SUICIDAL IDEATION AMONG VETERANS THROUGH A LENS OF THE INTERPERSONAL- PSYCHOLOGICAL THEORY OF SUICIDE

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ABSTRACT

SUICIDAL IDEATION AMONG VETERANS THROUGH A LENS OF THE INTERPERSONAL- PSYCHOLOGICAL THEORY OF SUICIDE

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Suicide among veterans has reached an all-time high. Joiner's Interpersonal-Psychological Theory of Suicide (IPTS) (Joiner, 2005; Van Orden et al., 2010) stipulates that the desire for suicide is the highest when both perceived burdensomeness and thwarted belongingness are present, and acquired capability for suicide is critical in the development of suicidal behavior. The present thesis tested predictions from the model in a military veteran data set. Hypotheses derived from the IPTS were tested in a sample of 62 veterans (59 males and 3 females). Data were archival (i.e., participants were recruited previously for a study on endocrinological- and personality factors as predictors of adjustment; see Bobadilla, Asberg, Johnson, and Shirtcliff, 2014, for the original study). At the time of their participation, veterans were involved in inpatient substance use treatment at the Charles George Veterans Affairs Medical Center (CMVAMC) in Asheville, NC. Two semi-structured clinical interviews, the Mini-International Neuropsychiatric Interview and the structured clinical interview for DSM disorders, (MINI, SCID-II) were completed to assess DSM-IV symptoms across a variety of disorders (e.g., major depression, PTSD, personality disorders). Additionally, the Combat Experiences Scale, a measure of self-reported experiences from combat, was utilized. The clinical and self-report data (i.e., items from the diagnostic interviews and the CES scales) were examined for symptoms associated with any of the three constructs of the IPTS. Results were partially consistent with

hypotheses. Limitations, suggestions for future research, and implications for IPTS will be discussed.

CHAPTER 1: INTRODUCTION

According to the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5; American Psychiatric Association [APA], 2013), traumatic stress is the direct experience or witnessing of an event that involves actual or threatened death or serious injury. In the DSM-5, the behavioral and emotional symptoms that an individual may experience following traumatic stress are divided into four distinct clusters, including re-experiencing, avoidance, negative cognitions and mood, and arousal (APA, 2013). For veterans of war, the combat experiences often entail significant traumatic stress. For example, in one sample of Army National Guard soldiers, 60.7 percent of veterans that recently returned from Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) report exposure to a potentially traumatic event (e.g., engaged in combat, wounded or killed someone, witnessed someone being wounded or killed) (Griffith, 2012). In another sample, 65.1 percent of OIF and 46 percent of OEF soldiers report a history of combat (Hoge, Auchterloine, & Miliken, 2006).

In some cases, having experienced a traumatic event increases the risk of mental illnesses like posttraumatic stress disorder (PTSD) and may contribute also to the risk of death by suicide (Boscarino, 2006; Drescher, Rosen, Burling, & Foy, 2003), suicide attempts (Freeman, Roca, & Moore, 2000; Krysinska & Lester, 2010; Nad, Marcinko, Vuksan-Eusa, Jakovljevic, & Jakoljevic, 2008), and suicidal ideation (SI) (Butterfield et al., 2005; Griffith, 2012; Guerra & Calhoun, 2011; Krysinska & Lester, 2010). In addition, substance use and misuse are common among veterans (Drescher et al., 2003; Waller, Lyons, & Constantini-Eerando, 1999) and such problems may also increase the risk of suicide (Prigerson, Maciejewski, & Rosenheck, 2002; Sierles, Chen, McFarland, & Taylor, 1983). Overall, both substance use disorders (SUDs) and

suicide are on the rise among veterans (Army Health Promotion Risk Reduction and Suicide Prevention Report, 2010; Kuehn, 2009; Mental Health Advisory Team Report, 2008), and although PTSD is sometimes, but not always, a predictor of such outcomes, there is a clear need for research examining the interplay among these variables and to identify specific risk factors for suicide in this population (Bell & Nye, 2007; Griffith, 2012; Pangioti, Gooding, & Tarrier, 2009; Zivin et al., 2007). For example, among individuals with PTSD symptoms, greater perceptions of burdensomeness and increased use of substance to cope exacerbated suicide ideation, while using substances to cope significantly moderated the pathway between perceived burdensomeness and suicide ideation (Poindexter, Mitchell, Jahn, Smith, Hirsch, & Cukrowicz, 2015). Therefore, PTSD symptoms may be associated with feelings of self-hatred and of being a liability to others, which results in greater thoughts of suicide, especially in the context of substance use (Poindexter et al., 2015).

One model that has proposed an explanatory mechanism for the association between combat exposure and suicidality is the IPTS (Joiner, 2005). IPTS suggests three constructs are central to suicidal behavior, two primarily related to suicidal desire – *thwarted belongingness* and *perceived burdensomeness* – and one primarily related to the capability of committing suicide – *acquired capability* for suicide. Specifically, the IPTS proposes that suicidal desire is developed by *thwarted belongingness* (feeling isolated or cut off from others), and *perceived burdensomeness* (feeling like a burden on others) such that an increase in these perceptions increases desire to die by suicide. Furthermore, IPTS proposes a separate construct with relevance to individuals with military service, namely the capability to engage in suicidal behavior or *acquired capability* (i.e., through direct or indirect exposure to death, pain, or violence). With few exceptions, these constructs of the IPTS have not been studied in relation to

suicidality and suicide attempts among veterans with substance use problems – a group that is clearly at high risk for suicide.

CHAPTER 2: LITERATURE REVIEW

The IPTS framework has shown a lot of promise for enhancing our understanding of individuals at risk for taking their own life, including veterans, who often experience alarming rates of mental health issues. Given the rates of suicide among veterans and the relative dearth of research specifically examining the components of the IPTS in individuals with substance use problems, the present study examined these associations in a clinical sample of veterans.

Mental Health and Suicide in Veterans

Suicide is the second leading cause of death in the U.S. military (U.S. Department of Defense, 2007) and in the first six months of 2012, more military personnel died by suicide than by combat-related injuries or causes (Zaroya, 2012). Between 1999 and 2010, the average age of male veterans who died by suicide was 59.6 years among veterans identified on state death certificates (Department of Veterans Affairs, 2012). In 2008, the rates of suicide among soldiers in the U.S. Army surpassed the rate of suicide in the general population (Kuehn, 2009), which is particularly alarming because active duty military suicide rates have traditionally been lower than those of the general population (Kang & Bullman, 2008). Kaplan, Huguet, McFarland, and Newson (2007) found that male veterans in the general population are twice as likely to die by suicide than nonveterans, and they are 58 percent more likely to use a firearm in their attempt. The use of firearms – something with which veterans are very familiar – likely contributes to the lethality of suicide attempts in this population (Newson, 2007).

Notably, the increasing rate of suicide is paralleled by an increasing rate of mental disorders. This is indicative of suicide attempts being secondary to mental illness (Bachynski et al., 2012). Approximately 90 percent of people who die by suicide have a diagnosable

psychiatric disorder at the time of death (Bertolote, 2003; Cavanagh, Carson, Sharpe, & Lawrie, 2003). Along the same lines, Bryan, Bryan, Ray-Sannerud, Etienne, and Morrow (2014), found that 40 percent of individuals who had made a suicide attempt prior to military service subsequently made a suicide attempt while in the military, as compared to only 4 percent of those who had not made a suicide attempt. Furthermore, Bertolote (2003) reported 53.7 percent of those who die by suicide were diagnosed with depression. Although a history of major depression is one of the strongest predictors of suicide ideation, it does not predict suicide attempts among individuals with suicide ideation; rather, disorders characterized by anxiety and agitation (e.g., PTSD) and problems with aggression and impulsiveness (e.g., substance use disorders) best predict the transition from ideation to suicide attempt (Nock, Hwang, Sampson, & Kessler, 2010). In fact, substance use coping is often conceptualized as a form of avoidant coping, especially in the context of PTSD symptoms (Asberg & Renk, 2012).

This has implications for the present study, which examines specifically suicide ideation and attempts among veterans in substance use treatment. Additionally, alcohol use, substance use, impulse control, psychotic, and personality disorders correspond with an increase in the risk of suicide (Hawton, Houston, Haw, Townsend, & Harris, 2003; Kessler, Borges, & Walters, 1999). However, mental illness in and of itself does not tell the whole story of suicide risk as the majority of individuals with a mental disorder never engage in suicidal behavior (Nock et al., 2008). In fact, there is a genetic risk that remains even when various mental disorders are controlled for (Fu et al., 2002; Statham, Heath, Madden, Bucholz, & Bierut, 1998). Overall, it is important to note that depression and PTSD (which are common diagnoses among veterans) increase the risk of suicide, but factors beyond the scope of this study (genetics, a family history of suicide) may also contribute to risk. Next, the literature on the psychosocial mechanisms by

which mental illness may increase contribute to suicidality, suicide attempts, and an increased risk for dying by suicide will be discussed.

PTSD and Suicidality

As noted previously, a diagnosis of PTSD generally increases the risk of suicide. In fact, PTSD is associated with all forms of suicidal behavior, such as ideation, attempts, and death by suicide (Panagioti, Gooding, & Tarrier, 2009). In one study, 57 percent of the participants with PTSD reported suicidal behavior, and 40 percent had made at least one previous attempt (Ferrada-Noli, Asberg, & Ormstad, 1998). However, the relationship between PTSD and completed suicides remains inconclusive. In a meta-analysis by Pangioti et al. (2009), the association between successful suicides and PTSD was not significant. The lack of an association between PTSD and completed suicide is surprising, and may be in part because of a lack of statistical power, statistical rarity of completed suicide, or methodological limitations (Krysinska & Lester, 2010). On the other hand, it may be that the comorbid disorders, which commonly accompany PTSD, are better predictors of subsequent suicide, and PTSD itself does not add any predictive power (Krysinska & Lester, 2010).

Even though the connection between *completed* suicide and PTSD is still unclear, PTSD has been associated with prior suicide attempts and current suicidal ideation (SI) (Griffin, 2012; Krysinska & Lester, 2010; Panagioti et al., 2012). Since "only" 3 to 13 percent of suicide attempters eventually die by suicide (Beck & Steer, 1998; Suokas, Snominen, Isometsa, Ostamo, & Lonnqvist, 2001), a difference in the neurobiology of suicidal behavior, depression, and completed suicide is likely (Pandey, 2013).

Theoretical Framework

As noted, the Interpersonal Psychological Theory of Suicide (IPTS; Joiner, 2005) is a model consisting of three constructs that are essential in the prediction of suicide; thwarted belongingness, perceived burdensomeness, and acquired capability (Joiner, 2005). Self-report measures designed to measure these constructs include: the Interpersonal Needs Questionnaire (for thwarted belongingness and perceived burdensomeness) and the Acquired Capability for Suicide Scale (ACSS) (for acquired capability) (Van Orden, Cukrowicz, Witte, & Joiner, 2010).

Additionally, this theory of suicide includes four hypotheses that outline the specific relationship between these three constructs. Firstly, Van Orden and colleagues (2010) noted, "Thwarted belongingness and perceived burdensomeness are capable of producing thoughts of passive ("I wish I was dead" or "I would be better off dead") suicide ideation." Secondly, "the simultaneous presence of thwarted belongingness and perceived burdensomeness, when perceived as stable and unchanging (i.e., hopelessness regarding these states) is a proximal and sufficient cause of active (e.g., "I want to kill myself") suicidal desire." Thirdly, "the simultaneous presence of suicidal desire and lowered fear of death serves as the condition under which suicidal desire will transform into suicidal intent." Lastly, "the outcome of serious suicidal behavior (i.e., lethal or near lethal suicide attempts) is most likely to occur in the context of thwarted belongingness, perceived burdensomeness (and hopelessness regarding both), reduced fear of suicide, and elevated physical pain tolerance" (Van Orden et al., 2010, p. 581). Overall, it is important to understand the unique contribution and interplay among thwarted belongingness, perceived burdensomeness, and acquired capability in the prediction of suicide risk.

Thwarted belongingness. Thwarted belongingness (i.e., "I am alone") involves a feeling of disconnectedness or lacking in meaningful relationships. In some cases, previously

meaningful relationships have become strained or lost. The IPTS is consistent with past suicidal behavior theories through its proposal of social connectedness, but it diverges in that it proposes an unmet "need to belong" (e.g., Baumeister & Leary, 1995) is the specific interpersonal need involved in desire for suicide (Van Orden et al., 2010). Additionally, IPTS proposes that thwarted belongingness is a multidimensional construct consisting of two factors: loneliness (i.e., "I feel disconnected from others") and the absence of reciprocally caring relationships ("I have no one to turn to and I don't support others") (Van Orden et al., 2010).

Perceived burdensomeness. According to the IPTS, perceived burdensomeness is a feeling of being a burden on the rest of the world. For someone to experience perceived burdensomeness they are not only failing to make meaningful contributions, but are also a liability. Perceived burdensomeness and thwarted belongingness produce a desire for suicide. According to the theory, perceived burdensomeness comprises two dimensions, beliefs that the self is so flawed as to be a liability on others (i.e., "I make things worse for the people in my life") and affectively laden cognitions of self-hatred ("I hate myself, or "I am useless") (Van Orden et al., 2010). In a sample of veterans entering inpatient treatment, perceived burdensomeness emerged as a robust predictor of suicidal ideation, controlling for gender, PTSD symptoms, and depressive symptoms. Additionally, the interaction between perceived burdensomeness and thwarted belongingness was statistically significant in the prediction of suicide ideation; however, thwarted belongingness predicted suicidal ideation only in the presence of high levels of perceived burdensomeness (Monteith, Menefee, Pettit, Leopoulos, & Vincent, 2013).

Acquired capability. Acquired capability is the degree to which a person is capable of a lethal suicide attempt. Acquired capability is a habituation to the fear-evoking, pain-inducing

suicidal behavior. So, experiences like self-injury or witnessing violence can produce an acquired capability for suicide (Joiner, 2005). Acquired capability is thought to be a multidimensional latent variable consisting of two dimensions: lowered fear of death and increased physical pain tolerance (Van Orden et al., 2010). Joiner (2005) suggests an important point that not all who are capable of suicide have the desire for suicide, and alternatively, not all who desire suicide are capable of suicide. This may, in part, explain why only a small fraction of those who attempt end up dying from suicide (Joiner, 2005), and suggests also the importance of identifying individuals who exhibit both the desire and the capability.

Importantly, one study suggests that all forms of combat experience predict higher levels of capability (Bryan & Cukrowicz, 2011). This is important because it suggests that the full range of combat experiences plays in the habituation to death and development of pain tolerance, even among service members not directly involved in violent or aggressive combat roles (e.g., medical personnel), and suggests that any form of death or suffering can contribute to the acquired capability of suicidal behavior (Bryan & Cukrowicz, 2011). Military veterans, then, may exhibit the capability by ways of their deployment, and therefore should be considered high risk for suicide in the context of mental health and substance use issues.

Moreover, Nock, Joiner, Gordon, Lloyd-Richardson, and Prinstein (2006) reported that the number of self-injury episodes, the severity of the self-injury, and the self-reported lack of physical pain during self-injury episodes predicted suicide attempts. Several studies have found that those who had attempted suicide showed higher pain tolerance than those who had not (Orbach et al., 1996). Additionally, self-inflicted injuries have more potential for increasing pain tolerance than unintentional injuries, which is consistent with Joiner (2005). An exploratory factor analysis was conducted on the ACSS in a prison sample, and three interpretable factors

were General Fearlessness and Perceived Pain Tolerance, Fearlessness of Death, and Spectator Enjoyment of Violence (Jahn, Smith, Wolford-Clevenger, & Mandracchia, 2013). The General Fearlessness and Perceived Pain Tolerance factor most closely approximates Van Orden's description of acquired capability (Van Orden et al., 2010). Additionally, the ACSS factors were unrelated to suicide ideation, supporting the notion that acquired capability is distinct from the suicidal desire (Jahn et al., 2013).

Additional Factors in the Context of IPTS

Although thwarted belongingness, perceived burdensomeness, and acquired capability may be linked directly to suicide risk, other factors may indirectly increase an individual's perception that he or she is not connected - or in fact present a burden - to other people, as well as decrease the fear of pain/death. For example, childhood adversity, consequences of suicidal behavior (relief from negative affect), components of PTSD (e.g., estrangement and numbing), guilt, and military stressors could be viewed as risk factors within the IPTS framework. Further, Joiner, Brown, and Wingate (2005) argued the importance of assessing hopelessness, social isolation, impulsivity/aggression, and ineffectiveness in the context of the IPTS and suicide, while Bryan, Jennings, Jobes, and Bradley (2012) suggested that military cultural values (e.g. mental toughness, self-reliance, self-sacrifice, etc.) are vital for understanding military suicide. These psychosocial and cultural concepts, in relation to the IPTS, will be discussed next.

Childhood adversity and acquired capability. Joiner (2007) suggested that childhood physical abuse and violent sexual abuse predicted the number of suicide attempts better than molestation and verbal abuse. So, the greater the pain and violence, the more likely someone was to have a suicide attempt. On the other hand, Puzia, Kraines, Liu, and Kleiman (2014) suggest that the relationship between SI and childhood abuse may be specific to child emotional

abuse, and that this childhood subtype increases risk for ideation through the individual's sense of being a burden on others in their social network. Although the present study will not examine childhood adversity, it is important to consider experiences that may contribute to an individual's acquired capability.

PTSD, thwarted belongingness, and acquired capability. Recent studies have used PTSD symptom severity (a total score of PTSD symptoms) to predict SI using the IPTS model with findings suggesting combat experience increased acquired capability, but not perceived burdensomeness or thwarted belongingness (Bryan, Cukrowicz, West, & Morrow, 2010). In contrast, Davis, Witte, and Weathers (2013), examined *specific* PTSD symptoms, and found a robust correlation between SI and the detachment/estrangement symptom. This correlation proved more robust than the relationship between SI and overall PTSD symptom severity or any other PTSD symptom alone. Similarly, Bell and Nye (2007) reported re-experiencing symptoms were more predictive of suicidal ideation than other symptoms of PTSD. Along these same lines, Bryan and Anestis (2011) suggested that PTSD re-experiencing symptoms directly relate to acquired capability for suicide while only indirectly relating to suicidal desire. Additionally, David, Witte, and Weathers (2013) examined the specific role of PTSD symptoms and SI in the context of the IPTS. Conceptually similar to thwarted belongingness, the PTSD symptom of detachment/estrangement had the strongest association with SI than any other individual PTSD symptom (David, Witte, & Weathers, 2013). Findings from other studies that did not specifically examine the IPTS have also been mixed, with some linking a PTSD diagnosis to risk of suicide; while others argue that particular clusters or symptoms better explain this association between PTSD and suicidality (e.g., numbing/avoidance; Selaman, Chartrand, Bolton, & Sareen, 2014).

Collectively, these findings suggest that examining PTSD symptomatology in relation to the IPTS constructs is of great importance in the prediction of suicidality.

Reinforcement of suicidal behavior and acquired capability. Moreover, several researchers have noted the importance of understanding also the *motivation* for suicidal behavior in order to predict risk. For example, Nock and Prinstein (2004) proposed four different functions of non-suicidal self-injury that differ along two dimensions: positive reinforcement (i.e., followed by a pleasant stimulus) versus negative reinforcement (i.e., followed by the removal of an unpleasant stimulus), and the other dimension, automatic (i.e., internally-focused) versus social (externally-focused). Consistent with the reinforcement model, Bryan, Rudd, and Wertenberger (2013) concluded that although active duty soldiers attempt suicide for many reasons, the primary reasons might involve the reduction of uncomfortable or aversive internal psychological states. It is possible, then, that coping with aversive psychological states through suicidal behavior decreases the fear of death and pain, and may result in completed suicide.

Guilt and perceived burdensomeness. Guilt is a common experience of trauma victims, including combat veterans, and is believed to be a core affective feature of combat related PTSD (Litz et al., 2009). Combat-related guilt was the most significant predictor of suicidal ideation and suicide attempts among Vietnam combat veterans (Hendin & Haas, 1991), and was significantly correlated with suicidal ideation in a clinical sample of Iraq and Afghanistan combat veterans with combat-related PTSD (McLean et al., 2012). In a recent study, Bryan, Ray-Sannerud, Morrow, and Etienne (2013) found that guilt is differentially associated with suicidal ideation among those military personnel according to history of direct combat experience. Guilt can be conceptualized also as a form of perceived burdensomeness, and as such it may be related to suicide risk.

Military life stressors and suicidality. Stressful life events may play an especially important role in the occurrence, and recent increase of suicidality among soldiers, given the stressful nature of military training in general. Soldiers experience many different military-related forms of stressors. Some of these include: combat exposure, injury, bereavement, negative unit climate (feeling ostracized, lacking unit cohesion, or feeling that one has let their unit down), family stressors (separation, family illness/death) marital or romantic stressors (infidelity), and legal or disciplinary problems (Nock, Deming, Fullerton, Gilman, & Goldenberg, 2013). Nock et al. (2013) also describes military stressors specific to current military personnel. First, the nature of the combat exposure related to OIF and OEF requires soldiers to be always on alert for improvised explosive devices (IED), enemy fire, and other dangers in civilian areas. Second, soldiers are on prolonged and repeated deployments; additionally, there is always uncertainty about a deployment being extended. Third, advances in modern medicine enable more life-saving interventions among those injured in combat. Higher distress among survivors with disfigurement or serious health issues may also be responsible for increases in overall suicide rate. Along these lines, one type of stressor that might be of particular relevance is traumatic brain injury (TBI). The high prevalence of TBI is a consequence of IEDs, and other non-fatal blast explosions that result in head trauma (Warden, 2006). Additionally, TBI is associated with depression and PTSD (Hoge et al., 2008), and other consequences of TBI include impulsivity, aggression and disinhibition (Kim, 2002). Further, stress exposure predicts changes in some psychological processes that have been associated with suicidal behavior including emotion regulation (McLaughlin & Hatzenbuehler, 2009), and hopelessness (Dixon, Rumford, Hepner, & Lips, 1992).

Hopelessness, burdensomeness, and failed belongingness. Hopelessness is a significant predictor of suicidal behavior and has been found to correlate more strongly with suicidal ideation than even depression (Beck, Brown, Berchick, Stewart, & Steer, 1990; Beck, Steer, Kovacs, & Garrison, 1985; Osman et al., 2010). Hopelessness is a series of cognitive beliefs that an individual has negative expectations about the future. According to the IPTS, suicidal people have hopeless feelings specifically about being a burden on others and failed belongingness (Joiner et al., 2005). Additionally, Pollock and Williams (2004) propose that suicidal behavior is associated more with hopelessness than with the severity of depression. It is important, then, to assess an individual's level of hopelessness in relation to their suicidality.

Moreover, Rudd et al. (in press) have recently expanded the hopelessness model of suicide by differentiating between state-based and identity based forms of hopelessness. Identity-based hopelessness, or un-lovability, consists of trait-like self-perceptions of worthlessness and defectiveness that are viewed by the individual as enduring and unchangeable. Trait hopelessness incrementally predicts current and future attempts above and beyond other common risk factors for suicide including state hopelessness (Rudd et al., in press). According to the IPTS (Van Orden et al., 2010), hopelessness in association with both perceived burdensomeness and thwarted belongingness should increase both suicide ideation and suicide attempts, hopelessness is seen to convert passive suicide ideation to active intent and attempts. In fact, one study in a large community-based cohort found that hopelessness was important in predicting ideation, and that it interacted with both feelings of thwarted belongingness and perceived burdensomeness (Christensen, Batterham, Soubelet, & Mackinnon, 2013).

Fluid vulnerability theory. Similar to the IPTS in some ways, the fluid vulnerability theory from Rudd (2006) proposes a model for understanding how these trait-like, identity-based

factors (i.e., shame) interact with state variables (i.e., hopelessness) to create and sustain acute suicidal episodes. Fluid vulnerability theory suggests, "an individual's vulnerability to suicide is variable but nonetheless identifiable and quantifiable" (Rudd, 2006). Additionally, some individuals are innately more at risk for suicidal behavior due to chronic, negative self-schemas that are part of their identity. One study suggests that the deleterious effects of hopelessness and past suicidal ideation on current suicidal ideation were especially pronounced for military patients with higher levels of shame (Bryan, Ray-Sannerud, Morrow, & Etienne, 2013). Consistent with Rudd's theory fluid vulnerability, the severity of a suicidal episode is dependent on the interaction between trait-based and state-based risk factors, with the central pathway to suicide risk being cognition. Therefore, individuals with negative self-judgments are especially vulnerable to the deleterious effects of past cognitions (i.e., worst-point suicidal episodes) and current cognitions (i.e., hopelessness), resulting in more severe current suicidal episodes (Bryan, Ray-Sannerud, Morrow, & Etienne, 2013).

Self-reliance and perceived burdensomeness. Bryan et al. (2012) suggests that, in the military culture, there is an expectation that each service member will be capable of accomplishing tasks under stress, and solve problems that interfere with mission completion. Service members who are unable to make quick decisions and solve problems are considered incompetent or substandard. Being unable to fix problems or having to ask for help becomes a threat to self-identity, and violates the cultural expectation to solve your own problems. During periods of emotional distress, problem solving deteriorates, and they can become unable to generate ways to cope with crisis resolution. The recurrent episodes of deteriorating problem solving can affect the service member's sense of self or cause identity based forms hopelessness

(i.e., “there is nothing redeeming about me,” “no one is as loathsome as me”). This hopelessness can lead to feelings of being a liability to others, and perceived burdensomeness.

Social isolation and thwarted belongingness. According to IPTS, when the social need is met, it can prevent suicide; however, when social connectedness is thwarted, it can increase the risk for suicide (Joiner, 2002). Baumeister and Leary (1995), suggest that the need to belong is a powerful, fundamental, and extremely pervasive motivation. Relationship issues were frequently mentioned as major suicide risk factors (Mental Health Advisory Team, 2008). It appears the tour durations, in itself, do not increase rates of suicide, but rather, serve as a secondary factor in provoking marital disruption and in sparking the loss of relationships. Also, separation or divorce appeared to have a fairly consistent association with suicide. The strength of the association was roughly comparable to one deployment (Hyman, Ireland, Frost, & Cottrell, 2012). Additionally, the Mental Health Advisory Team (2008) found that 51.5 percent of all soldiers surveyed have experienced feelings of isolation (e.g., “feeling distant or cut off from people”) at least a little bit in the past month. Overall, the impact of social supports (or lack thereof) is an important factor to consider in the context of suicidality.

Impulsivity and aggression. Impulsivity is defined as a personality trait characterized by disinhibition and tendencies to act quickly on urges or reactively (Brodksy et al., 2001) and not surprisingly, aggression and anger-related traits have also been implicated in suicidal behavior. Specifically, studies suggest that anger and impulsivity synergistically contribute to an increased suicide risk (Horesh et al., 1997). Moreover, impulsive aggressive behavior is a common risk factor for both adults and adolescent suicide; however, impulsivity and aggression are particularly highly related in adolescents (Apter, Gothelf, Orbach, Weizman, & 1995). Parents with a history of panic disorder, antisocial personality disorder, and suicidal behavior had proven

to be especially important in the prediction of suicidal behavior among offspring, supporting the possible transmission of impulsive aggression or high emotional reactivity (Gureje et al., 2011).

Moreover, certain types of stressful life events, including interpersonal loss, are associated with heightened impulsivity in regards to suicide attempts (Weyrauch, Roy-Byrne, Katon, & Wilson, 2001), whereas prefrontal cortex deficits are associated with impulsivity and aggression (Anderson, Bechara, Damasio, Tranel, & Damasio, 1999). One study concluded that soldiers with higher levels of exposure to violent combat, who had killed another person, and had been exposed to intense human trauma endorsed somewhat greater willingness to engage in risky behaviors such as driving fast, taking dangerous shortcuts, and seeking out high-thrill activities upon returning home (Killgore et al., 2008). The combat experience factor most consistently predictive of risk-taking propensity was violent crime exposure, which was positively correlated with total risk taking scores, and remained significantly predictive of most scales after demographic factors known to affect risk taking behavior had been controlled (Killgore et al., 2008). Moreover, one study found that anger was uniquely related to thwarted belongingness and perceived burdensomeness, but not acquired capability. In the context of IPTS, this might indicate that anger is associated more with suicidal desire than capability (Hawkins, 2014).

Ineffectiveness. Ineffectiveness is particularly important in the context of learned helplessness. Joiner et al. (2005) suggested that factors such as unemployment, low income, physical illness, and less education can make it more difficult to be an effective change in one's life. Along with IPTS, feeling ineffective can be devastating, but even more so when perceived as a burden on others (Brown, Comtois, & Linehan, 2003). Additionally, in a study by Joiner (2002) they found perceived burdensomeness was a significant predictor of lethality, and hopelessness and generalized emotional pain were not. Brown et al. (2003) reported that genuine

suicide attempts were driven by a desire to make others better off, whereas non-suicidal self-injury was driven by a desire to express anger or punish oneself. Therefore, in the context of the IPTS, identification of factors that may load on perceived burdensomeness is important in the prediction of suicide risk.

Self-sacrifice. Military culture places an emphasis on selflessness in the service of the greater good. The service member often believes that one's life is subordinate to the greater good or wellbeing of others (Gray, 1959). To be a good soldier, or the "calling" is one of self-sacrifice. It is not difficult to see how psychological distress is viewed as a sign of weakness in the military culture. Being unable to effectively cope with intense psychological distress and suffering functional impairment that is secondary to this distress can be viewed as a liability to the safety and wellbeing of the entire unit. To the service member, suicide may become an honorable self-sacrifice for the greater good of the group. As we know, the suicide never benefits others (Bryan et al., 2012). Joiner (2005) has identified this flawed thinking as perceived burdensomeness. Among military samples, perceived burdensomeness has been associated with suicidal thoughts and behaviors (Bryan, 2011; Bryan et al., 2010), and differentiates service members who died by suicide from a matched living cohort of service members (Nademin, Jobes, Pflanz, & Jacoby, 2008). The perceived burdensomeness, or flawed logic that my death is worth more than my life, is conceivably mistakenly colored as a virtuous act because of the revered ideal- the willingness to lay down one's life for the wellbeing of others.

Statement of the Problem

Suicide is a multifaceted, complex phenomenon. Studies have elucidated some of the constructs related to suicide. In particular, Joiner's IPTS has been suggested to predict

suicidality, specifically those at risk of dying by suicide, but the components of this theory have not been examined among veterans with substance use disorders, who arguably are part of a high risk group. Additionally, several studies have used diagnoses of psychological illness to predict suicide; however, results are mixed and examining specific symptoms associated with each diagnosis would potentially provide more useful information, especially in the context of the IPTS. For example, Davis et al. (2013) found that a specific symptom of PTSD, detachment/estrangement, was the most significant. There are a number of psychological factors associated with suicide such as guilt, ineffectiveness, hopelessness, impulsivity, and aggression that could also be useful in predicting suicidality.

Given that the present study will examine the constructs collectively, we did not rule out items focusing on indirect factors. Although the focus is on the three main factors of IPTS, the present study will not dismiss the possibility that these related variables might also load on constructs. Furthermore, given the items are not limited to the specific constructs, acquired capability, perceived burdensomeness, or thwarted belongingness, but may be related to the functioning of interpersonal relationships. Overall, numerous factors may be directly (thwarted belongingness, perceived burdensomeness, acquired capability) or indirectly (hopelessness, guilt) linked to suicide, but the research to date is inconclusive. In part, this may be due to which aspect of suicidality is studied (suicidal ideation, suicidal behavior, completed suicide) and the framework that is used for assessing risk. Joiner's (2005) IPTS is one possible framework[1], but

[1] Although beyond the scope of this study, it is important to acknowledge a biological component in the risk of attempting and dying of suicide. In one study, three categories were examined: the presence of suicidal thoughts; persistent thoughts of suicide, a plan to commit suicide, or a minor suicide attempt. In all categories, concordance rates were higher for monozygotic twins than dizygotic twins. Estimates of heritability of these types of suicidality were 43 percent for any ideation, and 44 percent for persistent/thoughts/plans/minor attempt. When controlling for psychopathology, a history of major depressive disorder, conduct disorder, alcohol dependence, and panic disorder, each increased risk of persistent thoughts, plan, or minor attempt in both men and women (Fu et al., 2002). There is a genetic risk that remained even when various mental disorders were controlled (Statham et al., 1998). Additionally, in examining familial risk factors for individuals who died by suicide, a family history of suicide

this model and its three factors have not been studied in veterans with substance use disorders, which can be considered a high risk group. Thus, the proposed study addresses an important gap in the literature.

The purpose of the current study is to evaluate different symptoms in a sample of military veterans with a diagnosis of SUD to see if any of their symptoms predict suicidal ideation. This study will provide more information about IPTS as well as specifying the symptoms of mental illness that are the most significant in suicidality. The symptoms can be seen through a lens of IPTS by matching each of the symptoms with the IPTS construct to which it most closely relates. Importantly, (Poindexter et al., 2015) suggests that PTSD symptoms adversely affect internalizing feelings that are associated with perceptions of burdensomeness, but do not negatively affect social relations and feelings of belongingness. Theoretically, all of the symptoms in the sample can be mapped onto a specific construct it is most closely related to. Based on the literature, several hypotheses were derived, and they will be discussed next.

Hypotheses

1) There will be three well-formed factors relating to Joiner's theory of suicide.
2) Symptoms around the theme of guilt and incompetence (i.e., "I feel incompetent"), will significantly load on the perceived burdensomeness construct.
3) Symptoms around the theme of social isolation and withdrawal from others (i.e., "I feel cutoff from people"), will significantly load on the thwarted belongingness construct.

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contributed about a twofold increase in risk, even when controlling for family psychiatric history. These results suggest that there is a genetic contribution to suicide regardless of the genetic contribution to mental illness (Qin, Agerbo, & Mortensen, 2003).

4) A previous history of self-harm or exposure to combat trauma (i.e., "I have a previous suicide attempt", "I have seen friends die in combat"), will significantly load on the acquired capability construct.

5) Symptoms that significantly load on thwarted belongingness, perceived burdensomeness, and acquired capability will predict both lifetime suicide attempts as well as a continuous variable for suicidality (both measured by the MINI semi-structured diagnostic interview).

These hypotheses would support the three factors of the IPTS and confirm studies that have found significant correlations to IPTS and suicidality. To our knowledge, our sample of veterans involved in substance use treatment (i.e., primary diagnosis of SUD) is unique and has not been previously utilized in studies examining the IPTS.

CHAPTER 3: METHODS

Participants and Procedure

The data are archival. Specifically, participants were drawn from a study on endocrinological functioning, exposure to trauma, and veterans' stress reactivity (see Bobadilla, Asberg, Johnson, & Shirtcliff, 2014) and included 59 male veterans and 3 female veterans. Participants for the original study were recruited from an inpatient substance use treatment unit at the Charles George VAMC in Asheville, NC. All participants had a primary diagnosis of substance abuse and ranged in age from 23 to 63 years (M=47.26, SD=10.02). Sixty-seven percent of participants were Caucasian, 24.2 percent were African-American, and 3.2 percent were Native American. Fifty-one percent of participants had some college, 19 percent completed high school, 11 percent completed a bachelor's degree, and 6 percent had an associate's degree. Forty-three percent of the participants did not report any previous substance use treatment and 50 percent did report previous substance use treatment. Additionally, 35 percent of participants reported that they had been in detox. Due to their participation in the aforementioned study, which required the provision of saliva and completion of a cognitive stress task, patients with a diagnosis of psychotic disorder or taking medications that could affect endocrinological function (e.g. corticosteroids) were excluded. Data for the present study was obtained from a total of 62 veterans, although not all of them had completed all components of the study.

Measures

Acquired capability for suicide. To obtain items that could potentially indicate acquired capability, the Combat Exposure Scale (CES, Keane, Fairbank, Caddell, Zimering, Taylor, & Mora, 1989), which is a 7-item self-report questionnaire that quantifies level of combat exposure,

was examined. The CES is a subjective measure of frequency of experiences related to combat (e.g. witnessing someone being killed or go missing in action; being under fire from enemy) and uses a 5-point scale for each item (*no*, *1-3 times*, *4-12 times*, *13-50 times* and *51+ times*). The CES items were included in analyses given their potential for tapping in to the acquired capabilities construct of the IPTS. The CES total score was used because the CES scale has demonstrated good internal consistency (α=.85; Cronbach, 1951) and a single factor accounted for a high percentage of the variance (CES; Keane, Fairbank, Caddell, Zimering, Taylor, & Mora, 1989).

Additionally, symptoms were chosen from two semi-structured clinical interviews (MINI; Sheehan et al., 1998, SCID-II; First, Gibbon, Spitzer, Williams, & Davies, 1995), which are used to assess DSM-IV symptoms across a variety of disorders (e.g., major depression, PTSD, personality disorders). These scales were examined for symptoms that are associated with any of the three constructs of the IPTS. Symptoms from the MINI were chosen to assess acquired capability and included symptoms from the suicidality scale (suffer any accident, intend to harm self as a result of an accident, intend to die in accident, injure self but without intent to die), and PTSD scale (experience trauma, re-experience past trauma, feel fear from trauma, feeling numb, hyper-vigilance, and startle easily). Additionally, symptoms from the SCID-II were used to assess acquired capability and included symptoms from the Borderline Personality (BPD) scale (impulsivity, inappropriate anger) and from the Adult Antisocial Behavior Scale (AASB) (impulsivity, disregard for others, irresponsibility, irritability, and lacks remorse).

Thwarted belongingness. Symptoms from the MINI were chosen to assess thwarted belongingness and included symptoms from the suicidality scale (feel hopeless), manic and hypomanic scale (persistently irritable, feeling “up” or “high” or “hyper” currently persistently

irritable, racing thoughts, easily distracted, past manic episode), panic disorder scale (anxiety in public place, avoid social situations, social anxiety, excessive social anxiety, avoid social situations, social fear disrupts life), OCD scale (unreasonable thoughts or behaviors, thoughts or behaviors interfere with life, persistent unwanted thoughts), PTSD scale (avoid talking about trauma, avoid activities because of trauma, less interest in social activities, estranged from others, feeling irritable, difficulty concentrating, problems interfere with life) alcohol dependence scale (gave up activities, interpersonal problems) and substance dependence scale (time spent using drug, gave up activities, interpersonal problems). Additionally, symptoms from the SCID-II were chosen to assess thwarted belongingness and included symptoms from the BPD scale (avoid abandonment, unstable relations) and from the AASB (deceitfulness, and failure to conform).

Perceived burdensomeness. Symptoms from the MINI were chosen to assess perceived burdensomeness and included symptoms from the depression scale (feeling guilt consistent with a delusional idea, feeling guilty in the past, feeling guilty in the last two weeks, symptoms cause significant problems), suicidality scale (thinking you are better off dead), manic and hypomanic scale (being hospitalized for symptoms, life problems), PTSD scale (thinking you will die sooner than other people), alcohol dependence scale (health problems and legal problems due to alcohol) and substance dependence scale (drug causing biggest problem, health problems and legal problems due to drug). Additionally, symptoms from the SCID-II were chosen to assess perceived burdensomeness and included symptoms from the borderline personality scale (identity disturbance, chronic emptiness, dissociative, and affect instability).

Suicidality. The MINI includes also a suicidality risk assessment, which generates a continuous score of suicidality, as well as a history of lifetime suicide attempts. The suicidality

score ranges from 0-8 points for low risk, 9-16 points for moderate risk, and ≥17 points for high risk. The lifetime suicide attempt is a dichotomous item (yes/no) used to assess the presence of a previous suicide attempt.

Statistical Analysis

Descriptive analyses were used to assess previous substance use treatment, previous detox, and level of education. Correlation matrices were run for the purpose of removing any constants in the data. A series of stepwise multiple regressions were employed to determine the efficacy of items associated with acquired capability, thwarted belongingness, and perceived burdensomeness in a series of prediction models. The dependent variables are the suicide ideation measures including a suicide risk assessment (a continuous score between 0 and 48) and a history of suicide attempts (dichotomous). Independent variables included the symptoms from the SCID-II interviews, MINI interviews, and CES total score. A principal components factor analysis was run to extract potential factors. In IPTS, the three constructs should be correlated. For this reason, the oblimin oblique rotation method was chosen. First, variables were removed pairwise; however, because of the large amount of missing data, almost all of the variables were removed so the model could not be run. To overcome this limitation, variables were deleted listwise instead. Data from 34 participants remained for analysis after variables were deleted listwise. Sixty-three symptoms related to IPTS were included in the factor analysis. Those factors were analyzed and symptoms were excluded if they did not load clearly on one factor or if factor loadings were below an absolute value of .20. The resulting symptoms were then compared in three, four and five-factor models to see which model fit the data best.

CHAPTER 4: RESULTS

Descriptive Information

Overall, the sample demonstrated low levels of suicidality on the MINI (M= 7.06, SD= 12.22) though scores ranged from 0 to 48. Of the 59 participants, 46 (72%) reported no previous suicide attempt, and 13 (21%) reported a suicide attempt.

Correlations

The correlations within each construct identified four constants which were excluded from the exploratory factor analysis and they included: currently persistently irritable, persistent unwanted thoughts, and feeling guilt consistent with a delusional idea in the past and in the last two weeks.

Multiple Regressions

Stepwise regression is the reverse of the backwards elimination process. The variable with the highest semi-partial correlation is added to the model, provided it contributes significantly. At each step, all variables are checked to see that they contribute significantly, or else they are removed. The process is repeated until the addition of further variables produces no more significant improvement.

The first stepwise regression used suicidality points as the dependent variable, and the predictors used in the model for perceived burdensomeness included 14 symptoms total (See table 1.1). The second stepwise regression used the dichotomous item ("have you ever made a suicide attempt") as the dependent variable, and the predictors used in the model for perceived burdensomeness included 15 symptoms (See table 1.2). The third stepwise regression used suicidality points as the dependent variable, and the predictors used in the model for acquired

capability included 13 symptoms (See table 2.1). The fourth stepwise regression used the dichotomous item ("have you ever made a suicide attempt") as the dependent variable, and the predictors used in the model for acquired capability included 17 symptoms (See table 2.2). The fifth stepwise regression used suicidality points as the dependent variable, and the predictors used in the model for thwarted belongingness included 27 symptoms total (See table 3.1). The sixth stepwise regression used the dichotomous item ("have you ever made a suicide attempt") as the dependent variable, and the predictors used in the model for thwarted belongingness included 26 symptoms (See table 3.2).

Adjusted R squared values were used because of the small sample size. Variables were included if they met conceptual criteria. Variables were excluded if they were constants with the dependent variable, or if they did not make conceptual sense. In cases where two independent variables were perfectly correlated, then the variable that made the most conceptual sense was chosen for inclusion.

Table 1.1 Perceived Burdensomeness and Suicidality Points

DV: Suicidality Points	*β*	*t*	*p*
(Constant)		1.922	.060
MINI: think going to die sooner than other people	0.371	2.896	.006**
MINI: hospitalized for symptoms	0.268	2.091	.042*
MINI: feeling guilt 2 weeks	0.036	0.278	--
MINI: feeling guilt past	0.039	0.305	--
MINI: significant problems in past	0.005	0.039	--
MINI: life problems	0.012	0.055	--
MINI: legal problems	-0.089	-0.702	--
MINI: drug causes biggest problem	-0.010	-0.078	--
MINI: health problems due to alcohol	-0.080	-0.632	--
MINI: health problems because of drug	0.120	0.855	--
BPD: identity disturbance	0.078	0.631	--
BPD: chronic emptiness	0.164	1.331	--
BPD: dissociative	0.146	1.165	--
BPD: affect instability	-0.023	-0.157	--
		Adj. R^2=.239, *F*=9.006, *p*=<.001	

Table 1.2 Perceived Burdensomeness and Suicide Attempt

DV: Suicide Attempt	*β*	*t*	*p*
(Constant)		-1.015	.315
MINI: think that you would be better off dead	0.368	3.100	.003**
BPD: affect instability	0.293	2.467	.017*
MINI: significant problems in past	0.251	2.142	.037
MINI: feeling guilt 2 weeks	0.107	0.841	--
MINI: feeling guilt past	0.043	0.285	--
MINI: hospitalized for symptoms	-0.052	-0.369	--
MINI: life problems	0.109	0.847	--
MINI: legal problems	-0.066	-0.547	--
MINI: drug caused biggest problem	0.098	0.808	--
MINI: think going to die sooner than other people	-0.073	-0.521	--
MINI: health problems due to alcohol	0.100	0.837	--
MINI: health problems because of drug	0.041	0.339	--
BPD: identity disturbance	-0.119	-0.996	--
BPD: chronic emptiness	0.002	0.020	--
BPD: dissociative	-0.112	-0.915	--
		Adj. R^2=.308, *F*=8.554, *p*<.001	

* p<.05
**p<.01
***p<.001

Table 2.1 Acquired Capability and Suicidality Points

DV: Suicidality Points	*β*	*t*	*p*
(Constant)		0.396	.694
MINI: re-experience past trauma	0.357	2.473	.018*
CES total	-0.041	-0.270	--
MINI: experience trauma	-0.047	-0.263	--
MINI: feel fear from trauma	-0.051	-0.175	--
MINI: feeling numb	0.154	0.732	--
MINI: hyper-vigilance	-0.245	-1.377	--
MINI: startled easily	-0.287	-1.386	--
BPD: impulsivity	0.246	1.715	--
BPD: inappropriate anger	0.258	1.811	--
AASB: impulsivity	0.179	1.249	--
AASB: disregard for others	0.049	0.329	--
AASB: irresponsibility	0.210	1.456	--
AASB: lacks remorse	-0.094	-0.647	--
		Adj. R^2 =.106, *F*=6.116, *p*=.018	

Table 2.2 Acquired Capability and Suicide Attempt

DV: Suicide Attempt	*β*	*t*	*p*
(Constant)		1.030	.309
MINI: hyper-vigilance	0.378	2.801	.008**
BPD: inappropriate anger	0.308	2.281	.028*
CES total	-0.108	-0.761	--
MINI: suffer any accident	0.060	0.439	--
MINI: intend to harm self as a result of accident	0.009	0.068	--
MINI: intend to die in accident	0.009	0.068	--
MINI: injure self but without intent to die	-0.005	-0.033	--
MINI: experience trauma	0.069	0.474	--
MINI: feel fear from trauma	0.045	0.281	--
MINI: re-experience past trauma	0.056	0.330	--
MINI: feeling numb	0.126	0.822	--
MINI: startled easily	-0.049	-0.281	--
BPD: impulsivity	-0.096	-0.669	--
AASB: impulsivity	-0.205	-1.505	--
AASB: disregard for others	-0.037	-0.260	--
AASB: irresponsibility	-0.068	-0.436	--
AASB: lacks remorse	0.225	1.709	--
		Adj. R^2=.223, *F*=7.183, *p*=.002	

* p<.05
**p<.01
***p<.001

Table 3.1 Thwarted Belongingness and Suicide Points

DV: Suicidality Points	*β*	*t*	*p*
(Constant)		0.541	.591
AASB deceitfulness	0.320	2.659	.011*
MINI persistently irritable	0.017	0.137	--
MINI past racing thoughts	0.154	1.262	--
MINI past easily distracted	0.154	1.262	--
MINI past manic episode	0.151	1.212	--
MINI anxiety in public place	-0.048	-0.380	--
MINI avoid social situations	0.028	0.227	--
MINI social anxiety	0.097	0.750	--
MINI excessive social anxiety	0.086	0.707	--
MINI avoid social situation	0.182	1.516	--
MINI social fear disrupts life	0.182	1.516	--
MINI unreasonable thoughts or behaviors	-0.066	-0.540	--
MINI avoid talking about trauma	-0.014	-0.096	--
MINI avoid activities because of trauma	-0.007	-0.050	--
MINI less interest in social activities	-0.078	-0.601	--
MINI estranged from others	0.006	0.047	--
MINI feeling irritable	0.018	0.140	--
MINI difficulty concentrating	0.003	0.020	--
MINI problems interfere with life	0.034	0.243	--
MINI give up activities	0.086	0.713	--
MINI interpersonal problems	0.037	0.303	--
MINI time spent using drug	-0.042	-0.323	--
MINI gave up activities for drug	-0.017	-0.137	--
MINI interpersonal problems because of drug	0.025	0.194	--
BPD Avoid Abandonment	0.071	0.583	--
BPD unstable relations	0.058	0.476	--
AASB failure to conform	0.065	0.502	--
	Adj. R^2=.324, F=12.282, p<.001		

Table 3.2 Thwarted Belongingness and Suicide Attempt

DV: Suicide Attempt	β	t	p
(Constant)		0.955	.345
MINI: unreasonable thoughts or behaviors	0.661	7.124	<.001***
MINI: past racing thoughts	0.260	2.841	.007**
MINI: estranged from others	0.260	2.790	.008**
MINI: persistently irritable	-0.249	-1.605	--
AASB: failure to conform	0.124	1.347	--
MINI: past manic episode	-0.237	-1.340	--
MINI: time spent using drug	0.099	1.067	--
MINI: avoid social situations	0.097	1.038	--
MINI: feeling irritable	0.110	0.990	--
MINI: interpersonal problems because of drug	0.084	0.879	--
AASB: deceitfulness	0.079	0.841	--
MINI: gave up activities for drug	0.072	0.767	--
MINI: less interest in social activities	-0.089	-0.559	--
MINI: avoid talking about trauma	-0.069	-0.474	--
MINI: problems interfere with life	-0.066	-0.424	--
MINI: avoid social situations	0.031	0.331	--
MINI: social fear disrupts life	0.031	0.331	--
BPD: avoid abandonment	-0.028	-0.296	--
MINI: excessive social anxiety	-0.025	-0.264	--
MINI: avoid activities because of trauma	0.028	0.243	--
MINI: give up activities	0.023	0.243	--
MINI: social anxiety	0.018	0.195	--
MINI: anxiety in public place	-0.018	-0.184	--
BPD: unstable relations	-0.023	-0.176	--
MINI: interpersonal problems	-0.013	-0.133	--
MINI: difficulty concentrating	-0.012	-0.091	--

Adj. R^2 = .612, F=25.75, p<.001

* p<.05
**p<.01
***p<.001

Exploratory Factor Analysis

An exploratory factor analysis was conducted using SPSS to determine the factor structure of our selected symptoms. Although IPTS is a three-factor model, an exploratory factor analysis was used due to the symptom selection technique and no clear delineation of subscales.

Additionally, an oblimin oblique factor rotation was used to increase interpretability of the factors while also allowing for factors to correlate. First, information was removed pairwise; however, there was a large amount of missing data and all of the variables were omitted. For this reason, information was removed listwise, which reduced our sample size to 34 subjects. Examination of eigenvalues in principle components analysis suggested a possible 15-factor model, which accounted for 88.8% of variability. The inflection in the scree plot suggested an eight-factor model (See figure 1). We selected the most parsimonious model with acceptable fit that provided conceptually and theoretically coherent and meaningful factor solution. After examining the eight factors in the component matrix, five realistic potential factors emerged. A unique solution using an oblimin factor rotation could not be identified because of the number of unclear factor loadings and small sample size. Symptoms that did not clearly load on a single factor were excluded and three, four and five factor models were tested. The symptoms that did not clearly load on a single factor included twenty symptoms from the MINI (feel hopeless, feeling guilty, hospitalized for symptoms, past manic episode, interpersonal problems because of drug, interpersonal problems, feeling guilty in the past two weeks, drug causes biggest problem, health problems due to alcohol, social fear disrupts life, avoid social situations, social anxiety, avoid social situations, excessive social anxiety, better off dead, anxiety in public place, legal problems, injure self but without the intent to die, and suffer any accident). The CES total score also did not load clearly on a single factor, and ten symptoms from the SCID-II also showed no clear factor loadings (BPD affect instability, BPD dissociative, AASB deceitfulness, AASB irresponsibility, AASB failure to conform, AASB impulsivity, BPD avoid abandonment, BPD identity disturbance, BPD impulsivity, and AASB lacks remorse). After excluding symptoms

that did not load clearly on a factor the three, four, and five factor models were tested to determine which model best fit the data.

Three-factor model. Factor loadings of this three-factor model and items comprising the factors are presented in Table 4. Factor one includes several PTSD items, factor two includes several mania, irritability, hostility symptoms, and factor three includes several substance and alcohol use related items. In the three-factor model, 49 subjects were included and the model accounted for 54.8 percent of the total variability.

Four-factor model. Factor loadings of this four-factor model and items comprising the factors are presented in Table 5. In the four-factor model, 49 subjects were included and the model accounted for 63.3 percent of the variability. Although the factors are not meaningful enough to name, there are some commonalities in each factor. For example, factor one includes several PTSD symptoms, factor two includes symptoms of anxiety, agitation and hostility, factor three includes obsessive compulsive behaviors and chronic emptiness, and factor four includes several substance and alcohol use related items.

Five-factor model. Factor loadings of this five-factor model and items comprising the factors are presented in Table 6. Factor one includes PTSD symptoms, factor two includes irritability and mania symptoms, factor three includes unstable relations, chronic emptiness, and obsessive compulsive behavior, factor four includes substance and alcohol use disorder symptoms, and factor five includes suicidality items. In the five-factor model, 49 subjects were included and the model accounted for 69.3 percent of the variability.

In conclusion, after comparing the models, the four-factor model makes the most theoretical and empirical sense for several reasons. Items clustered together in a more conceptually consistent way for the four-factor model. The four-factor loading provides the most

parsimonious and coherently meaningful factor solution. Additionally, the four-factor model accounts for only slightly less variability than the five-factor model, and is a more parsimonious model. It is difficult to name or interpret constructs with any degree of confidence in the light of actual data because of the extreme sample dependency of any factor analytic technique, particularly in an exploratory sense. Interpretations of entire constructs can change with just the smallest bit of change in the data (Cronbach & Meehl, 1955). By contrast, the three-factor model had several symptoms that were not loading clearly on a single factor. Additionally, the five-factor model includes a factor with only two items, making it difficult to justify its existence as an independent factor rather than as merely an artifact of the EFA iteration process.

Figure 1. Factor Analysis Scree Plot showing Eigenvalues and Potential Number of Factors

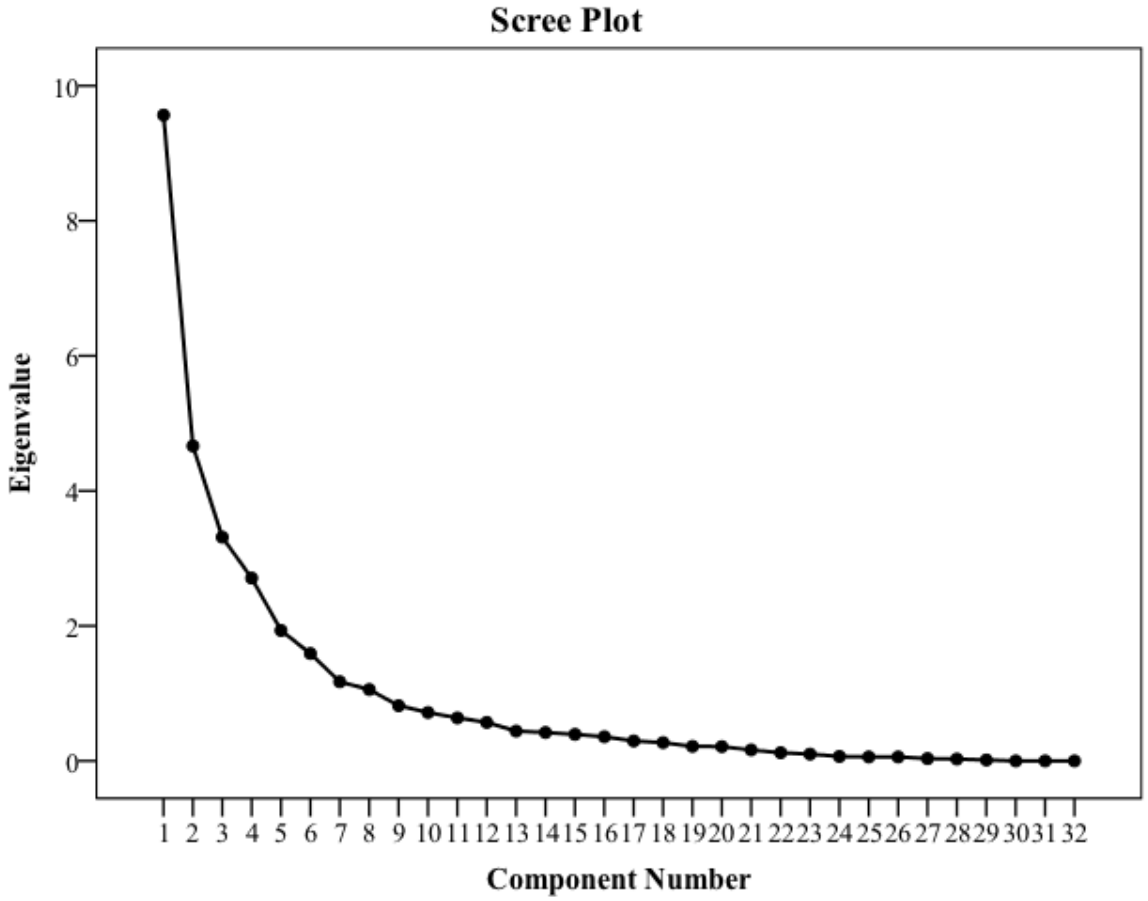

Table 4: Factor Loadings of the Three-Factor Model

Symptoms	Factor 1	Factor 2	Factor 3
MINI problems interfere with life/ PTSD	**0.941**		
MINI avoid talking about trauma/ PTSD	**0.922**		
MINI re-experience past trauma/ PTSD	**0.892**		
MINI feeling numb/ PTSD	**0.882**		-0.342
MINI avoid activities because of trauma/ PTSD	**0.852**		
MINI startled easily/ PTSD	**0.843**	-0.159	
MINI estranged from others/ PTSD	**0.815**		
MINI less interest in social activities/ PTSD	**0.799**		0.111
MINI die sooner than other people/ PTSD	**0.793**		-0.345
MINI difficulty concentrating/ PTSD	**0.765**		
MINI feel fear from trauma/ PTSD	**0.746**		
MINI hyper-vigilance/ PTSD	**0.721**		
MINI feeling irritable/ PTSD	**0.627**	0.167	0.163
MINI experience trauma/ PTSD	**0.538**	0.18	
MINI significant problems in past*/ Depression	**0.381**	0.157	0.233
MINI past racing thoughts/ Manic		**0.906**	
MINI life problems/ Manic		**0.906**	
MINI yes to EVER High/Hyper-Irritable/ Manic	0.126	**0.903**	-0.139
MINI past easily distracted/ Manic	0.126	**0.903**	-0.139
MINI persistently irritable/ Manic	0.201	**0.827**	
MINI give up activities*/ Alcohol Dependence	-0.14	**0.385**	
MINI intend to harm self as a result of accident*/ Suicidality		**-0.261**	-0.138
AASB disregard for others*	0.176	**-0.213**	0.204
MINI intend to die in accident*/ Suicidality		**-0.211**	
MINI obsessive thoughts or behavior interferes with life/ OCD	0.11		**0.852**
MINI unreasonable thoughts or behaviors/ OCD	0.11		**0.852**
BPD unstable relations		-0.118	**0.758**
BPD chronic emptiness		-0.22	**0.544**
MINI gave up activities for drug*/Substance Dependence	0.347	-0.159	**-0.507**
MINI time spent using drug*/ Substance Dependence	0.261	-0.153	**-0.467**
BPD inappropriate anger*	0.138		**0.326**
MINI health problems due to alcohol*/ Alcohol Dependence		0.291	**0.308**

*unclear factor-loading

Table 5: Factor Loadings of the Four-Factor Model

Symptoms	Factor 1	Factor 2	Factor 3	Factor 4
MINI problems interfere with life/ PTSD	**0.949**			
MINI avoid talking about trauma/ PTSD	**0.929**			
MINI re-experience past trauma/ PTSD	**0.901**			
MINI feeling numb/ PTSD	**0.883**		-0.291	0.169
MINI avoid activities because of trauma/PTSD	**0.858**			
MINI startled easily/ PTSD	**0.845**	-0.15		
MINI estranged from others/ PTSD	**0.804**			0.1
MINI less interest in social activities/ PTSD	**0.803**			-0.105
MINI feel fear from trauma/ PTSD	**0.774**	-0.138		-0.117
MINI difficulty concentrating/ PTSD	**0.767**			
MINI die sooner than other people/ PTSD	**0.763**	0.104	-0.206	0.342
MINI hyper-vigilance/ PTSD	**0.706**		0.11	
MINI feeling irritable/ PTSD	**0.59**	0.199	0.233	
MINI experience trauma/ PTSD	**0.558**			-0.217
MINI significant problems in past*/ Depression	**0.37**	0.133	0.216	-0.14
MINI past racing thoughts/ Manic		**0.941**		
MINI life problems/ Manic		**0.941**		
MINI easily distracted/ Manic		**0.935**		
MINI yes to EVER High/Hyper-Irritable		**0.935**		
MINI persistently irritable/ Manic	0.148	**0.813**		-0.128
AASB disregard for others*	0.233	**-0.314**		-0.271
MINI obsessive thoughts or behavior interferes with life/ OCD			**0.882**	-0.141
MINI unreasonable thoughts or behaviors/ OCD			**0.882**	-0.141
BPD unstable relations			**0.846**	
BPD chronic emptiness			**0.664**	0.161
BPD inappropriate anger*			**0.481**	0.218
MINI time spent using drug/ SUD	0.184		-0.17	**0.725**
MINI gave up activities for drug/ SUD	0.279		-0.226	**0.708**
MINI health problems due to alcohol/ AUD				**-0.705**
MINI intend to harm self as a result of accident/ Suicidality			0.124	**0.612**
MINI intend to die in accident/ Suicidality	-0.137		0.18	**0.553**
MINI give up activities*/ AUD		0.206	-0.237	**-0.504**

*unclear factor loading

Table 6: Factor Loadings of the Five-Factor Model

Symptoms	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
MINI problems interfere with life/ PTSD	**0.955**				
MINI avoid talking about trauma/ PTSD	**0.929**				
MINI re-experience past trauma/ PTSD	**0.893**				
MINI feeling numb/ PTSD	**0.889**		-0.295	0.143	
MINI avoid activities because of trauma/ PTSD	**0.859**				
MINI startled easily/ PTSD	**0.846**	-0.148			
MINI less interest in social activities/ PTSD	**0.812**			-0.148	
MINI estranged from others/ PTSD	**0.808**				
MINI difficulty concentrating/ PTSD	**0.77**				
MINI die sooner than other people/ PTSD	**0.766**	0.103	-0.202	0.301	0.107
MINI feel fear from trauma/ PTSD	**0.756**	-0.126			-0.204
MINI hyper-vigilance/ PTSD	**0.71**				
MINI feeling irritable/ PTSD	**0.596**	0.197	0.203		
MINI experience trauma/ PTSD	**0.521**	0.119			-0.38
MINI significant problems in past*/ Depression	**0.397**	0.123	0.135	-0.293	0.183
MINI past racing thoughts/ Manic		**0.942**			
MINI life problems/ Manic		**0.942**			
MINI yes to EVER High/Hyper-Irritable/ Manic		**0.937**			
MINI past easily distracted/ Manic		**0.937**			
MINI persistently irritable/ Manic	0.146	**0.813**		-0.13	
AASB disregard for others*	0.238	**-0.313**		-0.262	
MINI obsessive thoughts or behavior interfere with life/ OCD			**0.909**		-0.109
MINI unreasonable thoughts or behaviors/ OCD			**0.909**		-0.109
BPD unstable relations			**0.903**	0.134	-0.126
BPD chronic emptiness		-0.108	**0.593**		0.345
BPD inappropriate anger*			**0.425**		0.307
MINI gave up activities for drug/ SUD	0.25		-0.132	**0.8**	
MINI time spent using drug/ SUD	0.159			**0.789**	
MINI health problems due to alcohol/ AUD	0.105			**-0.771**	
MINI give up activities/ AUD		0.19	-0.347	**-0.659**	
MINI intend to die in accident/ Suicidality					**0.942**
MINI intend to harm self as a result of accident/ Suicidality					**0.896**

*unclear factor loading

CHAPTER 5: DISCUSSION

Given the need for a better understanding of factors affecting veterans and their high risk for suicide, the present study examined different symptoms associated with IPTS and suicide. The findings indicate that several symptoms are interfering with interpersonal needs in complex ways. It may be that several of the behaviors that are adaptive in combat and military life are maladaptive when veterans come home and reconnect with the civilian population, which is how our findings will be interpreted.

Perceived Burdensomeness.

Our model for perceived burdensomeness suggests that one of the items "I would be better off dead" is predicting whether the veteran has made a suicide attempt. This item is part of the suicidality scale on the MINI, so it may not be surprising that this item is predicting suicidality. However, in a finding by Van Orden and colleagues (2010), thwarted belongingness and perceived burdensomeness are capable of producing thoughts of passive ("I wish I was dead" or "I would be better off dead") suicide ideation. The two constructs that compose perceived burdensomeness are liability and self-hatred. Liability is the belief that their death is worth more than their life to others. The symptom, "I would be better off dead" is a direct measure of liability.

Additionally, veterans who endorsed that depression symptoms caused significant problems at work, at home, socially, or at school were also more likely to have made a suicide attempt. Veterans who endorsed that they have been hospitalized due to symptoms were more likely to have a higher suicidality score, as well as, veterans who reported thinking that they would die before other people. Consistent with other positive correlations with liability such as

distress from homelessness and distress from unemployment, distress from depression is measuring liability associated with perceived burdensomeness.

Our model for perceived burdensomeness also suggests that affect instability is predicting whether the veteran has made a suicide attempt. It is important to note that PTSD has many affective features, and there were not any participants in this sample diagnosed with borderline personality disorder. One study found that the association between mood variability and interpersonal stressors is not specific to students with borderline personality disorder, and overall there was a positive association between number of daily interpersonal stressors and intensity of negative affect reported at the end of the day for all participants (Tolpin, Gunthert, Cohen & O'Neill, 2004). Given these findings, an increased number of negative interpersonal events result in higher intensity of negative mood. Another study examined the relationships between four elements of affective instability (intensity of negative mood, mood amplitude, mood dyscontrol, and mood triggering) and the risk of suicidal ideation and behavior. The negative mood intensity was the only element that contributed significantly to prediction of daily self-reported suicidal ideation (Links et al., 2007). Veterans with substance use disorder are experiencing many interpersonal stressors on a daily basis, which likely increases intensity of negative mood and subsequent suicidal behavior.

For the regression equation predicting perceived burdensomeness three variables contributed to the model, which lends support to the notion that individuals who are experiencing passive suicide ideation, affect instability, and distress from depression have internalized the belief that they are a liability or hatred of self and should be retained as predictors.

Acquired Capability

Previous findings indicate that future suicide attempts and deaths by suicide are associated with a greater history of past suicide attempts, non-suicidal self-harm, trauma exposure, and higher pain tolerance (Christenson, & Jenson, 2007; Haw, Bergen, Casey, & Hawton, 2007; Orbach, et al., 1996). The two facets that compose acquired capability are pain tolerance and fearlessness about death. Specifically, the IPTS proposes that suicidal desire develops into suicidal intent only in the presence of fearlessness about death and that suicidal intent develops into a lethal suicide attempt only in the presence of pain tolerance (Joiner, 2005; Van Orden, 2010). While hyper-vigilance and pain or distress tolerance might be adaptive in the military life, it becomes maladaptive when it habituates painful, violent experiences. Additionally, hyper-vigilance and re-experiencing of past trauma indicates the presence of trauma exposure and subsequent acquired capability. Given the multifaceted nature of PTSD, some researchers have explored the relationships between symptom clusters and acquired capability. Specifically, Selby et al. (2010) emphasized the significance of re-experiencing symptoms, arguing that individuals that report these symptoms are mentally rehearsing past exposure to painful and fear-inducing traumatic stimuli, which could contribute to less fearlessness about death. Consistent with re-experiencing symptoms, hyper-vigilance, or the constant presence of elevated arousal may serve as a repeated exposure to emotional and physical discomfort, increasing an individual's ability to eventually engage in lethal self-harm. Research has demonstrated that hyperarousal symptoms of PTSD increase the extent with which individual's detect physical pain (Asmundson, Wright, McCreary & Pedlar, 2003). Interestingly, a recent study found that distress tolerance moderated the relationship between the severity of hyper-arousal symptoms and re-experiencing symptoms of suicide attempts in a population of veterans with substance use disorder. Their study posits

that low distress tolerance may increase the desire for suicide and the risk for low-lethality maladaptive behaviors to avoid emotional distress; however, individuals with high distress tolerance may be more capable of tolerating the discomfort associated with serious suicidal behavior. Distress tolerance might be seen as adaptive for individuals in the military and even individual's suffering from hyper-vigilance and re-experiencing symptoms, but this suggests that individuals with these symptoms and higher distress tolerance are actually more vulnerable to high lethality attempts. Another possible explanation is that hyper-arousal symptoms are serving as a proxy for re-experiencing symptoms, such that as the experience of more severe intrusive thoughts and memories would be expected to result in greater hyper-arousal (Anestis, Tull, Bagge, & Gratz, 2012). Inappropriate anger might be putting veterans at a higher risk of physical altercations and subsequently higher tolerance of pain.

For the regression equation predicting acquired capability all three variables (i.e. hyper-vigilance, re-experiencing, and inappropriate anger) contributed to the model, which lends support to the notion that individuals who are experiencing higher pain tolerance and fearlessness about death have experienced violence to which they have internalized the belief that they could die at any moment. Alternatively, this could be related to interpersonal needs and should be retained as predictors.

Thwarted Belongingness

While deceitfulness might be adaptive for people with substance use disorder to obtain money for drugs and to lie to family and friends about the extent of their substance use problem, it can be very damaging when trying to construct a healthy support system and developing reciprocally caring relationships.

In the military, the band of brothers was constructed for them, and structure, control, order, and perfectionism are very adaptive. However, when soldiers get out of the military, a more flexible mindset would be more adaptive. For this reason, racing thoughts and unreasonable thoughts and behaviors might be interfering with their relationships and producing feelings of being alone.

For the regression equation predicting thwarted belongingness all of the variables (i.e. deceitfulness, estranged from others, unreasonable thoughts and behaviors, and racing thoughts) contributed to the model, which lends support to the notion that individuals who are experiencing unreasonable thoughts and behaviors, racing thoughts, estrangement and deceitfulness have internalized the belief that they are alone or have un-reciprocally caring relationships.

Exploratory Factor Analysis

The factor analysis produced interesting factors that appear to have a theme interfering with personal relationships; however it is not consistent with Joiner's model. For example, the first factor has symptoms that are consistent with PTSD, but also include several symptoms that are specifically isolating (i.e. estranged from others, avoid activities, feeling numb, avoid talking about trauma). The second factor has some symptoms that indicate anxiety, irritability or hostility (i.e. persistently irritable, easily distracted, racing thoughts). Interestingly, this factor also has symptoms that would interfere with interpersonal relationships. The third factor is much harder to conceptualize; however, unstable relations, chronic emptiness, and unreasonable thoughts or behaviors would also be affecting interpersonal relationships. The fourth factor has some symptoms associated with substance use, accidents or impulsivity, which could be conceptualized as related to acquired capability.

Limitations

The present study had several limitations. First, data were archival and the design of the original study did not lend itself well to factor analysis, and data on suicidality was only collected incidentally as it was not part of the study. The small sample size was another clear limitation, especially in lieu of our proposed hypotheses and statistical plan. In addition to a small sample size, conclusions might not generalize to younger, OIF/OEF veterans with more frequent and higher intensity exposure to combat. In our sample <50% of the participants had combat exposure. Along these same lines, the data is cross-sectional (i.e., unknown whether any of the subjects completed suicide at a later time), and the sample predominantly male.

The study is additionally limited by the large variability in the age range of participants, although suicide risk remains high among middle age and elderly males. Additionally, the statistical rarity suicide (3 to 13% of attempters die by suicide; Beck & Steer, 1998; Suokas et al., 2001) as noted previously may suggest a difference in the neurobiology – and perhaps also theory - of suicidal behavior, depression, and completed suicide. In other words, the IPTS tested in this thesis may be best applied to completed suicides, but the constructs are nonetheless important in the prevention of suicide among those at high risk. Importantly, the dependent variables are based on suicidality scores or whether the veteran had made a suicide attempt, and not completed suicides. Predicting suicidality and attempts from the components of the IPTS (which is used primarily to determine who is at risk for death by suicide) is far from ideal. Given these limitations of the samples and the variables that were drawn from the data, future studies should examine these factors for completed suicide with larger samples. Larger samples would allow also for comparisons between attempters and non-attempters in the context of the IPTS, and a longitudinal design (or use of archival data from which the IPTS components could be

derived) would allow for the identification of suicide completers, specifically. Future studies would benefit also from sampling both clinical and nonclinical settings to determine the generalizability of our findings.

Several measurement issues also contributed to the limitations of this study. The archival data consisted of the MINI and SCID-II, which are both diagnostic tools; however, using measurements intended to measure interpersonal needs would be more ideal. Likewise, the data from the MINI semi-structured interview is dichotomous, which is not as informative as polytomous data, and the instruments used to subsequently identify variables for fit with the IPTS were not intended to measure the three IPTS constructs. Despite these limitations, using specific symptoms are a better predictor of suicide than the diagnosis of PTSD (Davis et al., 2013), and symptoms (items) that loaded on IPTS constructs and/or were predictive of suicidality and attempted suicide could be useful in scale development and future research. Furthermore, this study uses both a dichotomous suicide attempt variable and a continuous suicidality severity variable, which can be seen as a strength. In fact, research suggests that previous attempts significantly predict future suicide attempts (Bryan, Bryan, Ray-Sannerud, Etienne, and Morrow, 2014). Another strength of the study is the ability to examine symptoms rather than diagnoses.

Ultimately, our study does not dismiss IPTS, nor does it support it. IPTS is intended to examine completed suicides, and our study examined suicide attempts. While our factor analysis did not reflect the factors proposed in IPTS, it did provide a meaningful lens through which we could interpret the analyses.

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