefficient alpha of .89. The SSI-C was also shown to have a high internal consistency with a coefficient alpha of .84 for the 444 outpatients who currently exhibited ideation (Beck et al., 1997). In the Beck et al. (1979) study the SSI was compared to the suicide item on the Beck Depression Inventory (BDI) and found to have a correlation of .41 ($p < .001$), suggesting the measure has reasonable concurrent validity.

The discriminant validity was assessed between inpatients hospitalized for suicidal ideation and depressed patients seeking outpatient care (Beck et al., 1979). This comparison indicated a significant between group difference of $t = 4.14$, $p < .001$. Hopelessness, as assessed by the Beck Hopelessness Scale, and depression, as measured by the BDI, were positively correlated with scores on the SSI ($r = .47$, $p < .001$ and $r = .39$, $p < .001$, respectively). However, when these factors were isolated, the correlation with hopelessness was still significant, but depression was not significantly correlated with SSI scores. The SSI was used to assess the severity and frequency of suicidal ideation currently and at the worst period.

- UPPS-P Impulsivity Behavior Scale (UPPS-P)**.** The UPPS Impulsivity Behavior Scale (Whiteside & Lynam, 2001) is a self-report measure which has been shown to have internal consistency ranging from a coefficient alpha of .84 to .89 (Smith et al., 2007). Smith et al. (2007) conducted an analysis of the validity and utility of the factor structure of impulsivity. However, they had combined the two urgencies into one factor. These researchers discovered that lack of planning and lack of perseverance fell within a broader construct, while urgency and sensations seeking were best understood as separate constructs. Smith et al. (2007) also examined these facets utilizing a multi-trait multi-method study. They achieved this by utilizing the UPPS (Whiteside & Lynam, 2001) self-report and created an interview consisting of the same questions. Results from interview administration lead to the same facet structure as obtained with self-report; however the interview produced slightly lower scores in each trait. Internal consistency has been reported for each facet, lack of planning (α = .84 to .87), lack of persistence (α = .80 to .84), urgency (α = .88 to .89), and sensation seeking (α = .86 to .87; Cyders & Smith, 2007; Smith et al., 2007). Convergent and discriminant validity has been established (Cyders & Smith, 2007; Smith et al., 2007).

The UPPS-P Impulsivity Scale (Lynam, Smith, Whiteside, & Cyders, 2006) is a revised version of the UPPS Impulsive Behavior Scale (Whiteseide & Lynam, 2001), which includes the addition of the facet positive urgency (Cyders & Smith, 2007). The positive urgency facet was found to have high internal consistency with a coefficient alpha of .94. Convergent validity of positive urgency assessed with self-report and interview format indicated the two methods were significantly correlated (r =.65; Cyders & Smith, 2007). A factor analysis conducted by Cyders & Smith (2007) indicated three primary factors of impulsivity: urgency, sensation seeking, and deficits in conscientious. Deficits in conscientious consisted of two facets, lack of planning and

lack of perseverance. Urgency also consisted of two facets, positive urgency and negative urgency. The UPPS-P is a 59 item self-report which measures five aspects of impulsive behaviors. Items are rated on a four point likert-type scale ranging from *strongly agree* (1) to *strongly disagree* (4). The UPPS-P will be used in this study to assess the following components of impulsivity: negative urgency, positive urgency, lack of perseverance, lack of premeditation, and sensation seeking.

A self-report measure on impulsivity was chosen over other methods of measuring impulsive behaviors, such as cognitive performance tasks, due to its ability to collect information over a variety of acts and determine long-term patterns of behavior. Moeller et al. (2001) point out that self-report measures rely on the accuracy of the report by the individual; however, self-report measures allow the inclusion of social aspects of impulsivity that a behavioral laboratory measure would not provide.

- Psychiatric Diagnostic Screening Questionnaire (PDSQ)**.** The PDSQ is a screener for common DSM-IV diagnosed axis I disorders. Normative data was collected for this measure from medical and outpatient mental health settings (Zimmerman, 2002). This self-report measure can be administered by clinicians or office workers and takes 15 to 20 minutes to complete. The PDSQ has 13 subscales, including; Major Depressive Disorder, Posttraumatic Stress Disorder, Bulimia/Binge Eating Disorder, Obsessive Compulsive Disorder, Panic Disorder, Psychosis, Agoraphobia, Social Phobia, Alcohol Abuse/Dependence, Drug Abuse/Dependence, Generalized Anxiety Disorder, Somatization Disorder, and Hypochondriasis. The PDSQ total score assesses a global measure of psychopathology which is norm referenced.

According to Zimmerman (2002), psychometric analysis during the development of the PDSQ yielded an internal consistency rating of the subscales to be .85 (a coefficient alpha range

of.66 to .94). Test-retest reliability was indicated to be a range of .61 to .93 and the average convergent validity coefficient was approximated to be .64. Sheeran and Zimmerman (2004) reassessed the factor structure of the PDSQ using principal axis factoring and discovered 13 factors accounted for 50% of the variance. 10 of these factors mapped on to the intended DSM-IV diagnosis, two were composites (panic/agoraphobia, and hypocondriasis/somatization). The psychotic subscale did not maintain support in this analysis. The last factor was composed of the six items intended to assess the major depressive disorder symptom of suicidal ideation, including passive thoughts of dying to thoughts of a specific method of suicide. Suicidality was seen as its own factor in this analysis. Sheeran and Zimmerman (2004) attributed this factor as either indicating that suicidality is not exclusive to depression, or that the questions within this factor were redundant therefore forming their own factor.

Procedure

Participants were asked to read over the informed consent (Appendix A). The interviewer explained that completion of the study and any of its parts are on a completely voluntary basis. Participants were informed that they may leave the study at any time without repercussions. Students would continue to receive credit despite discontinuation of their study participation. The participants were also informed that the interview would be audio recorded to ensure accurate data collection, however; they had the option of declining being recorded. To ensure confidentiality no personally identifying information was attached to the data, instead an assigned identification number was used to organize the data. No record was kept associating participants to their identification number. All data is stored in a lock cabinet, in a locked room,

with the consent forms locked in a separate location. Any data electronically stored for computer analysis is secured with a password.

After signing the consent form participants first completed either the self reports or interviews which were counter balanced. The self reports began with a demographics survey (see Appendix B), followed by the Alcohol Use Identification Test, UPPS-P, and the Psychiatric Diagnostic Screening Questionnaire. A trained interviewer conducted the Structured Clinical Interview for the DSM-IV- Version I, substance use module and the Scale for Suicide Ideation with the participants. At the end of administration the researcher took time to review the scores and interpret the current suicide risk. If intervention was necessary, a commitment to treatment was discussed and the participant was escorted to the on-call clinician at either the UNT Psychology Clinic if a client or UNT's Counseling and Testing Services if the participant was a student. All participants received a referral source list including national hotlines, community and campus resources. Upon completion of data collection the participant was debriefed and allowed time to ask questions.

CHAPTER 4

RESULTS

Descriptive Statistics

Substance use and suicidal ideation**.** Information about substance use, suicidal ideation, impulsivity and other factors was gathered form a total of 82 participants. Of these 51 were recruited through The University of North Texas undergraduate SONA system and 31 were recruited from The University of North Texas Psychology Clinic. Additional demographic and frequency data may be found in Tables 1 and 2.

Of the total sample 78.0% indicated that at some point in their lifetime they have had some form of suicidal ideation (n = 64) based on their having endorsed any of the suicide items on The Psychiatric Diagnostic Screening Questionnaire (PDSQ) or The Scale for Suicide Ideation (SSI). This is a much higher than the 5.6 to 14.3% rate than was reported by Nock et al. (2008) in the national survey of adults; however, the current study was designed to solicit individuals who for various reasons could be inclined to endorse suicide items. Additionally, Nock et al., (2008) suggest that variations in ways of asking about suicidal ideation contribute to the variability in prevalence. For example, asking about thoughts of death versus asking if they have ever seriously considered suicide. The rates reported in the current study more closely resemble results from Nock et al.'s review of cross-national studies indicating that suicidal ideation is found in a range of 3.1-56.0% of individuals. 42.7 % met criteria for substance dependence (n = 35) and 14.6% met criteria for substance abuse (n = 12) according to the Structured Clinical Interview for the DSM-IV (SCID-I), substance use module. Heavy episodic drinking was assessed by examining question three on the Alcohol Use Disorders Identification Test (AUDIT), asking the frequency of five or more drinks on one occasion. Among the total

sample 57.3% of participants endorsed less than monthly or a higher frequency of heavy episodic drinking ($n = 47$).

The properties of the SSI, PDSQ, SCID-I, AUDIT, and UPPS-P Impulsivity Scale (UPPS-P) facets were examined and the mean, standard distribution, skew and kurtosis were calculated for the total sample, as well as for the clients and students separately (see Tables 3,4, and 5). In addition to the PDSQ scores for each subscale and PDSQ T-score, information regarding a composite of scores related to internalizing disorders and externalizing disorders is present on these tables. Included in the internalizing composite were the major depressive disorder, post-traumatic stress disorder, obsessive-compulsive disorder, panic disorder, agoraphobia, generalized anxiety disorder, somatization disorder, and hypochondriasis disorder subscales. The externalizing composite was a sum of the alcohol and drug subscales on the PDSQ. Many of the variables examined appear to have a non-normal distribution. Transformations were attempted to determine if normality could be achieved without success. The non-normal distributions of study variables warrants caution in the interpretation of results; however, it seems likely that the nature of suicidal ideation and substance use are not normally distributed phenomena and the results still contribute to the scientific literature (Bateman & Fonagy, 2008; Delucchi & Bostrom, 2004; Sara, 2010). Additionally, due to this non-normality many of the analyses run were conducted with nonparametric analyses or nonparametric analyses were conducted to compare differences in results with parametric procedures where possible.

Inferential Statistics

The first hypothesis stated that substance use would predict suicidal ideation above and beyond other possible factors. Given the need to have a better understanding of variable

association and the need to narrow the predictor variable set to accommodate the limited sample size, as well as variable overlap, the first hypothesis was actually the last hypothesis tested. Therefore hypotheses and their results are grouped by topic rather than by hypothesis order.

The relationship of impulsivity to substance use and suicidal ideation**.** Hypothesis five stated that impulsivity is a predictor of both heavy episodic drinking (HED) and lifetime incidence of suicidal ideation and was tested via two multiple regressions (HED as the dependent variable in one regression and suicidal ideation as the dependent variable in the second) with all independent variables entered at once. The independent variables for both analyses were the UPPS-P facet scores. The dependent variables used in each analysis separately included the third question on the AUDIT, which asks about frequency of drinking five or more drinks on an occasion, and the score for worst period on the SSI. Table 6 displays the unstandardized regression coefficients (*B)* and intercept, the standardized regression coefficient (β*),* R^2, Adjusted R^2, and the F-statistic (*F*) for this regression.

An examination of the assumptions and relevant factors that may be influencing the results was conducted. According to Tabachnick & Fidell (2007) an appropriate rule of thumb for examining the ratio of cases to variables in multiple correlations is $N \geq 50 + 8m$ (m is the number of IVs). For this analysis the recommended sample size is 90. Therefore the ratio of cases to variables in the current study was slightly under the recommended sample size. In addition, one participant was removed from this analysis due to their having not completed the UPPS-P Impulsivity scale, making the sample size for this analysis 81. Furthermore, one outlier was identified as having scored higher on positive urgency than other participants. However this outlier score remained less than two standard deviations away from the mean and was left within the analysis.

Further examination of the assumptions through SPSS ® EXPLORE and SPSS ® Regression were conducted. Given the strong inter-correlations, and regression collinearity statistics, the results to follow should be interpreted with some caution. Skew and kurtosis for the variables utilized in this analysis appeared to be within acceptable limits. However, according to Shapiro-Wilk test of normality, negative urgency, lack or perseverance, positive urgency, AUDIT Question 3, and SSI worst period were not normally distributed suggesting that a nonparametric analysis would be preferred. Results for logistic regressions examining dichotomous representations of HED and suicidal ideation can be found in Table 7. However, taking into consideration the continuous nature of these constructs and their clinical usefulness in the monitoring and treatment of individuals, the standard multiple regressions with continuous dependent variables were also conducted, given these may be more informative than utilizing dichotomous variables as required for a logistic regression.

Examination of the adjusted R^2 for the regression models indicates that the UPPS-P facets account for approximately 9.4% of the variance in frequency of heavy episodic drinking and 9.6% of the variance in score for worst period of suicidal ideation. Both heavy episodic drinking and suicidal ideation were most influenced by lack of premeditation ($\beta = .28$, $p < .05$ for both). Holding all other independent variables constant, for every one unit increase in lack of premeditation both scores for heavy episodic drinking and suicidal ideation increase by .28. The remaining UPPS-P facets did not reach significance in their contribution to the variance of the dependent variables.

The regression analysis described above is also useful in exploring hypothesis six that states negative urgency would be a better predictor of suicidal ideation than the other impulsivity facets. The contribution of negative urgency in predicting the score for worst period of suicidal

ideation was found to be non-significant ($\beta = .07$, $p = .61$), thus failing to support hypothesis six. Instead, the results suggest that lack of premeditation was the best predictor of suicidal ideation among the facets of impulsivity.

A multivariate analysis of variance (MANOVA) was conducted to further explore hypothesis six which also states that negative urgency would be the best predictor of substance use problems above other facets of impulsivity. A MANOVA was run to determine if the substance use groupings differed on the UPPS-P facet scores. These substance use groups included: a) those who do not use substances, b) individuals who use substances occasionally, c) individuals who met criteria for substance abuse, and d) individuals who met criteria for substance dependence. Participants who were categorized as having heavy episodic drinking as their highest level of use were placed in the abuse group in order to make the sizes of each group more equal for the analysis. The Levene statistic was examined to check the assumption of homogeneity of variance and found no significant differences in the variance among each variable. Results (see Table 8) suggest that there is no significant difference among the means of the four groups ($F(15) = 1.38$, $p = .156$). Therefore the null hypothesis that there is no difference in mean UPPS-P facets scores between substance use groups is retained.

However, an examination of the univariate results indicated a significant difference in lack of perseverance is seen among substance use groups ($F(3, 77) = 3.85$, $p < .05$). A Tukey's post hoc analysis (Table 9) revealed that the largest difference in means was present between individuals who occasionally used and individuals who met criteria for substance abuse ($p < .05$). A significant difference was also detected between occasional substance used and those who met criteria for substance dependence ($p < .05$). While the hypothesis that negative urgency would predict substance use problems was not supported, there is useful information regarding lack of

perseverance as being related to differences in those who use substances occasionally and those who met criteria for a substance use disorder.

The relationship of substance use to impulsivity and suicidal ideation**.** In order to determine whether poly substance users were more likely to have increased scores on suicidal ideation and impulsivity, as proposed by hypothesis four, Spearman's Rho correlations were conducted (Table 10, Table 11). Results indicate that the number of substances used has a significant positive relationship to SSI scores for current suicidal ideation ($r_s = .31$, $p < .01$), SSI scores for worst period of suicidal ideation ($r_s = .31$, $p < .01$), but not the sum of the PDSQ suicide items ($r_s = .11$, $p > .05$).

The differential pattern of correlations between number of substances used with SSI current score versus PDSQ suicide score (a measure of recent suicidal ideation), led to further examination of the correlation between these two measures (SSI current and PDSQ suicide) of current suicidal thoughts. As seen on Table 11, these measures maintain a moderate positive relationship ($r_s = .55$, $p < .01$). While these measures show decent convergence, there remains a lack of correlation between number of substances and PDSQ suicide score. This may be due to the limited number of questions on the PDSQ versus the SSI or a difference in reporting method (self-report versus interview). Regardless of the reason for the difference between measures, by examining the scores on the SSI current and worst period, it appears likely that there is a relationship between the number of substances used and severity of suicidal thoughts, thus supporting hypothesis four.

Regarding the UPPS-P impulsivity facets; number of substances had a significant positive relationship with negative urgency ($r_s = .23$, $p < .05$), lack of premeditation ($r_s = .38$, $p < .01$), and lack of perseverance ($r_s = .27$, $p < .05$) for the Spearman correlations for the total

sample. An examination of the samples split by participant type suggests that there may be some differences in these relationships between these two samples (Tables 12, 13, 14, and 15). Of particular interest is the significant positive relationship between sensations seeking and the number of substances (r_s = .47, p < .01) for students. Comparatively there is an insignificant relationship between these variables for the client participants (r_s = -.18, p = .33). While the relationship between number of substances and UPPS-P facets has differences in significance between clients and students, sensation seeking was the only variable with a change in the pattern of the relationship. While caution should be taken when interpreting these results, the persistent pattern of positive relationships between the remaining UPPS-P facets and number of substances indicates that the hypothesis being examined may still have relevance and this difference in sensation seeking simply provides additional information that may be clinically useful.

Hypothesis two stated that substance dependence will be a better predictor of suicidal ideation than abuse or heavy episodic use and was tested via an Analysis of Variance (ANOVA). An ANOVA was run to determine if the substance use groupings differed on the SSI scores for the worst period. Groups included those who: a) do not use substances, b) individuals who use substances occasionally, c) individuals who met criteria for substance abuse, and d) individuals who met criteria for substance dependence. Again, participants who were categorized as having heavy episodic drinking as their highest level of use were placed in the abuse group in order to make the sizes of each group more equal for the analysis. The Levene statistic was examined to check the assumption of homogeneity of variance and found no significant differences in the variance. An examination of the plot of residuals suggests that the data does not fit the assumption of normality; however, as previously stated given suicidal thoughts may not be a

normal phenomenon, non-normality is to be expected. Independence of observation is deemed met due to random selection of participants.

Results, found on Table 16, indicated that there was a significant difference among the means of the four groups ($F(3, 78) = 2.760$, $p<.05$). Therefore the null hypothesis that there is no difference in mean SSI Scores between substance use groups is rejected. A Tukey's post hoc analysis (Table 17) revealed that the largest difference in means was present between individuals who occasionally use and individuals who met criteria for substance dependence.

A Mann- Whitney U test was conducted to examine if participants who reported having engaged in substance use in the past 30 days would have a significantly higher mean score on the SSI for current suicidal ideation as suggested by hypothesis three. 53 individuals were coded as having engaged in substance use in the past 30 days ($m = 2.34$, $SD = 2.89$) versus 29 who did not ($m = 2.10$, $SD = 3.53$). Results suggest no difference in mean scores for those who engaged in substance use or not during the preceding 30 days ($p = .20$), therefore hypothesis three is not upheld.

Predicting suicidal ideation**.** In order to test hypothesis seven and determine if this sample maintains contiguity with previous research regarding risk factors for suicidal ideation an examination of the Spearman's Rho values between various variables and the worst period of suicidal ideation was examined (Table 18). Being married has a significant negative relationship with worst period of suicidal ideation ($r_s = -.24$, $p = .03$) and being divorced was positively associated with SSI-Current ($r_s = .28$, $p = .01$). Age was established as having a significant positive correlation to SSI-Current ($r_s = .24$, $p = .03$). The T-score on the PDSQ appears to be highly positively correlated with both worst period of suicidal ideation and current severity of suicidal ideation ($r_s = .43$, $r_s = .41$ respectively; $p < .01$). The T-score is representative of level of

distressed currently being experienced due to the axis I symptoms represented by the subscale scores of the PDSQ. Therefore, experiencing distress due to mental health disorders may increase risk for suicidal thoughts.

The PDSQ was also examined by internalizing and externalizing disorder composite scores. The internalizing disorders (worst $r_s = .44$, $p < .01$; current $r_s = .46$, $p < .01$) appear to have a larger effect size, and therefore a stronger relationship, with suicidal ideation than externalizing disorder (alcohol and drug abuse; worst $r_s = .29$, $p < .01$; current $r_s = .06$; $p = .62$). Additionally, the number of symptoms endorsed on both the alcohol (worst $r_s = .35$ $p < .01$; current $r_s = .24$; $p = .03$) and drug (worst $r_s = .30$ $p < .01$; current $r_s = .33$; $p < .01$) sections of the SCID-I maintain a significant positive relationship with both current and worst period of suicidal ideation. Surprisingly, gender and being separated were not found to have a relationship to suicidal ideation.

Hypothesis 1 states that the incremental validity of substance use will predict suicidal ideation, over and above other factors associated with suicidal ideation, including depression. In order to test this hypothesis and assess which variables may be best predictors of suicidal ideation, as represented by the SSI worst period total score, a stepwise multiple regression was conducted. While a multitude of variables could be included in this analysis, the independent variables were narrowed by looking at results from the analyses described above, correlation tables (Tables 10, 11, and 18), and the variables relevance to the hypothesis that substance use may predict suicidal ideation. One independent variable utilized was a newly created composite of scores for specific internalizing disorders on the PDSQ which were found to be correlated to SSI worst; included in this composite were the major depressive disorder, post-traumatic stress disorder, obsessive compulsive disorder, panic disorder, generalized anxiety disorder, and

somatization disorder subscales. Also included in this regression analysis was the subscale score for psychosis on the PDSQ, lack of premeditation from the UPPS-P, the number of substances used, the number of symptoms for alcohol problems endorsed on the SCID-I, the number of symptoms for drug problems endorsed on the SCID-I, marital status, highest frequency of substance use within a month, whether criteria was met for dependence, age, gender, and if drugs in the "other" classification was the most used substance.

An examination of assumptions and other factors that may have influenced these results was performed. Sample size used for this analysis was 77; five participants were removed from this analysis due to missing data. Examination of the Durbin-Watson statistic indicated that the assumption of independence of error is maintained in this analysis. The standardized residuals indicate that no outliers are present for this regression analysis. Levene statistics were examined for the dichotomous variables in the regression in relation to worst period of suicidal ideation and conclude that the assumption of homoscedasticity is satisfied. In addition, the tolerance values were examined to determine that the assumption of multicolliniearity is satisfied.

Results for the stepwise multiple regression are displayed in Table 19. Of the variables entered, the most predictive of worst period of suicidal ideation was the internal composite from the PDSQ subscales as seen in model one (F (1, 75) = 24.37, p<0.01). The internal composite accounted for 24% of the variance in the score for worst period of suicidality, according to the adjusted R^2. The number of symptoms endorsed on the SCID-I alcohol section was added to the regression equation in model two and resulted in an increase of .05 to R square which was statistically significant (F(2, 74) = 15.43, p<0.01). Model three again added .05 to R square with the inclusion of whether the participant was married or not (F (3,73) = 12.91, p < .01).

The *B* coefficient for the relationship between both the internal composite and SCID-I alcohol symptoms to the dependent variable were both positive coefficients which implied a direct relationship. In other words a higher score on the PDSQ measures for these internalized axis I disorders and a higher number of symptoms endorsed for alcohol abuse or dependence on the SCID results in higher scores for the worst period of suicidal ideation. However, being married has a negative coefficient indicating that not being married is the predictive component for increased suicidal ideation. Hypothesis one is retained given that after accounting for the effects of internalizing psychopathology, there remains an incremental effect of substance use on suicidal ideation, over and above internalizing psychopathology.

Participant type and suicidal ideation**.** To examine hypothesis eight, stating that participants recruited from the outpatient clinic would experience more suicidal ideation than student participants, a comparison of means via independent samples *t*-tests was conducted. These statistics are displayed in Table 20 and indicated that clients experience more current suicidal ideation than students (SSI-Current, $p < .01$, $d = .93$; PDSQ- Suicide, $p < .05$, $d = .45$). However, no significant difference was found among the samples regarding scores on worst period of suicidal ideation ($p = .103$, $d = .37$). Due to the normality issues described previously a Mann-Whitney U test was also completed to verify these findings. Again, a difference was discovered for SSI scores for current suicidal ideation and suicide score on the PDSQ ($p < .05$). The null hypothesis was retained regarding differences in SSI score for worst period of suicidal ideation ($p = .09$). Both the parametric and non-parametric tests produced the same results allowing us to retain confidence in the effect size for the *t*- tests, and thus conclude that clients reported experiencing more suicidal ideation at the time of the interview but no difference is seen in lifetime severity of suicidal ideation.

CHAPTER 5

DISCUSSION

The purpose of the current research study was to examine the relationship between suicidal thoughts, substance use, and impulsivity. Previous research provides evidence that a relationship exists between suicidal thoughts/behaviors and substance use (Brener et al., 1999; Borges et al., 2000; Conner et al., 2011; Pfaff et al., 2007). While substance use has been established as a risk factor, more research is needed regarding how the level of impairment due to substance use, type and number of substances, and frequency of substance use may be influencing the severity of suicidal thoughts and behaviors. In addition, previous research has suggested a relationship between impulsivity and both suicidality and substance use (Allen et al., 1999; Brady et al., 1998; Cherpitel, 1993; Magid & Colder, 2007; Mann et al., 1999; McCown 1988; Moss et al., 1990; Neufeld & O'Rourke, 2009; O'Boyle & Barratt, 1993; Patton et al., 1995; Smith et al., 2007; Smith et al., 2008; Swann et al., 2004; Witte et al., 2008). Therefore, the current study examined the construct of impulsivity and its relationship to both suicidal thoughts and substance use. The current study attempted to examine these relationships using both an undergraduate and outpatient clinic sample. With the exception of sensation seeking on the UPPS-P, patterns of correlations remained consistent across the two participant types, in-line with research that suggests most psychopathology is dimensional (not categorical) in nature. Therefore, merging the two samples for the current study was consistent with a dimensional approach, and also allowed for more variance in the study variables and perhaps greater generality of the findings.

The undergraduate and clinic client participants included in the study were similar in age and ethnic distribution to the data available regarding the populations from which they were

recruited. However, there were more female undergraduates recruited than are reported to be representative of the UNT student body. In addition, a larger percentage of participants in the current study reported having experienced some form of suicidal thoughts (78.0%) than was found in national studies of adults (5.6 to 14.1%; Nock et al., 2008). It is possible that this increase in prevalence of suicidal thoughts in this sample is due to the explicit recruitment of a clinical population. It may also be the case that the title of the study inadvertently attracted participants who have suicidal ideation tendencies. However, as previously mentioned the variability may be related to the manner in which suicidal ideation was evaluated. This difference in prevalence may hinder the ability of these results to be generalized to a larger population but will still provide useful clinical information regarding suicidal ideation.

The first hypothesis proposed that substance use would predict suicidal ideation above and beyond other possible factors. While this was the first hypothesis proposed, it was actually the last hypothesis tested, due to the need to narrow the set of independent variables included in the regression analysis. While symptoms of alcohol use problems (SCID-I alcohol use) was found to be a significant contributor to the variance in score on worst period of suicidal ideation, it was not the initial predictor. A composite score of internalizing disorder from the PDSQ was found to be the initial predictor of suicidal thoughts, accounting for 24% of the variance. Nevertheless, the SCID alcohol use variable demonstrated incremental validity in predicting worst suicidal period, over and above internalizing psychopathology in the next step of the regression equation. Therefore hypothesis one is supported, specifically alcohol use problems appear to be a reliable predictor of suicidal thoughts when accounting for mood related psychopathology.

Researchers had previously concluded that depression may not necessarily be causally associated with suicidal ideation (Shahar et al., 2006; Witte et al., 2006). However, the results from the current investigation suggest that depression and other mood disorders that were included in the internalizing composite played a substantial role in predicting suicidal ideation, relative to substance use. Some research has reported similar findings. A longitudinal study of undergraduates did not find that alcohol use or cannabis use disorders significantly predicted suicidal ideation, instead they identified depressive symptoms as the only variable that independently predicted recurrent suicidal ideation (Wilcox, Arria, Caldeira, Vincent, Pinchevsky, O'Grady, 2010). The strong predictive power of internalizing disorders in the current study suggests that depressive symptoms, and other internalizing psychopathology, play a significant role in predicting suicidal ideation.

However, it is also possible that the particular mental disorder or their symptoms may not be the most important factor but instead the amount of distress experienced by the participants as a result of disorder symptoms may be more relevant to predicting suicidal ideation. A recent article by Bryan and Rudd (2012) collected retroactive information on 72 active duty soldiers' experiences in the 24 hours preceding a suicide attempt. They discovered that emotional distress was the most common experience followed by external experiences, such as arguments with others, and trauma related experiences being much less frequently endorsed. While this sample did contain a rate of 89.3% being diagnosed with major depression, they discovered that deliberation about suicide was predicted by emotional distress even with diagnoses held constant. In other words, the soldiers spent more time experiencing suicidal ideation when emotionally distressed. However, caution should be taken as those who did not experience emotional distress may be more likely to engage in more impulsive suicide attempts (Bryan &

Rudd, 2012). Additional research utilizing a sample of the general population could benefit by collecting information about subjective emotional distress to determine if this is more predictive of suicidal thoughts and behaviors than specific psychological disorder or their symptoms.

In addition to the internalizing composite being the best predictor of severity of suicidal thoughts, symptoms of alcohol use problems accounted for 5% of the variance in severity of suicidal thoughts. Identifying increasing alcohol use problems as predictive of suicidal thoughts is consistent with previous research that drinking intensity and frequency predicted suicidal thoughts (Conner et al., 2011). However, it is intriguing that highest frequency of substance use was included in the current research but was not retained in the regression equation due to its lack of contribution as a predictor. It is possible that frequency of use does not always equate to problematic substance use; or perhaps there is limited variability of this variable in this relatively young sample.

Finally, marital status was also found to account for 5% of the variance in severity of suicidal ideation. This may also be related to the construct of failed belongingness previously found to be related to suicidal ideation in students (Van Orden, Witte, James, Castro, Gordon, Braithwaite, et al., 2008). However, considering the research conducted by Brener et al. (1999) regarding the protective influence of co-habitation and participation in Greek life, the finding that designations other than married (single, separated, divorced) is predictive of suicidal thoughts may be more accurately interpreted in relation to the protective nature of marriage. Therefore, being married may be seen as a protective factor, lowering the risk of experiencing intense suicidal thoughts.

Hypothesis 2 proposed that the severity of substance use problems would have an effect on suicidal ideation. The results revealed that a difference in the mean scores for severity of

suicidal thoughts was present between substance use groups. Specifically, the current results found that individuals who met for substance dependence had a higher severity of suicidal thoughts than those who occasionally used substances. This finding is congruent with the findings of Borges et al. (2000) who reported an increasing odds ratio of suicidal ideation as severity of substance use increased. However, a post hoc test revealed that the difference was limited to those diagnosed with dependence having significantly higher levels of suicidal ideation than those who used substances occasionally. Consequently, a difference in mean scores is present between two groups; however, there was not a significant effect for those who met criteria for substance abuse leading to partial support of this hypothesis. Additionally, it was unanticipated to see that individuals who have not ever used substances did not have a significantly different score on worst period of suicidal thoughts from those who abused substances or were dependent. It is possible that the limited number of participants within each group did not allow for an accurate analysis of this hypothesis.

The third hypothesis examined whether the conclusion from Brener et al. (1999) that those who used substances in the preceding 30 days would be more likely to endorse current suicidal ideation would be sustained in the current study. Unexpectedly there was no significant difference in scores on current severity of suicidal ideation among those who have or have not used a substance in the past 30 days. Disagreement with previous findings may be due to a lack of generalizability considering previous literature only sampled an undergraduate population.

The fourth hypothesis suggests that the number of substances used is positively related to severity of suicidal ideation and measures of impulsivity. Results confirmed a moderate positive relationship exists between the number of substances used and scores for current and worst period of suicidality on the SSI. These results indicate that as the number of substances used over

a lifetime increases the score reflecting the severity of suicidal ideation increases. However, there was conflicting results regarding a weak insignificant relationship to scores on the suicide items of the PDSQ. The difference between strength of relationship between the two measures of current suicidality may be due to the PDSQ having fewer questions than the SSI therefore resulting in less variance of scores. However this also could be the result of more valid reporting than self-report due to the interview format allowing for encouragement of the participant to share their experiences as suggested by Brown (2000). The correlation between number of substances and suicidal ideation is consistent with the research of Borges et al. (2000) which found the number of substances to be predictive of suicidal ideation.

Regarding impulsivity, the number of substances used was found to be associated with negative urgency, lack of premeditation, and lack of perseverance. These results support the hypothesis that those who use multiple substances exhibit higher impulsivity. Higher impulsivity among poly substance users was also found by McCowen (1988) and O'Boyle and Barratt (1993). The correlations suggest that those who react to negative emotions or experiences impulsively are more likely to try multiple substances. The use of multiple substances may be a method of coping with these negative experiences. Lack of premeditation and lack of perseverance were identified as falling under a broader construct of deficits in conscientiousness according to Cyders and Smith (2007). This suggests that those who engage in multiple substances may be more inclined to engage in activities without a conscientious effort, resulting in impulsively using substances without considering the consequences. However, the difference between direction of the correlation for sensation seeking and the number of substances used between student and client participants raises additional questions about this relationship. It may be that sensation seeking has a positive relationship with the number of substances for students

versus clients because they are at a different stage or life, maturity level, that students use substances as a method of thrill seeking, or conversely, that through therapy the clients learned alternate, less potentially harmful, ways of satisfying their need for exciting activities. Additional research to identify the moderating factor influencing the relationship among these groups is necessary.

Hypothesis 5 proposed that impulsivity would be a predictor of heavy episodic drinking (HED) and severity of suicidal ideation. Results confirm that impulsivity is a significant predictor of both HED and severity of suicidal ideation, accounting for 9.4 to 9.6% of the variance. Lack of premeditation was found to account for the most variance in both HED and severity of suicidal ideation during the worst period of suicidality. It seems intuitively sound that HED is best predicted by an inability to plan ahead resulting in drinking more than would necessarily be desired. This finding is supported by previous research by Magid and Colder (2007) who discovered that lack of planning was correlated with alcohol use. The finding of lack of premeditation was the best facet predictor for suicidal ideation suggests that individuals who have severe suicidal ideation may not be considering all their options when planning for their future.

The sixth hypothesis was that negative urgency would be the best predictor of substance use disorder group membership and suicidal ideations. The results indicated that negative urgency was not the best predictor among the facets of impulsivity for suicidal ideation or substance use group. As stated previously lack of premeditation was the facet found to be the best predictor of suicidal ideation. Additionally, impulsivity did not predict substance use group membership. This finding is surprising given that Magid & Colder (2007) identified urgency, the combined facet of positive and negative urgency, and lack of perseverance to be significantly

correlated to alcohol related problems. However a post hoc analysis indicated that the mean score for lack of perseverance was identified as being significantly higher for those who were diagnosed with a substance use disorder, such as abuse or dependence, than those who occasionally used substances. Since causality cannot be determined it is unclear if a history of abusing substances has led to an inability to focus on a tasks or if this inattention may lead individuals to be more susceptible to engaging in more substance use resulting in more substance use related problems.

Hypothesis 7 aimed to identify risk factors that were similar to past research. Some, but not all, previously identified risk factors were supported by the current research. Kessler et al. (1999) identified an age of early twenties and late teens as having the highest rate of suicidal ideation. Based on this information it was expected that age would have a negative relationship with suicidal ideation. However, the current research identified a significant positive correlation between age and suicidal ideation. This result may be due to the studies limited age range of 18 to 56 years old. Landheim et al. (2006) indicated that being female was a risk factor; however the current study also found no correlation between gender and suicidal thoughts. As previously stated, being married was found to be a protective factor against suicidality and being divorced was identified as a risk factor. This suggests that the current social support is what is most relevant as a protective factor, and having lost this particular type of support may put an individual at higher risk for suicide. However, this finding may also indicate that relationship status represents relational impairment as a result of psychological distress and suicidal ideation. The inability to replicate previous findings regarding age and gender may be due to the limited range of subject characteristics or the increase in range for scores on suicidal ideation of the current study that may not have been capture in previous research.

Previous research identified psychiatric diagnoses, including axis I disorders, as being a risk factor (Landheim et al., 2006; Rudd et al., 2006). Within the current study a relationship was found between psychiatric symptoms and suicidal ideation, supporting this previous finding. In particular internalizing psychopathology appeared to have more effect than externalizing psychopathology, as measured by the PDSQ, suggesting a potential difference in level of increased risk between different axis I disorders. In addition, examining the overall T-score for the PDSQ indicates moderate positive correlations to both current and past suicidal ideation, suggesting that level of distress may be a separate risk factor. Further investigation utilizing full diagnostic measures and collection of information on subjective level of distress is required to elaborate on this finding.

The eighth and final hypothesis stated that participants recruited from the clinic experience more suicidal ideation than undergraduates. This hypothesis was supported regarding current suicidal ideation, but no difference was found between the groups for severity of worst period of suicidal ideation. This finding suggests that psychiatric clients may be seeking treatment due to acute distress which includes thoughts of suicide. Since data are not presented on whether the student participants have or were seeking mental health treatment at the time of their participation it is difficult to determine the reason for the lack of difference on scores for worst period of suicidal ideation. One might speculate that many of the students have had treatment experiences in the past due to acute mental distress and therefore have had similar experiences with suicidal ideation as current clients. Additional research would need to be conducted to explain this finding further.

Clinical Implications

There is an increasing need to understand the risk factors for suicide given that it is the 11th leading cause of death in the United States (Nock et al., 2008) and there has been a rapid increase in suicide among armed service members since 2004 (as cited in Bryan & Rudd, 2012; Department of the Army, 2010; Ramchand, Acosta, Burns, Jaycox, & Pernin, 2011). The current study aims to provide some additional information regarding the influence of substance use, impulsivity, and other factors related to suicidal thoughts that may be useful in clinical and college campus settings. Clinical implications and suggestions for assessment and treatment of suicidal individuals can be extrapolated from these research results.

There are many frameworks and measures currently available for assessing suicidality (Jobes, 2006; Joiner et al., 2009; Reynolds, Lindenboim, Comtois, Murray, & Linehan, 2006; Shea, 2002). The current study suggests additional inquiries to ensure a thorough assessment of risk for not only suicidal behaviors but suicidal thoughts. While previous literature has established that psychiatric diagnoses are a risk factor for suicide, clinicians may wish to remain attentive to more than just the specific symptoms of mental health disorders. An assessment of the client or student's subjective experience of emotional distress may be beneficial as a prompt to inquiring about suicidal ideation.

In addition, obtaining a history of problematic alcohol use and any substance use dependence should be standard practice in assessing for risk for suicidality. Particular care should be given to the assessment of heavy episodic drinking due to its association with impulsivity. Given that impulsivity was also found to be associated with suicidal ideation, heavy episodic drinking may provide an indirect indicator of suicidalality. When conducting a suicide risk assessment it is important for the clinician, particularly new clinicians, to keep in mind that

research has shown that talking about suicide does not cause people to become depressed or suicidal (Gould, Marrocco, Kleinman, Thomas, Mostkoff, Cote, & Davies, 2005). In fact Gould et al. (2005) discovered that when clinicians openly discussed suicidal thoughts with participants their subsequent scores on the Beck Depression Inventory lowered. Having someone ask them about suicidal thoughts may actually demonstrated to participants that others care about their well-being, resulted in them feeling more connected, and/or allowing them insight into resources and help available. While discussing suicidal ideation in itself may be useful to those in distress, other interventions should be considered.

While the current study did not involve treatment provision, some of the findings may suggest therapeutic interventions that can be tested in future empirical studies. Given the protective contribution of being married and the theory that failed belongingness may contribute to suicidality, it may be prudent to encourage clients to engage in social activities during times of emotional distress. If social isolation is a presenting concern and the client is resistant to reaching out to others in their life, the clinician may consider increasing the frequency of therapy sessions. This would not only provide added time for empirically based interventions, but may also instill a sense of interpersonal connection for the client that may replicate the protective nature of social support. During these sessions, if impulsivity seems to be a present risk factor it may be helpful to incorporate skills training to reduce impulsivity. For instance mindfulness skills which include the act of paying attention on purpose may help the client slow down their actions and plan their behaviors more.

Finally, considering the implication that lack of premeditation is associated with suicidal ideation, clients experiencing suicidal thoughts may benefit from a solution based approach to therapy. This may include sessions in which the client and clinician identify goals or problems

and determine steps to achieving these goals or coming to a resolution. The difficulty suicidal clients experience in planning is also a valid reason to incorporate commitment to treatment plans rather than a simple having a suicide contract. By collaboratively developing a commitment to treatment plan the clinician models appropriate planning and ensures the client knows all the options available in coping with negative emotions. While suicidal ideation is a serious concern, steps may be taken to assess and intervene when an individual is experiencing suicidal thought.

Limitations and Future Research

There are several limitations to the current study that could be improved in future suicide research. First, a larger sample may result in the study variables maintaining a normal distribution leading to more confidence in the accuracy of the analyses. A larger sample would also have allowed for more even group membership when examining associations with substance use groups.

Second, it may be inappropriate to generalize results from this study to other populations. This limitation is particularly apparent when considering the current sample endorsed a higher rate of lifetime suicidal ideation than was represented in a national sampling of adults. A study which utilizes a random sampling across multiple universities, outpatient clinics and communities would be able to have more confidence in generalizing results.

Third, a cross-sectional study does not allow speculation regarding causality. Considering that experimentation regarding suicidal ideation would certainly not be allowed by any institutional review board, a long-term longitudinal study with a large sample size would be the best way to achieve interpretation about causality of suicidal ideation. A longitudinal study

would also limit recall errors in participant reporting. The current study has the limitation of including retrospective data about experiences with suicidal ideation and substance use. The accuracy of reports regarding frequency of substance use or suicidal thoughts is questionable when these experiences did not occur recently.

The current study was focused on understanding the relationship between substance use, impulsivity, and suicidal ideation. In order to fully understand suicidal ideation and subsequent suicidal behaviors future research should include additional independent variables that may be risk factors for suicidal ideation. Possible variables that may also be contributing to suicidal ideation include; family history of suicide or mental illness, history of childhood adversity and personality disorders.

Table 1

Demographics

Variable	Frequency (%)				
	Client	Student	SU diagnosis	AUDIT cut	SI ever
Gender					
Male	15 (48.4)	13 (25.5)	17 (60.7)	9 (33.3)	24 (85.7)
Female	16 (51.6)	38 (74.5)	30 (55.6)	15 (27.8)	40 (74.1)
Ethnicity					
Caucasian	22 (71.0)	29 (56.9)	32 (62.7)	14 (28.0)	42 (82.4)
African America	3 (9.7)	8 (15.7)	6 (54.6)	3 (27.3)	7 (63.6)
Hispanic	3 (9.7)	5 (9.8)	3 (37.5)	3 (37.5)	6 (75.0)
Asian/Pacific Island	0 (0.0)	3 (5.9)	1 (33.3)	3 (100.0)	2 (66.7)
Native American	0 (0.0)	1 (2.0)	1 (100.0)	1 (100.0)	1 (100.0)
Other	3 (9.7)	5 (9.8)	4 (50.0)	6 (75.0)	6 (75.0)
Marital Status					
Single	19 (61.3)	45 (88.2)	36 (56.3)	22(34.4)	53 (82.8)
Married	7 (22.6)	5 (9.8)	8 (66.7)	2 (18.2)	6 (50.0)
Separated	2 (6.5)	0 (0.0)	1 (50)	0 (0.0)	2 (100.0)
Divorced	3 (9.7)	1 (2.0)	2 (50)	0 (0.0)	3 (75.0)
Education					
High school/GED	1 (3.2)	5 (9.8)	2 (33.3)	1 (16.7)	5 (83.3)
Some college	17 (54.8)	36 (70.6)	34 (64.2)	20 (37.7)	43 (81.1)
Associate's degree	1 (3.2)	6 (11.8)	3 (42.9)	2 (28.6)	5 (71.4)
Bachelor's degree	8 (25.8)	4 (7.8)	5 (41.7)	0 (0.0)	7 (58.3)
Master's degree	4 (12.9)	0 (0.0)	3 (75.0)	1 (25.0)	4 (100.0)

Note. SU diagnosis = The number of participants in the group that met criteria for substance abuse or dependence; AUDIT cut = Cut score of 8 or higher met on the Alcohol Use Disorder Identification Test; SI ever = The number of participants in the group that endorsed ever experiencing suicidal thoughts on any of the measures administered.

Table 2

Frequencies

Variable	Student *n* (%)	Client *n (%)*
Suicidal ideation ever		
Yes	36 (70.6)	28 (90.3)
No	15 (29.4)	3 (9.7)
Substance use group		
No diagnosis	7 (13.7)	4 (12.9)
Occasional use	14 (27.5)	5 (16.1)
HED	3 (5.9)	2 (6.5)
Substance abuse	8 (15.7)	4 (12.9)
Substance dependence	19 (37.3)	16 (51.6)
HED ever		
Yes	29 (56.9)	18 (58.0)
No	22 (43.1)	12 (38.7)
Poly substance user		
Yes	34 (66.7)	21 (67.7)
No	17 (33.3)	10 (32.3)
Most used substance		
None used	7 (13.7)	3 (9.7)
Alcohol	26 (51.0)	9 (29.0)
Cannabis	6 (11.8)	6 (19.4)
Other	2 (3.9)	2 (6.5)
Multiple substances	10 (19.6)	10 (32.3)
Use in past 30 days		
Yes	30 (58.8)	23 (74.2)
No	21 (41.2)	8 (25.8)

Note. HED = Heavy episodic drinking.

Table 3

Descriptive Statistics - Total Sample

Variable	*n*	*M*	*SD*	Skew	Kurtosis
Age	81	25.88	9.92	1.79	2.33
SSI- Worst	82	13.92	10.70	0.32	-0.96
SSI- Current	82	2.26	3.11	1.67	2.28
PDSQ- Suicide	82	0.62	1.30	2.50	5.90
Frequency substance use	82	13.34	11.73	0.24	-1.69
Number of substances	82	2.61	2.03	0.86	0.11
PDSQ- Alcohol	82	0.79	1.63	1.94	2.31
PDSQ- Drug	82	0.48	1.24	2.85	7.40
SCID- Alcohol	82	2.74	3.02	0.78	-0.71
SCID- Drug	79	4.05	6.85	2.34	5.71
AUDIT	81	5.27	5.22	1.14	0.65
PDSQ- MDD	82	5.79	4.30	0.74	-0.10
PDSQ- PTSD	82	2.99	3.78	1.42	1.44
PDSQ- Eating	82	1.74	2.61	1.31	0.21
PDSQ- OCD	82	0.54	0.86	1.54	1.41
PDSQ- Panic	82	1.32	1.96	1.68	2.57
PDSQ- Psychosis	82	0.33	0.77	3.17	11.58
PDSQ- Agoraphobia	82	1.62	1.78	0.76	-0.70
PDSQ- Social phobia	82	4.90	4.73	0.67	-0.98
PDSQ- GAD	82	4.95	3.38	-0.20	-1.41
PDSQ- Somatization	82	0.93	1.18	1.38	1.81
PDSQ- Hypochondriasis	82	0.37	0.92	2.67	6.48
PDSQ-Internal comp	82	23.40	14.49	0.31	-0.82
PDSQ-External comp	82	1.27	2.32	2.02	3.76
PDSQ T-Score	82	44.15	10.24	-1.75	6.81
Negative urgency	81	2.29	0.65	0.17	-0.82
Positive urgency	81	1.73	0.61	0.72	-0.37
Lack of premeditation	81	1.86	0.49	0.30	-0.53
Lack of perseverance	81	2.08	0.56	0.07	-0.92
Sensation seeking	81	2.56	0.72	-0.17	-0.76

Note. SSI = Scale for Suicide Ideation; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frequency substance use = Highest frequency of substance use recorded in days per month; SCID- Alcohol = The number of alcohol use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; ; SCID- Drug = The number of other substance use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; AUDIT = Alcohol Use Disorders Identification Test; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder; Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

Table 4

Descriptive Statistics - Client Sample

Variable	*n*	*M*	*SD*	Skew	Kurtosis
Age	30	31.10	11.98	0.89	-0.56
SSI- Worst	31	16.39	11.07	0.11	-1.15
SSI- Current	31	4.03	4.03	0.70	-0.56
PDSQ- Suicide	31	1.00	1.67	1.92	2.85
Frequency substance use	31	15.74	12.66	-0.15	-1.96
Number of substances	31	3.19	2.36	0.49	-0.92
PDSQ- Alcohol	31	0.61	1.45	2.41	4.74
PDSQ- Drug	31	0.71	1.47	2.17	3.83
SCID- Alcohol	31	2.90	3.05	0.78	-0.72
SCID- Drug	31	6.10	8.93	1.88	2.78
AUDIT	30	4.70	5.01	1.63	2.38
PDSQ- MDD	31	7.68	4.51	0.38	-0.36
PDSQ- PTSD	31	3.65	4.53	1.26	0.49
PDSQ- Eating	31	2.23	2.79	0.88	-0.73
PDSQ- OCD	31	0.52	0.81	1.15	-0.43
PDSQ- Panic	31	1.55	2.01	1.56	2.44
PDSQ- Psychosis	31	0.45	1.06	2.74	7.15
PDSQ- Agoraphobia	31	1.84	1.95	0.53	-1.30
PDSQ- Social phobia	31	5.90	4.82	0.53	-1.24
PDSQ- GAD	31	5.97	3.16	-0.72	-0.72
PDSQ- Somatization	31	1.10	1.27	1.15	1.25
PDSQ- Hypochondriasis	31	0.26	0.68	3.00	9.27
PDSQ Internal comp	31	28.45	14.93	0.29	-0.98
PDSQ External comp	31	1.32	2.64	2.56	6.39
PDSQ T-Score	31	47.55	7.97	0.22	-1.00
Negative urgency	30	2.41	0.64	0.22	-0.37
Positive urgency	30	1.87	0.70	0.62	-0.70
Lack of premeditation	30	1.95	0.51	0.37	-0.29
Lack of perseverance	30	2.34	0.49	-0.30	-0.54
Sensation seeking	30	2.44	0.72	-0.32	-0.67

Note. SSI = Scale for Suicide Ideation; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frequency substance use = Highest frequency of substance use recorded in days per month; SCID- Alcohol = The number of alcohol use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; ; SCID- Drug = The number of other substance use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; AUDIT = Alcohol Use Disorders Identification Test; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder; Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

Table 5

Descriptive Statistics - Student Sample

Variable	*n*	*M*	*SD*	Skew	Kurtosis
Age	51	22.80	6.94	3.02	10.85
SSI- Worst	51	12.41	10.29	0.44	-0.75
SSI- Current	51	1.18	1.67	1.59	2.20
PDSQ- Suicide	51	0.39	0.96	2.78	7.40
Frequency substance use	51	11.88	10.99	0.47	-1.38
Number of substances	51	2.26	1.74	1.03	1.30
PDSQ- Alcohol	51	0.90	1.74	1.76	1.63
PDSQ- Drug	51	0.33	1.07	3.66	13.49
SCID- Alcohol	51	2.65	3.03	0.80	-0.64
SCID- Drug	48	2.73	4.75	1.90	2.73
AUDIT	51	5.61	5.36	0.94	0.19
PDSQ- MDD	51	4.65	3.77	0.99	0.48
PDSQ- PTSD	51	2.59	3.22	1.35	1.64
PDSQ- Eating	51	1.45	2.48	1.68	1.38
PDSQ- OCD	51	0.55	0.90	1.72	2.16
PDSQ- Panic	51	1.18	1.93	1.84	3.18
PDSQ- Psychosis	51	0.26	0.52	1.99	3.28
PDSQ- Agoraphobia	51	1.49	1.67	0.92	-0.13
PDSQ- Social phobia	51	4.29	4.61	0.80	-0.76
PDSQ- GAD	51	4.33	3.32	0.08	-1.46
PDSQ- Somatization	51	0.82	1.13	1.59	2.67
PDSQ- Hypochondriasis	51	0.43	1.04	2.44	4.99
PDSQ-Internal comp	51	20.33	13.46	0.23	-1.14
PDSQ-External comp	51	1.24	2.13	1.42	0.33
PDSQ T-Score	51	42.08	10.96	-2.12	7.00
Negative urgency	51	2.21	0.66	0.18	-1.06
Positive urgency	51	1.64	0.54	0.59	-0.80
Lack of premeditation	51	1.80	0.46	0.19	-0.90
Lack of perseverance	51	1.92	0.54	0.37	-0.67
Sensation seeking	51	2.62	0.71	-0.09	-0.90

Note. SSI = Scale for Suicide Ideation; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frequency substance use = Highest frequency of substance use recorded in days per month; SCID- Alcohol = The number of alcohol use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; ; SCID- Drug = The number of other substance use disorder symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders; AUDIT = Alcohol Use Disorders Identification Test; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder; Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

Table 6

Multiple Regression Analyses for Variables Predicting Heavy Episodic Drinking and Worst Period of Suicidal Ideation

	Heavy episodic drinking			SSI- Worst		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Constant	-1.16	0.63		-4.60	6.89	
Negative urgency	0.19	0.21	0.13	1.81	2.35	0.07
Positive urgency	-0.35	0.25	-0.22	1.19	2.79	0.07
Lack of premeditation	0.57	0.28	0.28*	6.17	3.05	0.28*
Lack of perseverance	0.31	0.22	0.18	0.74	2.40	0.04
Sensation seeking	0.21	0.16	0.15	0.25	1.78	0.02
R^2(Adjusted R^2)	.151(.094)			.153(.096)		
F	2.66*			2.70*		

Note. *N* = 81. All variables entered on step one. Heavy episodic drinking refers to question three of the AUDIT which asks about the frequency of five or more drinks on one occasion; SSI- Worst= Total score for worst period as reported on the Scale for Suicide Ideation.
*$p < .05$.

Table 7

Logistic Regression Examining Predictors of Ever Experiencing Heavy Episodic Drinking and Suicidal Thoughts

	Heavy episodic drinking			Suicide ever		
Variable	*B*	*SE B*	*OR*	*B*	*SE B*	*OR*
Constant	-6.97**	1.96	0.00	-5.60**	2.09	0.00
Negative urgency	1.09*	0.55	2.97	.61	.62	1.84
Positive urgency	-1.32	0.71	0.27	.90	.91	2.46
Lack of premeditation	1.10	0.72	3.00	.17	.84	1.19
Lack of perseverance	1.64**	0.61	5.16	.94	.64	2.56
Sensation seeking	0.70	0.44	2.00	.82	.50	2.26
NagelKerke R^2	.33			.30		

Note. *N* = 81. All variables entered on step one. Heavy episodic drinking refers to question three of the AUDIT which asks about the frequency of five or more drinks on one occasion.
*$p = .05$. **$p = .01$.

Table 8

Multivariate Analysis of Variance Summary Table for Substance Use Groups on UPPS-P Facet Scores

	Multivariate			Negative urgency			Positive urgency			Lack of premeditation			Lack of perseverance			Sensation seeking		
Source	F^a	p	η^2	F^b	p	η^2	F^b	p	η^2	F^b	p	η^2	F^b	p	η^2	F^b	p	η^2
Substance use group	1.38	.16	.09	2.34	.08	.08	.47	.70	.02	1.99	.12	.07	3.85	.01	.13	.56	.64	.02

Note. Mutlivariate *F* ratios were generated from Pillai's statistic.
[a] Multivariate $df = 15$. [b] Univariate $df = 3,77$.

Table 9

Mean Scores on UPPS-P Impulsive Behavior Scale Facets as a Function of Substance Use Group

	Negative urgency		Positive urgency		Lack of premeditation		Lack of perseverance		Sensation seeking	
Substance use group	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
No substance use	2.03	.56	1.58	.36	1.68	.46	1.91	.47	2.36	.59
Occasional use	2.05	.62	1.69	.62	1.70	.47	$1.77_{a,b}$	.50	2.61	.68
Abuse/HED	2.46	.70	1.69	.62	1.90	.47	2.25_{a}	.58	2.45	.71
Dependence	2.41	.63	1.82	.66	1.98	.49	2.21_{b}	.54	2.64	.79

Note. Means in a column sharing a subscript indicate that the groups are significantly different from each other on that UPPS-P facet at $\alpha = .05$ according to the Tukey HSD procedure.

Table 10

Summary of Spearman Correlations Between Substance Use and Suicide Variables to All Other Study Variables- Total Sample

				PDSQ		SCID				SSI	
Variable	SUD	Frq SU	No. subs	Alcohol	Drug	Alcohol	Drug	AUDIT	PDSQ suicide	Current	Worst
Age	**.27***	.29	**.34****	-.03	.00	**.32****	.21	.06	.11	**.24***	.00
Education	-.02	.03	.05	-.13	-.13	-.01	-.01	-.14	.18	.14	-.10
PDSQ scales											
MDD	.13	.09	.13	.10	.12	**.25***	.10	.07	**.63****	**.51****	**.40****
PTSD	.20	.21	**.26***	.06	.07	**.25***	.18	.04	**.24***	.21	**.28***
Eating	**.23***	.09	.20	.20	**.34****	.21	.20	.13	-.07	-.02	.12
OCD	.21	**.23***	.17	.14	**.34****	**.23***	**.26***	.14	-.03	.18	**.28****
Panic	.09	.07	.08	-.08	**.31****	.14	.14	.06	**.24***	**.31****	**.32****
Psychosis	**.37****	**.22***	**.29****	**.25***	**.26***	**.35****	**.34****	**.31****	**.26***	**.26***	**.33****
Agoraphobia	.12	.11	.11	.02	**.24***	.12	.10	.09	.03	.09	.11
Social phobia	**.24***	.19	.20	.20	**.31****	**.31****	.20	.22	.10	.17	.19
GAD	**.32****	**.27***	**.26***	.15	**.28****	**.33****	.21	**.24***	**.33****	**.42****	**.35****
Somatization	**.40****	**.31****	**.39****	**.22***	**.31****	**.39****	.21	.20	.13	.15	**.35****
Hypochondriasis	.16	.09	.15	.21	.07	**.22***	.01	.22	.13	.13	.11
Internal comp	**.31****	**.26***	**.31****	.17	**.32****	**.38****	**.25***	.21	**.42****	**.46****	**.44****
External comp	**.59****	**.53****	**.45****	**.85****	**.69****	**.61****	**.54****	**.71****	.01	.06	**.29****
PDSQ T-score	**.39****	**.33****	**.37***	**.27***	**.41****	**.44****	**.36****	**.30****	**.35****	**.41****	**.42****
UPPS-P Scales											
Negative urgency	**.25***	.22	**.23***	.15	**.32****	**.29****	.22	**.23***	.06	.15	**.30****
Positive urgency	.09	.11	.14	.01	**.33****	.09	.22	.03	**.22***	**.27***	**.33****
Lack of premeditation	**.23***	**.25***	**.38****	**.28****	**.25***	**.24***	**.34****	**.29****	**.35****	**.30****	**.35****
Lack of perseverance	**.29****	**.23***	**.27***	.09	**.34***	**.31****	**.26***	**.23***	.02	**.28***	.21
Sensation Seeking	.08	.07	.20	.18	-.02	.01	.11	.12	.15	-.01	.14

Note. SUD = The highest substance use group met; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frq SU = Highest frequency of substance use recorded in days per month; No. subs = The number of substance classifications used in lifetime; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during heaviest period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

* $p < .05$. ** $p < .01$; two-tailed.

Table 11

Summary of Spearman Correlations for Substance Use Variables and Suicide Measures- Total Sample

Variable	1	2	3	4	5	6	7	8	9	10
1. Frq SU	-									
2. No. substance	**.72****	-								
3. PDSQ alcohol	**.38****	**.30****	-							
4. PDSQ drugs	**.46****	**.42****	**.29****	-						
5. SCID alcohol	**.70****	**.60****	**.54****	**.36****	-					
6. SCID drugs	**.71****	**.79****	**.33****	**.57****	**.63****	-				
7. AUDIT	**.57****	**.53****	**.73****	**.35****	**.70****	**.53****	-			
8. PDSQ- Suicide	.05	.11	-.01	-.02	.10	.17	-.07	-		
9. SSI- Current	**.24***	**.31****	-.02	.06	**.24***	**.33****	.05	**.55****	-	
10. SSI-Worst	**.22***	**.31****	**.24***	.17	**.35****	**.30****	**.25***	**.43****	**.52****	-

Note. Frq SU = Highest frequency of substance use recorded in days per month; No. substance = The number of substance classifications used in lifetime; PDSQ = The Psychiatric Diagnostic Screening Questionnaire subscale scores; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during heaviest period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation.

$^{*}p < .05$. $^{**}p < .01$; two-tailed.

Table 12

Summary of Spearman Correlations Between Substance Use and Suicide Variables to All Other Variables- Student Sample

				PDSQ		SCID				SSI	
Variable	SUD	Frq SU	No. subs	Alcohol	Drug	Alcohol	Drug	AUDIT	PDSQ suicide	Current	Worst
Age	**.36****	**.38****	**.34***	.14	.11	**.37****	.15	**.29***	-.14	-.10	-.09
Education	.06	.17	.12	-.05	-.08	.01	-.05	-.01	-.04	-.24	**-.30***
PDSQ scales											
MDD	.19	.10	.13	.15	.26	.21	.02	.18	**.56****	**.44****	**.48****
PTSD	**.30***	.26	.21	.16	.16	**.30***	.10	.18	-.00	.07	.09
Eating	.07	-.07	-.02	**.32***	**.34***	.13	-.02	.09	-.15	-.15	.12
OCD	.19	.25	.18	.15	**.28***	.22	.26	.13	-.05	.22	**.31***
Panic	.05	.01	.05	-.13	.27	.09	.07	.04	.27	**.40****	**.44****
Psychosis	**.39****	.23	.23	**.29***	.27	**.39****	.22	**.35***	**.33***	**.45****	**.43****
Agoraphobia	.14	.03	.15	-.04	.25	.07	.04	.05	.07	.22	.13
Social phobia	.20	.16	.18	.27	**.30***	.27	.08	.25	-.01	.23	.24
GAD	.18	.16	.22	.13	.23	.16	.01	.17	**.29***	**.48****	**.44****
Somatization	**.34***	.24	**.44****	.27	**.39****	**.35***	.15	.25	.07	.18	**.35***
Hypochondriasis	.20	.05	.25	.12	.16	.17	.05	.20	.05	.17	.04
Internal comp	**.29***	.20	**.30***	.21	**.38****	**.29***	.09	.27	**.30***	**.47****	**.45****
External comp	**.62****	**.51****	**.58****	**.91****	**.61****	**.68****	**.62****	**.79****	.06	.16	**.38****
PDSQ T-score	**.36***	.27	**.35***	**.33***	**.46****	**.36****	.20	**.37****	.24	**.43****	**.45****
UPPS-P Scales											
Negative urgency	.19	.20	.27	.26	**.31***	.24	.13	.28	.04	.19	**.37****
Positive urgency	.20	.22	**.28***	.22	**.48****	.17	.24	.23	.12	**.30***	**.38****
Lack of premeditation	.27	**.29***	**.50****	**.38****	**.35***	.26	**.34***	**.40****	.17	**.30***	.27
Lack of perseverance	**.34***	**.28***	**.28***	.05	**.43****	**.28***	.22	**.29***	.04	**.35***	**.28***
Sensation seeking	**.28***	.22	**.47****	**.34***	.10	.19	**.30***	.24	.22	.25	**.29***

Note. SUD = The highest substance use group met; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frq SU = Highest frequency of substance use recorded in days per month; No. Subs = The number of substance classifications used in lifetime; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during the heaviest period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder; Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

* $p < .05$. ** $p < .01$; two-tailed.

Table 13

Summary of Spearman Correlations Between Substance Use and Suicide Variables to All Other Variables- Client Sample

				PDSQ		SCID				SSI	
Variable	SUD	Frq SU	No. subs	Alcohol	Drug	Alcohol	Drug	AUDIT	PDSQ suicide	Current	Worst
Age	.05	.03	.25	-.17	**-.37***	.24	-.02	-.30	.22	**.39***	-.07
Education	-.18	-.16	-.04	-.16	-.33	-.08	-.11	-.29	.29	.31	.00
PDSQ scales											
MDD	-.04	.05	.04	.07	-.15	.28	.08	-.12	**.66****	**.41***	.27
PTSD	.07	.15	**.38***	-.08	-.08	.17	.31	-.17	**.50****	**.41***	**.54****
Eating	**.43***	.25	**.41***	.04	.30	.31	**.41***	.28	-.07	.02	.07
OCD	.25	.24	.13	.11	**.44***	.27	.34	.15	-.00	.19	.32
Panic	.10	.13	.02	.04	.33	.17	.22	.10	.13	.10	.13
Psychosis	.30	.25	**.39***	.19	.26	.27	**.53****	.20	.16	.08	.24
Agoraphobia	.10	.21	.07	.14	.22	.23	.22	.17	-.03	-.15	.10
Social phobia	.24	.25	.14	.09	.28	.33	.31	.25	.12	-.02	.08
GAD	**.49****	**.39***	.22	.27	.31	**.57****	**.37***	**.39***	.27	.21	.17
Somatization	**.47****	**.36***	.30	.18	.21	**.44***	.28	.14	.12	.05	**.37***
Hypochondriasis	.11	.16	.05	**.41***	-.03	.31	-.01	.27	.24	.11	.28
Internal comp	.27	.31	.27	.17	.16	**.48****	**.39***	.15	**.50****	.33	**.39***
External comp	**.56****	**.61****	.21	**.74****	**.82****	**.47****	**.44***	**.58****	-.07	-.10	.14
PDSQ T-score	**.39***	**.41***	**.37***	.26	.30	**.56****	**.51****	.27	**.44***	.30	**.37***
UPPS-P scales											
Negative urgency	.35	.26	.13	-.07	.31	**.37***	.34	.23	-.03	-.00	.10
Positive urgency	-.12	-.05	-.05	-.28	.13	-.04	.14	-.23	.27	.21	.22
Lack of premeditation	.08	.13	.20	.13	.09	.16	.27	.11	**.56****	.31	**.43***
Lack of perseverance	.18	.08	.15	.22	.09	**.39***	.19	.21	-.17	.07	-.04
Sensation seeking	-.25	-.16	-.18	-.19	-.11	-.32	-.11	-.14	.16	-.20	-.04

Note. SUD = The highest substance use group met; PDSQ = The Psychiatric Diagnostic Screening Questionnaire; Frq SU = Highest frequency of substance use recorded in days per month; No. subs = The number of substance classifications used in lifetime; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during heaviest period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation; MDD = Major depressive disorder; PTSD = Posttraumatic stress disorder; OCD = Obsessive-Compulsive disorder; GAD = Generalized anxiety disorder; Internal comp = Composite score for internal subscales; External comp = Composite score for external subscales.

* $p < .05$. ** $p < .01$; two-tailed.

Table 14

Summary of Spearman Correlations for Substance Use Variables and Suicide Measures- Client Sample

Variable	1	2	3	4	5	6	7	8	9	10
1. Frq SU	-									
2. No. substance	**.69****	-								
3. PDSQ alcohol	**.36***	.06	-							
4. PDSQ drugs	**.56****	.23	**.38***	-						
5. SCID alcohol	**.70****	**.58****	**.46****	.32	-					
6. SCID drugs	**.73****	**.84****	.17	**.54****	**.65****	-				
7. AUDIT	**.56****	.29	**.69****	.35	**.51****	**.39***	-			
8. PDSQ- Suicide	.06	.14	.01	-.11	.14	.16	-.17	-		
9. SSI- Current	.14	.31	-.11	-.10	.24	.26	-.21	**.47****	-	
10. SSI-Worst	.19	.24	.09	.05	.19	.33	.01	**.48****	**.56****	-

Note. Frq SU = Highest frequency of substance use recorded in days per month; No. substance = The number of substance classifications used in lifetime; PDSQ = The Psychiatric Diagnostic Screening Questionnaire subscale scores; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during the heaviest period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation.

$^{*}p<.05$. $^{**}p < .01$; two-tailed.

Table 15

Summary of Spearman Correlations for Substance Use Variable and Suicide Measures- Student Sample

Variable	1	2	3	4	5	6	7	8	9	10
1. Frq SU	-									
2. No. substance	**.70****	-								
3. PDSQ alcohol	**.43****	**.47****	-							
4. PDSQ drugs	**.35***	**.47****	**.29***	-						
5. SCID alcohol	**.73****	**.62****	**.60****	**.40****	-					
6. SCID drugs	**.70****	**.70****	**.47****	**.54****	**.64****	-				
7. AUDIT	**.63****	**.68****	**.75****	**.40****	**.79****	**.63****	-			
8. PDSQ- Suicide	-.02	.07	.02	-.03	.04	.10	.03	-		
9. SSI- Current	.27	**.29***	.07	.07	.22	**.30***	.22	**.60****	-	
10. SSI-Worst	.22	**.35***	**.35***	.22	**.43****	.26	**.41****	**.35***	**.46****	-

Note. Frq SU = Highest frequency of substance use recorded in days per month; No. substance = The number of substance classifications used in lifetime; PDSQ = The Psychiatric Diagnostic Screening Questionnaire subscale scores; SCID = The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during heavies period of use; AUDIT = Alcohol Use Disorders Identification Test; SSI = Scale for Suicide Ideation.

$^{*}p<.05$. $^{**}p < .01$; two-tailed.

Table 16

One-Way Analysis of Variance Summary Table for Substance Use Groups on Scores for Worst Period of Suicidal Ideation

Source	*df*	*SS*	*MS*	*F*	*p*	η_p^2
Between-group	3	889.884[a]	296.628	2.760	.048	.096
Within-group	78	8382.518	107.468			
Total	81	9272.402				

Note. a. R^2 = .096 (Adjusted R^2 = .061)

Table 17

Mean Scores on Worst Period of Suicidal Ideation as a Function of Substance Use Group

Substance use group	N	*M*	*SD*
No substance use	11	12.64	10.13
Occasional use	19	8.95_a	8.75
Abuse/HED	17	13.35	11.55
Dependence	35	17.29_a	10.63

Note. Means sharing a subscript indicate that the groups are significantly different from each other on the measure of suicidal ideation at α = .05 according to the Tukey HSD procedure.

Table 18

Summary of Spearman Correlations for Worst and Current Suicidal Ideation to Potential Risk Factors

						PDSQ			SCID	
Variable	Age	Sex	Married	Separated	Divorced	External comp	Internal comp	T-score	Alcohol	Drug
SSI-Worst	.00	-.04	-.24*	-.00	.04	.29**	.44**	.43**	.35**	.30**
SSI-Current	.24*	-.21	-.07	-.02	.28**	.06	.46**	.41**	.24*	.33**

Note. External comp = Composite score for external subscales; Internal comp = Composite score for all internal subscales on PDSQ.
* p <0.05. ** p <0.01; 2-tailed.

Table 19

Stepwise Multiple Regression Analyses Predicting Severity of Worst Period of Suicidal Ideation

Variable	*B*	*SE B*	*β*	R^2 (Adjusted R^2)	ΔR^2
Step 1:				.25 (.24)**	
Internal composite	.52	.10	.50**		
Step 2:				.29 (.28) *	.05
SCID - Alcohol	.83	.36	.23*		
Step 3:				.35 (.32)*	.05
Married	-7.13	2.94	-.23*		

Note. Internal Composite = sum of major depressive disorder, post-traumatic stress disorder, obsessive compulsive disorder, panic disorder, generalized anxiety disorder, and somatization disorder subscales on The Psychiatric Diagnostic Screening Questionnaire; SCID - Alcohol= The number of symptoms endorsed on the Structured Clinical Interview for DSM-IV Disorders during heaviest period of alcohol use.
* $p < .05$. ** $p < .01$.

Table 20

Group Difference for Scores on Measures of Suicidal Ideation Between Students and Clients

	Students		Clients				
Measure	*M*	*SD*	*M*	*SD*	*t* (80)	*p*	Cohen's *d*
SSI-Worst	12.41	10.29	16.39	11.07	-1.65	.10	.37
SSI-Current	1.18	1.67	4.03	4.03	-4.48	.00	.93
PDSQ- Suicide	.39	.96	1.00	1.67	-2.09	.04	.45

Note. SSI = Scale for Suicide Ideation, PDSQ = The Psychiatric Diagnostic Screening Questionnaire.

APPENDIX A

CONSENT FORM

University of North Texas Institutional Review Board
Informed Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Title of Study: The Predictive Power of Impulsivity and Substance Use

Principal Investigator: Dr. Craig Neumann, University of North Texas (UNT) Department of Psychology.

Purpose of the Study: You are being asked to participate in a research study which involves the assessment of suicidal ideation in the both general and psychiatric population, as well as how these traits are related to mood disorders and substance use. The purpose is to determine how these things relate to one another in an undergraduate sample versus those who are seeking outpatient psychological treatment.

Study Procedures: You will be asked to fill out 3 paper-and-pencil assessments as well as complete 2 assessment interviews that will take about 2-3 hours of your time.

Foreseeable Risks: Some people experience discomfort when discussing personal psychological information. Should the interview become too overwhelming you may ask to stop or take a break. However, some people find the process of talking about their experiences somewhat therapeutic.

Benefits to the Subjects or Others: We expect the project to be of no direct benefit to you, but it may benefit others in that it will contribute to the field of research by increasing the limited knowledge regarding suicidal thoughts and their correlates among the general population.

Compensation for Participants: You will be able to use your participation in this study to meet your research credit requirement or as extra credit in undergraduate psychology courses if your instructor has arranged for that credit. Credit will be received whether you complete the study or not.

Procedures for Maintaining Confidentiality of Research Records: Your confidentiality will be strictly maintained as all records will be placed in a locked location. Additionally, your name will not appear on any of the raw data collected, so there will be no way to reference your performance on any of the assessments. Also, the confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

Exceptions to Confidentiality: However, there are three exceptions to confidentiality;

1) If there is reason to believe you are planning to hurt yourself or someone else
2) If there is reason to believe that child or elder abuse is taking place
3) If it is mandated by a court order.

Questions about the Study: If you have any questions about the study, you may contact Dr. Craig Neumann.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Dr. Craig Neumann or a research assistant has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

_____
Printed Name of Participant

_____ _____
Signature of Participant Date

For the Principal Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

_____ _____
Signature of Principal Investigator or Designee Date

APPENDIX B

DEMOGRAPHICS QUESTIONNAIRE

Demographics Questionnaire

Please circle or fill in the answer that most closely describes you.

Sex: Male Female

Age: _____

Marital Status: Single Married Divorced Separated

Ethinicity: European-American (Caucasian)
African-American
Hispanic
Asian or Pacific Islander
Native American
Other _____

Highest Level of Education Completed:
8th grade
High School/GED
Some College
Associates Degree
Bachelors Degree
Masters Degree
Doctoral Degree

Have you ever seen a counselor, therapist, or psychiatrist? _____

If so, how many times have you been in treatment? _____

What is the longest period of time that you have been in treatment? _____

Have you ever been hospitalized for mental health difficulties?_____

Have you ever had 10 or more drinks in one sitting? _____

In the past two weeks have you had 10 or more drinks in one sitting? _____

Have you ever use a non-prescribed drug by method of injection? _____

Demographics Questionnaire Continued

Has anyone in your family ever attempted suicide? _____

What is your relationship with this person(s)? _____

Has anyone in your family ever committed suicide? _____

What is your relationship with this person(s)? _____

Has anyone in your family ever had problems with alcohol? _____

What is your relationship with this person(s)? _____

Has anyone in your family ever has problems with other drugs? _____

What is your relationship with this person(s)? _____

Has anyone in your family ever been told by a professional that they have a mental health disorder? ___

What is your relationship with this person(s)? _____

What was the diagnosis? _____

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