THE ROLE OF IMPULSIVE AGGRESSION IN A COHORT OF SUICIDE ATTEMPTERS

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DEDICATION

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Research Objective: This study attempts to understand the role of impulsive aggression in a group of suicide attempters. The study hypothesized that a greater proportion of suicide attempters would meet criteria as impulsive aggressive than would be found among suicide ideators and unintentionally injured controls. The study further hypothesized that levels of impulsive aggression among all study participants would remain stable across time. **Methods:** Three groups of patients (n = 291) were recruited, with suicide attempters as the experimental group and suicide ideators and traumatic injury patients as control groups. Subjects were evaluated for the presence of impulsivity and aggression during initial treatment for suicidality or unintentional injury and again three months later. Two hundred one of the initial recruits also completed a follow-up assessment. Using a definition of impulsive aggression previously developed by Skodol (2002), study patients identified as "impulsive aggressive" needed to meet

three criteria: the presence of significant impulsivity a measured by the Barratt Impulsivity Scale (Barratt, 1994), and significant aggression, measured using two subscales (irritability and assaultiveness) from the Buss-Durkee Hostility Inventory (Buss & Durkee, 1956). Chi-square analyses, one-way ANOVAs, and interclass correlation coefficients were utilized to compare groups, with post hoc tests used as warranted. Covariates that are known to impact impulsivity and aggression (i.e., age, race, gender, depression, borderline personality disorder, and alcohol use/abuse) were controlled. **Results:** Before controlling for clinical differences between groups (e.g., levels of depression, alcohol use/abuse), chi-square analysis revealed significant differences in the number of impulsive aggressive individuals by group. A post hoc analysis suggested that the percentage of impulsive aggressive individuals was significantly higher among suicide ideators than among traumatic injury patients However, when covarying for age, gender, race, borderline personality disorder, major depressive disorder, and alcohol abuse, no differences were found in the level of impulsivity, irritability, or assaultiveness between groups. There was good consistency in the proportions of individuals by group who maintained their baseline level of impulsivity, irritability, and assaultiveness at follow-up, suggesting that these characteristics function in many individuals as a trait, rather than a state. In an attempt to corroborate the validity of this study's operationalized definition of impulsive aggression, external items that assessed these tendencies were identified and analyses were performed to see if participants who endorsed impulsive aggressive behavior also endorsed these external variables. There was not a good match between groups of individuals who were classified as impulsive aggressive using the traditional BIS-11/BDHI criteria and selected external variables. **Conclusions:** Findings from this research study do not support an association between impulsive aggression and suicidal behaviors.

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CHAPTER ONE

Introduction

More than 400,000 medically-treated suicide attempts are made annually in the United States, with 10 to 15 such attempts made for each completed suicide (Claassen, Trivedi, Shimizu, Stewart, Larkin, & Litovitz, in press). Some risk and protective factors have been identified, but there is limited understanding of what prompts suicidal behavior. While many risk factors have been identified and correlated with suicidal behavior, they have failed to produce a valid, reliable risk assessment procedure that is usable in clinical assessment of suicide risk (Jacobs et al., 2003). One theory suggests that increased numbers of lifetime suicide attempts are associated with characterological factors such as impulsive aggression (Oquenda & Mann, 2000). Impulsive aggression is conceptualized as a stable and enduring personality trait and has been associated with increased morbidity and mortality in several mental health diagnoses, including Borderline Personality Disorder (Skodol et al., 2002), Intermittent Explosive Disorder, Antisocial Personality Disorder, and Attention-Deficit/Hyperactivity Disorder (Fossati, Di Ceglie, Acquarini, & Barratt, 2001). A link between impulsive aggression and substance abuse, criminal behavior, and other high-risk, health-threatening activities has been previously established (i.e., Gerson & Stanley, 2002; Dougherty, Mathias, Marsh, Moeller, & Swann, 2004; Lester, 1999).

In recent years, the term impulsive aggression has been utilized to describe actions that are both impulsive (i.e., “acting on the spur of the moment, non-planning”, Schalling, Edman, Asberg, & Oreland, 1987) and aggressive (i.e., “behavior by one

individual directed at self or another person or object in which either verbal force or physical force is used to injure/coerce or to express anger" (Coccaro, 2003). This construct was initially studied in criminal populations and was defined as "behavior in which the perpetrator gets carried away by certain features of the environment so that [his/her] crime of passion is at least partially involuntary" (Berkowitz, 1974). The construct has recently gained widespread attention among mental health researchers. It is, however, no longer considered a viable legal defense (Felthous, 1998).

Biological, psychological, and environmental models have been used to conceptualize the many facets of impulsive aggressive behaviors and instruments have been developed to assess the various components of this construct.

With reference to suicidal behavior, Simon et al. (2001) found that 24 % of individuals who attempt suicide spent less than five minutes planning their suicidal actions. In an attempt to better understand the role of impulsivity and aggression in non-fatal suicidal behaviors, the current study seeks to identify and measure these constructs in a population of suicidal individuals and non-suicidal controls. In addition, the study will examine the stability of this construct in personality over time. Increased understanding of impulsive aggression, as examined in this study, may help researchers and clinicians identify patients who are at higher risk for suicidal behavior and, ultimately, may lead to the development of appropriate therapeutic interventions for this population.

CHAPTER TWO
Review of Existing Literature

Preventing suicidal behavior is challenging, in part, because suicidal behavior is so difficult to predict (i. e., Gunnell & Frankel, 1994; Goldstein, Black, Nasrallah, & Winoker, 1991). For this reason, in recent years, researchers have focused more effort on understanding what provokes suicidal behavior. The following discussion will concentrate on a relatively new theory which suggests that the personality factor, impulsive aggression, may be associated with an increased risk for suicidal behavior. Initially, a review of the literature on impulsivity and aggression as separate constructs will be presented, discussing the theoretical underpinnings, correlates, and current state of research for each. Next, research that conceptualizes impulsive aggression as a single construct will be discussed. Finally, research examining the role of impulsive aggression and its link to suicide will be overviewed.

Impulsivity

Eysenck, Pearson, Easting, and Allsop (1985) suggest that impulsivity is "the tendency to act with little forethought, without deliberation and evaluation of consequences." Moeller, Barratt, Dougherty, and Schmitz (2001) added to this definition by characterizing impulsivity as a "predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others." These theorists, as well as others, believe that impulsivity is linked in a unique way to personality structure and overall mental health.

Theoretical Models of Impulsivity

Dimensionally-based Personality Theory of Impulsivity: Most theorists suggest that impulsivity is integral to personality structure. Some consider it to be a stable personality trait on the level of extroversion or other characteristics of a personality style. Others suggest that impulsivity is a more transient manifestation of a failure in the integrity of the overall personality structure, changing as different needs and situations arise (Schmidt, Fallon, & Coccaro, 2004).

Eysenck (1985) believed impulsivity to be a stable trait. His personality model includes a hierarchical design of three "biologically-based" types or traits - extroversion, neuroticism, and psychoticism. Impulsivity, in conjunction with hostility, non-conformity, and tough-mindedness, comprise the subdivisions of psychoticism. Four "habits" (behavioral tendencies that depict subdivisions of impulsivity) are also identified by Eysenck et al. (1985) as narrow impulsivity, non-planning, liveliness, and risk-taking. Following Eysenck's heirarchechal model, "specific responses" are empirical behaviors or observations that portray the habits. Eysenck's model of personality is widely accepted, cited most frequently after Piaget and Freud's basic models of personality.

Cloninger (1987) developed a biosocial theory of personality that includes the construct of impulsivity. He believes that, "personality is a complex hierarchic system that can be naturally decomposed into distinct psychobiological dimensions of temperament and character." According to Cloninger, Svrakic, and Przybeck (1993), three character dimensions (self-directedness, cooperativeness, and self-transcendence) and four temperament dimensions (novelty seeking, harm avoidance, reward dependence,

and persistence) help explain personality. The temperament dimensions are the result of genetic and neurobiological determinants while character dimensions are impacted more by lifetime development (Cloninger et al., 1993). Impulsivity in the Cloninger model is believed to be an aspect of novelty seeking; one that is likely inherited, demonstrated early in life, and predictive of adolescent and adult behavior.

Dickman (1990) suggests that impulsivity does not have to be a negative characteristic. He suggests that individuals can spontaneously determine their actions based on the possibility of a good outcome (functional impulsivity) or make impulsive decisions that do not consider the consequences of their action (dysfunctional impulsivity).

Gray's model (1987) is one of the first to integrate the standard "personality" theory with biological and neurological implications (Kasch, Rottenberg, Arrow, & Gottlib, 2002). According to Gray, impulsivity is defined as an action-oriented predisposition of personality and is correlated with sensation-seeking and avoidance of boredom or monotony (Soloff, Lynch, & Moss, 2000). This theory proposes a two-dimensional model, with a behavioral activating system (BAS) and a behavioral inhibition system (BIS) (Gray, 1987). The behavioral activating system is sensitive to how punishment and reward dependence interact with impulsivity, while the behavioral inhibition system represents a measure of anxiety. A number of studies have emerged in recent years to test this theory in various populations (Kasch et al., 2002) and the general census seems to be that it is feasible to view impulsivity and anxiety in conjunction with biological patterns (i.e., Knyazev, Slobodskaya, & Wilson, 2002; Jorm et al., 1999).

Typically, BAS scores are associated with low arousal in the cerebral cortex and it is thought that this is responsible for subsequent impulsive, disorganized behavior. In turn, BIS scores are associated with an active EEG pattern, or higher physiological arousal, and this is thought to represent anxiety (Kasch et al., 2002). This comprehensive biological and neuropsychological theory implies that impulsivity is inherent in personality but is autonomous and not dependent on the presence or absence of anxiety (Miller, Joseph, & Tudway, 2003).

Biologically-based Theory of Impulsivity: Recent studies suggest that impulsivity may be biologically based, with the strongest evidence being an association between serotonin level and impulsive behaviors. Linnoila and Virkkunen (1992) conducted a study to assess the role of serotonin in a group of impulsive violent offenders who attempted manslaughter without premeditation, provocation, or economic motivation. These subjects were found to have significantly lower levels of 5-hydroxyindoleacetic acid (5-HIAAA), a serotonergic metabolite, in the cerebrospinal fluid (CSF) than normal controls. Other studies have found similar results in populations of impulsive fire setters (Virkkunen et al., 1992), substance abusers (Soloff et al., 2000), and suicide attempters (i.e., Asberg, Thoren, & Traskman, 1976; Corruble et al., 2003), although there is some disagreement about whether it is serotonin or its transporter receptors or other serotonin-linked "candidate genes" that are responsible for the reduced 5-HIAAA levels and corresponding impulsivity (Skodol, 2002). Mann (1998) also reported that the number of 5-HT1A and 5-HT2A receptors is increased in the prefrontal cortex of suicide victims, providing further evidence that serotonin activity may be decreased in this population.

The executive function of behavioral inhibition is associated with the ventral prefrontal cortex and one theory suggests that an abnormality in this area could lead to disinhibition or "a greater propensity to act on powerful feelings such as suicidal or aggressive feelings" (Mann, 1998). The biologically-based theory is further supported by evidence that psychopharmacological treatment with selective serotonin reuptake inhibitors (SSRIs) is often effective in reducing impulsive/aggressive behaviors (i.e., Skodol et al., 2002; Gerson & Stanley, 2002). Many of the above-cited studies were conducted in populations of individuals considered to be impulsive and aggressive, and who exhibited behaviors such as angry outbursts and self-destructive behavior. Thus, the measured trait is often termed impulsive aggression and this further complicates the measure of a more "pure" measure of impulsivity.

Oquendo and Mann (2000) have also suggested that other neurotransmitters may be associated with suicidal thoughts or behaviors. For instance, autopsy results in one study reveal that the total number of noradrenergic neurons was decreased in the brainstem of suicide victims. In addition, more recent studies have investigated the role of dopamine in animals and humans and suggest that increasing dopamine in the mesolimbic pathway that modulates affective responses to the environment results in increased aggressive behavior (Oquenda & Mann, 2000).

Impulsivity and Suicide

Research indicates that impulsivity is associated with Axis I and II disorders (i.e., Skodol et al., 2002; Shea, Turgay, & Carrol, 2004). Skodol et al. (2002) reported a link between impulsive behaviors and a diagnosis of Borderline Personality Disorder,

reporting that 77% of individuals who are diagnosed with Borderline Personality Disorder demonstrate persistent impulsivity. These high rates are associated with an increase in morbidity and mortality. Specifically, according to Gerson and Stanley (2002), 70.8% of patients who were diagnosed with Borderline Personality Disorder reported self-mutilation or suicidal attempts in comparison to just 17.5% of patients who reported self-mutilation or suicidal attempts but were diagnosed with other types of personality disorders. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) diagnoses of Intermittent Explosive Disorder and Antisocial Personality Disorder also include impulsivity as a core component of these disorders (American Psychological Association, 2000).

Impulsive actions have also been studied outside the realm of a specific diagnosis, with a plethora of research suggesting that impulsivity may be linked to aggression (i.e., Soloff et al., 2000; Linnoila & Virkkunen, 1992), depression (Suominen et al., 1997), alcoholism (Fishbain, Fletcer, Aldrich, & Davis, 1987), and environmental factors (i.e., Corruble et al., 2003; Mikolajczak & Hagen, 1978; Weyrauch, Roy-Byrne, Katon, & Wilson, 2001). Suominen et al. (1997) conducted a study among suicide attempters with major depression, alcoholism, or a combination of both or neither in an attempt to better understand differences in levels of impulsivity. The sample included 114 patients who were admitted to the emergency room following a suicide attempt. All patients were over 15 years of age, with a mean age of 37.2 years. Twenty-four percent of the sample were diagnosed with major depression, 27% received a diagnosis of alcohol dependence, 14% had comorbid major depression and alcohol dependence, and 35% had neither a diagnosis

of major depression nor alcohol dependence. Impulsivity was assessed by measuring two items from the Suicidal Intent Scale (SIS) that identified degree of pre-meditation prior to the suicidal gesture (i.e., Item 6 - degree of planning, Item 15 - degree of premeditation) and subjects were classified as follows - 1) non-impulsive 2) intermediate level of impulsivity or 3) impulsive. Overall, 44% of all cases were found to be impulsive, 32% had intermediate levels of impulsivity, and 24% had no indication of impulsivity associated with the suicidal gesture. Impulsivity was found to be a significant covariate of suicidal intent. The degree of impulsivity or planning correlated significantly, yet inversely, with scores of hopelessness. Patients with a diagnosis of alcohol dependence but no diagnosis of major depression exhibited higher levels of impulsivity than those with major depression but no alcohol dependence. This was not a surprising finding given that alcohol use may serve to disinhibit patients and increase impulsive behaviors. Again, substance abusers and suicidal patients have shown more elevated levels of impulsive responses than normal controls when tested with laboratory paradigms (Dougherty et al., 2004).

Corruble et al. (2003) found that neurotic personality styles (defined as the endorsement of idealization, reaction formation, undoing, and pseudo-altruism as coping mechanisms) and immaturity (defined as utilizing coping mechanisms such as acting out, passive-aggressive behaviors, splitting, and denial) were positively correlated with impulsivity in a group of 77 depressed patients. Impulsivity was operationalized as the presence of spur-of-the-moment behaviors. Participants were all inpatients with a diagnosis of unipolar major depressive disorder, single or recurrent, without psychotic

symptoms. All patients were between 18 and 65 years of age, with a mean age of 39.2 years. Sixty-one percent of the sample were women. Defense mechanisms were assessed by using the Defense Style Questionnaire (DSQ) and subjects were classified into mature, neurotic, or immature categories. Patients who were found to have immature or neurotic personality styles were more likely to be impulsive than those with mature defense mechanisms (the use of humor, suppression, sublimation, and/or anticipation). Impulsive patients were also found to have higher numbers of lifetime suicide attempts than non-impulsive patients.

Stressful life events may influence levels of impulsivity in suicide attempts. Weyrauch et al. (2001) investigated how impulsiveness varied by situations in a sample of 99 patients who attempted suicide. Participants were between 16 and 76 years of age, with a mean age of 33.2 years. A score of impulsivity was derived by adding three self-reported variables - planning, final preparation, and the presence of a suicide note. When patients endorsed more than one suicide attempt, levels of impulsivity were found to be higher with regard to current attempts than in patients with only one attempt. In addition, impulsivity was negatively correlated to higher numbers of interpersonal relationship stressors. While some literature suggests that environmental stressors such as interpersonal difficulties may be associated with suicidal ideas and gestures, this study suggests that this information may not be particularly relevant in predicting who is at risk for a suicide attempt.

Many researchers suggest that age is associated with impulsive suicidal behavior (Kashden, Fremouw, Callahan, & Franzen, 1993) and there is ample evidence that

adolescents exhibit more impulsive behavior than adults (Dougherty et al., 2004). In addition, the highest rates of medically-treated, nonfatal intentional self harm are consistently found in individuals under the age of 30 (i.e., Claassen, in press; Shaw, 2002). Kashden et al. (1993) completed a study with three groups of adolescents between 13 and 18 years of age, including a group of inpatient suicide attempters, inpatient non-suicidal patients, and a high school control group. The sample consisted of 63 adolescents who were assessed by both self-report and laboratory measures. An analysis of variance was conducted to determine differences between two laboratory measures of impulsivity, the Gordon Diagnostic System vigilance commission error report (the inability to sustain attention to just one stimuli while inhibiting other stimuli) and the Gordon Diagnostic System delay efficiency ratio (the inability to delay responses for six seconds as required). Despite the fact that all groups demonstrated similar problem-solving skills, the suicidal subjects exhibited significantly higher levels of impulsivity than the other groups.

Dougherty et al. (2004) provide additional support for the association between impulsivity and suicidal tendencies in adolescents. Laboratory measures that required quick decisions (immediate and delayed) were administered as well as a reward-directed task and teenagers with suicidal thoughts were more impulsive on all tasks when compared to teens who did not report suicidal thinking or behaviors.

Impulsivity is associated with suicidal ideation and attempts, with almost half of all attempters doing so in an impulsive manner, according to one study (Simon et al., 2001). Beautrais, Joyce, and Mulder (1999) studied the role of personality characteristics

in a sample of young individuals (under 25 years of age) who presented to the hospital following a medically serious suicide attempt which required a hospital stay greater than 24 hours and medical treatment other than observation. The sample consisted of 45.7% males and 54.3% females, with a mean age of 20.2 years and 18.7 years respectively. Findings suggest that individuals with the highest levels of impulsivity, as measured by the Barratt Impulsivity Scale (BIS) were 6.2 times more likely to have a serious suicide attempt compared to those with the lowest levels of impulsivity (Beautrais et al., 1999). In an attempt to corroborate the self-report measure of impulsivity, "significant others" were queried about study participants and results again suggested that those with the highest level of impulsivity were 9.9 times more likely to attempt a serious suicide attempt compared to those with the lowest levels of impulsivity. However, in multivariate analyses using six distinct personality characteristics, impulsivity was only significant when correlated to other personality traits such as hopelessness, neuroticism, and external locus of control.

Simon et al. (2001) suggested that inadequately controlled impulsive aggression may be a better predictor of suicidal behavior than depression. Their study differentiated impulsive from non-impulsive suicidal behaviors by identifying numerous characteristics of the attempt - planning time before the attempt, time of day, likelihood of being discovered, method used, alternate methods that were considered, intent, history of past aggressive behaviors, alcohol use, and prior attempts. Five percent of the sample stated they spent less than one second planning the attempt and 24% spent less than five minutes planning the suicidal behavior. Participants who attempted suicide between 7:01

p.m. and 6:59 a.m. and utilized a violent method such as a gun, hanging, or cutting were more likely to be classified as impulsive attempters. Those who thought they would die were significantly less likely to be classified as impulsive attempters. Those who were classified as "impulsive suicide attempters" were more likely to have engaged in fighting in the past year and less likely to be depressed or hopeless. In addition, impulsive attempters were as likely to tell someone about their suicidal thoughts or leave clues as non-impulsive attempters.

Mann et al. (1999) suggests a stress-diathesis model of suicide with regard to impulsivity. This model describes impulsivity as a core trait of personality, one which may yield a person vulnerable to suicidal actions when life stressors become overwhelming. On the other hand, models which describe impulsivity as a "state" characteristic suggest that individuals may not display impulsive behaviors typically, yet they may become prone to this behavior in certain environmental conditions (Dougherty et al., 2004). A 2001 study by Weyrauch et al. (2001) found that impulsiveness did, indeed, vary between suicide attempts in the same individual. Because there is no clear understanding of whether impulsivity represents an innate component of personality or a transient state that fluctuates in various situations, it is important to identify and measure impulsivity in different populations over time.

Clinical Measures of Impulsivity

While there are few good discussions in the literature of impulsivity, there has historically been a great deal of energy devoted to identifying and measuring it. There is, however, no clear consensus about how to measure the construct and, as a result,

instruments contain wide variability with regard to the dimensions which are represented when the construct is measured. Three types of measurements exist - self-report, physiological/biological, and laboratory. Self-report measures were the first type of instruments to be used (e.g., Buss, Durkee, & Baer, 1956) and the majority of these instruments are well correlated with each other. Limitations of these instruments include their reliance on self report and an insensitivity to differentiation of state-versus-trait possibilities. Physiological tests focus primarily on measuring levels of serotonin as this is the neurochemical most frequently associated with impulsivity (Soloff et al., 2000). "Laboratory tests," as used here, refer to computerized tests that measure three types of impulsivity-punishment, reward-directed, and rapid-decision paradigms (Dougherty et al., 2004). In order to further clarify previous conceptualizations of impulsivity, the instruments measuring them are identified and described below.

Self-report Measures

Barratt's Impulsivity Scale, Edition 11 (BIS-11): The original BIS was developed in 1959 by Barratt and was one of the first measures of impulsivity not included in a more general personality inventory. A revised scale, the BIS-11, was published in 1995 (Patton, 1995) and it differentiates motor (11 action-oriented items), cognitive (eight "feeling" items), and non-planning (11 items) components of impulsivity (Fossati et al., 2001). Examples of items include, "I do things without thinking" and "I am self-controlled." While this instrument is well-accepted for its ability to assess global levels of impulsivity, other measures offer a more specific look at impulsivity (Stanford & Barratt, 1995). For example, some instruments suggest that impulsivity can be further

classified by whether these actions have a positive or negative impact or if the behaviors are only a fraction of what is accepted as true "impulsivity".

The Eysenck Impulsiveness Scale (IVE-7): Eysenck's original measures of impulsivity, the Eysenck Personality Inventory (EPI) (Eysenck, 1964) and the Eysenck Personality Questionnaire (EPQ) (Eysenck & Eysenck, 1975), suggested that this construct was comprised of four dimensions - "narrow" impulsiveness (i.e., acting on impulse without regard to consequences), risk taking, non-planning, and liveliness. Revised in 1985, this questionnaire assesses primary dimensions of impulsiveness, venturesomeness, and empathy. According to Eysenck, impulsiveness occurs when behavior is demonstrated without the appreciation of risk evaluation while venturesomeness recognizes the risk that will be taken (Caci et al., 2003).

Temperament and Character Inventory (TCI): Developed by Cloninger in 1987 and based on his theory of personality, this inventory explores four dimensions of temperament - novelty seeking, harm avoidance, reward dependence, and persistence. The temperament dimensions represent traits that are heritable, seen early in life, and involve an unconscious or preconscious bias in learning. On the other hand, three character dimensions - self-directedness, cooperativeness, and self-transcendence - represent attributes of an individual that are formulated through the aging process and environmental determinants. In this model, impulsivity is part of the temperament dimension of novelty seeking and it is thought to be a personality trait that is stable over the course of a lifetime.

Sensation Seeking Scale (SSS): Zuckerman developed this instrument in 1979 and it is still widely used in research today. It is a multi-dimensional instrument, measuring four subscales - thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. Limitations of this scale include the forced-choice format and out-of-date items (Ferrando & Chico, 2001).

Laboratory Measures

Laboratory behavioral measures add an observable measure of impulsivity (Dougherty et al., 2004). Typically, impulsivity is measured by its association with punishment, reward, or response latency (i.e., how long a response takes). In punishment paradigms, impulsivity is indicated by a persistent response that is negatively reinforced. For example, one task uses a card playing format. Players can learn that specific responses result in punishment; however, impulsive players typically continue to make the same kind of choices despite being punished for such decisions. Populations that have been identified as impulsive while using this measure include sex offenders, boys with conduct disorder, and suicidal patients (Dougherty et al., 2004). In reward model tasks, some choices receive faster gratification than other responses. A persistent pattern of choosing responses that will gain quick gratification, or reward, is considered impulsive. Women with Borderline Personality Disorder, substance abusers, and parolees with a history of violence have been found to have higher scores of impulsive responses on laboratory behavioral measures than normal controls (Dougherty et al., 2004). Finally, impulsivity can be measured by quantifying response times (i.e., response

latency) with quick, inaccurate responses being seen as more impulsive than slower, accurate responses.

In summary, impulsivity appears to play an important role in mental illness. Psychological, biological, and environmental determinants provide a basis for understanding and measuring impulsive behaviors. Research studies have identified an association between impulsivity and personality characteristics and temperament, alcoholism and substance use, stressful life events, and suicidal gestures. There is wide disagreement about whether impulsivity is a core component of personality or more of a transient characteristic that can be induced or aroused by specific environmental conditions.

For the purpose of this study, impulsivity will be measured by the self-report BIS-11. This measure is widely accepted as a global measure of impulsivity and is the current "gold standard" in measuring impulsivity in suicidal behavior. It can also be used with ease in a wide variety of clinical settings as a part of patient interviews. Many of the other instruments include impulsivity as a part of the overall instrument but do not focus on impulsivity primarily.

This paper will next present an overview of the construct of aggression. Definitions of the construct, underlying theories that explain its development and maintenance, and a summary of current research and instrumentation in this area will be provided.

Aggression

An aggressive act is defined as "a physical act that is directed by an individual toward other persons with a goal of causing them physical harm, or toward the self with the goal of suicide" (Mann, 1998). According to Mousavi and Tallaei (2004), aggression is a "verbal or physical, sudden, goal-directed behavior for devaluating, threatening, or injuring others." It can be classified by cause (offensive or retaliatory) or intent (instrumental or emotional). Offensive aggression includes behavior that is indirectly caused by another person while retaliatory aggression is a provoked response. Instrumental aggression includes planned behavior for which a reward is anticipated (i.e., a robbery) while emotional aggression is spontaneous behavior that is frequently impulsive and inflicted for its own sake. While these definitions provide a broad description of aggression, theoretical models help explain how aggression develops and is maintained over time.

Theoretical Models of Aggression

Psychoanalytically-based Theory of Aggression:. According to Freud (as edited by Gay, 1989), personality in humans can be explained by two primary drives that co-exist, the aggressive drive and the sexual drive. Individuals are constantly trying to resolve conflict that occurs as a result of these two primary drives. The id, superego, and ego are part of one's conscious and unconscious mind and help control these primary drives. The id, according to Freud (1938), operates on the pleasure principle by seeking pleasure and avoiding pain. The superego, in turn, exists in the conscious mind and contains morals and values that have been learned over the lifetime. The ego operates on

the reality principle and is responsible for achieving a balance between the desires of the id and superego. According to Freud (as edited by Gay, 1989), the superego must inhibit the aggressive drive found within the id. Freud said, "aggression is introjected, internalized as [is] the superego conscience. Civilization, therefore, obtains mastery over the individual's dangerous desire for aggression by weakening it and disarming it and by setting up an agency within [the individual] to watch over it, like a garrison in a conquered city."

Environmentally-based Theories of Aggression: According to McCawley (2002), the environment plays a vital role in the way aggression is expressed. Bandura (1975) endorsed the social learning theory which suggests that individuals learn aggression from others or themselves. In several studies with children, Bandura (1975) found that children modeled aggressive behavior when two aspects were present: 1) seeing others who demonstrated aggressive behavior and 2) seeing a reward that existed as a consequence of the aggressive behavior. Additional studies have found that peer influences, neighborhood and family conditions, and cognitive factors play a role in the development of aggression over the course of a lifetime (i.e., personal and social restraints, lack of social support, limited educational/training opportunities).

Biologically-based Theory of Aggression: The first report of a link between aggression and reduced serotonin was found in an animal study by Yen et al. in 1959. Mice were induced into an isolated state of aggression and low levels of serotonin were found. Linnoila and Virkkunen (1992) also investigated violent offenders and found that they had significantly lower levels of 5-HIAA than persons who were not aggressive. A

follow-up study by the same authors revealed that impulsive fire setters also had similar physiological profiles. The latest work by Linnoila and Virkkunen compared impulsive and non-impulsive violent offenders with healthy controls. Results suggest that the impulsive subjects had significantly lower levels of cerebral spinal fluid, CSF 5-HIAA, than did the non-impulsive violent offenders.

Further work by Coccaro (1989) suggested that aggressive states may be contingent upon other factors that provoke such a state. For example, rats who had prior exposure to mice exhibited decreased states of aggressiveness toward the mice in comparison to those with no prior exposure (Coccaro, 1989). In addition, Coccaro points out that homicide offenders who committed premeditated acts of aggression toward others have been found to have normal levels of serotonin, evidence that the violence by itself may not be associated with reduced serotonin levels. He postulates that "irritable" impulsive aggression may require an "environment of arousal" in order to produce the reduced serotonin state that is associated with impulsive aggression.

New et al. (2001) also reported a link between impulsive aggressive suicide attempters and serotonin. The authors conducted post-mortem brain studies in a population of suicide attempters and found abnormalities in the HTR1B genotype in white males with impulsive aggressive behaviors. Animal studies have also found an association between serotonin and aggressive behaviors (Mann, 1998).

Correlates of Aggression

As with impulsivity, aggressive behavior is correlated with Axis I and II disorders, age, lifetime stressors, alcoholism and substance use, a past history of

aggressive behaviors, and suicidal behaviors (Nordstrom, Gustavsson, Edman, & Asberg, 1996). Zanarini, Gunderson, Frankenburg, and Chauncey (1990) reported that 70.8% of those with Borderline Personality Disorder endorsed aggressive, self-harming behaviors. According to Mikolajczak and Hagen (1978), aggressivity is higher in young males, but tends to decline with age. Psychiatric and medical patients in a Veterans Association (VA) Hospital were evaluated for aggression, depression, and suicidal thoughts or behaviors and compared with patients at a private psychiatric hospital. Again, the most aggressive group were male patients in the VA Hospital who were less than forty years of age. The nature of their aggression was that it was primarily directed outward, and these patients endorsed aggressive thoughts as well as actions and verbalization of these thoughts (Mikolajczak & Hagen, 1978).

According to Mann's 2003 study, criminals who have had a history of suicide attempts report a lifetime history of aggressive behaviors in comparison to criminals who do not have a history of suicidal behaviors. Thirty percent of individuals who commit homicide report a history of aggressive behaviors and 10 to 20% of those who attempt suicide have a past history of violence toward others.

Clinical Measures of Aggression

As noted previously, the available instruments that assess aggression operationally define this construct in widely different ways and an overview of instruments adds to the understanding of this construct. In comparison to impulsivity, aggression is historically studied only with self-report measures (Barratt, Stanford, Felthous, & Kent, 1997).

Buss-Durkee Hostility Scale (BDHI): Originally developed by Buss and Durkee in 1956 to assess hostility, this scale was normed on a group of male and female college students and is still widely used for a global assessment of hostility or aggression. Seven subclasses of hostility are identified as follows: assault, indirect hostility, irritability, negativism, resentment, suspicion, and verbal hostility. Two overarching factors, an emotional or attitudinal component and a motor component, are extracted from the data. The emotional factor identifies feelings of aggression while the motor factor is comprised of aggressive actions. The Assault and Irritability subscales of this instrument are frequently combined and added to a measure of impulsivity to produce a measure of impulsive aggression. A revision of the BDHI, the Aggressiveness Questionnaire (AQ), has recently been completed by Buss and Warren (2000). Because it is relatively new, there is no clear understanding of its usefulness, reliability, or validity. It has been described as a screening tool to measure the propensity for aggressiveness as well as the ability to refrain from exhibiting aggressive behaviors.

Lifetime History of Aggression (LHA): Developed by Coccaro, Berman, and Kavoussi (1999), this is a revision of the Brown-Goodman Lifetime History of Aggression. The original instrument was developed to assess the relationship between aggression and serotonin levels. The current measure was developed for use in both clinical and research arenas and to assess diverse aspects of aggression that have occurred over a lifetime. Aggression is measured by adding scores from three subscales - self-harm, social consequences/anti-social behaviors, and aggression.

Overt Aggressiveness Scale - Modified (OAS-M): This scale, developed by Coccaro, Harvey, Kupshaw-Lawrence, Herbert, and Bernstein in 1991, is a modification of the Overt Aggressiveness Scale (OAS). It was created to assess aggressive thoughts and actions over the past week in an outpatient population. Three domains include aggression, irritability, and suicidality. The aggression subscale measures verbal aggression, aggression against objects, aggression against others, and auto-aggression. Irritability measures global and subjective irritability, while suicidality measures suicidal tendencies (ideation and behavior), intent of suicidal attempt, and the lethality of suicidal attempt.

Aggressive Acts Questionnaire (AAQ): Barratt developed this self-report instrument in 1994 to measure frequency and content of recent aggressive acts. All items are scored on four factors - impulsive aggression, premeditated aggression, mood, and agitation. This instrument is useful in differentiating impulsive aggression from other types of aggression (Barratt & Slaughter, 1998).

In summary, there is no simple way to understand aggression. Definitions and theories that attempt to capture the essence of aggression vary widely. Linnoila and Virkkunen (1992) point out that researchers have spent years attempting to determine whether low levels of serotonin in violent offenders is responsible for aggressive, violent behavior or whether the loss of control over impulse leads to violent behavior. Simon et al. (2001) also suggests that the inability to identify, understand, and manage the aggressive drive may, in part, be associated with its tendency to interact with impulsive behaviors. Recent research has, thus, begun to explore the idea that impulsivity and

aggression may be linked as potent risk factors in situations such as suicidal states and that this linkage may increase risk.

For the purpose of this study, the BDHI will be utilized to determine levels of aggression. This instrument allows researchers to assess a global level of aggression or hostility as well as obtaining more specific information about what type of aggression is present (i.e., irritability, assault, etc.). In addition, the AAQ will be used to differentiate whether aggressive acts were impulsive or pre-meditated in nature. Other instruments such as the OAS-M were designed for specific populations (i.e., inpatients, married or cohabitating partners, etc.) or assessment periods (past week only) and were inappropriate for use in this study.

The next section will summarize what is known about impulsive aggressiveness - definitions, theoretical bases for development, and the state of current research about this construct.

Impulsive Aggression

"Impulsive aggression" was first conceptualized by Berkowitz in 1974 in a population of criminal offenders. Coccaro et al. (1991) described impulsive aggressive tendencies as impulsiveness, angry outbursts, and self-destructive behavior. McCauley (2000) states, "Impulsive aggression (also known as irritable, angry, or expressive aggression) is marked by strong emotion, especially anger, and is aimed at hurting another." As a general rule, impulsive aggression is studied as a single construct, although it contains two components (Barratt, Stanford, Kent, & Felthous, 1997). Impulsive aggressive individuals are thought to be capable of getting "carried away" with

their aggressive behavior, escalating into levels of violence beyond what would be expected. These are the individuals who commit acts frequently labeled "crimes of passion" (Nourse, 1997).

Theoretical Models of Impulsive Aggression

Biologically-Based Theory of Impulsive Aggression: According to Oquenda and Mann (2000), impulsive aggressivity is linked to changes in serotonergic, dopaminergic, noradrenergic, and/or GABA (gamma aminobutyric acid) systems. Research studies with mice show that decreasing serotonin results in increased levels of aggression. In turn, fighting, mouse murder, and pup murder decreases when serotonin treatment is initiated. Some studies use knock-out mice, mice that are genetically engineered without the serotonin 5HIAA gene, to show a propensity for aggressive behavior in comparison with mice that are not genetically altered (Oquenda & Mann, 2000).

Human studies also provide support for a biological link between serotonin and impulsive aggressive behavior. Linnoila and Virkunen (1992) concluded that a group of impulsive suicide attempters had lower levels of serotonin when compared to non-impulsive suicide attempters. As with mice, treatment with selective serotonin reuptake inhibitors (SSRIs) often results in improvement of impulsive aggressive behaviors in humans, further evidence of a biological connection to impulsive aggressivity (Skodol et al., 2002).

Oquendo and Mann (2000) reported that impulsive aggressive personality-disordered patients who attempted suicide were found to have lower levels of serotonin. Traskman-Benz et al. (1992) also reported low levels of CSF 5-HIAA in impulsive,

violent patients with personality disorders. Several studies have reported the link between low levels of serotonin and impulsive aggressive behaviors, and Gardner et al. (1990) suggested that these low levels of serotonin can be found months to years after the violent impulsive behavior is demonstrated. In recent years, positron emission tomography (PET) studies have been instrumental in determining a decrease in serotonin in impulsive patients with personality disorder (Soloff et al., 2000).

Impulsive murderers and fire-starters demonstrated lower levels of serotonin than non-criminals (Linnoila & Virkkunen, 1992). One study reported that violent prisoners who were repeat offenders in a three year period had lower levels of serotonin than violent prisoners who did not engage in criminal activities during the three year study period.

Patients with Lesch-Nyhan syndrome demonstrate self-mutilating behavior and are found to have low levels of serotonin in their spinal fluid (Asberg et al., 1976). Autopsy results of suicidal patients also show atypical, low levels of serotonin in the brain stem of such patients.

Animal studies demonstrate a link between impulsive aggressive behavior and norepinephrine as well. When mice are given norepinephrine, they exhibit an increase in impulsive aggressive behavior that is not seen in a control group of mice that receive no treatment. A group of monkeys became aggressive and bit themselves when administered L-dopa (Oquenda & Mann, 2000). Likewise, manipulation of GABA and dopamine has been shown to induce fighting and mouse murder.

Studies involving norepinephrine and its relationship to impulsive aggression are limited at this time. A study of gamblers revealed that this group had higher levels of norepinephrine than non-gamblers (Oquenda & Mann, 2000). Other studies involving norepinephrine are contradictory, with some showing higher levels of norepinephrine and other showing lower levels of norepinephrine in suicide victims (Oquenda & Mann, 2000).

Personality-Based Theory of Impulsive Aggression: Cloninger suggests that impulsive aggressive characteristics can be measured by looking at levels of high novelty seeking and low harm avoidance (Skodol et al., 2002).

Correlates of Impulsive Aggression

Personality Disorders: Coccaro (1989) reported a link between impulsive aggressive and personality disorder, in particular Borderline Personality Disorder. Skodol et al. (2002) also reported that patients with Borderline Personality Disorder demonstrated a lower level of serotonin in conjunction with impulsive aggressive tendencies. In a study of adolescents, Brent et al. (1994) reported a significant correlation between teen suicide completions and personality disorders. Those with personality disorders were also ranked by their parents as having higher levels of lifetime aggression and impulsivity than the control group.

Conduct disorder, diagnosed in childhood, and anti-social personality disorder, diagnosed in adulthood following a diagnosis of conduct disorder, are both associated with high levels of impulsive aggressive behavior (Soloff et al., 2000). In addition,

adolescents and adults with alcohol use disorders exhibited significantly higher levels of impulsive aggressive behavior when compared to healthy controls (Soloff et al., 2000).

Traumatic Brain Injury: Greve et al. (2001) studied a group of patients with traumatic brain injury in an attempt to better understand which patient might be at higher risk for aggressive behavior and to determine whether the impulsive aggressive behavior found among individuals in this group is similar to impulsive aggression found in other groups without a brain injury. Forty-five patients who were being treated for a traumatic brain injury in a rehabilitation clinic were recruited for this study. All were in the chronic phase of treatment (i.e., injury occurred at least 20 months prior to study; enrollment in rehabilitation treatment for a minimum of six months). Of the 45 patients, 26 were identified as impulsive aggressive (persistent uncontrolled temper outbursts while in treatment) and 19 patients comprised the non-aggressive control group (no episodes of impulsive aggressive behavior while in rehabilitation facility). Seventy-four percent of the impulsive aggressive group reported a prior history of aggressive behaviors, while only 26% of the non-aggressive control group disclosed a past history of aggressive actions. In addition, the impulsive aggressive group were significantly more impulsive than the non-aggressive group. These findings suggest that, after the acute treatment period for a traumatic brain injury, patients without a history of impulsive aggressive behaviors are less likely to develop these behaviors than patients with a pre-morbid history of impulsive aggressive behaviors. According to Greve et al. (2001), it is feasible that young males with a history of impulsive aggressive behaviors are at a higher risk for a traumatic brain injury because of their risk-taking tendencies and that the aggressive

behavior merely acts as a catalyst in discharging behaviors that were already present prior to a traumatic brain injury.

Impulsivity, Aggression, and Alcoholism in Teens: A study by Soloff et al. (2000) was conducted to see if high levels of impulsivity and aggression would be found in adolescents with an alcohol use disorder. Postulating that the adolescent findings would be similar to findings in adult populations, they assessed impulsivity and aggression in 18 adolescents with and without alcohol use disorder. The mean age of participants was 19.6 years, with an average onset of alcohol use at age 16. The term "behavioral undercontrol" (Martin, Kaczynski, Maisto, & Tarter, 1996) appears to describe the population of teens with alcohol use disorder who are found to have high levels of impulsivity, aggressivity, and anti-sociality. While no significant biological differences were found between the teens with and without alcohol use disorder, the authors noted that nine teens with alcohol use disorder and a history of conduct disorder did have significantly higher levels of cortisol than teens with no alcohol use disorder or history of conduct disorder.

Impulsive Aggression and Suicide

Plutchik, Praag, and Conte (1989) suggest that both impulsive and aggressive 'drives' work together and result in suicidal or violent behaviors. According to the authors, underlying aggressive tendencies drive impulses to turn inward or outward, resulting in suicidal or violent behaviors. A study by Kotler, Iancu, Efroni, and Arnir (2001) supported this theory by comparing a sample of patients with post-traumatic stress disorder (PTSD) against a group with non-PTSD anxiety disorders and a control group

without a diagnosis of PTSD or anxiety. As predicted, a multivariate analysis revealed that anger and impulsivity scores were highest in those with PTSD and this group also had the highest risk of suicidal behaviors. The authors questioned whether anger and impulsivity are separate entities or should be considered interdependent (Kotler et al., 2001). Brent et al. (1994) suggests that impulsive violence is a risk factor for attempted and completed suicide in adults. Research indicates that there is an association between impulsive violence and attempted suicide in patients with major depression, alcoholism, or a diagnosis of Borderline Personality Disorder (Coccaro & Kavoussi, 1997).

Mann et al. (1999) concluded that impulsive aggressiveness was the only significant predictor of suicidal behaviors in a population of psychiatric inpatients. In addition, Mann (1998) suggests that individuals with a diagnosis of major depression, personality disorder, and a past history of suicidal behavior exhibit significantly higher levels of aggression and impulsivity over their lifetime than controls.

Clinical Measures of Impulsive Aggression

Impulsive aggressive behavioral tendencies are typically measured by administering separate self-report instruments for each construct. The most common measure of impulsive aggressiveness is obtained by using the combined Assault and Irritability scales of the Buss-Durkee Hostility Inventory (BDHI) and the Barratt Impulsivity Scale (BIS) (Soloff et al., 2000). Some researchers suggest that the Brown-Goodwin Assessment for Lifetime History of Aggression (LHA) can be used to measure "impulsive aggressive" behavior (Brown, Goodwin, Ballenger, Goyer, & Major, 1979).

Engstrom, Alling, Gustavsson, Oreland, & Traskman-Bendz (1997) administered biological tests to determine whether there was an association between clinical and biological characteristics in 217 suicide attempters. Low monoamine oxidase (MAO) levels are indicative of low levels of serotonin and, in this study, low MAO levels were found in two clusters of patients, one of which had demonstrated high levels of impulsivity and aggression (Engstrom et al., 1997). Imaging studies have also been used to identify abnormalities in prefrontal metabolic activity in patients with impulsive aggressive characteristics (Brown et al., 1982 as in Skodol et al., 2002).

There are many elements of impulsive aggression that are not well understood. It is unclear whether the prediction of suicidal states can be enhanced by measuring levels of aggression in addition to impulsiveness. The assumption that impulsive aggression is likewise understood best by measuring impulsivity and aggression as separate entities remains untested. There is little understanding about the relationship between impulsive aggression and novelty seeking, harm avoidance, anxiety, and other psychological states. Finally, because this quality is assumed to be a personality "trait," it is important to know whether impulsive aggression is a consistent component of personality over time and situation (i.e., a trait) or whether it state-like, fluctuating over time and situation.

In summary, the literature shows that a link exists between impulsive aggressive behaviors and suicidal behaviors. One study suggests that impulsive aggressive behavior may, in fact, be the best predictor of suicidal behavior among a host of clinical measures (Simon et al., 2001), a stronger predictor than even a depressive state. Some theorists believe that impulsive aggression is an innate trait, one that remains consistent

throughout a lifetime. Other theorists disagree and suggest that impulsive aggression is more transient, fluctuating as life events and stressors change over the course of a lifetime.

A better understanding of the relationship between impulsive aggression and suicidal states is needed. Because past literature is so limited, such knowledge might empower clinician and researchers alike to recognize potential risk factors and develop treatment strategies which better thwart suicidal behavior.

This study will explore the level of impulsive aggression endorsed by a cohort of patients who have recently attempted suicide in comparison to patients who have experienced either a traumatic injury or suicidal ideation without an actual attempt. In addition, individuals who are classified as having impulsive aggression will be followed over time to determine whether these characteristics tend to remain constant over time or appear to fluctuate in different situations. Based on research and current literature, we expect impulsive aggression to represent a personality characteristic, one that remains primarily constant over time.

Specifically, overall aims and hypotheses are as follows:

Overall Aim: To gain a better understanding of the role of impulsive aggression in suicidal behaviors.

Aim 1: To determine if levels of impulsive aggression vary across groups and are significantly different in suicide attempters.

Hypothesis 1: The proportion of individuals meeting criteria as impulsive aggressive as defined below will be significantly higher in Group 1 (suicide attempters)

than in the control groups, Group 2 (suicide ideators) and Group 3 (patients with unintentional trauma) at baseline. Impulsive aggression will be defined as present if patients are above the established cut scores for all three baseline measures (BIS-11 total score with a cut score of > 63.8, Assault subscale score of the BDHI with a cut score of > 5, and the Irritability subscale score of the BDHI with a cut score of > 5.5) (Jacobs et al., 2003).

Aim 2: To determine if levels of impulsivity and aggression are significantly higher in suicide attempters in comparison to suicide ideators and patients with traumatic injury.

Hypothesis 2: The mean level of impulsiveness, as measured by the total score from the BIS-11, and the mean level of aggressiveness/hostility, as measured by two scores, the total score from the Assault subscale of the BDHI and the total score from the Irritability subscale of the BDHI, will be significantly higher in Group 1 (suicide attempters) than in the control groups, Group 2 (suicide ideators) and Group 3 (patients with unintentional traumatic injuries) at baseline.

Aim 3: To determine if levels of impulsive aggression remain relatively stable over time or tend to fluctuate over time and in various situations.

Hypothesis 3: The total score from the BIS-11, the total score from the Assault subscale of the BDHI, and the total score from the Irritability subscale of the BDHI will each show significantly high agreement from baseline to follow-up for all groups combined.

Aim 4: To determine if external measures of impulsivity and aggression are found in those who are classified as impulsive aggressive.

Hypothesis 4: Individuals who are defined a having impulsive aggression at baseline (hypothesis 1) will demonstrate significant agreement on external measures of self-reported impulsiveness and aggression/anger [as measured by two specific items from the BPD screen (self-reported criterion for borderline personality disorder) and two items from the AAQ (self-reported aggressive acts)] and the subscales of novelty seeking and harm avoidance from the TCI (self-reported personality characteristics)] at follow-up.

CHAPTER THREE
Methodology

Participants and Research Design

This prospective, descriptive cohort study is designed to examine the impact of impulsive aggressive personality characteristics on ongoing suicidal ideation and behavior. Approval by the Institutional Review Board (IRB) was obtained prior to study recruitment. Three groups of patients were recruited for this inpatient study. Suicide attempters were the group of interest, and two control groups were used to compare levels of impulsivity and aggression. These two control groups were: 1) suicide ideators and 2) patients experiencing unintentional traumatic injury. Participants for the study were selected from patient populations at Parkland Health and Hospital System (psychiatric emergency department and 23-hour trauma observation unit) and Zale Lipshy Hospital (inpatient psychiatric unit) in Dallas, Texas. All subjects were English-speaking, between 18 and 60 years of age, willing to allow access to prior and current medical records, capable of providing informed consent, and amenable to completing both the initial and follow-up sessions. A brief mental status screening test was administered to participants prior to study enrollment to assess capacity to provide informed consent and to answer study questions. Suicide attempters were assessed within 24 hours of their attempt. Patients were excluded if they had a major medical illness or an organic mental disorder. Three groups of participants were recruited as follows: 1) suicidal attempters, 2) suicidal ideators, and 3) patients who were being observed following an unintentional, traumatic injury. A total of 291 patients were enrolled in the study.

Suicide attempters: Patients who reported that they were seeking ED treatment for a recent suicide attempt were recruited from among those being assessed in the psychiatric emergency service at Parkland Memorial Hospital, or on the inpatient unit at Zale Lipshy Hospital. All of these recent suicide attempters had been treated for physical injuries as required prior to study recruitment, and were believed to be medically stable at the time of enrollment . Participants were excluded if they were actively psychotic, or required isolation because they posed a danger to self or others (i.e., demonstrated physical violence, exhibited inappropriate sexual behavior).

Suicide ideators: Patients presenting to the psychiatric emergency service primarily for the treatment of self-reported suicidal ideation were recruited directly from the psychiatric emergency room. Patients were excluded if they were actively psychotic, experiencing altered mental status due to alcohol or substance use, or required isolation because they posed a danger to self or others (i.e., demonstrated physical violence, exhibited inappropriate sexual behavior).

Traumatic injury controls: At Parkland Hospital, the trauma nursing staff maintains an ongoing log of all patients admitted to the emergency department's trauma service. This "trauma log" contains a list of traumatic injury patients who have been admitted to 23 hour trauma observation at Parkland Health and Hospital Systems. Potential study subjects for the trauma group were identified daily during study enrollment from this trauma log and approached during 23 hour observation. Trauma patient controls in this study were not recruited if their traumatic injury was the result of violence (e.g., assault) or intentional injury. Nurses and doctors were consulted to help

identify patients who were inappropriate (i.e., unable to speak due to tracheal tube, pending transfer to Intensive Care Unit, experiencing altered mental status secondary to required sedation or pain medication use, etc.).

Procedures

After potential study subjects were identified, they were approached by a research assistant. Research assistants were medical students or individuals with a Master's Degree or beyond in psychology and all research assistants completed training in Preventive Management of Aggressive Behaviors (PMAB) prior to study initiation.

Screening and patient enrollment: Potential study subjects interested in the study were provided with an explanation that covered: a) the purpose of the study, b) the duration of each of the two assessment sessions (sixty to ninety minutes per session typically), c) the limits of confidentiality (limited to situations in which imminent dangerousness to self or others was not present), and d) financial compensation for participation ($30.00 for baseline assessment and $60.00 for follow-up assessment). All potential subjects were told that study participation was voluntary and that participation would not affect their routine care in any way. In addition, participants were informed that they could terminate participation at any time. If potential subjects indicated that they were interested after this study introduction, they were assessed to determine whether or not they were qualified to participate. Research assistants first asked whether each potential study subject would be able to provide at least five pieces of follow-up contact information (e.g., telephone number, address, alternate phone number, phone

number of a friend or relative, etc.) If this was possible, the mental status screening was conducted.

Once an individual met study criteria and agreed to participate, the research assistant reviewed the Consent to Participate in Study form with the participant and obtained appropriate signatures. In addition, the Authorization to Disclose Health Information form was reviewed and signed. Both the research assistant and the participant kept copies of all forms. Patients were compensated $30.00 by cash (given to the nurse if patients were restricted from keeping cash in their room) or payroll augmentation (UT Southwestern employee participants).

Assessments: Next, the baseline assessment protocol was administered by the research assistant. (See Table I for a complete description of the assessment protocols used at baseline and follow-up.) The baseline assessment was conducted as a semi-structured interview, with the research assistant verbally asking all questions and recording all answers.

Approximately two and a half months after the initial assessment, participants were contacted by a research assistant to schedule the follow-up assessment, conducted at three months post-baseline assessment. Participants either came into the research office or completed the follow-up assessment by telephone. At the beginning of the follow-up assessment, the research assistant again reviewed the study consent and Authorization to Disclose Health Information forms. Patients were reminded that confidentiality was limited to situations in which imminent dangerousness to self or others was not present, and, a brief screen to determine the presence of current suicidal ideation and self-harm

behaviors was administered prior to the assessment. If a participant endorsed active suicidal ideation, Dr. Cynthia Claassen, Principal Investigator, was contacted immediately so the participant could be evaluated for possible acute psychiatric care/hospitalization. Upon completion of the follow-up assessment, participants were compensated $60.00 in cash (in-office assessment) or by check (phone assessment) or payroll augmentation (UT Southwestern employee participants).

Materials

All patients completed identical packets. This dissertation study is part of a larger study that aims to understand the state of mind of patients who are being treated for suicide attempts or ideation or unintentional traumatic injuries. In addition to obtaining general demographic information (i.e., age, gender, race/ethnicity, marital status, educational level, occupation) and clinical history (history of psychiatric treatment, history of suicidal states), the packet contained the additional list of questionnaires found in Table I. A description of each instrument follows:

Chart Review Form (CRF): This form was developed to obtain diagnostic information, admit and discharge dates, presence of family/friends, and global assessment of functioning (GAF) levels at the time of discharge from baseline treatment setting.

Risk Rescue Rating (RRR): The Risk Rescue Rating scale is used to measure the risk of suicide. The instrument ranks the lethality of the suicide attempt against the likelihood of discovery to obtain a rating score. According to Brent et al. (1988), it has acceptable reliability, with intraclass correlation coefficients ranging from .91 to 1.00.

Quick Inventory of Depressive Symptomotology, Self-Report (QIDS-SR): The QIDS-SR is a 16-item self-report questionnaire that assesses criteria symptoms of depression (as found in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision) (DSM-IV-TR) over the past seven days. This brief screening instrument is used to identify depressive symptoms and was extracted from the longer form, the Inventory of Depressive Symptomotology (IDS) (Rush & Giles, 1985; Rush, Gullion, Basco, Jarrett, & Trivedi, 1996). Both forms offer a clinician-rated version as well. The original version was normed on 544 outpatients diagnosed with Major Depressive Disorder and 402 outpatients diagnosed with Bipolar Disorder. The patient samples were selected from clinics that were geographically and ethnically diverse. High internal consistency was found in the QIDS-SR, with Cronbach's alpha of .86 in the population of patients with Major Depressive Disorder and .81 among patients with Bipolar Disorder. In addition, the QIDS-SR was sensitive to change in severity of symptoms and change with treatment (Rush et al., 1996).

Short Michigan Alcohol Screening Test (S-MAST): This brief screening instrument was developed by Selzer et al. in 1975 to identify those who may be at risk of substance abuse or dependence. It contains 13 true/false statements. Nine different studies in populations of hospitalized psychiatric patients and general Latino populations reported good reliability, with a range between .83 and .95 (Chronbach's alpha) (Jacobs et al., 2003). According to Ross et al. (1990) as reported in the Handbook of Psychiatric Measures, this screening test also has good sensitivity (.89) and specificity (.79) in psychiatric patients.

Drug Abuse Screening Test (DAST): This is a brief screening tool that was created in 1982 by Skinner (Gavin, Ross, & Skinner, 1989). The instrument contains 28 yes/no statements. A score of six or greater (one as a point for each "yes" answer) suggests that a problem with drug abuse is likely. High internal consistency, .92 and .94 (Chronbach's alpha) was found in two psychiatric populations (Jacobs et al., 2003). The DAST is recognized (i.e., Cocco & Carey, 1998; El-Bassel et al., 1997) for its ability to identify drug use disorders. When used to identify drug abuse in psychiatric patients, sensitivity and specificity scores of .96 and .81, respectively, were found when a cut score of 5 was used (Jacobs et al., 2003).

Barratt Impulsivity Scale, Edition 11 (BIS-11): Developed originally in 1959 by Barratt, this was one of the first measures of impulsivity that was not embedded in a general personality inventory. Barratt created this measurement tool while doing research with prison populations and outpatients with temper outbursts. The revised scale, the BIS-11, was developed in 1995 and it includes motor, cognitive, and non-planning subfactors. Patton (1995) reported acceptable internal consistency reliability in three groups of participants – psychiatric inpatients, patients diagnosed with substance abuse, and the general population, with coefficients of .70 for the Motor Impulsiveness subscale, .72 for the Non-planning Impulsiveness subscale, and .61 for the Cognitive Impulsiveness subscale.

Buss-Durkee Hostility Inventory (BDHI): This scale was originally developed in 1954 by Buss and Durkee to assess hostility and aggression. It was normed on a group of male and female college students and is still utilized frequently to obtain a global

assessment of hostility/aggression. The scale yields two factors – the emotional/attitudinal (called the "hostility" factor by some) and motor (called the "aggressiveness" factor by some) components (Buss & Durkee, 1957). Seven subscales include assault, indirect hostility, irritability, negativism, resentment, suspicion, and verbal hostility. The following subscales are found within each of these two factors: 1) emotional/attitudinal – resentment and suspicion and 2) motor – assaultiveness, irritability, indirect hostility, and verbal hostility. Guilt is not found in either factor. The Assault and Irritability subscales are frequently used to determine levels of impulsive aggression. Test-retest time interval reliability was found to range between .58 and .72 in an undergraduate population study. When subjects were retested within one to two weeks, Cronbach's alpha coefficient ranged from .82 to .92. Regarding validity, the subscale correlation ranged between .42 and .82 when compared with the General Hostility scale on the Hostility and Direction of Hostility Questionnaire (Moreno, Fuhriman, & Selby, 1993). The total hostility score was found to have good internal consistency and test-retest reliability; however, some studies suggest that a social desirability bias likely exists for this instrument (Jacobs et al., 2003).

Beck Hopelessness Scale (BHS): The Beck Hopelessness Scale is a self-report questionnaire that was developed to identify pessimistic and negative expectations for the future. The inventory has 20 true/false statements (Beck & Schylyer, 1974). Scores range from 0 to 20, with 20 representing the highest level of hopelessness. The test was normed on 294 psychiatric patients who had recently attempted suicide and internal consistency reliability, as reported by Beck (Barratt, E., Stanford, M., Dowdy, L.,

Liebman, M., & Kent, T., 1999) ranged from .82 to .93. Test-retest reliability was found to be .66 over a six week period (Barratt et al., 1999). According to Beck, clinical ratings of hopelessness correlated with BHS scores, with a correlation of .74 while a score of .62 was obtained in a suicide attempt sample.

Sheehan Functional Level Scale (SFLS): Developed by Sheehan in 1983, this instrument is a brief visual analog screen that asks whether emotions have disrupted work/school, social life, or home responsibilities over the past week. It contains three statements that are ranked on an 11-point continuum from 0 = not at all to 10 = extremely. Two questions are used to rank productivity over the past week. This screening instrument was normed on 1001 primary care patients. Internal consistency was high (alpha = .89) (Jacobs et al., 2003), and measured change over time in response to treatment (Sheehan, 1983). Jacobs et al. (2003) reported adequate validity, with sensitivity of .83 and specificity of .69. However, because this screening instrument consists of just five items, the authors caution against using it as a diagnostic tool (Sheehan, 1983).

Aggressive Acts Questionnaire (AAQ): Barratt developed this self-report instrument in 1994 to measure frequency and content of recent aggressive acts. This 22 item questionnaire assesses the four most recent events during the past six months through the use of a 5 point Likert scale, with 1 = definitely yes and 5 = definitely no. Each reported acts is classified for four dimensions: presence of impulsive aggression, presence of premeditated aggression, quality of associated mood, and presence of agitation (Barratt, Stanford, Dowdy, Liebman, & Kent, 1999). Normed on the general

population, researchers caution that this instrument may not be appropriate when used in forensic populations (Jacobs et al., 2003). Inter-rater reliability ($\kappa = .83$) was obtained for this instrument (Barratt et al., 1999). A Cronbach's alpha coefficient of .55 was obtained for overall internal reliability (Barratt et al., 1999).

Temperament and Character Inventory (TCI): This instrument was developed by Cloninger et al. in 1993 to assess temperament and characteristics of personality. As described in the literature review of this manuscript, the test is based on Cloninger's theory of personality, and measures four "temperament" dimensions (novelty seeking, harm avoidance, reward dependence, and persistence) and three "character" dimensions (self-directedness, cooperativeness, and self-transcendence). This true/false instrument has 240 items and was first normed in a sample of college students ($n = 212$). Internal consistency of the temperament scales ranged from .76 to .87, and a range of .84 to .89 was found for the character scales. Validation of the instrument is still underway (Jacobs et al., 2003).

Statistical Analyses

Data for all participants was double-entered into separate Microsoft Excel spreadsheets and reconciled using CS-ExcelDiff to compare spreadsheets and display discrepancies. If discrepancies occurred, original data was used to make corrections and a final comparison was performed to ensure that all discrepancies were reconciled accurately. The Statistical Package for the Social Sciences (SSPS), Version 10.0 was utilized to perform statistical analyses. Statistical analyses for each hypotheses are as follows:

Hypothesis 1: The proportion of impulsive aggression as defined below will be significantly different in Group 1 (suicide attempters) than in the control groups, Group 2 (suicide ideators) and Group 3 (patients with unintentional trauma) at baseline. Impulsive aggression is defined as present if patients are above the established cut scores for all three measures (BIS-11 total score with a cut score of > 63.8), Assault subscale score of the BDHI with a cut score of > 5, and the Irritability subscale score of the BDHI with a cut score of > 5.5 (Jacobs et al., 2003).

A chi-square analysis was performed to compare the three groups on the presence or absence of impulsive aggression based on evidence from the impulsiveness measure and the assault and irritability subscale measures from the aggression measure at baseline. If significant, a post hoc tukey-type multiple comparison test for proportions was performed to compare group differences.

Hypothesis 2: The mean level of impulsiveness, as measured by the total score from the BIS-11, and the mean level of aggressiveness/hostility, as measured by two scores, the total score from the Assault subscale of the BDHI and the total score from the Irritability subscale of the BDHI, will be significantly higher in Group 1 (suicide attempters) than in the control groups, Group 2 (suicide ideators) and Group 3 (patients with unintentional traumatic injuries) at baseline. Possible covariates for these models were age, gender, race/ethnicity, depression, borderline personality disorder, and alcohol abuse.

A one-way ANOVA examined differences for the three groups on each of the three measures separately at baseline. If the group factor was found significant, the post

hoc Scheffe test was conducted using orthagonal contrasts to compare 1) Group 1 versus Group 2 and 3 and ii) Group 2 versus 3.

An ANCOVA was performed to examine differences for the three groups when controlling for age, gender, race, depression, borderline personality disorder, and alcohol abuse.

Hypothesis 3: The total score from the BIS-11, the total score from the Assault subscale of the BDHI, and the total score from the Irritability subscale of the BDHI will each show significantly high agreement from baseline to follow-up for all groups combined.

An intraclass correlation coefficient (ICC) was performed for each pair of measures separately to compare baseline and follow-up measurements across all groups.

Hypothesis 4: Individuals identified as having high levels of impulsive aggression at baseline (hypothesis 1) will also be those identified as having higher levels of self-reported impulsiveness and aggression/anger on external measures [as measured by two specific items from the BPD screen (self-reported criterion for borderline personality disorder) and two items from the AAQ (self-reported aggressive acts)] and the subscales of novelty seeking and harm avoidance from the TCI (self-reported personality characteristics)] at follow-up.

Three separate kappa coefficients were performed to estimate the proportion of agreement between these pair of measures.

CHAPTER FOUR

Results

Characteristics of the Overall Sample

The overall sample consists of 291 individuals who completed the baseline assessment and were recruited from Parkland Health and Hospital Systems and Zale-Lipshy Hospital in Dallas between June 2003 and August 2005. Males represented 53.6 percent of the sample (n = 156) while 46.4 percent of the sample (n = 135) were female. The overall mean age was 36.0 years (range: 18 to 60 years) and 25 participants were between 18 and 20 years of age (8.6%), 75 were between 21 and 30 years of age (25.8%), 89 were between 31 and 40 years of age (30.6%), 72 were between 41 and 50 years of age (24.7%), and the remaining 10.3 percent were 51 years of age or older (n = 30). Two thirds of the participants were Caucasian (n = 194) while African-Americans represented 20.6 percent (n = 60) of the sample, Hispanics represented 10.6 percent (n = 31), American Indians and Alaskan Natives represented 1.7 percent (n = 5), and one participant was Asian (.4%). The highest level of education reported ranged from completion of fourth grade to doctorate level, with 12 individuals completing less than ninth grade (4.1%), 44 completing ninth through eleventh grade (15.1%), 86 completing high school or GED (29.6%), 86 completing some college or technical school (29.6%), 19 obtaining an associates or technical degree (6.5%), 22 obtaining a four-year college degree (7.6%), 10 completing some graduate school (3.4%), 10 obtaining a graduate school degree (3.4%), and two with completion of a M.D. or Ph.D. (.7%). Of the 291 participants, 100 were single and had never been married (34.4%), 77 were married

(26.4%), 52 were divorced (17.9%), 30 were currently separated (10.3%), 25 were cohabitating with a partner (8.6%), and 7 were widowed (2.4%). At the time of the initial assessment, 24.1% of the participants were unemployed and not looking for employment (n = 70), 28.5% were unemployed but looking for employment (n = 83), 30.6% were employed full-time (n = 89), 6.5% were self-employed (n = 19), 4.5% were employed part-time (n = 13), 5.5% were part-time students who were either working part-time or were unemployed (n = 16), and one participant was retired/not working (.3%). See Table II for a distribution of descriptive characteristics by group.

Characteristics of the Subsample who Completed Baseline and Follow-up Assessments

Of the 291 participants who completed the baseline assessment, 201 (69.1%) completed the follow-up assessment as well. Males represented 50.2% of the subsample (n = 101) while 49.8% were females (n = 100). The mean age for this subsample was 36.3 years (range: 18 to 58 years) and 16 were between the ages of 18 and 20 (8.0%), 52 were between 21 and 30 years of age (25.9%), 64 were between 31 and 40 years old (31.8%), 44 were between 41 and 50 years old (21.9%), and 25 were between 51 and 58 years of age (12.4%). The majority of the subsample were Caucasian (n = 132, 65.7%), 21.9% were African-American (n = 44), 9.9% were Hispanic (n = 20), one participant was Asian (.5%), and 2.0% were American Indian or Alaskan Native (n=4). Of the 201 participants in this subsample, six completed sixth through eighth grade (3.0%), 22 completed ninth through eleventh grade (10.9%), 59 completed high school or obtained a GED (29.4%), 68 completed some college or technical school (33.8%), 12 obtained an associates or technical degree (6.0%), 18 obtained a college degree (8.9%), seven

completed some graduate school (3.5%), seven obtained a graduate degree (3.5%), and two obtained a M.D. or Ph. D. (1.0%). Sixty-eight participants were single and had never married (33.8%), 58 were married (28.9%), 38 were divorced (18.9%), 18 were currently separated (8.9%), 15 were cohabitating with a partner (7.5%), and 4 were widowed (2.0%). Regarding employment status, 46 were unemployed and not looking for employment (22.9%), 57 were unemployed and looking for employment (28.3%), 60 were employed full-time (29.8%), 15 were self-employed (7.5%), 11 were employed part-time (5.5%), and 12 were students who were either unemployed or employed part-time (6.0%). See Table III for a distribution of descriptive characteristics by group.

Demographic data from the two groups (201 baseline and follow-up versus 90 baseline only) were compared to determine if significant differences existed between them. Participants who completed baseline were not found to be significantly different from those who completed both baseline and follow-up assessments on age, gender, race, marital status, employment, or education attained. See Table IV for a more complete comparison of demographic data.

Hypothesis 1

Hypothesis 1 proposes that impulsive aggression will be significantly higher in Group 1 (suicide attempters) than in Group 2 (suicide ideators) or Group 3 (patients with traumatic injuries). Impulsive aggression was defined as present if participants met or exceeded cut-off scores in a measure of impulsivity (BIS-11) and met or exceeded cutoff scores in two subscales of a measure of aggression (i.e., BDHI Assault subscale, BDHI Irritability subscale). Of the 201 individuals with both baseline and follow-up measures,

68.6% (n = 69) were suicidal attempters (Group 1), 30.8% (n = 62) were suicide ideators (Group 2), and 30.4% (n = 70) were traumatic injury patients (Group 3). A chi-square analysis was performed and results indicated that there was significant difference between groups, χ^2 (df = 2, N = 201) = 8.51, $\underline{p}$ = .014. See Table V for a complete comparison of impulsive aggression across groups.

Tukey-type, post-hoc multiple comparison tests for proportions were performed to determine differences among the three groups. The proportion of patients who met the criteria for impulsive aggression in Group 3 was significantly lower than Group 2, q (df = ∞ ,2) = 4.00, $\underline{p} < .05$ and a trend for Group 3 to be lower than Group 1, q (df = ∞, 2) = 2.90, $\underline{p} < 0.10$ was found

Hypothesis 2

This hypothesis examined the performance of three different impulsivity and aggression measures separately for the three groups, with the expectation that the mean scores of each measure would be significantly higher in Group 1 (suicide attempters) than Group 2 (suicide ideators) or Group 3 (participants with a traumatic injury). Three separate one-way ANOVAs were performed. The first ANOVA examined the impulsivity measure (BIS-11) across the three groups. Six of the respondents in the subsample had incomplete responses on the BIS-11, leaving a total of 195 valid profiles for this analysis. When covariates were not considered, the mean score from the BIS-11 was significantly different between groups, F (2, 194) = 10.29, $\underline{p}$ = <.001. Scheffe post hoc tests revealed that mean scores from the BIS-11 were not significantly different between suicide attempters and ideators, $\underline{p}$ = .912; however, the mean score was

significantly different between traumatic injury patients and both suicide attempters and ideators ($p = < .001$). See Figure II for group comparisons on the BIS-11.

Next, six covariates well-known to impact impulsivity and aggression were identified (i.e., age, gender, race, symptoms of borderline personality disorder, depression, and alcohol use/abuse). Race was classified into two categories (Caucasian and non-Caucasian) because the number of individuals in each of the non-Caucasian groups was small (See Table VI). An ANCOVA was used to examine group differences in mean scores of the BIS-11 when these covariates were included in the model. Four covariates (i.e., age, symptoms of borderline personality disorder, depression, and alcohol use/abuse) were found to be significant ($p < .05$); however, no significant group differences were found for the mean scores on the impulsivity measure (BIS-11), $F(2,192) = 1.71$, $p = .184$.

The second ANOVA examined group differences in the mean score of the BDHI Assault subscale. When covariates were not included, no group differences were found, $F(2, 192) = 2.413$, $p = .092$. Next, the same six covariates used in the analysis of the impulsivity measure were used. Four covariates were found to be significant (i.e., age, gender, depression, and alcohol use/abuse), $p < .05$; however, no group differences were found for the mean score from the BDHI Assault subscale, $F(2, 194) = .427$, $p = .653$. See Figure III for group comparison on the BDHI Assault subscale.

The BDHI Irritability subscale was then examined for group differences. For the ANOVA, there was a significant difference between groups, $F(2, 194) = 21.506$, $p = < .001$. Specifically, Group 3 was significantly lower than Group 1 and Group 2, according

to the Scheffe post hoc tests ($p = < .001$). An ANCOVA was performed to examine group differences for the BDHI Irritability subscale with the six included covariates. Four covariates (i.e., age, symptoms of borderline personality disorder, depression, and alcohol use/abuse) were found significant, $p < .05$; however, no significant group differences were found for the mean scores from the BDHI Irritability subscale, $F (2, 194) = .426$, $p = .654$. See Figure IV for group comparison on the BDHI Irritability subscale.

Hypothesis 3

Hypothesis 3 postulates that responses from the impulsivity measure (BIS-11) and the two aggression measures (i.e., BDHI Assault subscale, BDHI Irritability subscale) at baseline would be in high agreement with responses from the same measures at follow-up. An intraclass correlation coefficient was performed for each of the measures. Regarding the BIS-11, the baseline and follow-up scores were found to be in high agreement, with the intraclass correlation coefficient of .61, $F (194, 195) = 4.07$, $p < .001$. Means for the BIS-11 total score were similar at baseline ($M = 67.04$, $SD = 14.33$) and follow-up mean was 66.10 ($SD = 13.54$).

Likewise, the BDHI Assault subscale mean score at baseline ($M = 4.25$, $SD = 2.62$) was found to be similar at follow-up ($M = 4.06$, $SD = 2.62$). The intraclass correlation coefficient was .64, $F (196, 197) = 4.59$, $p < .001$.

The BDHI Irritability subscale mean scores at baseline ($M = 5.86$, $SD = 3.01$) and follow-up ($M = 5.27$, $SD = 2.99$) were also similar. The intraclass correlation coefficient was .50, $F (196, 197) = 3.096$, $p < .001$.

While there was high agreement between baseline and follow-up mean scores for the BDHI Irritability subscale, it was somewhat lower than the agreement between the two other measures. A paired-samples t-test was performed to further understand the difference between baseline and follow-up means for this subscale. Results indicated that the mean for the BDHI Irritability subscale at baseline (M = 5.86, SD = 3.01) was significantly higher than the mean for the BDHI Irritability subscale at follow-up (M = 5.27, SD = 2.99). The mean difference between the baseline and follow-up BDHI Irritability subscale was .59, although there was considerable overlap in their distributions (See Figure V).

Hypothesis 4

This hypothesis suggests that individuals who were classified as having impulsive aggression would demonstrate agreement on external measures of impulsive aggression. The first analysis investigated whether participants who were identified as having impulsive aggression (from hypothesis 1) would endorse impulsivity and aggression based on two specific items from the BPD screen. Of the 201 individuals in the subsample, 26.4% (n = 53) were classified as having impulsive aggression, while 73.6% (n = 148) did not have impulsive aggression. Of those who were classified as having impulsive aggression, 47.2% (25/53) endorsed items that were indicative of impulsive and aggressive behavior while 16.9% of those who were not classified as having impulsive aggression (25/148) endorsed these items from the BPD screen. There was 73.6% agreement and, using a kappa coefficient, κ (n = 201) = .308, $p < .001$, fair agreement was found. See Table VII.

A second kappa coefficient investigated whether individuals who were classified as having impulsive aggression would endorse high levels of novelty-seeking and low levels of harm avoidance as measured by two subscales from the Temperament and Character Inventory (TCI). A kappa coefficient, κ (n = 201) = -.048, $\underline{p}$ = < .353, revealed poor agreement. See Table VIII.

The final analysis explored whether participants who were classified as having impulsive aggression also reported an impulsive, aggressive act during the past six months. Of the participants who were not classified as having impulsive aggression, only 8.8% (13/148) reported an impulsive, aggressive act in the past six months while 91.2% (135/148) stated that they did not. Of the 53 who were classified as having impulsive aggression, 12 (22.6%) reported an impulsive, aggressive act in the past six months. According to the kappa coefficient, κ (n = 201) = .167, p = .009 there was poor agreement. See Table IX.

CHAPTER FIVE

Conclusions and Recommendations

In the past decade or so, researchers have shown an increased interest in understanding impulsive aggressive behavior. Some believe that impulsive aggression is stable over the course of a lifetime (Coccaro, 1989) while others believe that this personality characteristic is expressed in different ways as life circumstances evolve and change (i.e., Mann, 1999; Dougherty et al., 2004). There is also little understanding about whether impulsive aggression is best measured as a single construct or by simply looking at impulsivity and aggression separately (Soloff et al., 2000). This study attempted to gain a better understanding of the role of impulsive aggression in suicidal behavior.

To meet criteria as impulsive aggressive in this study, a subject had to meet criteria as "impulsive" as defined by the Barratt Impulsivity Scale (BIS-11), as well as meeting criteria as "assaultive and as "irritable" as defined by the Buss Durkee Hostility Inventory (BDHI) . According to Soloff et al. (2000), the total score from the BIS-11 in combination with the total scores from the Assault and Irritability subscales from the BDHI renders a good assessment of impulsive aggression.

The first hypothesis looked at whether impulsive aggression would be significantly higher in suicide attempters than in suicide ideators and traumatic injury patients. Based on previous literature (i.e., Nordstrom, Gustavsson, Edman, & Asberg, 1996; Simon et al., 2001), it was expected that significantly more suicide attempters would endorse response patterns consistent with impulsive aggressive personality

characteristics, compared to suicide ideators and patients with traumatic injuries; however, findings do not support this hypothesis. There was a significant difference between groups of attempters, ideators, and trauma patients in terms of the proportion of individuals identified as impulsive aggressive. Chi-square analysis revealed that attempters and ideators had a higher percentage of impulsive aggressive individuals than the trauma patient group. A post hoc analysis suggested that the percentage of subjects meeting criteria as impulsive aggressive was significantly higher in the suicide ideator group than was found in the trauma group. Attempters, while also higher in proportion of impulsive aggressive subjects than trauma patients, were not significantly higher and were somewhat lower in percentage of impulsive aggressive individuals than the ideator group. While the finding of increased numbers of impulsive aggressive individuals among suicidal populations in general (e.g., ideators and attempters) holds with previous literature (Nordstrom, Gustavsson, Edman, & Asberg, 1996; Goldstein et al., 1991) there were significant clinical differences between study groups (e.g., presence of depression, symptoms of borderline personality disorder), making it difficult to interpret our findings without further analyses.

The second hypothesis attempted to gain a better understanding of the role of impulsivity, irritability, and assaultiveness by exploring each construct separately, while controlling for important clinical differences among groups. It was expected that the mean score on measures of each of these three components would be significantly higher among suicide attempters when compared to suicide ideators and traumatic injury control groups. However, when covarying for age, gender, race, borderline personality disorder,

major depressive disorder, and alcohol abuse, no differences were found in the levels of impulsivity, irritability, or assaultiveness across groups, suggesting that impulsive aggression was not a distinguishing characteristic of suicidal individuals presenting for treatment in this emergency department study sample.

Understanding the temporal stability of impulsivity and aggression in suicidal populations was another important aim of this study. In order to understand whether impulsive aggression is more "state-like" or "trait-like," participants' responses at baseline were compared to their responses on the same measures of impulsivity and aggression at the three-month follow-up interview. At the three-month follow-up, there was good consistency in the proportions of individuals by group who maintained their baseline levels of impulsivity and irritability, and fair consistency in the proportions of individuals by group for the assaultiveness subscale, suggesting that these characteristics function in many individuals as a trait, rather than a state. It is particularly relevant that these similar responses at baseline and follow-up were achieved during vastly different circumstances. At baseline, study patients were all being treated in acute care medical settings for suicidal attempts, ideation, or traumatic injuries; however, follow-up assessments were administered three months post-crisis. The trait-like nature of impulsive aggression as demonstrated here is consistent with some previous studies (i.e., Cloninger, 1987; Skodol et al., 2000) and inconsistent with others (i.e., Weyrauch et al., 2001; Suominen et al., 1887).

In an attempt to corroborate the validity of the operationalized definition of impulsive aggression as used here, other measures or items that purportedly assess these

tendencies were also administered to study patients to see if participants who endorsed impulsive aggressive behavior also scored as impulsive and aggressive on these measures. There was overall not a good match between groups of individuals who were classified as impulsive aggressive using the traditional definition offered by the BIS-11/ BDHI criteria and the following alternative measures: a) those so classified using two questions on impulsive aggression from the BPD screen, b) those so classified using the high novelty-seeking and low harm-avoidance subscales of the Temperament Character Index, or c) those reporting an impulsive, aggressive act in the last six months on the Aggressive Acts Questionnaire.

Specifically, almost half of those who were classified as impulsive aggressive endorsed items of impulsivity and aggression on the BPD screen (25/51), while less than 17% of those who did not have impulsive aggression did so, suggesting that the BPD screen does not appear to capture the same group of individuals who are classified as impulsive aggressive by the BIS-11/BDHI. Even more striking was the fact that 123 of the 148 participants (81.5%) who were not classified as having impulsive aggression denied a persistent pattern of impulsive aggressive behaviors on the BPD screen.

According to Cloninger, two subscales from the TCI (Novelty Seeking and Harm Avoidance) can be utilized to assess impulsive aggression (i.e., Cloninger, 1987; Cloninger, 1993). Cloninger suggests that high levels of novelty seeking in conjunction with low levels of harm avoidance are indicative of impulsive aggression. When comparing individuals that did and did not endorse BIS-11/BDHI impulsive aggression to those who did and did not receive high scores on novelty-seeking and low scores on harm

avoidance, analyses revealed that the groups labeled as such by each instrument were not the same individuals. Because there were only 13 individuals who endorsed high novelty seeking in conjunction with low harm avoidance in the entire sample, however, it is difficult to make definitive statements about this finding.

The Aggressive Acts Questionnaire was utilized to identify an impulsive, aggressive act that was committed by the participant within the past six months. This instrument requires a participant to describe the aggressive act (definition of aggressive act provided to participants) and report whether it was spontaneous or pre-meditated. According to Barratt et al. (1997), aggression can be classified as 1) impulsive 2) planned or pre-meditated or 3) medically-related/other. The AAQ was included as part of the study instrumentation at follow-up because it is the only one-test measure of the impulsive aggression construct available. It is relatively new (published in 1994 by Barratt) and psychometric properties are not available yet. Findings from this study indicated that fewer than 50 percent of participants who were classified as having impulsive aggression by the BIS-11/BDhI reported an act meeting AAQ criteria as impulsive aggressive in the past six months. On the other hand, over 91 percent of participants who were not classified by the BIS-11/BDHI as having impulsive aggressive behavior denied having committed an impulsive aggressive act within the past six months, while only nine percent of this group reported an impulsive aggressive act within the past six months. These results suggest that this measure may have better specificity than sensitivity.

In summary, poor concurrent validity was demonstrated by the correlations between the study's operationalized definition of impulsive aggression and other measures of this construct. The two items from the BPD screen were selected based only on face validity and this may not be an adequate measure of impulsive aggression in a population of suicide attempters. The two subscales from the TCI, novelty-seeking and harm avoidance, did not identify enough individuals as impulsive aggressive to afford good statistical comparison. Understanding the discrepancy between findings from the AAQ and the traditional definitions of impulsive aggression associated with the BIS-11 and BDHI, however, is more difficult. Only 25 of the 201 individuals in the subsample were classified as impulsive aggressive according to the AAQ and these low numbers may have impacted results. The AAQ did, however, correlate well with the BIS-11/BDHI in that over 91 percent of those who were not classified as having BIS-11/BDHI impulsive aggression did not report having an impulsive aggressive act in the past six months, suggesting good specificity. Even so, it is difficult to understand why 50% of those identified as impulsive aggressive by the AAQ were not classified as such by the more traditional criteria used in this study.

In doing this research, we expected to find that suicide attempters were significantly different from both the suicide ideators and traumatic injury patients. This research failed to produce those results and suggests that cohorts of suicide attempters and ideators presenting for emergency treatment are actually more similar than originally thought, while demonstrating clinically different, and sometimes significantly different, profiles. Both groups were significantly different from traumatic injury patients. This

finding of similarity between suicide attempters and ideators is consistent with prior studies (Silberfield, Streiner, & Ciampi, 1985). In looking at how close ED-treated suicide ideators and attempters were on all measures, it appears that these may not be separate groups at all. In this study, the sample of suicidal ideators were presenting for treatment in a psychiatric emergency service, suggesting that perhaps their ideation and/or suicidal impulses were regarded as more dangerous than the suicidal ideation experienced by many community-based individuals. The ideators, as well as the attempters in this study, may well have been in a state of imminent risk.

Some suicidologists have begun to study the construct of impulsivity without assessing aggression as well (i.e., Caci et al., 2003; Kashden et al., 1993). This study does not provide definitive evidence that addresses whether it is better to study impulsive aggression in suicidal states, as a single construct, or to study impulsivity and aggression separately. This study has done both - first looking at impulsive aggression as a single construct, one that is studied by combining an impulsivity measure (BIS-11) and two hostility/aggression measures (i.e., BDHI Assault subscale, BDHI Irritability subscale) into one category. In doing so, it is necessary to convert numerical data to nominal data (Y/N) in order to identify those participants who exceeded the cut-off score on all measures. While valuable data is lost for further analyses, this method does identify participants who have a strong, clear presence of self-reported impulsive aggression. .

There are several limitations to this study. First, there are several reasons why the sample of individuals recruited for this study might not be representative of the general population of United States' suicide attempters and ideators. Help seeking in medical

settings is a selective process and it is well known that more women than men seek medical help (Jacobs et al., 2003; Elixhauser, Kelly, Steiner, & Bierman, 1997). In addition, many, if not most suicide attempters and ideators do not require or seek medical care (Gliatto & Rai, 1999). All participants for this research study were recruited from a large metropolitan county hospital and these recruits may not be representative of the general population. Typically, patients who are indigent, lacking medical insurance, or are transported by local law enforcement agencies are routinely seen at the county hospital, so these patients are likely overrepresented in this study sample.

Other limitations include the exclusive use of self-report instruments to measure impulsive aggression. Further, participants were paid to participate in this study and the financial incentive may influence their willingness to complete the study.

Clearly, there is no single risk factor that is indicative of pending suicidal behavior. Rather, a myriad of demographic and clinical characteristics must be assessed simultaneously in order to determine the severity of suicidal risk. Even so, suicidal behavior is extremely rare and unpredictable (Gunnell & Frankel, 1994).

Findings from this research study do not support an association between impulsive aggression and suicidal behaviors, yet there are many studies that have found that a link does exist (Mann, 1998; Nordstrom et al., 1996). Because the covariates in this study made such a difference in how these groups looked, future studies may want to examine impulsivity and aggression using different comparison groups that do not share so many overlapping characteristics. It is important, though, to continue the quest for

understanding what prompts suicidal behavior in the hopes of developing interventions and treatment to lower mortality associated with these actions.

Table I: Study Instrumentation

	Instrument
Imminent Dangerousness	
	Presence of current suicidality / homocidality – Self-reported; level of current risk of suicidal / homicidal behavior, current treatment providers and current treatment plan.
Psychiatric Diagnoses Screen	
	Major Depressive Disorder – Quick Inventory of Depressive Symptoms
	Substance misuse – Short Michigan Alcoholism Screening Test (S-MAST), Drug Screen Test (DAST),
	Borderline Personality Disorder Screen (BPD), Structured Clinical Interview for DSM-IV – II, Borderline Personality Disorder module, with Columbia Presbyterian Medical Center qualitative scaling system

Impulsive Aggression Scales	
	Barratt Impulsivity Scale, Edition 11 (BIS-11) Buss-Durkee Hostility Inventory (BDHI) Aggressive Acts Questionnaire (AAQ) (follow-up only) Temperament and Character Inventory (TCI) (follow-up only),
Functional Level	
	Sheehan Functional Level Scale (SFLS),
Suicidal State Assessment	
	Beck Hopelessness Scale (BHS), Risk Rescue Rating scale (RRR) (baseline only; suicide attempters only), Reasons for Self-Harm (RSH) (suicide attempters only).

Table II.
Characteristics of Sample by Group

	Suicide Attempter (n = 93)		Suicide Ideators (n = 99)		Trauma Patients (n = 99)		Total (n = 291)	
	N	%	N	%	N	%	N	%
Gender								
Male	38	0.41	55	0.56	63	0.64	156	0.54
Female	55	0.59	44	0.44	36	0.36	135	0.46
Age								
18 to 20	9	0.10	7	0.07	9	0.09	25	0.09
21 to 30	27	0.29	14	0.14	34	0.34	75	0.26
31 to 40	29	0.31	36	0.36	24	0.24	89	0.31
41 to 50	23	0.25	29	0.29	20	0.20	72	0.25
51 to 65	5	0.05	13	0.13	12	0.12	30	0.10
Age Summary								
Mean	33.28		36.59		35.45		35.37	
SD	24.00		37.00		29.00		90.00	
Race/Ethnicity								
Caucasian		57	0.61	62	0.63	75	0.76	194	0.67
Black	21	0.23	28	0.28	11	0.11	60	0.21
Hispanic	15	0.16	4	0.04	12	0.12	31	0.11
Other	0	0.00	5	0.05	1	0.01	6	0.02

Current Marital Status								
Single, unmarried	29	0.31	40	0.40	31	0.31	100	0.34
Married/Cohabitating	36	0.39	24	0.24	42	0.42	102	0.35
Divorced/Separated/ Widow (er)	28	0.30	35	0.35	26	0.26	89	0.31
Education								
Less than 12th grade	12.2	0.18	25	0.25	14	0.14	56	0.19
H.S./GED	29	0.31	29	0.29	28	0.28	86	0.30
Less than 4 year college	32	0.34	26	0.26	47	0.48	105	0.36
4 year college degree	8	0.09	9	0.09	5	0.05	22	0.08
More than 4 year college	7	0.08	10	0.10	5	0.05	22	0.08
Education Summary								
Mean	12.25		11.73		12.00		11.96	
SD	24.00		37.00		29.00		29.00	

Table III.

Characteristics of Subsample by Group

	Suicide Attempter (n = 69)		Suicide Ideators (n = 62)		Trauma Patients (n = 70)		Total (n = 201)	
	N	%	N	%	N	%	N	%
Gender								
Male	24.00	0.35	32.00	0.52	45.00	0.64	101.00	0.50
Female	45.00	0.65	30.00	0.48	25.00	0.36	100.00	0.50
Age								
18 to 20	7.00	0.10	3.00	0.05	6.00	0.09	16.00	0.08
21 to 30	18.00	0.26	9.00	0.15	25.00	0.36	52.00	0.26
31 to 40	22.00	0.32	23.00	0.37	19.00	0.27	64.00	0.32
41 to 50	18.00	0.26	16.00	0.26	10.00	0.14	44.00	0.22
51 to 65	4.00	0.06	11.00	0.18	10.00	0.14	25.00	0.12
Age Summary								
Mean	37.00		39.00		33.00		37.00	
SD	39.00		39.00		38.00		40.00	
Race/Ethnicity								
Caucasian	42.00	0.61	37.00	0.60	53.00	0.76	132.00	0.66
Black	16.00	0.23	18.00	0.29	10.00	0.14	44.00	0.22
Hispanic	11.00	0.16	3.00	0.05	6.00	0.09	20.00	0.10
Other	0.00	0.00	4.00	0.06	1.00	0.01	5.00	0.02

Current Marital Status								
Single, unmarried	19.00	0.28	26.00	0.42	23.00	0.33	73.00	0.36
Married/Cohabitating	27.00	0.39	15.00	0.24	31.00	0.44	68.00	0.34
Divorced/Separated/ Widow (er)	23.00	0.33	21.00	0.34	16.00	0.23	60.00	0.30
Education								
Less than 12th grade	11.00	0.16	10.00	0.16	7.00	0.10	28.00	0.14
H.S./GED	21.00	0.30	20.00	0.32	18.00	0.26	59.00	0.29
Less than 4 year college	21.00	0.30	15.00	0.24	32.00	0.46	80.00	0.40
4 year college degree	6.00	0.09	7.00	0.11	5.00	0.07	18.00	0.09
More than 4 yr college	6.00	0.09	6.00	0.10	4.00	0.06	16.00	0.08
Education Summary								
Mean	13.00		13.00		13.00		13.00	
SD	12.00		9.00		10.00		12.00	

Table IV.
Differences between sample (baseline only) and subsample (baseline and follow-up)

	Baseline only (n = 90)		Baseline and follow-up (n = 201)		Total (n = 291)	
	N	%	N	%	N	%
Gender						
Male	55	61.1%	101	50.2%	156	53.6%
Female	35	38.9%	100	49.8%	135	46.4%
Age						
18 to 20	9	10.0%	16	8.0%	25	8.6%
21 to 30	23	25.6%	52	25.9%	75	25.8%
31 to 40	25	27.7%	64	31.8%	89	30.6%
41 to 50	28	31.1%	44	21.9%	72	24.7%
51 to 65	5	5.6%	25	12.4%	30	10.3%
Age Summary						
Mean	35.48		36.56		36.02	
SD	10.82		11.06		10.94	
Race/Ethnicity						
Caucasian	62	68.9%	132	65.7%	194	66.7%
Black	16	17.8%	44	21.9%	60	20.6%
Hispanic	11	12.2%	5	2.5%	31	10.7%
Other	1	1.1%	5	2.5%	6	2.0%
Current Marital Status						
Single, unmarried			68	33.8%	100	34.4%
Married/Cohabitating			73	36.4%	100	34.4%
Divorced/Separated/Widow (er)			60	29.8%	89	30.5%
Education						
Less than 12th grade	28	31.1%	28	13.9%	56	19.1%
H.S./GED	27	30.0%	59	29.4%	86	29.6%
Less than 4 year College	25	27.8%	80	39.8%	105	36.1%
4 year college degree	4	4.4%	18	8.9%	22	7.6%
More than 4 year College	6	6.7%	16	8.0%	22	7.6%
Education Summary						
Mean	12.28		12.8		12.54	
SD	2.25		1.86		2.04	

Table V.

Group differences across sample and subsample

	Suicide Attempters (n = 69)			Suicide Ideators (n = 62)			Trauma Patients (n = 70)			Group Differences * sign.
	Mean	SE	Q value	Mean	SE	Q value	Mean	SE	Q value	
Borderline Personality Disorder	125.8	10.16	0.654	119.2	9.86	6.64	60.42	10.13	5.8	*
(BPD screen)	125.8	10.16	0.654	119.2	9.86	6.64	60.42	10.13	5.8	*
Depression	120.5	10.17	-1.8	138.9	9.86	7.33	48.24	10.13	8.94	*
(QIDS)	120.5	10.17	-1.8	138.9	9.86	7.33	48.24	10.13	8.94	*
Drug/Alcohol screen	115	10.17	1.615	98.59	9.85	2.61	89.33	10.13	0.91	*
(DAST)	115	10.17	1.615	98.59	9.85	2.61	89.33	10.13	0.91	

Table VI.

Impulsive Aggression (N/Y) across groups

	Impulsive Aggression		
Group	No	Yes	Total
Attempter	48 (69.6%)	21 (30.4%)	69
Ideator	40 (64.5%)	22 (35.5%)	62
Trauma	60 (85.7%)	10 (14.3%)	70
Total	148 (73.6%)	53 (26.4%)	201

Table VII.

Subjects with and without impulsive aggression who self-reported impulsivity and aggression on the BPD screen

Endorsed Impulsive Aggression		BPD Screen No	Yes	Total
No	Count	123.0	25.0	148.0
	% within Endorsed IA	83.1%	16.9%	100.0%
	% within BPD Screen	81.5%	50.0%	73.6%
	% of Total	61.2%	12.4%	73.6%
Yes	Count	28.0	25.0	53.0
	% within Endorsed IA	52.8%	47.2%	100.0%
	% within BPD Screen	18.5%	50.0%	26.4%
	% of Total	13.9%	12.4%	26.4%
Total	Count	151.0	50.0	201.0
	% within Endorsed IA	75.1%	24.9%	100.0%
	% within BPD Screen	100.0%	100.0%	100.0%
	% of Total	75.1%	24.9%	100.0%

Table VIII.

Subjects with and without impulsive aggression who endorsed high levels of novelty-seeking and low levels of harm avoidance on the TCI

Endorsed Impulsive Aggression		High Novelty-seeking Low Harm Avoidance		
		No	Yes	Total
No	Count	137.0	11.0	148.0
	% within Endorsed IA	92.6%	7.4%	100.0%
	% within Hi NS, Lo HA	72.9%	84.6%	73.6%
	% of Total	68.2%	5.5%	73.6%
Yes	Count	51.0	2.0	
	% within Endorsed IA	96.2%	3.8%	100.0%
	% within Hi NS, Lo HA	27.1%	15.4%	26.4%
	% of Total	25.4%	1.0%	26.4%
Total	Count	188.0	13.0	201.0
	% within Endorsed IA	93.5%	6.5%	100.0%
	% within Hi NS, Lo HA	100.0%	100.0%	100.0%
	% of Total	93.5%	6.5%	100.0%

Table IX.

Subjects with and without impulsive aggression who self-reported an impulsive aggressive act within the past six months

Endorsed Impulsive Aggression		AAQ No	AAQ Yes	Total
No	Count	135.0	13.0	148.0
	% within Endorsed IA	91.2%	8.8%	100.0%
	% within AAQ	76.7%	52.0%	73.6%
	% of Total	67.2%	6.5%	73.6%
Yes	Count	41.0	12.0	53.0
	% within Endorsed IA	77.4%	22.6%	100.0%
	% within AAQ	23.3%	48.0%	26.4%
	% of Total	20.4%	6.0%	26.4%
Total	Count	176.0	25.0	201.0
	% within Endorsed IA	87.6%	12.4%	100.0%
	% within AAQ	100.0%	100.0%	100.0%
	% of Total	87.6%	12.4	100.0%

Figure I. Unadjusted and adjusted mean total score for BIS-11 with 95% Confidence Intervals

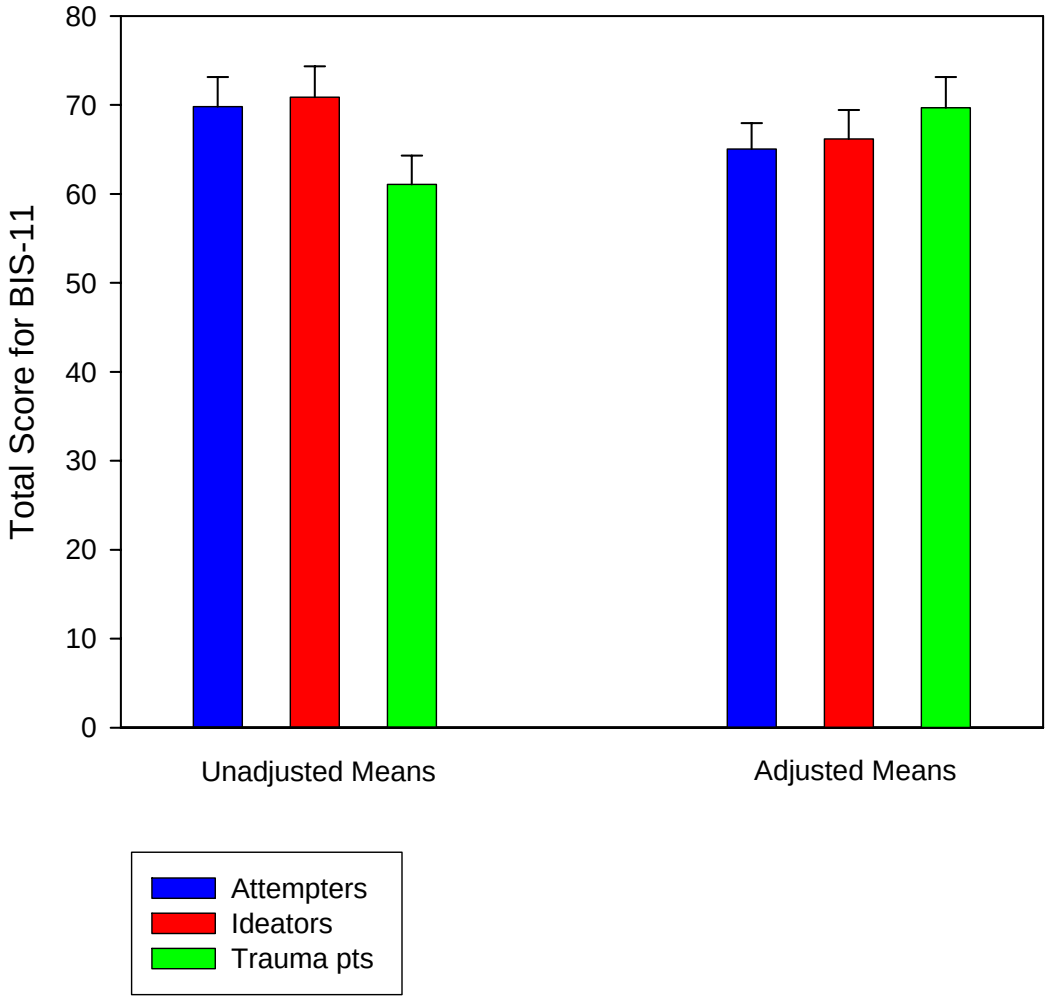


Figure II. Unadjusted and adjusted mean total score for BDHI Irritability Subscale with 95% Confidence Intervals

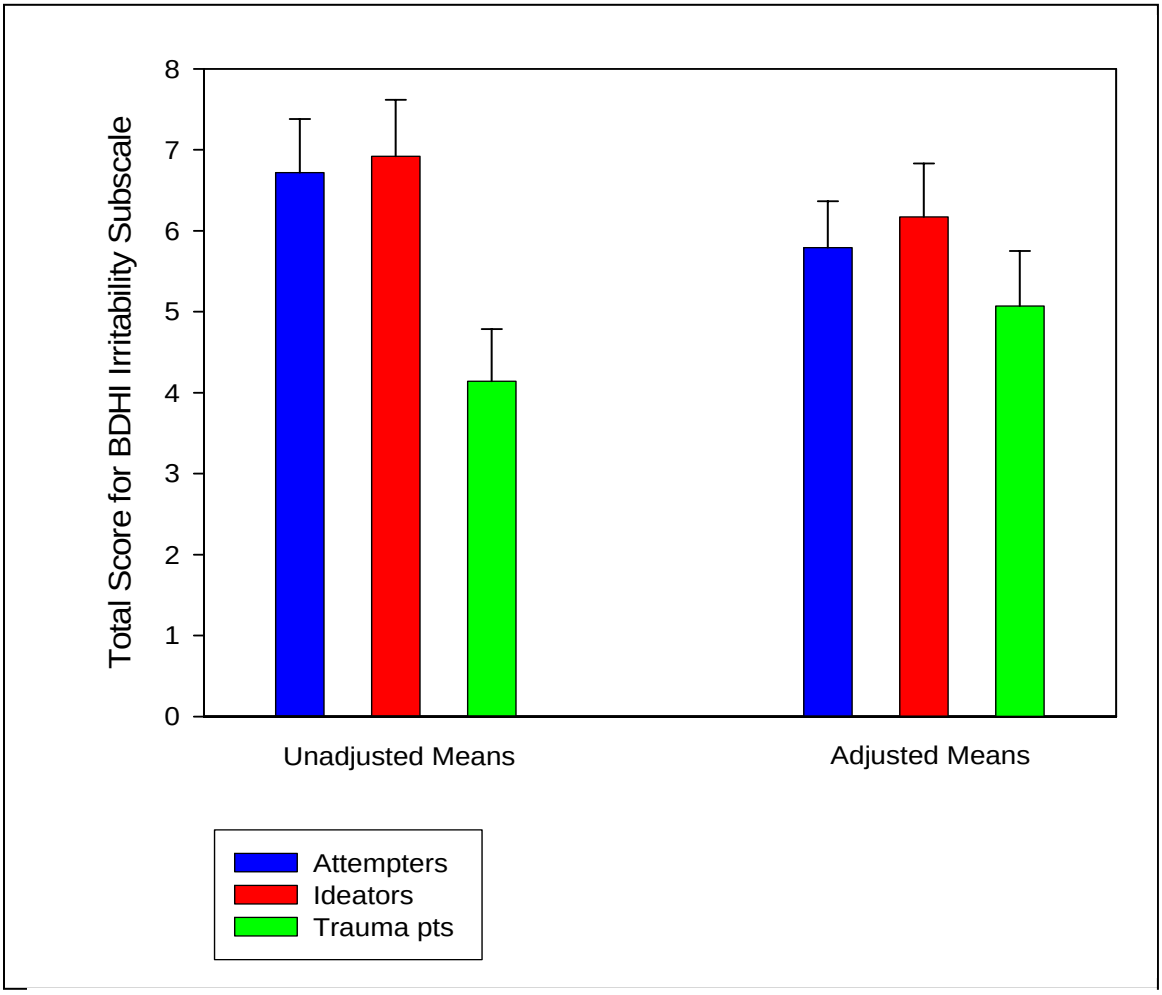


Figure III. Unadjusted and adjusted mean total score for BDHI Assaultiveness Subscale with 95% Confidence Intervals

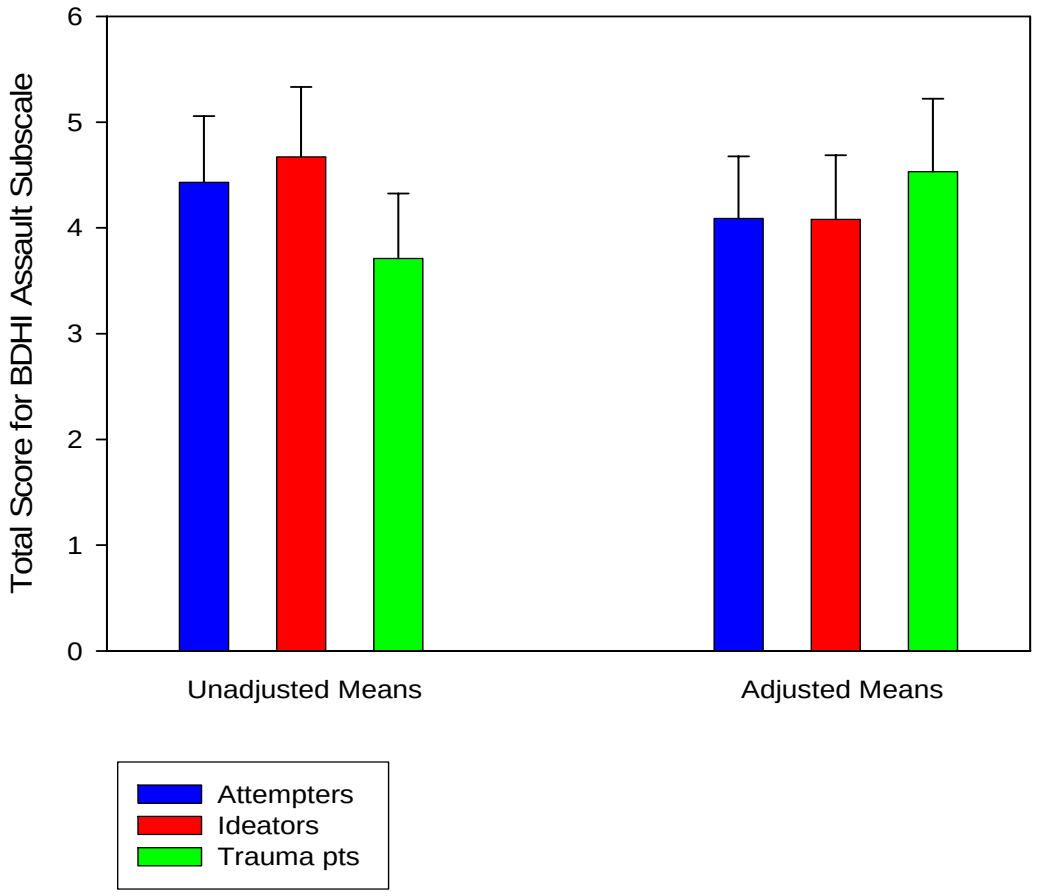
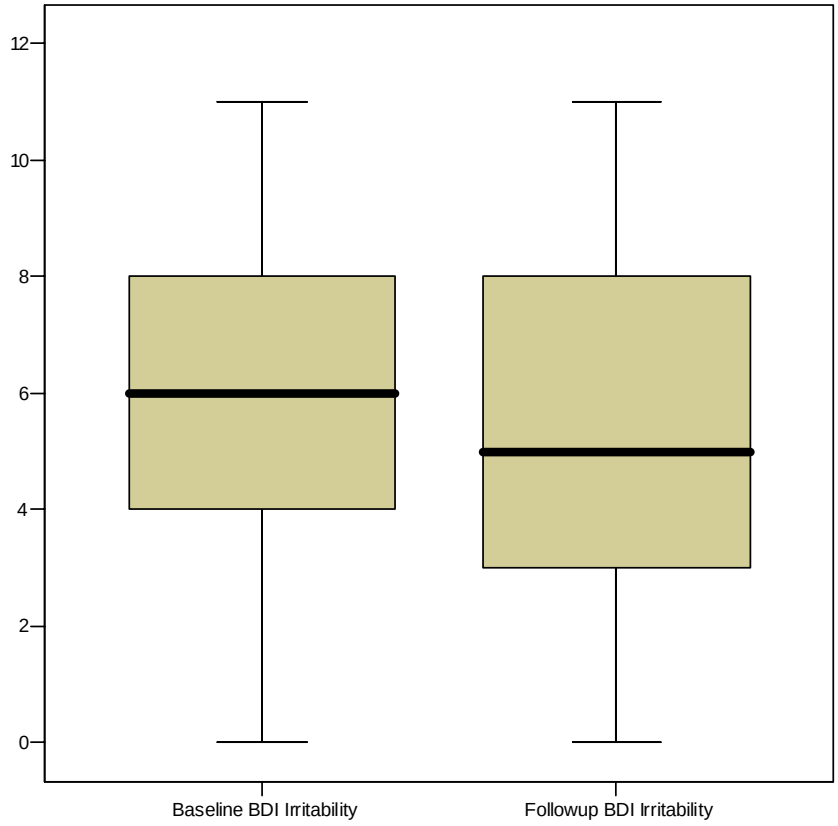


Figure IV. Mean differences between BDHI Irritability subscale scores at baseline and follow-up.



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VITAE

Gayle Elizabeth Hodges was born in Dallas, Texas on July 5, 1954, the daughter of Don Alvin and Mary Margarette Hodges. After completing high school, she married and raised her son and daughter, Mark and Kerri. Gayle is married to Dr. Ricardo Diaz. When her children were teenagers, Gayle attended Eastfield Community College. She completed her undergraduate at The University of Texas at Dallas in Richardson, Texas. She graduated Summa Cum Laude in May, 1998 and received a Bachelor's Degree of Arts. Following graduation, she entered the Graduate School of Biomedical Sciences at the University of Texas Health Science Center at Dallas. She received a Masters of Science degree in Counseling Rehabilitation Psychology in August, 2000. In August, 2000, Gayle entered the doctoral program in Clinical Psychology at The University of Texas Southwestern Medical Center at Dallas.

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