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14. ABSTRACT Suicide rates have been increasing in military personnel in the last several years (Lorge, 2008), and it is a vital goal that suicide screening and risk assessment techniques for members of the military be improved. The current project is an effort to accomplish this goal, by using a parsimonious yet fruitful research design to compare several highly promising risk assessment approaches to one another in the prediction of future suicide-related outcomes. The design has been implemented in a large military sample that has been documented to be at high risk for suicidal behavior, namely, army recruiters. Full access to the sample has been arranged. This project will deliver more efficient, economical, and effective suicide screening measures and risk assessment procedures that can be adapted to any area of the military.					
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Introduction:

Suicide rates have been increasing in military personnel in the last several years (Lorge, 2008), and it is a vital goal that suicide screening and risk assessment techniques for members of the military be improved. The current project is an effort to accomplish this goal, by using a parsimonious yet fruitful research design to compare several highly promising risk assessment approaches to one another in the prediction of future suicide-related outcomes. The design has been implemented in a large military sample that has been documented to be at high risk for suicidal behavior, namely, army recruiters. Full access to the sample has been arranged. This project will deliver more efficient, economical, and effective suicide screening measures and risk assessment procedures that can be adapted to any area of the military.

Body:

As noted in previous reports, delays at the beginning of the project (mostly due to IRB delays) were an impediment, but we have overcome that problem and have made significant progress toward getting back to the original plan. This will allow us to achieve all aims. At the current rate we should exceed N=3000 by the end of 2012, and we should begin to approach our stated goal of N=5000 in mid-2013 (at this point, given previous delays and time constraints, baseline data collection will end; N will exceed 4000 and power calculations suggest this is adequate). If the last baseline assessment occurs in mid-2013, given the 18 month longitudinal component of the study, the last data point would be collected in late 2014.

Data Collection:

Current figures as of 09/29/12

Individuals who have been consented and offered participation in the study: 2491

Individuals who have completed the Stress and Mental Strain Survey (SAMSS): 1562

Individuals who have completed the Alternate Survey: 235

Individuals who have opted not to participate: 694

Overall, data collections has been going relatively smoothly, with no major issues to report. Additionally, constant communication with Ms. Sara Slama from Harvard has also ensured the steady correction of any errors between the SAMSS and IAT. Furthermore, participation has been relatively constant between 50%-75%. If this trend remains constant, we expect to reach our target goal prior to next September.

Additionally, we are scheduled to consent approximately 425 individuals within the next month and a half before the holidays. I expect that participation will remain consistent with past SAMSS enrollment trends.

We are also attempting to obtain access to purchased care data so that we can confirm clinical data on our participants. The process takes a while but this will help with better analysis of the population and the usage of

BH care.

Research Projects

There have been multiple research manuscripts to come from this award. These manuscripts have been prepared even before the end of the proposed data collection period. We expect to be able to prepare several more publications after all data collection has been collected and analyzed. A detailed description of the current manuscripts are described below:

Our group has recently published an article in Clinical Psychology Review.

1. Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury:

Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Please see full copy of the above article in the appendices.

Abstract:

Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal-Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

2. Jessica D. Ribeiro, M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. (In Submission, *Journal of Abnormal Psychology*). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.

Please see full copy of the above article in the appendices.

Abstract

According to the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), the difficulties inherently associated with death by suicide deter many individuals from engaging in suicidal behavior. Consistent with the notion that suicidal behavior is fearsome, acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When considered through the lens of the interpersonal theory, acute states of heightened arousal may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. In the present project we examine how acute agitation may interact with acquired capability to predict suicidality in a large military sample ($n = 1,208$). We suggest that among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death, the heightened state of arousal experienced during periods of acute agitation may facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. Results from hierarchical multiple regression analyses were in line with hypotheses: among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases. Findings are discussed with respect to the interpersonal theory of suicide as well as alternative theoretical perspectives. Limitations of the study are noted. Implications for both theory and practice are offered.

Key Research Accomplishments

1. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide.
2. Among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases.

Reportable Outcomes

Manuscripts, Abstracts, Presentations:

Selby, E.A., Anestis, M.D., Bender, T.W., Ribeiro, J.D., Nock, M.K., Rudd, D.M., Bryan, C.J., Lim, I.C., Baker, M.T., Gutierrez, P.M., & Joiner, T.E. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal-Psychological Theory of Suicide. *Clinical Psychology Review*. 30, 298-307.

Jessica D. Ribeiro, M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. (*In Submission, Journal of Abnormal Psychology*). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.

Degrees obtained that are/were supported by this award:

Theodore W. Bender, Ph.D.

Dr. Bender obtained his Ph.D. from Florida State University in 2012 while partially funded by the current award.

Michael D. Anestis, Ph.D.

Dr. Anestis attained his Ph.D. in 2011 while partially funded by this award. Additionally, he completed his Post-Doctorate from Florida State University while partially funded by this award.

Conclusion

As of now, data collection continues to be moving ahead sufficiently. We expect to adhere to the following revised approved statement of work.

Statement of Work (with revised timeframes on remaining tasks with no-cost extension until December 2014).

Task 1. Begin and complete baseline data collection; start longitudinal tracking:

1b. Complete baseline data collection (approved revised goal, mid-2013).

Task 2. Continue and complete longitudinal tracking:

2a. Continue longitudinal tracking

2b. Complete longitudinal tracking (approved revised goal, late 2014).

Task 3. Data analysis; manuscript and report writing

3a. Complete data analyses and report writing (revised goal, late 2014).

The results of the above studies are beginning to suggest that among the three theory components, the acquired capability for suicide may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Agitation is also proving to be a useful risk factor to explore, according to our second study. It would appear that in individuals high on the acquired capability component, as agitation increases, the risk for suicide increases. The results of the above studies are to be considered as scientific knowledge.

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- Jessica D. Ribeiro, M.S., Jennifer Buchman, B.A., Theodore W. Bender, Ph.D., Matthew K. Nock, Ph.D., M. David Rudd, Ph.D., Craig J. Bryan, Psy.D., Ingrid C. Lim, Psy.D., Monty T. Baker, Ph.D., Chadwick Knight, M.H.S.A., Pete Gutierrez, Ph.D., & Thomas E. Joiner, Ph.D. (In Submission, *Journal of Abnormal Psychology*). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in the Military.
- Lorge, E. (2008). Army responds to rising suicide rates Retrieved September 17, 2008, from <http://www.behavioralhealth.army.mil/news/20080131armyrespondtosuicide.html>.
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Clinical Psychology Review



Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the Interpersonal–Psychological Theory of Suicide

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abstract

Suicide rates have been increasing in military personnel since the start of Operation Enduring Freedom and Operation Iraqi Freedom, and it is vital that efforts be made to advance suicide risk assessment techniques and treatment for members of the military who may be experiencing suicidal symptoms. One potential way to advance the understanding of suicide in the military is through the use of the Interpersonal–Psychological Theory of Suicide. This theory proposes that three necessary factors are needed to complete suicide: feelings that one does not belong with other people, feelings that one is a burden on others or society, and an acquired capability to overcome the fear and pain associated with suicide. This review analyzes the various ways that military service may influence suicidal behavior and integrates these findings into an overall framework with relevant practical implications. Findings suggest that although there are many important factors in military suicide, the acquired capability may be the most impacted by military experience because combat exposure and training may cause habituation to fear of painful experiences, including suicide. Future research directions, ways to enhance risk assessment, and treatment implications are also discussed.

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1. Military service and death by suicide

Suicide is a significant cause of death in the general population, with approximately one million deaths by suicide each year world-wide ([National Institute of Mental Health, 2008](#)). In the United States, the suicide rate is approximately 11 deaths by suicide for every 100,000 people ([Benda, 2005](#)). Thus, suicide is a major public health concern in the general community. Suicide is also the second most common cause of death in the United States Armed Forces, with rates of between 9 and 15 deaths by suicide per 100,000 people ([Ritchie, Keppler, & Rothberg, 2003](#); [U.S. Department of Defense, 2007](#)). Although this is a similar rate of death by suicide as in the civilian population, the military suicide rate during times of peace is generally lower than the civilian rate ([Kang & Bullman, 2008](#)). Furthermore, previous studies have indicated that military service may be a risk factor for suicidal behavior ([Kaplan, Huguet, McFarland & Newsom, 2007](#)), and that the most common type of traumatic death suffered during armed forces training was suicide ([Scoville, Gardner, & Potter, 2004](#)).

In recent years the suicide rate of military personnel and veterans appears to be rising ([Kang & Bullman, 2008](#); [Lorge, 2008](#)), which has sparked a pressing interest in better ways to identify suicidal ideation and treat those military personnel who are affected. Since the start of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), the suicide rate for military personnel who have seen combat has increased to that of the general population ([Kang & Bullman, 2008](#)), and perhaps beyond. This alarming increase suggests that exposure to combat may be an important factor that may cause or at least contribute to later death by suicide. At the same time, military service appears to have some qualities that lower suicide risk in times of peace, with deaths by suicide during basic training being as low as 5 deaths for every 100,000 military recruits ([Scoville et al., 2004](#)). Thus, the

relationship between military service and suicidal behavior appears to be quite complex, serving as a risk factor for some and a protective factor for others.

Unfortunately, research on the mechanisms through which military service influences suicide risk one way or the other is sparse. Employing new theoretical approaches to suicide may shed light on the recent alarming elevation in suicide rate, and aid military health professionals in providing efficient, economical, and effective assessments and treatment for suicidality. The purpose of this review is to integrate current research on the psychological effects of military service and training, and evaluate how those effects may influence suicidal behavior through the framework of the Interpersonal– Psychological Theory of Suicide (IPTS; [Joiner, 2005](#)). Using this theoretical framework the many influences of military service on suicidal behavior may be illuminated, which may, in turn, suggest important assessment strategies and treatment implications.

2. The Interpersonal–Psychological Theory of Suicide

In his Interpersonal–Psychological Theory of Suicide, [Joiner \(2005\)](#) delineates a theory of suicidal behavior that focuses on three necessary, jointly sufficient variables that must be present for an individual to make a lethal suicide attempt: thwarted belongingness, perceived burdensomeness, and the acquired capability to enact lethal

self-injury. These three domains can be used to determine not only who desires to die by suicide, but also who is most capable of engaging in lethal suicidal behavior. This determination is important because there is evidence that although approximately 15% of the U.S. population seriously considers suicide at some point in the course of their life (Nock, Borges, Bromet, Alonso et al., 2008), only 1.4% of the population actually dies by suicide (Nock, Borges, Bromet, Cha et al., 2008). Importantly, the suicide attempt to completion ratio is estimated to be 25 to 1, further indicating that a substantial number of people try to die by suicide, but only a few do, many of whom do so only after multiple previous attempts (McIntosh, 2009). Thus, there appears to be something preventing many suicidal people from dying by suicide, despite their desire. IPTS suggests that all three aforementioned domains must be present for extreme suicidal behavior, and that the low base rate of individuals exhibiting sufficiently high levels of all three factors is what accounts for the low suicide death rate. In order to better understand suicide in the military, we will describe the IPTS in more detail. As will be discussed later on, there may be many important aspects of military service that may influence these variables, some for the better, others for the worse.

2.1. The desire for death

Perceptions of burdensomeness and thwarted belongingness constitute what the IPTS refers to as a “desire for death.” Essentially, it is through the combination of these two constructs that IPTS attempts to answer why someone would want to die by suicide. The more intense the combination of these factors, the more intense one's suicidal ideation is likely to be.

Thwarted belongingness, as conceptualized in the IPTS, is defined as an unmet need to belong that involves a lack of frequent, positive social interactions, and feelings of not being cared about by others (Baumeister & Leary, 1995). The “thwarted” aspect of belongingness indicates that, although some individuals may attempt to meet desires to belong, there may be barriers that are preventing them from successfully doing so. Thwarted belongingness is applicable to individuals who genuinely lack social support networks, as well as individuals who have contact with family and friends but feel that they are not genuinely connected to those individuals. Studies have found the construct of thwarted belongingness to be highly related to suicidal ideation (Van Orden, Witte, Gordon, Bender, & Joiner, 2008), suicide attempts (Conner, Britton, Sworts, & Joiner, 2007; Witte, Duberstein, Conwell, Beckman, & Joiner, in preparation), and completed suicide (Joiner, Hollar, & Van Orden, 2006). Instances of increased connection to others, on the other hand, have been linked to decreases in death by suicide (Joiner et al., 2006).

The second component of a desire for death is perceived burdensomeness. This domain of the IPTS involves a sense on the part of the individual that he or she is a burden to others around him/her, not only failing to make meaningful contributions to society, but also serving as a liability to others. Because of these feelings, the individual assumes that his or her death is worth more to others than his or her life. It is important to note the “perceived” component, as those who believe they are a burden may feel this way despite evidence to the contrary. Perceived burdensomeness has been linked to suicidal ideation (Van Orden et al., 2008), attempted suicide (Joiner et al., 2009, 2002; Van

Orden et al., 2008), and death by suicide (Joiner et al., 2002; Pettit et al., 2002).

There is also evidence indicating that there is an interaction between perceived burdensomeness and thwarted belongingness which predicts increased suicidal ideation and more previous suicide attempts (Joiner et al., 2009). Although military service may influence both of these factors in different ways, these factors may not be where military service most directly influences suicide risk. The primary influence of military experience on suicidal behavior, as we hope to demonstrate through this review, may lie with the final domain of the IPTS, acquired capability.

2.2. Acquired capability

Although perceived burdensomeness and thwarted belongingness explain why someone might desire death, the acquired capability for lethal self-injury (hereafter referred to simply as acquired capability) postulates who is capable of death by suicide. Acquired capability involves the degree to which an individual is able to withstand the fear of death, an outcome that is psychologically frightening and likely to be physically painful. Joiner (2005) posited that, because a lethal or near-lethal suicide attempt is extremely fear-inducing and often involves intense physical pain, experience with and habituation to the fear and pain involved is a prerequisite for a serious suicide attempt. It is this variable that separates individuals who desire to die by suicide but do not attempt or do so using a very low lethality method, from those who actually make a nearly lethal attempt or die by suicide.

The IPTS suggests that acquired capability is developed over time through repeated exposure to painful and provocative events. Through the experience of painful and provocative events, pain and fear become less aversive and easier to tolerate. Joiner (2005) argues that this process mirrors the manner in which jumping out of a plane for skydiving, or parachute training in the case of the military, results in terror the first time one does it, but results in significantly less terror with each subsequent jump. A similar process may exist with suicidal behavior. Consistent with this possibility, Van Orden et al. (2008) found that individuals with previous suicide attempts and greater exposure to painful and provocative events (a composite variable of non-suicidal self-injury, exposure to violence, aggression, etc.) may be more capable of self-injurious behaviors than those who have not experienced those events. Acquired capability and experience with painful and provocative experiences have been linked to number of previous suicide attempts (Joiner et al., 2005, 2007, 2009; Van Orden et al., 2008) and death by suicide (Brown, Beck, Steer, & Grisham, 2000; Holm-Denoma et al., 2008).

2.3. The combined desire for death and acquired capability

Although the purpose of this review is not to extensively present evidence supporting the IPTS in general, it is important to point out two recent studies testing this theory in order to illustrate the empirical foundation upon which it is built. The first study, conducted by Van Orden et al. (2008), found an interaction between perceived burdensomeness and thwarted belongingness significantly predicted suicidal ideation and that individuals with more previous suicide attempts exhibited higher scores on a measure of acquired capability. They also found an interaction between acquired capability and perceived burdensomeness predicted clinician-rated suicide risk. The second study, conducted by Joiner et al. (2009), found an interaction between low family social support and feelings that one does not matter (perceived burdensomeness) that predicted suicidal ideation beyond measures of depression. This second study also found that the three-way interaction between measures of thwarted belongingness and perceived burdensomeness, and previous number of suicide attempts (as a proxy for acquired capability), predicted current suicide attempt status, again beyond indices of depression and other

covariates. Thus, although IPTS is a relatively new theory, there appears to be accumulating evidence supporting its ability to predict suicidal ideation and behavior.

3. Military service and mental health

Before discussing IPTS factors in relation to military service, it is important to understand the influences of military service on mental health. The psychological effects of military service in general, and combat exposure in particular, go beyond suicidal behavior and can involve problems with depression, anxiety, and substance use, among others.

3.1. Negative psychological effects of combat exposure and training

Former President Dwight Eisenhower once said of combat: "I hate war as only a soldier who has lived it can, only as one who has seen its brutality, its futility, its stupidity." This quote appropriately summarizes the experience of combat, an experience that, for most, is difficult; for many incomparably so. It is also an experience that can be difficult to comprehend if one has never seen it. In this review we define combat as the *in vivo* experience of wartime conflict including actual engagement in conflict with armed, hostile forces, as well as witnessing such conflict. Although this is a rather broad definition, the theaters of war vary tremendously, as do the opposing forces. Furthermore, civilians can also experience combat, even if they are not actively engaged in the conflict. Thus, this definition is inclusive of conflict, or witnessing thereof, with legitimate armed forces, guerrilla forces, or terrorist organizations.

There is no doubt that engaging in combat is a terrifying experience for most who experience it, although with enough experience that fear, like any other, may decrease through habituation. Yet, despite the difficulties and potentially horrifying experiences, the majority of those who enter theaters of war remain relatively unaffected (Hotopf et al., 2006). This can be seen in previous studies in which approximately 30% of military personnel developed psychological symptoms as a result of combat experience (Schlenger et al., 1992). Although many who see combat may have some problematic reactions, for many those problems may not be to the point of causing clinical impairment. It is also possible that many problems go unreported. Despite the finding that most seem to be unaffected, there remains a large minority of individuals who experience combat who do develop clinically significant symptoms. For example, there is evidence that veterans of OIF are experiencing higher rates of mental health problems, with approximately 20% of active duty and 42% of reserve personnel reporting problems severe enough to require mental health treatment (Milliken, Auchterlone, & Hoge, 2007). Furthermore, there appears to be a strong dose–response relationship between amount of combat exposure and severity of mental health problems (Dohrenwend et al., 2006). Thus, increased frequency and intensity of combat exposure may be better predictors of negative psychological outcomes than predisposing factors or brief combat exposure (Hoge et al., 2004; Hoge & Castro, 2006).

3.2. Risk factors for problematic outcomes following combat exposure

Some of the most important predictors for development of problems and psychopathology following combat exposure include previous trauma history (accidents, assaults, and natural disasters) and younger age (King, King, Foy, & Gudanowski, 1996), pre-combat history of psychiatric illness (Brewin, Andrews, & Valentine, 2000), problematic family relationships prior to combat (Iverson et al., 2007), and lower intellectual ability (Gale et al., 2008). Other risk factors include exposure to prior trauma and sexual abuse (Clancy et al., 2006; Cabrera, Hoge, Bliese, Castro, & Messer, 2007), exposure to a mentally

ill person in the home, exposure to alcoholism in the home, psychological abuse, and violence directed against one's mother ([Cabrera et al., 2007](#)).

3.3. Military service and psychopathology

Exposure to combat zones has been shown to increase rates of somatic symptoms, psychological distress, impaired health status, and greater health-related physical and social impairment in functioning ([The Iowa Persian Gulf Study Group, 1997](#)). Various studies have shown that exposure to combat is a risk factor for elevated symptoms of depression ([Lapierre, Schwegler, & LaBauve, 2007](#)), posttraumatic stress disorder (PTSD; [Bullman & Kang, 1994](#); [Clancy et al., 2006](#); [Elbogen, Beckham, Butterfield, Swartz, & Swanson, 2008](#); [Hoge et al., 2004](#); [Hoge, Terhakopian, Castro, Messer, & Engel, 2007](#); [Koenen, Stellman, Stellman, & Sommer, 2003](#)), and abuse of alcohol and other substances ([Hooper et al., 2008](#); [Jacobson et al., 2008](#); [Prigerson, Maciejewski, & Rosenheck, 2002](#)). Many of these psychological symptoms have been found to last throughout the lifetime of the individual ([Ikin et al., 2007](#)).

Psychopathology may influence suicidal behavior in combat veterans due to increased problems with families, difficulties at work, and by increasing acquired capability. For example, depression can cause difficulty with loneliness and lack of connection, feelings of worthlessness, and difficulty maintaining energy to keep up with an occupation or with family. Those who experience injuries during combat also endorse more depressive and suicidal symptoms ([Koren, Norman, Cohen, Berman, & Klein, 2005](#); [Pitman, Altman, & Macklin, 1989](#)). PTSD is strongly linked to suicidal behavior ([Kessler, 2000](#)), and it is a major predictor of who transitions from suicidal ideation to attempting suicide ([Nock et al., 2009](#)). It is also important to note that there are clinical features commonly experienced by those with PTSD, including, agitation, insomnia, and nightmares; these same clinical features have also been identified as risk factors for suicidal behavior ([Bernert et al., 2005](#); [Fawcett et al., 1990](#)). Substance abuse problems can influence the domains of IPTS in many ways. For example, illicit substances may provide additional methods for death by suicide (e.g., intentional overdose). They may lower the suicidal ideation threshold needed for the individual to attempt suicide (e.g., drugs may facilitate a suicide attempt). Those abusing substances may also drive away those close to them through drug seeking and reckless behavior. Finally, substance use may also increase acquired capability as it may lead the individual to engage in more provocative behaviors (e.g., fighting, criminal activities, and reckless injuries), and some may require self-inflicted pain (e.g., intravenous drug administration).

4. Evaluating the link between military service and suicide with the IPTS

There are many ways in which military service may influence suicidal behavior. Some aspects may increase risk for suicidal behavior, while other aspects of the military may protect against it. We will now detail and discuss the negative influences of military service on each of the three domains of the IPTS. Furthermore, in our discussion of perceived burdensomeness and thwarted belongingness, we will discuss the positive influences of military service, as it is likely that there are many aspects of military service that facilitate increased feelings of belonging and attenuate perceived burdensomeness.

Of the three components of the IPTS, we believe that acquired capability is the most important factor in understanding suicide in the military. This is because unlike thwarted belongingness and perceived burdensomeness — which may be mitigated by military service for some — acquired capability is likely to be universally increased by military service through combat exposure and training. If one has been trained to kill enemies, and trained to overcome significant reservations in doing so, as well as to withstand other hardships, the

same habituation process may generalize to include facing death by suicide, if suicidal ideation is present.

4.1. Combat experience and acquired capability

We begin with the role of combat exposure in acquired capability, as this is the aspect of suicide risk we believe is most profoundly impacted by military service. IPTS posits that acquired capability is developed in response to repeated exposure to painful and fear-inducing situations. Combat exposure is, without a doubt, a source of exposure to pain, fear, and death. Witnessing fellow soldiers severely injured and killed, and killing enemy combatants, are likely to be distressing experiences for most, yet that distress may be attenuated with repetition.

In general, increased suicidal ideation is associated with greater exposure to war zone violence and atrocities ([Yehuda, Southwick, & Giller, 1992](#); [Beckham, Feldman, & Kirby, 1998](#)), and witnessing war time atrocities (e.g., mutilated bodies or mass killings; [Sareen et al., 2007](#)). Findings on actual death by suicide more directly highlight the link between combat exposure and acquired capability. For example, recent evidence suggests that exposure to combat may be increasing the suicide rate of soldiers from OIF and OEF ([Kang & Bullman, 2008](#)). Length of tour of duty has also been associated with death by suicide in Vietnam veterans ([Adams, Barton, Mitchell, Moore, & Einagel, 1998](#)), a finding that may also be relevant to OIF and OEF, as tours of duty for these theaters are longer than previous wars, and multiple tours of duty are common ([Tanielian & Jaycox, 2008](#)). In fact, an Institute of Medicine committee reviewed numerous studies of Vietnam veterans and concluded that there is significant evidence supporting a relationship between deployment to a war zone and suicide in the years after deployment ([Institute of Medicine, 2007](#)).

The evidence presented thus far does not directly support the role of combat exposure increasing acquired capability, and thus suicide potential, *per se*. Direct evidence is less available, as IPTS is a relatively new theory and has not yet been tested extensively in military populations. One study that specifically explored variables from the IPTS in a military sample found that U.S. Air Force personnel who died by suicide were rated as having higher scores on a scale of acquired capability than a comparison sample of active duty air force personnel ([Nademin et al., 2008](#)). It was unclear in this study, however, if there were differences between the two groups in amount of combat exposure, and the group differences in acquired capability may have been present prior to military service. In another study using a military sample, [Bryan, Morrow, Anestis, and Joiner \(2010\)](#) found that active duty members of the United States Air Force exhibited higher levels of acquired capability than did a non-military clinical sample. Active duty soldiers did not differ from the non-military sample on measures of perceived burdensomeness or thwarted belongingness; however, the authors found that an interaction between acquired capability and perceived burdensomeness which predicted suicidal symptoms such that higher levels of both corresponded with highly elevated suicidality.

Although actual acquired capability has not received much attention in explaining military suicide rates, there are other findings that are consistent with the IPTS view that combat exposure is likely to increase acquired capability. For example, one study found that, in comparison to the general population, Vietnam veterans who had been hospitalized for combat wounds were at higher risk for suicide ([Bullman & Kang, 1996](#)). Furthermore, this study also found that those wounded more than once and those with more severe injuries had the highest risk of suicide. Along these lines, elevated suicide rates have also been documented in combat veterans who experienced amputation of a limb ([Bakalim, 1969](#)), as well as those who experienced spinal cord injuries ([Nyquist & Borg, 1967](#)). Different branches of the military may also experience more injuries, which may increase suicide risk. For example, one study of Vietnam veterans found that

individuals in the Army were seven times more likely to die by suicide than were veterans in the other military branches (Adams et al., 1998).

Posttraumatic stress symptoms may also contribute to increased acquired capability through mental habituation to pain and death. In a sample of Vietnam War veterans, Bell and Nye (2007) found that re-experiencing symptoms of PTSD are more highly predictive of suicidal ideation than are other symptoms of the disorder. In turn, re-experiencing symptoms of PTSD have been shown to be associated with the degree to which individuals have been exposed to war atrocities and heavy violence, with greater exposure resulting in more severe symptoms (Hendin & Haas, 1991; Hartl, Rosen, Drescher, Lee, & Gusman, 2005). Nightmares, which have been linked to suicidal behavior (Bernert et al., 2005) and are a common symptom of PTSD, may be an additional form of re-experiencing painful and provocative events.

There may also be indirect routes to developing acquired capability that are a result of combat exposure. There is evidence that many who experience combat may develop a sense of “invincibility,” which may lead them to engage in more risky and dangerous behaviors. For example, more exposure to violent combat, killing another person, and more contact with human trauma were all associated with more risk-related behaviors including substance abuse and physical aggression (Killgore et al., 2008). Another study found that depressed and substance-abusing military personnel who have seen combat are almost as likely to die from reckless accidental death as they are to die by suicide (Thoresen & Mehlum, 2004). These findings indicate that some soldiers who experience combat may develop a fearlessness that leads them to engage in more reckless behaviors such as thrill seeking and substance abuse, a consequence of which may be the experience of pain and provocation. Thus, the same invincibility or fearlessness that develops from combat exposure for some may also have the potential to be used in violence against oneself.

Overall, combat exposure appears to have many negative influences on suicidal behavior. There are numerous ways through which combat exposure may contribute to suicidal behavior in military personnel: witnessing violence against others and against one's fellow service members, enacting violence against others, and experiencing multiple and/or severe injuries in combat are all likely to increase acquired capability. The constant threat of loss of life and severe injury may also cause habituation to fear of death and pain.

4.2. Combat training and acquired capability

Training for combat situations may also contribute to the acquired capability for suicide for all who serve in the military, as intense combat training is required of all who serve. Military training often necessarily involves exposure to the use of violent weapons, simulated combat activities, and other intense situations. The more thoroughly an individual is trained to carry out these activities, the less difficult it may be to engage in real combat situations. Such training may also facilitate imperviousness to fears of death and injury. Although not an extensively studied topic, there does appear to be some evidence that those in the military have a decreased fear of death. Male veterans, in general, appear more likely to utilize firearms in death by suicide (Kaplan et al., 2007), despite many of them not having seen combat. Another study found that both military officers and their wives had decreased fear of death compared to non-military groups (Koob & Davis, 1977). This may be a result of habituation to the threat of death that is often a part of military life, and may be evidence for increased acquired capability. There is also evidence that members of high death-risk occupations, including those in military service, may attempt to deny, suppress, or control anxiety about death (Lewis, Espe-Pfeifer, & Blair, 2000).

One potential area for combat training to increase acquired capability is through severe and/or repeated injuries, as injuries are

common in intensive military training (Munnich & Bridger, 2007). The Army reports that over the last two decades number of recruits injured during basic training ranged from 15% to 35% for men and from 40% to 60% for women (Jones, 1983; Cowan et al., 1988; Knapik et al., 1998). There is also evidence that male Army personnel may obtain injuries due to physical fights when off-duty (Tiesman, Peek-Asa, Zwerling, Sprince, & Amoroso, 2007).

Branch of military training may also influence acquired capability. Suicide rates during basic training were found to be higher in the Army and Marines than in the Air Force and Navy (Scoville et al., 2004); this may be because Army and Marines may have more provocative combat training than the latter two. That is, the latter two may focus more on operational training for ships and aircraft, rather than for direct combat. It is important to note, however, that self-selection may lead individuals with higher levels of acquired capability to enlist in these two branches. Self-selection would not necessarily negate the hypothesis that greater training results in greater increases in acquired capability, but it would obscure inter-pretations of simple group differences.

The specific training that individuals in the military receive may result in more habituation for different forms of provocation. If one is trained to use guns in combat, the use of a gun in suicide may not invoke as much fear as other potential methods. As an illustration, Scoville et al. (2004) listed a number of cases of soldiers who died by suicide. From the cases listed, those who jumped tended to be in the Air Force (decreased fear of heights), those who hung themselves tended to be in the Navy (extensive experience with rope and knots), and those who shot themselves tended to be in the Army or Marines (extensive training with guns). Thus, training with exposure to activities that could be used for suicide may increase habituation to that activity, making its use for suicide less fear provoking.

Despite the constant supervision of soldiers during training and the potential bonds that are formed with fellow recruits, some individuals die by suicide during basic training. In the aforementioned study by Scoville et al. (2004), one of the most common suicide methods during training was self-inflicted gunshot wounds incurred at marksmanship training. This is a surprising finding, given that the soldiers would do this while surrounded by other soldiers, rather than when they were alone. The finding that suicide method may be influenced by occupational access to lethal weapons is further exemplified by the findings of a case-control study in which soldiers who died by suicide tended to do so while on duty, using weapons they acquired as a part of their shift (Mahon, Tobin, Cusack, Kelleher, & Malone, 2005). Interestingly, most of these deaths by suicide occurred during the morning shift, shortly after coming on duty. Thus, understanding the manner in which combat training influences the acquired capability for suicidal behavior may aid in suicide risk assessment.

4.3. Military service and thwarted belongingness

Particular aspects of military service may influence thwarted belongingness in various ways, particularly in veterans who have seen combat and, as a result, have difficulty relating to their family and friends who may have trouble understanding such experiences, or newer personnel who fail to make connections with fellow recruits. But first, it is important to begin with a brief discussion of the positive influence that military service can have on feelings of belonging. Those in the military may form strong bonds and camaraderie with those with whom they serve or train. For example, military personnel may find ways of increasing group coherence through various activities (e.g., acquiring identical tattoos; Coe et al., 1993). This behavior may seem trivial in some ways, but a tattoo may be a strong reminder of a connection with others. Combat experience may also foster the connections that soldiers have with each other, perhaps creating a “brothers-in-arms” bond. For example, the rate of suicide during military basic training is lower than the age-equivalent suicide

rate for the general population (Scoville, Gubata, Potter, White, & Pearse, 2007). Military training may also instill improved ways of handling interpersonal conflict for some, which may benefit non-military relationships. For example, divorce rates of US Air Force Academy graduates are lower than the divorce rate in the general population (McCone & O'Donnell, 2006). Thus, military training may facilitate one's ability to establish and maintain healthy relationships, both in and outside of the military.

Combat experience may be a factor that increases thwarted belongingness for some individuals, however. For example, when veterans return home they may find it hard to express the difficulties of their experiences to their friends and family, or they may feel out of place in civilian life. Similarly, if they fought in an unpopular war, many veterans may feel like they are viewed negatively by their community (Koenen et al., 2003). Taking the life of another may also be a factor that instills thwarted belongingness. For example, guilt about actions during combat has been linked to more severe PTSD symptoms (Henning & Frueh, 1997). These same feelings of guilt may also contribute to feelings of isolation and lack of belonging, perhaps due to thoughts such as "I'm unlovable because of what I've done..." Importantly, this study also found that guilt was particularly associated with the re-experiencing symptoms of PTSD, which we suggested earlier may also increase acquired capability.

Combat deployment causes a great deal of stress on the families of those deployed, and this stress likely contributes to family problems that arise during and after deployment. Parental deployment has been linked to behavioral and academic problems in children (Caselli & Motta, 1995; Levi, Kaplan, Ackerman, & Hammock, 1995; Hiew, 1992). Combat deployment has also been linked to later domestic violence and child maltreatment (Gibbs, Martin, Kupper, & Johnson, 2007), and increased intimate partner violence (Marshall, Panuzio, & Taft, 2005). More combat exposure is a negative indicator of family adjustment after return from a warzone for both men and women (Taft, Schumm, Panuzio, & Proctor, 2008), and combat exposure has also been linked to divorce (Prigerson, Maciejewski, & Rosenheck, 2002).

What is it about combat experience that results in negative interpersonal outcomes? One potential mechanism may be the mistrust that can result from combat. Hypervigilance and paranoid ideation have been found to be significantly correlated with combat exposure (Orsillo, Roemer, Litz, Ehlich, & Friedman, 1998), and these states of mind may be beneficial to the soldier in the combat zone because they may aid survival. But when integrating back into civilian life these experiences may cause difficulties with their families because of constantly being "on-guard." Another potential mechanism may be "emotional numbing," often a symptom of PTSD, that may arise from combat exposure. One study found that Vietnam veterans who experienced emotional numbing reported more interpersonal difficulties and lower overall quality of relationships with their children (Ruscio, Weathers, King, & King, 2002).

As has already been mentioned, military training may facilitate feelings of belonging to a group in some individuals, but for those soldiers who have difficulty connecting with others prior to military training, military experience may actually serve to further aggravate a sense of thwarted belongingness. If they are unable to form these bonds with their military peers, they may experience even stronger feelings of not belonging to the group or being the "odd man out." Non-military relationships may also be implicated. Two important risk factors for suicide in military personnel are living alone and breaking-up with a romantic partner (Farberow, Kang, & Bullman, 1990; Thoresen & Mehlum, 2006; Wong et al., 2001). Another study using psychological autopsy of soldiers found that being unmarried, divorced, or separated was a particularly potent risk factor for death by suicide (Thoresen, Mehlum, Roysamb, & Tonnessen, 2006). So, a global sense of belonging and connection to both military and non-military peers may provide the most protection against suicide.

4.4. Military service and perceived burdensomeness

Feelings of perceived burdensomeness may be a major influence on suicidal ideation for some military personnel. This may be particularly so for those wounded or disabled in combat. We will discuss evidence for perceived burdensomeness in the military shortly, but first there are many ways in which serving in the military may contribute to positive feelings of making a meaningful contribution, thus protecting against perceptions of burdensomeness.

Military service is likely to be a positive occupational experience for most individuals, instilling feelings of honor, accomplishment, contributing to society, and having a sense of mission. Many military personnel may feel like they are part of a greater cause for their country and that they are helping to protect their family. In fact, feelings of pride about serving in the military have been found to exhibit significant negative correlations with a variety of negative outcomes (e.g., depression) in individuals involved in peacekeeping missions (Orsillo et al., 1998). Veterans of World War II and the Korean War reported that combat experience taught them how to cope with adversity and be self-disciplined, and it also instilled feelings of greater independence and broader perspectives on life (Elder & Clipp, 1989).

One review found that most veterans of war and peacekeeping reported more positive than negative effects of theater experience, and that those who viewed the combat as having an overall positive meaning (i.e., a good cause) also reported better psychological adjustment (Schok, Kleber, Elands, & Weerts, 2008). There is also evidence that many Vietnam veterans reported high levels of life satisfaction and attainment (Vogt, King, King, Savarese, & Suvak, 2004), including occupational attainment. Yet, this same study also found that these positive effects of military service were attenuated by exposure to combat, wartime atrocities, perceived threats, and malevolent environments.

For many individuals who experience feelings of positive contribution while serving in the military, a return from combat or discharge from the military may result in experiencing feelings of loss of purpose or perceived burdensomeness. While on the front lines or in the military, the individual may have felt a greater purpose; but, once discharged, the individual may feel like he or she has nothing more to contribute, or that he or she is a drain on society because of disabling injuries or other adjustment difficulties (Brenner et al., 2008). One study found that excessive motivation to excel in the Army was an important risk factor for completed suicide among soldiers who experienced combat (Bodner, Ben-Artzi, & Kaplan, 2006), suggesting that perhaps these same individuals were experiencing greater feelings of failure or perceived burdensomeness at the time of their deaths.

Perceptions of burdensomeness may be particularly increased if one abandons or is expelled from the military. One study of veteran Finnish peacekeepers found that those who did not complete their service commitment due to premature repatriation had increased suicide risk relative to those who completed their service (Ponteva et al., 2000). In another study, a psychological autopsy of soldiers who died by suicide found that involuntary repatriation was a significant risk factor for completed suicide (Thoresen et al., 2006). In a related note, military personnel who develop mental disorders have significantly higher than average rates of attrition from the military (Hoge et al., 2002). There is also some evidence that legal problems, misconduct, unauthorized absences, and substance use problems may mediate the relationship between psychological illness and early attrition from the military (Hoge et al., 2005). Thus, occupational difficulties and repatriation may lead to perceptions of being a burden on the military, and these perceptions may be aggravated by feelings that they are not just failing their duties, but that they are personally failing and hurting their fellow soldiers and their country as well.

Another potential contributor to perceptions of burdensomeness may be survival guilt, an experience for some veterans who feel like they did not deserve to live through combat or that they should have died alongside their friends. These feelings of guilt may particularly contribute to perceived burdensomeness if the individual's action, or inaction, resulted in the death of a friend, perhaps causing feelings of responsibility or failure. These thoughts may then generalize to other aspects of life, through thoughts like, "I'm just making things worse for everyone, just like during the war..." Importantly, survival guilt has been linked to death by suicide in Vietnam veterans (Hyer, McCranie, Woods, & Boudewyns, 1990).

There are several other ways that the negative psychological effects of combat exposure may increase perceptions of burdensomeness. Military personnel who are discharged or complete their service may face a difficult transition from serving their country to reengaging in a different component of society (e.g., previous occupations and returning to school). Those who remain in the military may also have trouble completing their duties due to mental health symptoms. One study found that military personnel are more likely to report "attitudinal barriers," such as concerns about being seen as weak or that unit leadership would treat them differently, to seeking out mental health services, rather than "structural barriers," such as the cost of health care (Hoge et al., 2004). Military personnel experiencing symptoms of PTSD may also experience increased feelings of being a burden on the military. One study of OIF veterans found that those with PTSD (approximately 16% of the sample) reported more sick call visits, more missed workdays, and more problems with physical health (Hoge et al., 2007). Furthermore, approximately one third of the homeless population consists of military veterans (Gamache, Rosenheck, & Tessler, 2003), a situation that may further increase perceived burdensomeness on family and/or society.

There are also scenarios where some soldiers may still be on active duty and experience feelings of burdensomeness. For example, if as a means of punishment or for safety precautions a soldier has his or her service weapon taken away, failing at a task assigned during duty which may result in feelings of failure and perceived humiliation, and/or stern reprimands and/or harangues from superiors could contribute to feelings of burdensomeness. Thus, attempts at "toughening" soldiers up may, for some, result in feelings of failure or being a burden.

4.5. Overall IPTS framework and summary

Overall, military experience is a positive experience for most who serve. Time spent in the military allows many individuals to develop deep bonds with others who serve beside them, fosters feelings of pride and fulfillment in serving one's country, and it may also provide a broader perspective on life. If an individual reports strong relationships with peers and family, and feels that he or she is making an active contribution to his or her country and community, he or she may be buffered from the negative influences of combat exposure and thus at less risk of suicide. Understanding the positive ways in which military experience has influenced the life of an individual may be beneficial for both suicide assessment and treatment.

Importantly, however, there appears to be a dose–response relationship of combat exposure and suicide risk, one that is strong enough that even these protective buffers may erode for some with multiple combat deployments. Most of the negative factors involved in the relationship between military service and suicidal behavior, and their relationships to the three domains of the IPTS, are displayed in Fig. 1. In this framework, pre-service risk factors (although not a comprehensive list) are displayed as feeding into psychopathology. One pre-service factor, experience with trauma, is also displayed with an arrow to acquired capability, as previous traumas may also contribute to acquired capability. These pre-service factors may then serve to influence the development of psychological disorders

such as depression, PTSD, and substance use following combat exposure. Combat exposure may then contribute, through psychopathology in particular, to the three domains of the IPTS because of the interpersonal problems, functional and occupational difficulties, and through symptoms such as the re-experiencing symptoms of PTSD or the physical injuries that arise from substance use. Combat exposure may also have influences on suicidal behavior independent of psychological disorders, such as through directly increasing acquired capability. Thwarted belongingness, perceived burdensomeness, and acquired capability may be further developed through the mechanisms listed beneath each domain of the IPTS. Risk for a lethal suicide attempt would increase, then, as more of these factors are endorsed by an individual. In this model we have also provided a larger and darker arrow for acquired capability for contributing to suicide risk because the evidence suggests that combat exposure and training may be the most profound and widespread negative impact of military service on suicide. Importantly, low endorsement of any of the IPTS domains may indicate less suicide risk.

5. Discussion

5.1. Future research directions

Little research has been conducted exploring the IPTS in military suicide; additional research on the IPTS domains in the military may be beneficial for helping U.S. military personnel. Future studies should explore perceptions of burdensomeness, thwarted belongingness, and levels of acquired capability in military samples, and then compare levels of these variables to community and clinical samples. Future studies should also assess whether initial levels of these variables change following basic training. Change in these variables should also be measured following deployment to war zones and direct combat exposure. Importantly, these variables should also be measured in relation to suicidal ideation and behavior in the military. Finally, evaluating use of IPTS domains in treating and assessing suicidal behavior in the military may also be a promising avenue of research.

5.2. Improving suicide screening and risk assessment

Regular screening of military personnel for suicidal symptoms may be an important way to prevent suicide in active duty personnel. One study of soldiers who died by suicide found that although many of these soldiers effectively maintained their military duties and expectations right up until death by suicide, they also demonstrated signs of emotional deterioration during the last days of their lives (Orbach et al., 2007). Thus, although a member of the military may appear to be functioning adequately, he or she may be masking suicidal ideation and preparation.

The domains of the IPTS may serve as important indicators of suicide risk assessment in clinical settings. Although research directly measuring these variables in the military are few, especially for acquired capability, several studies have reported findings that are consistent with these constructs (e.g., Anestis, Bryan, Cornette, & Joiner, 2009; Brenner et al., 2008; Kaplan et al., 2007). In clinical practice, actual measures of perceived burdensomeness, thwarted belongingness, and acquired capability may provide the most accurate assessment, but many of the variables displayed in Fig. 1 could be used to generate estimates of risk. When military personnel score high in all three of these areas, it may be important to take additional risk precautions to ensure safety.

Assessment may also be important in terms of what duties are assigned to military personnel. One study found that military personnel who had access to firearms as a part of their duties accounted for over 50% of suicides, with many of these incidents taking place while the individuals were on the job rather than off duty (Mahon et al., 2005). If an individual is designated at higher risk for

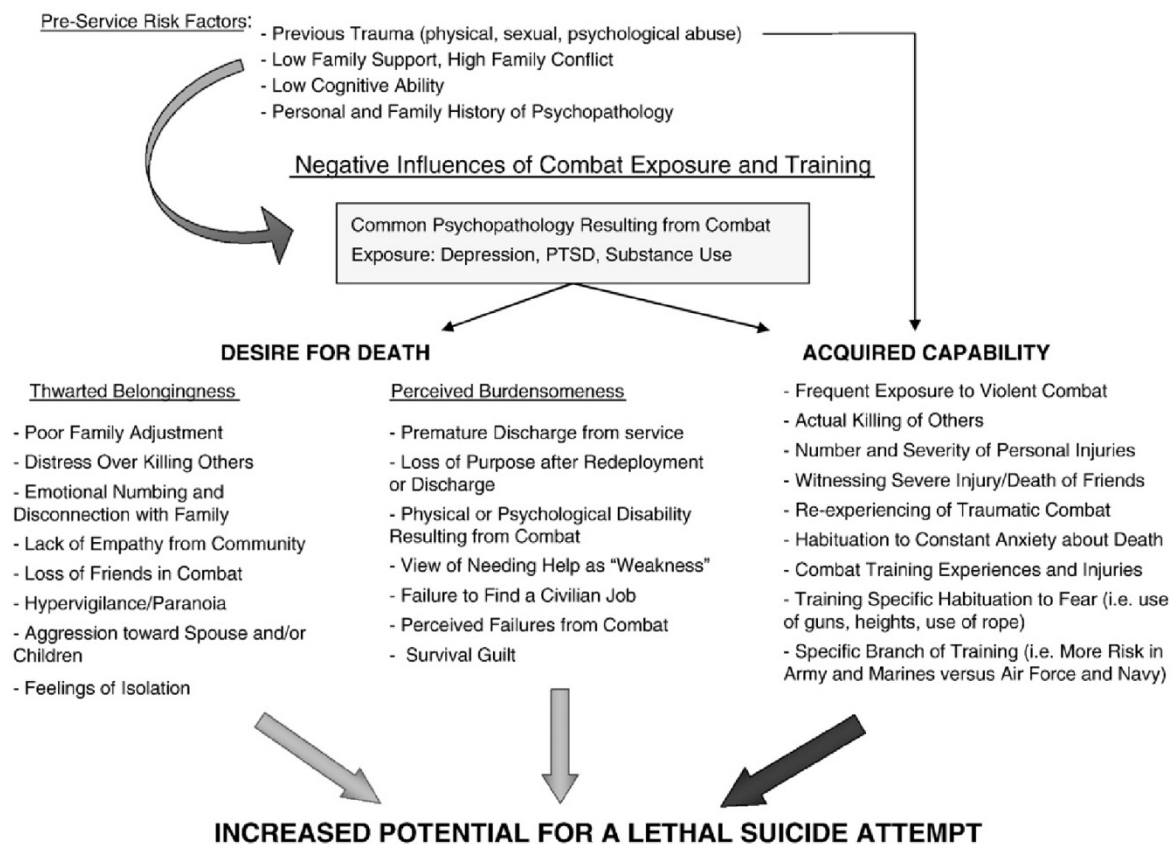


Fig. 1. Negative influences of military service on suicidal behavior as viewed through an IPTS lens.

suicide, it may be beneficial to reassign them to duties that do not have easy access to firearms. In reassigning the soldier, however, it may be important to monitor humiliation reactions that may arise. Similarly, training recruits determined to be at risk for suicide may need to be restricted from firearm training, as one study found that a high percentage of suicides during basic training took place during marksmanship training (Scoville et al., 2004).

5.3. Improving treatment for suicidality in the military

Numerous potentially useful approaches towards addressing thwarted belongingness and perceived burdensomeness exist. Although an ideal solution would involve ensuring improvement of the quality of relationships with non-military peers and family as well, increasing communication with fellow military personnel and veterans, with whom such soldiers could share experiences, might serve as an effective point of crisis intervention capable of mitigating severely thwarted belongingness. Programs such as Battlemind Transition Training, which is currently being researched at the Walter Reed Medical Center, could help veterans reintegrate into civilian life in a manner that helps maintain military relationships without neglecting non-military relationships, while simultaneously addressing a variety of mental health outcomes (Adler, Castro, Bliese, McGurk, & Miliken, 2007; Adler et al., 2006). Meaning-making may also be an important future avenue for therapy, as finding a higher meaning for combat and traumatic experiences could mitigate some of the deleterious effects of combat exposure (Schok et al., 2008). Strategies might include examining the potential positive contributions made and highlighting personal growth from the experiences, hopefully decreasing perceived burdensomeness.

Although acquired capability may not be directly treatable, explaining to combat veterans how their experiences may have contributed to invincibility or fearlessness toward pain and death may

help them maintain awareness of their increased risk. It could be communicated to military personnel in general that they should seek help immediately when they feel suicidal, not because they are weak, but to the contrary, because they may lack fear. This explanation may also help decrease cognitive barriers to seeking aid for mental health.

6. Conclusion

This review has highlighted evidence indicating the IPTS as a valuable framework for understanding, researching, assessing, and treating suicidal behavior in the military. Military experience may increase suicidal behavior, primarily due to the painful and provocative situations resulting from combat, which may increase acquired capability and enhance one's ability to inflict lethal self-injury. Combat exposure may also result in feelings of thwarted belongingness and increased feelings of being a burden on others. When all three of these components are present, an individual's suicide risk is likely to be high. Suicide in the military is a complex phenomenon, but using the IPTS framework may help improve the situation for some of our nation's most valuable resources and the families of those who serve.

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An Investigation of the Interactive Effects of the Acquired Capability for Suicide and Acute Agitation on Suicidality in a Military Sample

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Abstract

According to the interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010), the difficulties inherently associated with death by suicide deter many individuals from engaging in suicidal behavior. Consistent with the notion that suicidal behavior is fearsome, acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When considered through the lens of the interpersonal theory, acute states of heightened arousal may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. In the

present project we examine how acute agitation may interact with acquired capability to predict suicidality in a large military sample ($n = 1,208$). We suggest that among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death, the heightened state of arousal experienced during periods of acute agitation may facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. Results from hierarchical multiple regression analyses were in line with hypotheses: among individuals high on acquired capability, as agitation increases, suicidality increases whereas as agitation increases among individuals low on acquired capability, suicidality decreases. Findings are discussed with respect to the interpersonal theory of suicide as well as alternative theoretical perspectives. Limitations of the study are noted. Implications for both theory and practice are offered.

Keywords: agitation, acquired capability for suicide; suicide; suicidal behavior; interpersonal theory of suicide

Introduction

Suicide is a leading cause of death worldwide (World Health Organization, 2012). In the United States alone, more than 36,000 lives are lost to suicide annually, which corresponds to nearly 100 deaths by suicide per day. Even so, lethal suicidal behavior is still statistically rare. Having thoughts about suicide is much more common (Nock, Bromet, Borges, Cha, Kessler, & Lee, 2008). Nevertheless, even among individuals who desire suicide, evidence suggests that very few will attempt suicide and most attempts will not result in death (Nock et al., 2008). Many existing theories of suicide rest on the assumption that stronger suicidal desire is what differentiates individuals who die by suicide from those who may have thoughts about suicide but do not die. Consequently, these theories have largely focused on identifying factors that contribute to the desire for suicide. The interpersonal theory of suicide (Joiner, 2005; Van Orden et al., 2010) challenges this idea, suggesting that the desire for suicide is necessary but not sufficient for the prediction of lethal suicidal behavior. In order for lethal suicidal behavior to occur, according to the theory, an individual must have both the desire and capability for suicide.

The inherent difficulties associated with death by suicide deter many individuals from engaging in suicidal behavior, per the theory's account. One aspect, according to the theory, that makes suicide difficult is that it is instinctively fearsome as suicide requires confronting and overcoming strong, evolutionarily-based motives for self-preservation. A second deterring aspect is that lethal suicidal behavior is also often physically painful. The theory suggests that individuals who have acquired the capability for suicide, therefore, will evidence a sense of fearlessness about pain, injury and death as well as elevated tolerance for physical pain. According to the theory, because the capability is not fully innate, it must be developed over time. The primary mechanism by which it develops is through repeated exposure to pain and provocative experiences that are fear-inducing and/or painful (Joiner, 2005; Van Orden et al., 2010). For instance, non-fatal suicidal behavior, non-suicidal self-injury, combat exposure, physical aggression, among a host of others, represent fearsome and painful experiences that are thought to confer risk for developing the acquired capability for suicide.

Although the theory highlights the necessary role of acquired capability for suicide in lethal suicidal behavior, the capability for suicide alone is not sufficient to result in death by suicide. An individual must also

evidence the requisite level of suicidal desire. According to the interpersonal theory, the most severe form of active suicidal desire will occur only when two painful interpersonal states – namely, thwarted belongingness and perceived burdensomeness – are experienced simultaneously and perceived as global and unchanging (i.e., hopeless). Thwarted belongingness is characterized by a sense of loneliness and actual or perceived social disconnection. Perceptions of being a burden to others and the (often mistaken) belief that one's death may be worth more to others than one's life characterizes perceived burdensomeness.

A growing empirical literature of both direct and indirect evidence largely supports the main propositions of the interpersonal theory (see Van Orden et al., 2010 for a comprehensive review). With respect to acquired capability in particular, a strong literature exists indicating well-documented associations between suicidal behavior and an attenuated fear of death (Gutierrez, King, & Ghaziuddin, 1996; Minton & Brush, 1980; Neuringer, 1970; Orbach, Feshbach, Carlson & Ellenberg, 1984; Orbach, Kedem, Gorchover, Apter, & Tyano, 1993) and an elevated pain tolerance (Orbach et al., 1996a; Orbach et al., 1996b; Orbach, Mikulincer, King, Cohen, & Stein, 1997). Direct assessment of acquired capability has also repeatedly been linked to a range of painful and provocative experiences, including past suicidal behavior (Bender et al., 2011; Bryan, Cukrowicz, West, & Morrow, 2010; Franklin, Hessel, & Prinstein, 2011; Nademin et al., 2008; Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010; Van Orden et al., 2008). Lastly, there is initial evidence supporting the hypothesized three-way interaction between thwarted belongingness, perceived burdensomeness, and acquired capability in predicting later suicidal behavior (Joiner et al., 2009).

Consistent with the interpersonal theory's view that suicidal behavior is fearsome, evidence indicates that acute and heightened states of arousal are commonly observed in individuals immediately prior to lethal and near-lethal suicidal behavior. When confronting any potential threat to survival, like those involved in suicidal behavior, the body's automatic and innate response is increased arousal – that is, the involuntary stress response, commonly referred to as the fight-or-flight response (Cannon, 1932). The direct biological consequence of being confronted with a potentially lethal stimulus is increased autonomic nervous system arousal, which in turn results in the release of catecholamines (i.e., epinephrine and norepinephrine) that prepare the individual for action (Cacioppo, 1994). The resulting increases in vigilance, heart rate, and oxygen circulation, for instance, prime the individual to either confront the threat (i.e., fight) or escape it (i.e., flight).

One particular state of acute and heightened arousal is acute agitation, often noted in the days and weeks before lethal or near-lethal suicidal behavior. Acute agitation has been identified through both empirical evidence and expert clinical consensus as a significant risk factor for imminent lethal and near-lethal suicidal behavior. As it relates to suicidal behavior, acute agitation is a time-limited state of both psychological and behavioral overarousal often characterized by restless and/or repetitive behaviors (such as fidgeting, pacing, hand-wringing, etc.) coupled with expressions of emotional turmoil and/or mental anguish, tension, or unrest (Benazzi, Koukopoulos, & Akiskal, 2004; McGuffin et al., 1991; Ribeiro, Bender, Selby, Hames, & Joiner, 2011). Experts have deemed agitation a leading warning sign for suicide (Rudd et al., 2006).

Bolstering expert consensus, retrospective, prospective, and cross-sectional studies have also documented high rates of acute agitation among suicide decedents present in the days and weeks prior to their deaths. In a set of psychological autopsies reported by Robins (1981), for instance, “nervousness” occurred in approximately 60% of suicide decedents prior to their deaths, placing it as the second most common symptom documented in the study; “tension” was also common among decedents, occurring in over 40% of the 134 suicide decedents studied. Retrospective studies of inpatient (e.g., Busch et al., 2003) and inmate (e.g., Way, Miraglia, Sawyer, Beer, & Eddy, 2004) suicide deaths report rates of agitation present in close to 80% of suicide decedents in the weeks before the deaths. Beyond retrospective reports, acute agitation has also been linked to imminent suicidal behavior prospectively. Evidence from a large longitudinal study of depressed patients identified agitation and related indicators (e.g., presence of panic attacks) as one of the strongest predictors of near-term death by suicide (Fawcett et al., 1990), occurring in significantly more patients who died by suicide within a year of baseline assessment compared to those who did not. Acute agitation has also been documented as a precursor of near-lethal attempts. Hall and colleagues (1999) reported that close to 90% of patients admitted to an emergency mental health care unit following an attempt reported experiencing “severe psychic anxiety” during the month preceding the attempt; close to 80% also endorsed panic attacks during that time period as well (Hall, Platt, & Hall, 1999).¹

¹ It is possible that individuals may be mistakenly identifying symptoms of agitation as panic or other anxiety symptoms. Although agitation and anxiety share features of heightened physiological arousal and mental preoccupation, the states are distinct. Whereas anxiety is characterized by future-oriented cognitions that function to prepare an individual to avoid or cope with an anticipated negative event (Barlow, 2000), symptoms of agitation are typically more focused on immediate experience of physical and psychological unrest.

When considered further through the perspective of the interpersonal theory of suicide, acute states of heightened arousal, like acute agitation, may be relevant to suicidal behavior particularly when considered in the context of the acquired capability for suicide. For most individuals, the prospect of engaging in potentially lethal suicidal behavior in the close future will naturally elicit some degree of arousal. Among individuals who possess the requisite levels of pain tolerance and fearlessness about pain, injury, and death (i.e., individuals high on acquired capability), the heightened state of arousal experienced during periods of acute agitation may serve to facilitate suicidal behavior in part because it would provide the necessary energy to approach a potentially lethal stimulus. Among individuals who are low on acquired capability, the arousal experienced during agitation may result in further avoidance. This prediction would be in line with previous theories of the effects of increased arousal on behavior. A robust literature exists supporting the notion that states of heightened arousal lead individuals to react with their most dominant response or the response that is most familiar or commonly elicited (e.g., dominant response theory; Hull, 1943; Zajonc, 1965). For individuals who are low on acquired capability, the response when faced with a potentially lethal means for suicide will be avoidance; for individuals who are high on acquired capability, avoidance is less likely to be the dominant response.

Alternate views may also be used to conceptualize the function of agitation in suicidal behavior. Some theories may suggest that agitation, which might arise for a variety of reasons, is so distressing that the experience of it will result in using suicide as a means of resolving or escaping the distress. This view, for instance, would be consistent with the views advanced in Psychache Theory (Shneidman, 1993, 1999) as well as in Escape Theory (Baumeister, 1990). The interpersonal theory perspective suggests agitation is not the cause of suicidality² but instead a byproduct of the daunting nature of the prospect of engaging in potentially lethal suicidal behavior. Although the aversive nature of agitation may serve to increase an individual's distress, it alone is not sufficient in predicting suicidal behavior in the absence of requisite levels of the capability for suicide. Should the alternate view (i.e., suicide as a means of escaping aversive state of agitation) hold true, we would expect that arousal alone would result in increased suicidality. The interpersonal theory suggests that heightened states of arousal will only result in lethal or near-lethal suicidal behavior among

² For the purposes of the present project, the term "suicidality" is used to describe a subset of suicidal symptoms, including suicidal thoughts, urges, and plans, that increase risk of death by suicide.

suicidal individuals who are high on acquired capability for suicide – among those who lack the requisite levels of fearlessness about pain, injury and death and/or pain tolerance, arousal will likely serve to deter them from engaging in suicidal behavior as increased arousal might serve to increase avoidance of potentially lethal suicidal behavior. Of note, although there is an existing literature supporting a direct relationship between agitation and suicidal behavior, it is important to note that the majority of research on the role of agitation on suicidal behavior to date has been conducted with samples of participants who have died by suicide or suffered a suicide attempt. Past suicidal behavior is a strong risk factor for developing the acquired capability; as such, samples used in existing research were likely comprised of individuals who had heightened levels of acquired capability for suicide. In samples enriched with respect to the acquired capability (such as those used in past research), a main effect of arousal on suicidal behavior would be expected within the context of the interpersonal theory of suicide perspective.

In the present project, we examine the hypothesis that agitation may interact with the acquired capability for suicide to predict greater suicide risk in a large military sample of Army recruiters. Further, we believe the effects of this statistical interaction will extend beyond those of other factors known to be associated with suicidal ideation. We expect that elevated levels of agitation will be particularly dangerous for individuals who evidence high levels of acquired capability for suicide. For most individuals, the prospect of impending suicide will elicit some level of increased arousal (one form of which may be agitation). The heightened state of arousal may provide individuals high on acquired capability the energy and arousal necessary to engage in suicidal behavior; however, for individuals who evidence low levels of acquired capability, the increased arousal associated with agitation will not significantly increase risk and may, in fact, be associated with significantly less risk of engaging in suicidal behavior (see Anestis et al, 2011 for a compatible account).

Method

Participants and Setting

Participants included in the study were new Soldiers attending the Army Recruiting Course at The Recruiting and Retention School (RRS) at Fort Jackson, South Carolina. As an occupation, recruiting duty is a demanding one and some recent figures indicate that Army recruiters are a group within the military that may be particularly vulnerable to suicide. Recruiters play an integral role in the Army's recruiting mission as they

function primarily to disseminate information about personal and professional experiences in the Army to individuals interested in joining the Army. Typically, recruiters represent a unique group of individuals identified as exceptional and dedicated Soldiers who have performed well during their service. Meeting mission requirements of working with a volunteer to commit and follow through with joining the Army is difficult. Many recruiters experience a loss of confidence and may find the failure to meet the demands demoralizing. Moreover, recruiters are often also physically and socially isolated, with most being located a considerable distance from military installations. These challenges unique to recruiting are in addition to those typically experienced by most Soldiers, such as post-combat adjustment.

All new Army recruiters are required to complete a number of surveys and assessments during the recruiting course orientation. The assessments administered as part of this study were added to the original orientation protocol. The inclusion criterion used for the study was as follows: Soldiers attending the RRS at Fort Jackson, at least eighteen years of age, able to speak English, and capable of completing the informed consent process. All participants were provided informed consent prior to participation. No compensation was given for participation.

The sample consisted of 1,208 Army recruiters. As expected the sample was predominantly male (91.7%). Although the over-representation of males in this sample may raise some concerns about the generalizability of findings, use of a predominantly male sample squares well with the fact that males are at significantly higher risk of death by suicide. The ethnic/racial composition of the participants reflected the level of diversity commonly seen in the United States military. In our sample the breakdown was as follows: 66.0% Caucasian, 14.1% Black/African American, 12.9% Hispanic/Latino, 2.2 % Asian, 1.6% Native Hawaiian or Other Pacific Islander, 1.2% American Indian/Alaskan Native and 1.7% chose not to respond. About 12% of the participants identified as single and never married, 1.2% identified as engaged, 77.4% as married, 7.6% as divorced, and 1.4% chose not to respond. Ages ranged from 21 to 57 with a mean of 30.00 (standard deviation = 4.93). It is also of note that the age range and mean age of the sample are higher than many other military samples. Although historically the middle-aged age group has received relatively less attention for its suicide risk, recent trends in suicide rates suggest that rates of suicide are on the rise for middle-aged adults, particularly

middle-aged men (Hu, Wilcox, Wissow, & Baker, 2008). Inclusion of both young and middle-aged adults in the present sample is likely to be an advantage in this study as both age groups are at elevated risk of suicide.

Measures

Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008). A short version of the ACSS that is comprised of four items designed to measure the degree to which an individual reports habituation to both the fear of death and physiological pain was used in this study. Respondents are asked to rate statements measuring a sense of fearlessness (e.g. “I am not afraid to die”) and pain tolerance (e.g. “I can tolerate more pain than most people”) on a 5-point likert scale. Total scores can range from 0 – 16 with higher scores indicating higher pain tolerance as well as high fearlessness. Past research supports the construct validity and internal consistency of both the full and short versions of the ACSS (e.g., Van Orden et al., 2008; Bender et al., 2011). The alpha coefficient for the ACSS in this study was .77, indicating adequate internal consistency. The ACSS will be used as a predictor variable in the main analysis of this paper.

Brief Agitation Measure (BAM; Ribeiro, Bender, Selby, Hames & Joiner, 2011). The BAM is a 3-item self-report scale designed to measure agitation. Respondents are asked to assess how true statements of agitation (e.g., “Recently, I feel so stirred up inside I want to scream”) are to them on a 7-point likert scale. Total scores can range from 3 – 21 with higher scores associated with higher levels of agitation. A study by Ribeiro and colleagues (2011) provided support for the BAM as having both internal consistency and strong preliminary validity. In the present study, the internal consistency of the scale was adequate with an alpha coefficient of .84, quite satisfactory for a three-item scale. BAM total score will be entered as a predictor variable in the main analyses of this project.

Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012). An abbreviated version of the INQ was used in the present study. The INQ is comprised of two independent subscales designed to assess the two interpersonal states (i.e., thwarted belongingness and perceived burdensomeness) thought to contribute to suicidal desire, according to the interpersonal theory of suicide. The INQ-Thwarted Belongingness subscale uses four self-report items designed to measure the extent to which an individual feels he or she lacks meaningful interpersonal connections in his or her life. Participants are asked to assess how true belongingness statements (e.g., “These days, I am close to other people”) are to them on a 7-point likert scale. Range of total

scores is 4 – 28 with higher scores corresponding to greater thwarted belongingness. The INQ-Perceived Burdensomeness is a four-item self-report subscale designed to measure the severity of perceived burdensomeness. Participants are asked to assess how true statements such as “These days I feel like a burden on the people in my life” are to them on a 7-point likert scale. The INQ and both its constituent subscales have demonstrated sound psychometric properties consistently in past work (e.g., Van Orden et al., 2008; Van Orden et al., 2006). In this study, the internal consistency of both subscales was strong with coefficient alphas of .90 and .86 for the INQ-Thwarted Belongingness and INQ-Perceived Burdensomeness respectively. The correlation between the scales in this sample was low-to-moderate (.34, $p < .05$), which is in line with past research using the full version of the INQ that indicates that the scales are correlated but not redundant (e.g., Van Orden et al., 2012). Both subscales will be entered into the analyses as covariates.³

Suicide Cognitions Scale (SCS; Rudd et al., 2008). The version of the SCS used here consists of ten self-report questions devised to measure suicide-specific hopelessness including helplessness, unlovability and poor distress tolerance. The SCS requires participants to rate statements such as “Nothing can help solve my problems” on a 5-point likert scale. Scores range from 10 – 50 with higher scores signifying higher levels of suicide-specific hopelessness. Past research using the SCS provides some evidence for the scale’s sound psychometric properties, including strong internal consistency and construct validity (e.g., Jahn, Cukrowicz, Linton, & Prabhu, 2011; Slee, van der Leeden, Arensman, & Spinhoven, 2008; Slee, Garnefski, Spinhoven, & Arensman, 2008). The alpha coefficient for the SCS in the present sample was .82, indicating adequate internal consistency. SCS total score will be entered as a covariate in our analyses. It is worth noting that the content of several SCS items directly references suicide, and therefore is conflated, at least to a degree, with most suicidal outcome variables, including the DSI-SS. Therefore, the SCS in the present study represents a particularly stringent covariate for our analyses.

Depressive Symptoms Index – Suicidality Subscale (DSI-SS; Metalsky & Joiner, 1997). The DSI-SS is a 4-item self-report scale designed to assess the degree and severity of suicidal thoughts as well as plans

³ Analyses testing specific aspects of the interpersonal theory of suicide are possible with these data; however, those analyses go beyond the scope of the current project, the intention of which is to examine the unique contribution of the interaction between agitation and acquired capability to suicide risk, beyond the effects of stringent covariates. All findings reported here remain when interpersonal theory variables and interactions are controlled.

and impulses for suicidal behavior. For each question, participants are asked to respond using a four-point likert scale with total scores ranging from 0 – 12. Higher scores on the DSI-SS indicate greater severity of suicidality. DSI-SS total scores will serve as the main outcome measure in the current analyses. The DSI-SS has been shown to have strong psychometric properties as a measure of suicidality (Joiner et al., 2002; Ribeiro, Braithwaite, Pfaff, & Joiner, 2012). In the present study, the DSI-SS had an alpha coefficient of .60. The attenuated coefficient alpha in this sample is worth discussing, given the DSI-SS has repeatedly demonstrated strong internal consistency (e.g., Joiner et al., 2002; Ribeiro et al., 2012; Pfaff, Almeida, Witte, Waesche, & Joiner, 2006). Given the sample, the lower alpha of the present project may be influenced by Soldiers potentially withholding information about the extent or severity of suicidal symptoms on some DSI-SS items⁴. Importantly, the fact of somewhat low reliability should make effects harder not easier to detect, and as reported next, predicted effects emerged.

Results

Preliminary Analyses. Means, standard deviations, and intercorrelations for the variables used in these analyses are presented in Table 1. As expected, perceived burdensomeness, thwarted belongingness, agitation, and suicidal cognitions were all significantly associated with each other as well as DSI-SS suicidality scores. The strongest association with the DSI-SS was with suicidal cognitions as measured by the SCS, which was in the moderate-to-strong range ($r = .51, p < .001$). This is not surprising given the content of the items included in the SCS, which includes direct references to suicidal thoughts. All other associations fell in the low-to-moderate range. As is consistent with the interpersonal theory, acquired capability (as measured by the ACSS) failed to demonstrate a significant zero-order correlation with DSI-SS scores (and only evidenced a very modest association when entered as a main effect into the regression model; see Table 2). This finding is in line with the interpersonal theory of suicide because, according to the theory, the acquired capability for suicide is distinct from suicidal ideation and should only be predictive of suicidal behavior when experienced in conjunction with suicidal desire. As such, we would expect very modest (if any) associations with outcomes

⁴ Consistent with the possibility of under-report, analyses examining response frequency and item-level correlations of the DSI-SS items indicated that endorsement of Item 2 was rare and its associations with the other items of the DSI-SS were all very modest or non-significant. Item 2 of the DSI-SS directly assesses the development of a plan for suicide, which may conceivably result in more intensive intervention if endorsed as compared to the intervention that might be indicated by endorsing suicidal ideation or ability to control suicidal urges in the absence of a plan for suicide. Alpha increased to close to .70 when it was recalculated for the items of the DSI-SS omitting Item 2.

related to suicidality, just as we found here. Scores on the DSI-SS are also of note. The mean and standard deviation of the scale were lower than what has been documented in past research. Although this may well be accurate given that recruiters are selected because of their relatively high functioning, it is also possible that this is an indication of under-reporting.

Acquired Capability, Agitation, and Their Interaction as Predictors of Suicidality. Hierarchical multiple regression was used to examine the effect of the interaction between agitation and acquired capability for suicide on suicidality, controlling for the effects of thwarted belongingness, perceived burdensomeness, and suicidal cognitions. In the first step, SCS scores as well as scores on the thwarted belongingness and perceived burdensomeness subscales of the INQ were entered. Agitation (BAM total scores) and acquired capability (ACSS total scores) were entered into the analysis as predictors in the second step, and the interaction between ACSS and BAM scores was entered in the third. Results indicated that the model as a whole was significant ($F[6, 1201] = 78.23, p < .001$), explaining 27.7% of the variance in DSI-SS suicidality scores. As expected, the influence of the covariates was strong accounting for a significant proportion of the variance in DSI-SS in the first step of the model. In the second step, acquired capability evidenced a significant main effect ($\beta = .005, p = .04, \text{partial } r = .07$), which, in line with the interpersonal theory's proposition, was modest in magnitude. Also consistent with the perspective of the interpersonal theory of suicide (and in contrast to alternative perspectives discussed above), the main effect of arousal failed to evidence a significant main effect on DSI-SS scores ($\beta = -.001, p = .66$). With respect to the joint influence of agitation and acquired capability, results were also in line with our a priori hypotheses: the statistical interaction of agitation and acquired capability remained significant, even after accounting for the main effects of BAM and ACSS scores as well as the effects of INQ-Perceived Burdensomeness, INQ-Thwarted Belongingness and SCS scores ($\beta = .003, p < .001, \text{partial } r = .13$). The interaction accounted for 1.1% beyond the main effects of acquired capability and agitation as well as the effects of suicidal cognitions, belongingness and perceived burdensomeness, which accounted for 26.6% of the variance (see Table 2 and Figure 1).

To interpret this interaction, we assessed the simple effect of agitation among individuals high (1 SD above the mean) and low (1 SD below the mean) in acquired capability ($M = 9.53, SD = 3.28$). As anticipated, among individuals high on acquired capability, as agitation increased, suicidality also increased ($\beta = .009, p = .02$,

partial $r=.14$). Among individuals low on acquired capability, as agitation increases, DSI-SS scores decrease, when controlling for belongingness, perceived burdensomeness, and suicidal cognitions ($\beta=-.012$, $p=.002$, partial $r=.13$).

Discussion

The interpersonal theory of suicide suggests that most individuals who develop suicidal desire will not die by suicide because of the difficulties inherent in engaging in suicidal behavior. Because lethal suicidal behavior is innately fearsome and often physically painful, in order to engage in suicidal behavior individuals must also develop the capability to do so. Nevertheless, confronting any potential threat to survival will result in increased arousal. Converging evidence indicates acute states of heightened arousal are commonly observed in the short time period preceding deaths by suicide – this would be consistent with the proposition that suicidal behavior is daunting and requires energy. The guiding hypothesis of the present work was that heightened states of arousal would serve to facilitate suicidal behavior, particularly among individuals who are high on acquired capability. The present project was designed to test this hypothesis. Results were in line with a priori hypotheses.

As expected, suicide risk increased as a function of the interaction between acute agitation and acquired capability, such that risk was highest among individuals who were both high in self-reported acquired capability and agitation. Importantly, in light of our conceptualization, for individuals endorsing low levels of acquired capability, increasing levels of agitation were associated with lower suicide risk as measured by the DSI-SS. The effect of the statistical interaction between agitation and acquired capability held beyond the main effects of agitation and acquired capability as well as the effects of strong covariates associated with suicidal desire – namely, thwarted belongingness, perceived burdensomeness, and suicidal cognitions.

Prior to discussing the implications of these findings on research and practice, several limitations are worth noting. One limitation of the present project is that our assessments were limited to self-report and therefore subject to self-report biases. This may be particularly relevant for certain populations where stigma about mental health is well-documented, such as within the military (Kim et al., 2011; McFarling et al., 2011). In the present sample, for instance, the attenuated mean, standard deviation, and coefficient alpha associated with the DSI-SS may be indicative of biased self-report. Multiple methods of measurement, such as behavioral

or clinical interview assessments coupled with self-report, would be ideal in future studies. Relatedly, the outcome measure used to index suicide risk can be improved. For the present project, we used an index of suicidality that includes questions about current suicidal thoughts, plans, and urges to act. As our argument holds that acquired capability and agitation may function to increase the likelihood of suicidal behavior, examining the influence of the relationship on suicidal behavior (e.g., preparations, attempts, death) per se would be optimal. Further, the findings from the present research are cross-sectional, precluding any causal inferences. Prospective and experimental study designs may clarify the direction of causality of the relationship between suicide risk, acute agitation, and acquired capability. Lastly, because the sample is predominantly male and drawn from a military population, it is unclear whether findings will generalize outside of the present sample. Studies designed to replicate these findings in samples that are more representative of the general population are necessary. It should be noted, however, that there are several advantages of this sample. In particular, it is enriched with respect to several salient risk factors (i.e., military background, predominantly male, not exclusive to young adults). Using an enriched sample such as the one of the present paper often increases the likelihood of identifying findings relevant to high risk populations that share similar risk factors for death by suicide.

The present study adds to and extends the existing empirical literature base documenting a link between agitation and suicide. Although the link was well-documented, theoretical explanations that offered strong explanations for why the link exists are limited. The present project was designed to address this gap in the literature, offering evidence in support of a novel perspective that extends the propositions of the interpersonal theory of suicide. In addition to adding to the construct validity evidence of the link between agitation and suicide, it further clarifies the nature of that link by offering evidence for the moderating role of acquired capability. Beyond further clarifying the role agitation may play in suicide, the current study also adds to the construct validity of the acquired capability for suicide as well as the theory's proposition that suicidal behavior is difficult and requires energy to enact.

At first blush, finding that the interaction between acquired capability and agitation significantly predicts an outcome measure mostly composed of items assessing suicidal thoughts may seem inconsistent with the main tenets of the interpersonal theory of suicide, as the theory would hold that acquired capability should only

be associated with outcomes of suicidal ideation when in the presence of the risk factors for suicidal desire – perceived burdensomeness and thwarted belongingness. In the present paper, we controlled for the influence of variables thought to contribute to suicidal ideation and found evidence that the interaction of acquired capability and agitation explained a significant amount of variance in the outcome. It is important to note, however, that the items that comprise the DSI-SS not only assess ideation but suicidal plans as well. Previous research has repeatedly demonstrated that suicide risk can be differentiated into two separable underlying factors – suicidal desire/ideation and resolved plans/preparation (Joiner et al., 1997; Witte et al., 2006). Resolved plans and preparation is defined in part by an elevated intent to engage in suicidal behavior (Joiner et al., 1997) and shown to be predictive of later death by suicide (Harriss, Hawton, & Zahl, 2005). According to Van Orden and colleagues (2010), individuals who evidence suicidal intent must have habituated to the fear involved in suicide to the degree necessary to formulate a plan and engage in suicidal behaviors. As DSI-SS total scores incorporate both desire and planning aspects jointly, the relation with outcomes on the DSI-SS and ACSS scores particularly when considered in the context of arousal is certainly possible and consistent with the tenets of the theory. Moreover, there has also been some evidence to suggest that mental rehearsal of suicidal thoughts may contribute to the acquired capability for suicide (Selby, Anestis, & Joiner, 2007); however, as we did not assess for level of mental rehearsal in the present study, it remains a question open for further empirical study.

Further, although alternative perspectives may suggest that suicidal behavior is used to escape agitation, our findings do not support this conceptualization. In the event that risk of suicide were to increase as a function of increasing agitation alone, we would expect the main effect of agitation to be significant beyond the effects of the other predictors in the model, which was not the case in the present study. Instead, the effect is moderated by level of acquired capability for suicide such that agitation is most dangerous for individuals high on the acquired capability for suicide. It is also notable that a significant effect was observed for individuals low on acquired capability such that increased arousal was associated with significantly less suicidality. This effect is highly consistent with the interpersonal theory of suicide's conceptualization of the agitation-suicide link but difficult to account for using theories that suggest that individuals engage in suicidal behavior to escape the distress associated with agitation.

With respect to implications for clinical work, our findings indicate that agitation may be an important target for risk assessment. Beyond having a clear link to suicide, agitation has limited face validity with respect to its suicide risk. Because of this, it may be a particularly informative assessment target, especially among high-risk individuals who may be unable or unwilling to disclose information about suicidal ideation or intent. Several studies have reported that many suicide decedents fail to directly communicate suicidal intent in the days and weeks preceding their deaths (Isometsä, Heikkinen, Marttunen, & Henriksson, 1995), even when directly questioned about suicidal symptoms (Busch & Fawcett, 2004; Busch et al., 2003). In settings where stigma about mental health symptoms is common, incorporating the assessment of risk factors with limited face validity, such as agitation, may be useful. One such setting is within the military, for instance, where stigma about mental health is well-documented (Kim et al., 2011) and acquired capability is likely high, given that combat exposure has been shown to confer risk for its development (Bryan et al., 2010).

The findings of the present research have important implications for treatment planning as well. According to our results, agitation may be particularly dangerous among individuals who are high on the acquired capability for suicide. Based on the interpersonal theory's conceptualization, treating or reducing an individual's level of acquired capability for suicide may be difficult and time-intensive, as it would require reversing an individual's learned associations about pain, injury, and death (Van Orden et al., 2010). Acute agitation, by contrast, is time-limited and modifiable (Fawcett et al., 1990). Therefore, should agitation arise, particularly among individuals who likely are higher on acquired capability, it may be prudent to prioritize the treatment of the acute agitation. When agitation is severe, pharmacological interventions are indicated, including time-limited use of benzodiazepines, atypical antipsychotics, or their combination (Battaglia, 2005). Non-pharmacological techniques, like increased and intensive activity (e.g., exercise) followed by a relaxing activity or an activity that is not over-stimulating, may be useful for less extreme states of agitation; however, this has yet to be directly tested empirically. When agitation is severe or extreme, monitoring and managing the agitation in a hospital setting may be indicated in order to ensure safety.

In sum, the present research represents an initial effort evaluating the link between agitation and suicidal behavior through the lens of the interpersonal theory of suicide. The preliminary evidence gathered in the present study suggests that the combination of agitation with high levels of acquired capability may be a

particularly dangerous state with respect to suicide risk. There is a need for more research further elaborating our understanding of this association and we look forward to prospective and experimental designs that are able to further refine our understanding of the association between imminent suicide risk, agitation, and the acquired capability for suicide.

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Table 1
Means, Standard Deviations, and Inter-correlations

	1	2	3	4	5	6
1. ACSS	1.00					
2. BAM	.02	1.00				
3. INQ-Perceived Burdensomeness	-.01	.37**	1.00			
4. INQ-Thwarted Belongingness	-.07*	.34**	.36**	1.00		
5. SCS	-.03	.40**	.60**	.33**	1.00	
6. DSI-SS	.04	.22**	.38**	.23**	.51**	1.00
Mean	9.53	4.35	4.45	7.12	10.32	.03
Standard Deviation	3.28	2.50	1.78	4.38	1.50	.26

Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.

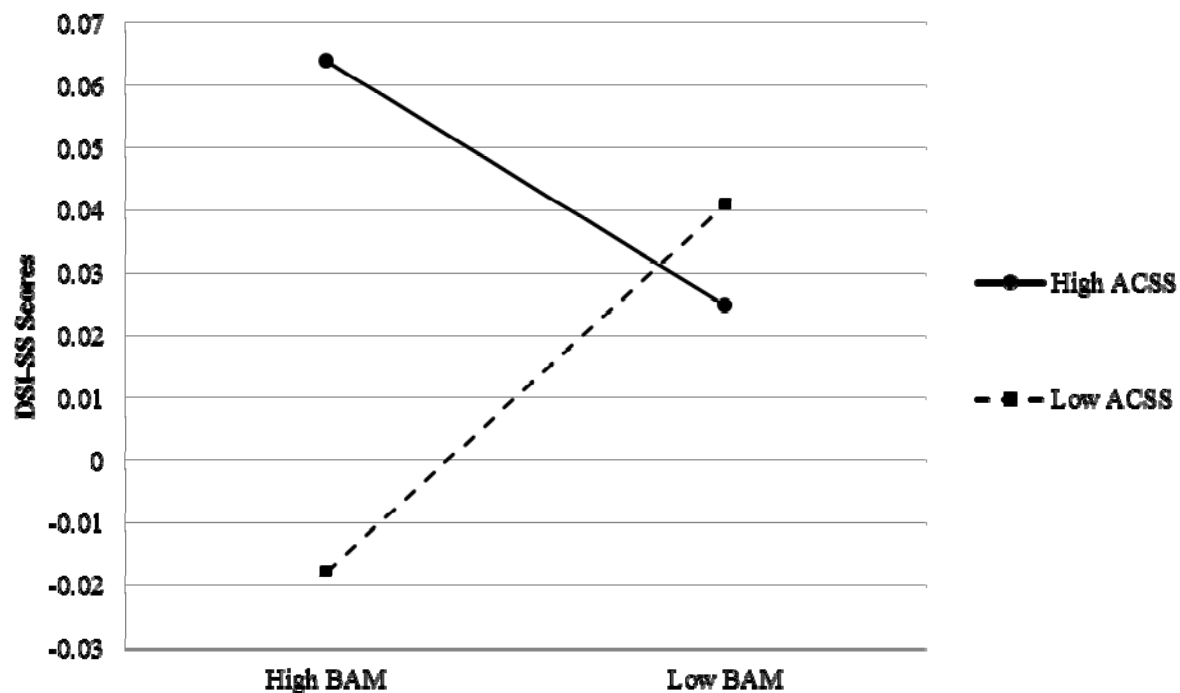
Table 2

	R^2	β	t	p
Step 1	.516			
INQ-Thwarted Belongingness		.014	3.18	.002
INQ-Perceived Burdensomeness		-.003	-1.89	.06
SCS		.073	13.75	<.001
Step 2	.519			
BAM		-.001	-.43	.66
ACSS		.005	2.40	.04
Step 3	.530			
ACSS X BAM		.003	4.36	<.001

Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.

Figure 1

Interaction of BAM and ACSS scores predicting DSI-SS scores, Controlling for INQ-Thwarted Belongingness, INQ-Perceived Burdensomeness, and SCS scores



Note. ACSS = Acquired Capability for Suicide Scale; BAM = Brief Agitation Measure; INQ = Interpersonal Needs Questionnaire; SCS = Suicide Cognitions Scale.