

Author Manuscript

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/sltb.12537](https://doi.org/10.1111/sltb.12537)

This article is protected by copyright. All rights reserved

Article type : Original Article

Corresponding author mail-id : blowa@msu.edu

**Intimate Relationships Buffer Suicidality in National Guard Service Members: A
Longitudinal Study**

Adrian J. Blow, PhD, Michigan State University.

Adam Farero, MS, Michigan State University.

Dara Ganoczy, MPH, Veterans Health Administration

Heather Walters, MS, University of Michigan

Marcia Valenstein, MD, University of Michigan

Suicide and attempted suicides are a large public health problem in the United States (U.S.), a problem that continues to grow (Caine, 2017). Suicide is one of the top ten causes of death within all age groups (Curtin, Warner, & Hedegaard, 2016), and suicide rates have all increased since 2000 (Olfson, Blanco, Wall, & et al., 2017). The percentage of U.S. adults making a suicide attempt increased from 0.62% in 2004-2005 to 0.79% in 2012-2013 (Olfson et al., 2017). Men are three times more likely than women to die of suicide (Curtin et al., 2016). Along with the loss of life, suicide brings significant financial costs (approximately 56.9 billion dollars a year) and substantial emotional distress to family members left behind (CDC, 2017).

Suicide in Military Populations

Suicide rates by current and past members of the U.S. military are high. One VA study estimated that in 2014, twenty Veterans died by suicide each day (Office of Suicide Prevention, 2016). Even though Veterans only comprise 8.5% of the U.S. adult population, they account for 18% of deaths by suicide in adults in the U.S. (Office of Suicide Prevention, 2016). The risk for suicide among Veterans is 21% higher than civilians, taking into account differences in age and sex (Department of Veterans Affairs, 2016), and the rates of Veteran suicides have grown over the last decade (Hyman, Ireland, Frost, & Cottrell, 2012; Ramchand, Acosta, Burns, Jaycox, & Pernin, 2011). Younger male Veterans (ages 18-29) are at the highest risk for suicide, while Veterans over the age of 60 represent the lowest risk (Office of Suicide Prevention, 2016).

While the above data describe Veterans in general, rates and characteristics of suicide may be different for those who are still active in the military or who have recently separated from service. In one in-depth review of suicide that includes a focus on soldiers who are still active duty, Nock and colleagues (2013) show that since 2005, rates of suicide among active

duty soldiers have been increasing at alarming rates, surpassing suicides in civilian populations in 2008.

Suicide rates are high among both active duty and the National Guard and Reserves (Reserve Component), with 2016 data showing that there were 275 completed suicides in the active component and 203 in the reserve component (Franklin, 2016). Given that the active component is comprised of approximately 500,000 more personnel, these numbers suggest that the reserve component risk for suicide is equal to or higher than active duty.

Many reasons are provided in the literature for the high rates of suicide in military populations. In civilian populations, risk factors for suicide and suicidal thoughts vary and include depression, posttraumatic stress disorder, anxiety, economic challenges, lower levels of education, antisocial personality disorder, borderline personality disorder, substance use disorders, not being in a stable relationship, low levels of social support, and a history of violent behavior (Gunnell, Harbord, Singleton, Jenkins, & Lewis, 2004; Olfson et al., 2017). In military-connected populations, similar reasons account for higher suicide rates including economic issues, underlying mental health difficulties (posttraumatic stress disorder and depression in particular), relationship problems, and an accumulation of life stressors (Franklin, 2016; Griffith, 2012, 2017; Office of Suicide Prevention, 2016). Pietrak et al. (2010) studied suicide risk and protective factors in soldiers deploying in Operations Enduring Freedom and Iraqi Freedom. They concluded that those with increased psychosocial difficulties were at higher risk for suicidal thoughts, while increased social support and a strong sense of purpose were protective of suicidality. Another study supported this finding in active duty personnel with a PTSD diagnosis, concluding that interpersonal support specifically was protective for suicidal ideation (McLean et al., 2017). Studies suggest that combat exposure alone does not differentiate those who attempt

and do not attempt suicide in the military; there are other factors at play (Bryan, Hernandez, Allison, & Clemans, 2013; Bush et al., 2013; Schoenbaum et al., 2014). One study looked at the timing of suicide post deployment for service members and found risks were highest around five months after return from deployment (Ursano, Kessler, Stein, & et al., 2016).

Studies have examined risk factors for suicide in National Guard service members specifically. Griffith's review of suicides in the Army National Guard included an in-depth look at 706 suicides between 2007 and 2014 (Griffith, 2017). He concluded that risk factors for the National Guard are similar to those of active duty soldiers. Those at risk included younger, male, white service members. Strong predictors of National Guard suicides included a variety of factors such as substance abuse, poor performance in the military, mental health problems, income and employment stress, and parent-family relationship problems. Griffith defined parent-family relationship problems broadly as "parent-child discord, partner problems, loss, or recent death" (p. 5), and he concluded that these family problems/conflicts were among the top cited difficulties associated with these suicides, present in 28% of the cases. A different study focused on suicidal thoughts and behaviors in National Guard members specifically, and concluded that individuals knowing people who died by suicide were themselves at higher risk for recent suicidal thoughts (Bryan, Cerele, & Bryan, 2017). This is consistent with other studies that show the contagion of suicidality in military units (Hoge, Ivany, & Adler, 2017; Ursano, Kessler, Naifeh, & et al., 2017). Multiple factors have been associated with the timing of post-deployment suicides among National Guard service members. Griffith and colleagues (2017) recently reported that National Guard suicide deaths were more likely to occur within the first year after returning from deployment in younger, single, and lower ranking service members. National

Guard members who were slightly older, married, and higher ranking were more likely to die from suicide a year or more following deployment (Griffith et al., 2017).

Mental Health Difficulties and Suicide Vulnerability in the Military

Nock and colleagues (2015) suggest that one reason suicides have been increasing in military populations is because mental health difficulties have also been increasing in this population. In National Guard populations, the focus of this study, mental health challenges are present at comparable rates to those of active duty in the post-deployment time period, and these individuals may have difficulty getting access to effective mental health treatments (Blow et al., 2013; Gorman, Blow, Ames, & Reed, 2011; Valenstein et al., 2014). The presence of mental health difficulties is a vulnerability risk factor for suicide, while mental health treatment, on the contrary, is a protective factor (Nock et al., 2013). One study of National Guard members, shortly after return from deployment, showed that up to 40% of National Guard members met the criteria for one or more of the following mental health difficulties: post-traumatic stress disorder (PTSD), depression, suicidal ideation, and hazardous alcohol use (Gorman et al., 2013).

Although anxious/agitated disorders such as PTSD are related to the transition from suicide ideation to attempt (Nock et al., 2010; Nock et al., 2009), many National Guard members experience a variety of barriers to mental health care, including a lack of nearby services, stigma surrounding treatment, and fear of career repercussions (Valenstein et al., 2014). These barriers can prevent National Guard service members from receiving the treatment they need, and consequently put them at higher risk for suicide.

Interpersonal Support is Protective for Suicide

Mental health symptoms in returning soldiers leads to increased stress, resulting in them feeling trapped, and not seeing any course of action that will provide relief from their problems.

They may feel powerless and may consider suicide as a viable option. Studies suggest that interpersonal support, which can appear in a variety of forms, is protective for outcomes such as suicide (Cohen, 2004). Cohen (2004) has written extensively on the association between both positive and negative relationships and physical and mental health outcomes. His work suggests that supportive interpersonal relationships can serve as a buffer for suicide, especially when there is a positive social context and high levels of social support. In the same way, the absence of support, such as when negative interpersonal relationships exist, could be a catalyst leading to a suicide attempt. Feelings of isolation and loneliness can have a negative impact on health and wellbeing (Cacioppo et al., 2002; Cohen, 2004; Gerst-Emerson & Jayawardhana, 2015; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). Cohen (2004) suggests that both the quality and quantity of support received is important to our wellbeing. His work describes a process by which relationships are protective. First, support buffers stress by providing both physical and psychological resources that help an individual cope with stressors. Second, social relationships provide a social integration that allow an individual to have a wider engagement in social activities along with an increased sense of community and belonging. This social integration creates social pressure on an individual to take better care of his or herself, i.e., being socially connected is influential in helping an individual engage in more positive health behaviors. Cohen (2014) suggests that the “stress-buffering model is supported by an interaction of stress and social support” (p. 677). In this regard, support interacts with the stressor and buffers the individual from negative outcomes. Cohen suggests multiple supports are not necessary to help an individual; the perception that at least one significant reliable source will provide support in the face of a life stressor is sufficient (see Cohen 1988; 2004; Cohen & Wills, 1985).

We propose in this study that the significant intimate relationship can serve as one key buffer to the stress of living with mental health conditions such as PTSD, depression, or anxiety at the same time a National Guard service member endures the stress of reintegrating back into civilian and family life post deployment. Cohen suggests that the belief that another will provide necessary coping resources “may bolster one’s perceived ability to cope with demands, thus changing the appraisal of the situation and lowering its effective stress” (p. 677). This perception of support can change how an individual chooses to respond to the stressful event, including avoiding behavioral responses that are destructive or maladaptive. A positive intimate relationship can provide support in finding solutions to post-deployment stress, providing a distraction from the stress, or providing more life meaning that serves as a motivating force in the face of stress. In short, the studies by Cohen and colleagues conclude that key social supports serve a stress-buffering role through “promoting less threatening interpretations of adverse events and effective coping strategies” (p. 677).

Baumeister (1991) is another scholar who discusses the importance of social context in providing meaning to the lives of individuals. In his model, meaning provides life purpose and related values that can serve as a deterrent to suicide. When our lives have meaning, in his view, we are compelled to view our lives as inherently worthy and valuable, and ideally, to believe that others see us in the same positive light. One’s intimate family relationships are an inherent part of this meaning system as one’s pursuit of meaning almost always occurs within these types of social contexts. The loss of connection in these relationships can have an adverse effect in terms of life meaning including one’s values, purpose, self-worth, and efficacy. Baumeister suggests that the loss of social inclusion can have a negative impact on one’s sense of meaning and in this regard, can affect one’s capacity for self-regulation in the face of stress (Baumeister, 1991).

Durkheim (1897) explained the relationship between marital status and suicide using the idea of social integration. In his view, social integration refers to how strong an individual perceives his/her ties to society and how stable his/her social relationships are within society. Sudden shifts in social relationships can lead to increased tendencies toward suicidality. In describing Durkheim's work, Kposowa (2000) suggests that along with a marriage/committed partnership comes a feeling of cohesiveness and support that those who are not in stable intimate relationships do not experience. This sense of cohesion and support is protective for suicide, but is also a potential catalyst for suicide when these relationship bonds fall apart.

The Interpersonal Theory of Suicide

The interpersonal theory of suicide (Joiner, 2005) provides another explanation for the connection between suicidal thoughts and behaviors and interpersonal relationships. This theory proposes that individuals are more suicidal if they experience two variables, thwarted belongingness and perceived burdensomeness. Thwarted belongingness occurs when an individual feels alone or that he or she does not belong to a social group. Belonging is an important need in humans (Chu et al., 2018), and when this is impaired in some way, individuals do not always respond favorably. In an intimate relationship, this could occur when an individual feels unimportant, unloved, unwanted, or left out by a partner or spouse. Individuals high in thwarted belongingness experience "loneliness and the absence of reciprocal care" (Chu et al., 2018, p. 1314). In a relationship this could occur when, for example, a partner fails to meet one's needs or does not seem to care about one's needs. Chu and colleagues (2018) hypothesize family conflict is one dimension of thwarted belongingness. The second key construct in the interpersonal theory of suicide is perceived burdensomeness, which occurs when an individual views him/herself as burdensome to others to the extent that these individuals believe that their

death would be less of a burden than their continued living. Individuals who view their burdensomeness in this way are at higher risk for taking their own lives. The post-deployment period is a time of high stress and as noted earlier, suicide rates peak at around five months after a deployment has ended. We hypothesize that soldiers who feel valued by their family members after a deployment would do better than those who felt left out and that they were a burden to their loved ones. Joiner (2005) also argues that suicide involves an individual feeling a sense of hopelessness that their situation could actually change in the future.

Intimate Relationship Difficulties and Suicide

A growing body of literature supports the association between intimate relationship difficulties and mental health problems including depression, anxiety, alcohol use disorders, and suicidal behaviors (Beach & Whisman, 2012; Whisman & Baucom, 2012; Whisman & Uebelacker, 2006). Longitudinal studies have demonstrated an association between decreases in relationship quality and increases in symptoms of depression (Davila, Karney, Hall, & Bradbury, 2003; Kouros, Papp, & Cummings, 2008). One study of African American women showed that marital discord was one of two predictors of suicide attempts (child sexual abuse was the other predictor) (Kaslow, Thompson, Brooks, & Twomey, 2000). A systemic review of the literature by McLaughlin and colleagues (2012) concluded that there was a strong association between abuse in an intimate relationship and suicidal thoughts and behaviors. The directionality of the relationship between relationship difficulties and mental health concerns is debated in the literature with scholars concluding that the influence is in a reciprocal, bidirectional manner (see Beach & Whisman, 2012). One study of National Guard members and their spouses shortly after a deployment showed that depression, in particular, was a predictor of negative relationship wellbeing for both service members and their spouses (Blow et al., 2013).

Relationship separation and divorce have also been linked to suicidal behaviors. One study found that separation in a marital relationship represents a high risk for suicide (Wyder, Ward, & De Leo, 2009). A study (Bush et al., 2013) of suicide in the U.S. military concluded that in 30% of cases, relationship failure occurred in the 30-day window prior to a suicide attempt. The authors of this study determined that suicide risk doubles when there is a history of partner relationship difficulties. This finding mirrors that of civilian studies, which show that a severe intimate relationship disruption such as a separation (break-up or divorce) is strongly related to suicide attempts (Cheung, Law, Chan, Ka Yuet, & Yip, 2006; Kazan, Calear, & Batterham, 2016). One study by Kposowa (2000) showed that divorce and marital separation were both strongly related to suicide risk, especially for men. This study concluded that individuals with these types of relationship difficulties were more than twice as likely to take their own lives when compared to those who were married. In a review of 51 studies detailing the relationship between intimate partner problems and suicidality (Kazan et al., 2016), the authors concluded that both relationship separation and poor relationship quality were risk factors for suicidal behaviors and ideation. This review suggested that intimate relationships could be both protective from suicidality as well as a predictor of suicide.

Current Study

In this study, we focus on intimate relationships and suicidality, and propose that healthy relationships are protective in National Guard service members, when it comes to suicidality. Despite the understanding that the interpersonal theory of suicide provides, and the growing literature, which shows an association between relationship difficulties and suicide, there has not been enough exploration of the role of intimate relationships in suicidality in members of the military post-deployment. In particular, there is a need for longitudinal studies of National Guard

service members during the post-deployment period, the focus of this study. For National Guard soldiers, unique stressors characterize the reintegration and post-deployment period. Upon returning home these individuals are required to reenter the work force or regain employment, renegotiate family roles, and reestablish intimacy in their romantic relationships, all while possibly navigating the challenges of PTSD, depression, or other mental health difficulties. A strong relationship provides a critical sense of belonging and motivation to move forward during this time of transition. On the contrary, if the relationship is struggling, a soldier could question his or her sense of purpose and value, and may be more at risk for engaging in suicidal behaviors as a result.

Through the lens of interpersonal theory, it is highly conceivable that service members, especially those who are struggling with mental health issues post deployment, could come to view themselves as not having value (belonging) in their intimate relationships. When things are not going well, especially when a mental health condition is present, they could also view themselves as highly burdensome to their intimate partners. If these variables are present, these soldiers would be more at risk for engaging in suicidal behaviors. In contrast, if an individual perceives him or herself as not burdensome, but rather as important to an intimate partner, this could serve as a deterrent to thoughts of suicide. While numerous studies now exist looking at the interpersonal theory as related to suicide risk, we could find few studies that looked at family relationship variables, specifically the role of a strong intimate relationship, as a buffer of suicide risk in a National Guard sample. Given the importance of an intimate relationship in one's life, we assert that the quality of an intimate relationship would be particularly important for National Guard service members post deployment.

Purpose

We examined the associations between mental health symptoms (depression, anxiety, and PTSD), relationship satisfaction, and suicidality among National Guard members at 6 months post deployment. We also assessed the longitudinal impact of 6-month mental health symptoms and relationship satisfaction on 12-month suicide risk. We examined whether relationship satisfaction served as a protective factor for soldiers who were struggling with their mental health symptoms at 6 months. Based on previous findings that the presence of mental health difficulties are a suicide vulnerability factor, and that a positive family/intimate relationship can be a protective factor for suicide risk (Nock et al., 2013), we hypothesized that soldiers with worse mental health and lower relationship satisfaction six months after returning home from deployment would have a higher risk of suicide 12 months post deployment. Additionally, we hypothesized that the associations between 6-month mental health symptoms and 12-month suicide risk would be moderated by relationship satisfaction. In this way, we were able to examine one aspect of Cohen's (2004) stress-buffering model for suicide, by exploring the interaction of mental health stress and the presence of a supportive intimate relationship.

Method

Procedures

Soldiers from the National Guard residing in a Midwestern state in the US were recruited for the study. These soldiers had all recently returned home from a deployment to either Iraq or Afghanistan. The deployments occurred between August 2010 and July 2013. The soldiers who deployed to these countries were approached at drill weekends and asked to participate in the study. When soldiers were not present on drill weekends for some reason, they received several surveys by mail per the Dillman protocol (Dillman, Smyth, & Christian, 2009). Soldiers were assessed on two occasions, at 6 and 12 months after they returned home, with 1,474 soldiers

completing a survey at 6 months and 1,448 at 12 months. 968 individuals completed the survey for both waves. This constituted response rates of 55% at 6 months and 51% at 12 months.

Soldiers were asked to respond to questions/measures related to mental health and wellbeing as part of a larger study of their experiences in a peer outreach program (Valenstein et al., 2014). The Department of Veterans Affairs Ann Arbor Health System Institutional Review Board approved data collection. Data were collected under an approved waiver of written informed consent.

Participants

There were 712 soldiers who were included in this study. These were soldiers who were in a committed relationship, and who completed both the Couple Satisfaction Index measure and the suicide questions. The majority of the respondents were Caucasian (85.5%) and male (92.3%). A sizeable portion of the sample (72.3%) reported being married, while 5.1% were cohabiting, and another 22.6% were in another type of relationship (e.g., committed but not living together). Most of the participants were in the 22-40 age range (approximately 65%), and about 79% had completed high school and some college. The majority earned less than \$75,000 annually, with \$25,001 to \$50,000 being the most commonly reported income bracket (35%). In terms of military rank, 37.6% were E1-E4, 36.9% E5-E6, 12.1% E7-E9, 6.9% O1-O3, 3.8% O4-O9, and 2.7% WO1-5. See Table 1 for complete sample demographics and descriptive statistics.

Measures

Suicide risk. This variable was measured using the Suicide Behavior Questionnaire-Revised (SBQ-R). This questionnaire includes four items, each of which assesses a different dimension related to suicide. These dimensions include lifetime suicidal ideation and/or suicide attempts, the amount of suicidal ideation over the past 12 months, the likelihood of a suicide

attempt, and the chances of suicidal behavior occurring in the future. SBQ-R responses range from 3 to 18, with higher scores indicating increased suicide risk (Osman et al., 2001). The internal consistency of SBQ-R in our study sample was adequate, with Cronbach's alpha of .77 at 6 months and .77 at 12 months.

Depression. This variable was assessed using the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001). The PHQ-9 has good construct validity and reliability as a measure of symptoms of depression in the general population (Martin, Rief, Klaiberg, & Braehler, 2006). The PHQ-9 is a short measure in which participants respond to 9 questions related to how often they have been bothered by the core symptoms of major depressive disorder during the last two weeks (not at all, several days, more than half the days, nearly every day). Depressive symptoms include low mood, lack of pleasure, energy, sleep, appetite, suicidal thoughts, changes in psychomotor activity, concentration, and negative views towards self. The total score is acquired by summing all boxes on the questionnaire according to their value, with a total possible score ranging from 0 to 27. The PHQ-9 Cronbach's alpha for this study was .90 at 6 months and .92 at 12 months.

Posttraumatic Stress (PTSD). Symptoms of PTSD were assessed with the Post-Traumatic Stress Disorder Checklist-Military Version (PCL-M) (Weathers & Litz, 1993; Weathers, Litz, Herman, Huska, & Keane, 1993). This self-report instrument consists of 17 items asking about PTSD symptoms in relation to the last 30 days. Respondents answer each item regarding their most distressing military/life event on a five-point Likert type scale with possible responses ranging from "Not at All" to "All the time." Scores were summed and the total score was used as a continuous measure of PTSD symptom severity. Scores of 50 or above are indicative of likely PTSD and represent significant symptoms. The PCL-M has strong

psychometric properties and varying studies have reported internal consistency scores ranging from .94 to .97 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers & Litz, 1993). For this study, the PCL-M Cronbach's alpha scores were: 6 month = .96 and 12-month = .97.

Anxiety. Anxiety was measured with the Generalized Anxiety Disorder 7 item Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006), a 7-item questionnaire with anxiety-related questions associated with generalized anxiety disorder. In response to the following question, participants completed their responses: "Over the last 2 weeks, how often have you been bothered by any of the following problems?" Specific problems on the scale include feeling nervous, anxious, on edge, or having trouble relaxing. Participants rate items on a four-point scale that ranges from "Not At All" to "Nearly Every Day." The GAD-7 has good psychometric properties with studies reporting Cronbach alphas that range from .86 to .91 (Dear et al., 2011; Spitzer et al., 2006). The GAD-7 Cronbach's alpha for this study were: 6-month = .94 and 12-month = .94.

Couple Satisfaction Index. The Couples Satisfaction Index (CSI-16; Funk & Rogge, 2007) was used to assess respondents' satisfaction in their intimate relationships. Participants completed the index if they indicated that they were currently in a committed relationship with a spouse/significant other. On this 16-item measure, respondents answer two questions about their perception of the quality of the relationship; one measures the degree of happiness on a seven-item Likert scale ranging from "Perfect" to "Extremely Unhappy" and the other captures how often things are going well on a six-item Likert scale ranging from "All of the time" to "Never." They then answer eight questions on varying aspects of their relationship with a partner on a six-item Likert scale ranging from "Not at all True" to "Completely True." For the final six items,

they indicate on a continuum from 0 to 5 their perception of their relationship (for example, how interesting or how enjoyable it is), with higher scores being more positive. These items get at important social relationship variables emphasized by Cohen (2004), especially in terms of an individual perceiving their relationship as happy, going well, and that they are part of a team. The CSI has excellent internal consistency, with Cronbach's alphas ranging from 0.84 to 0.99 (Funk & Rogge, 2007). The CSI Cronbach's alpha for this study were: 6-month = .98 and 12-month = .98.

Data Analysis

We evaluated the relationship between suicide risk, mental health symptoms, and relationship satisfaction in National Guard soldiers. We were also interested in exploring if relationship satisfaction moderated the relationship between soldier mental health symptoms (PTSD, depression, and anxiety) and suicide risk. To start we ran a baseline model, using our demographic variables (age, gender, household income, relationship status, and relationship length) as predictors of suicide risk at 12 months post deployment. Next, we ran a main model and 3 interaction models, where we added our main variables of interest to those included in the baseline model. Our main multiple regression model examined suicide risk at 12 months post deployment (Time 2), and hypothesized that it would be predicted by mental health symptoms (PTSD, depression, and anxiety) and relationship satisfaction at the previous assessment (Time 1; 6 months post deployment). In order to test the moderating effect that relationship satisfaction may have on each of the mental health symptoms, we ran three separate regression models with interaction terms. In each of these models, we predicted Time 2 suicide risk from each of the three Time 1 mental health symptom variables (PTSD, depression, and anxiety), relationship satisfaction, and the interactions between the mental health symptom and relationship

satisfaction. Our final set of models added suicide risk at 6 months post deployment as a control variable to our main model and each of our interaction models. All models controlled for age, gender, household income, relationship status, relationship length, and hazardous drinking.

Results

Bivariate Associations and Baseline Model

Simple bivariate relationships suggest significant associations between each of the mental health variables at 6 months and suicide risk at 12 months post deployment. Specifically, higher levels of depression ($r = .31, p < .0001$), anxiety ($r = .28, p < .0001$), and PTSD symptoms ($r = .25, p < .0001$) were each associated with increased suicide risk. Additionally, couple satisfaction at 6 months was associated with suicide risk at 12 months ($r = -.21, p < .0001$) post deployment. As expected, depression, anxiety and PTSD symptoms were highly correlated with each other, with the strongest relationship between anxiety and depression ($r = .85, p < .0001$). Our baseline model did not significantly predict suicide risk at 12 months ($F=0.91 [11,654], p = 0.53; R^2 = .0151$).

Main Model

Our main model tested our hypothesis that higher levels of mental health symptoms and lower relationship satisfaction, at 6 months post deployment, were associated with greater suicide risk, at 12 months post deployment. By adding the mental health and couple satisfaction variables we were able to significantly predict suicide risk at 12 months ($F=5.13 [16,622], p < 0.001; R^2 = .117$) As hypothesized, Time 1 depression and Time 1 relationship satisfaction both significantly predicted Time 2 suicide risk. Specifically, lower relationship satisfaction ($\beta = -0.107, 95\% \text{ CI } [-0.190, -0.024]$) and more depressive symptoms ($\beta = 0.204, 95\% \text{ CI } [0.048, 0.361]$) at the 6-month assessment were related to greater suicide risk at 12 months. However,

neither PTSD ($\beta = 0.025$, 95% CI [-0.095, 0.144]) nor anxiety ($\beta = 0.038$, 95% CI [-0.114, 0.191]) symptoms at Time 1 were significantly associated with suicide risk at Time 2. See Table 2 for standardized coefficients for each model.

Interaction Models

Our interaction models tested our hypothesis that relationship satisfaction would moderate the relationship between mental health symptoms and suicide risk. We ran three separate interaction models testing this hypothesis, one for each type of mental health symptom included in our study.

Interaction Model 1, PTSD and PTSD*CSI: In our first interaction model we examined the interaction between Time 1 couple relationship satisfaction and Time 1 PTSD in relation to Time 2 suicide risk. This interaction model also was a significant predictor of suicide risk at 12 months ($F=4.82$ [15,627], $p < 0.001$; $R^2 = .103$). Higher PTSD symptoms were significantly associated with higher Time 2 suicide risk for soldiers ($\beta = .161$, 95% CI [.077, .245]), and couple satisfaction was associated with higher suicide risk ($\beta = -.125$, 95% CI [-.208, -.042]). The interaction between couple satisfaction and PTSD at 6 months post deployment was also significantly associated with suicide risk ($\beta = -0.092$, 95% CI [-0.161, -0.024]) at 12 months post deployment. See Figure 1, which depicts this interaction.

Interaction Model 2, depression and depression*CSI: Our second interaction model tested the interaction between Time 1 couple satisfaction and Time 1 depression in relation to Time 2 suicide risk. This model significantly predicted suicide risk at 12 months ($F=6.17$ [15,647], $p < 0.001$; $R^2 = .125$). As hypothesized, depression was significantly associated with suicide risk for soldiers ($\beta = 0.225$, 95% CI [0.142, 0.308]). While couple satisfaction was not associated with higher suicide risk in this model ($\beta = -.059$, 95% CI [-0.143, 0.025]), the interaction between

couple satisfaction and depression was significantly associated with suicide risk ($\beta = -0.103$, 95% CI [-.167, -.038]). See Figure 2, which depicts this interaction.

Interaction Model 3, anxiety and anxiety*CSI: Our final interaction model was a significant predictor of suicide risk at 12 months ($F=5.20$ [15,649], $p < 0.001$; $R^2 = .107$). In our final interaction model, we examined the interaction between Time 1 couple satisfaction and Time 1 anxiety in relation to Time 2 suicide risk. Similar to above findings, anxiety was significantly associated with suicide risk for soldiers ($\beta = 0.191$, 95% CI [0.109, 0.272]), indicating that higher levels of anxiety are associated with higher levels of suicide risk. Additionally, couple satisfaction was associated with higher suicide risk ($\beta = -0.096$, 95% CI [-0.179, -.014]). When we examined the interaction of couple satisfaction and anxiety, the interaction was significantly associated with suicide risk ($\beta = -.082$, 95% CI [-.146, -.019]). See Figure 3, which depicts this interaction.

For each post-hoc model, the mental health symptoms and the couple satisfaction*mental health symptom interactions were statistically significant. Three plots (Figure 1, Figure 2, and Figure 3) show the suicide risk with different levels of PTSD, depression, and anxiety with the continuous couple satisfaction score. Each plot shows how, when the severity of the mental health symptom increases, better relationship satisfaction is protective, and reduces the risk of suicide. These plots show that as mental health for soldiers worsens, a stronger intimate relationship acts as a buffer, and is associated with a lower suicide risk for soldiers.

Final Models

Our final models added suicide risk at 6 months as a predictor to each of the previous 4 models reported. For each of these models, as expected, 6-month suicide risk was a significant predictor of suicide risk at 12 months post deployment. Additionally, for each of the models, the

mental health symptom variables and the couple satisfaction variable were no longer significant. This strong association may be in part due to the scale we used for suicide risk. Specifically, three of the four items (“Have you ever thought about or attempted to kill yourself,” “How often have you thought about killing yourself in the past year” and “Have you ever told someone that you were going to commit suicide, or that you might do it”) would be expected to have very similar responses, for some participants, over a 6 month period of time.

Discussion

In this paper, we examined the relationship between the main effects of couple satisfaction, PTSD, depression, and anxiety at 6 months post deployment and the outcome of suicidal ideation at 12 months post deployment in a sample of National Guard soldiers. When all variables were entered into a regression model, only depression and couple satisfaction were significant predictors of suicide risk at the second time point. This finding is in line with prior studies, which suggest that these variables are associated with suicide in military populations (Griffith, 2017; Rozanov & Carli, 2012). It is of interest that for this first model the predictors were able to explain roughly 12% of the variance in suicide risk. However both of the significant associations were not particularly strong ($\beta = 0.202$ and $\beta = -0.107$, for depression and couple satisfaction).

Secondary analyses building on this main model and including interaction terms, provided additional insight into the relationships between mental health symptoms, relationship quality, and subsequent suicidal ideation. As Figures 1, 2, and 3 depict, among soldiers with any one of these mental health conditions, as relationship satisfaction increases for individuals with these mental health conditions, the risk of suicide decreases. This is an important finding when it comes to thinking about prevention of suicides in the military, and the National Guard

specifically. These data suggest that those with negative perceptions of their relationships are at a greater risk of suicide when also struggling with a mental health condition. Those who have a mental health condition post deployment may be less likely to engage in suicidal behaviors if they have a strong intimate relationship.

It is important to note that the research design of this study does not allow causality or directionality of the association between relationship satisfaction and suicide risk to be determined. Although it is reasonable to consider that negative interactions in a romantic relationship could contribute to issues related to suicide risk, the converse may also be possible. An individual's suicide risk may in fact affect their interactions with their partner and negatively affect their perceived relationship quality.

Given that National Guard soldiers are experiencing distress in their relationships, and that mental health symptoms contribute to this distress, these findings suggest that more needs to be done to help these relationships so that they can play a more prominent role in National Guard soldier suicide prevention. Relationships do not get enough consideration in the literature when it comes to treating and preventing military suicide. For example, in one recent in-depth review of treatment options for suicidal military personnel, Bryan and Rozek (2018) suggest that interventions for military, in terms of suicide prevention, need to target emotion regulation and cognitive flexibility, but they do not mention any aspect of intimate relationship functioning.

Although we did not directly test the specific variables of thwarted belonging and perceived burdensomeness, these findings provide some support for the interpersonal theory of suicide when it comes to the role of intimate relationships. Military service and deployment may contribute to thwarted belongingness in family relationships (Selby et al., 2010), as in some cases, these military activities negatively influence the ways in which service members relate to

their family. Bonds between service members may also weaken following return from deployment, particularly among National Guard service members, who have much less contact with their former “battle buddies” and as a result must instead rely on family, and in particular an intimate partner, for a sense of wellbeing. Given that deployment and deployment-related stress is related to difficulties in intimate relationships (Allen, Rhoades, Stanley, & Markman, 2010; Blow et al., 2013; Gorman, Blow, Ames, & Reed, 2011; Khaylis, Polusny, Erbes, Gewirtz, & Rath, 2011), it can be challenging for National Guard soldiers and their families to remain emotionally connected during the post deployment period. Those engaged in acts of war may experience traumatic events, which are difficult for service members to discuss with their partners. This breakdown in communication may lead to a disconnection in military couples. Those with PTSD may experience emotional numbing which leads to further relational distancing (Allen et al., 2010). Depression is also widely prevalent and may send a message to an intimate partner that one is not happy to be home and back in civilian life post deployment (Blow et al., 2013). Spouses may take this personally, leading to an increased distancing in the relationship (Renshaw & Campbell, 2011).

Service members who have visible or invisible wounds from time spent deployed may see themselves as a burden to family members and this may increase their risk of suicide (Selby et al., 2010). Facing struggles with issues such as physical disability, mental illness, or unemployment could conceivably make soldiers question the value they offer to their families, and lead them to wonder if their loved ones are better off without them.

In order to combat these suicide risk factors, which are linked to deployment, and capitalize on the potential resource of the significant partner, there should be a focus on strengthening soldiers’ intimate relationships. In cases where soldiers are not in a committed

relationship, or where the intimate relationship is severely troubled, they might need additional relational supports (e.g., close friends, extended family) to help with their mental health conditions.

Implications

Findings from the current study make the case for concerted efforts to strengthen relationships of soldiers and their families post deployment. When soldiers have a mental health condition, they are at higher risk for suicide, and when their relationships are not going well, suicide risk from these mental health conditions may increase.

Strengthening relationships could be accomplished through relationship prevention programs such as Strong Bonds, or couple therapy interventions such as Emotionally Focused Therapy (Johnson, 2004) or Integrative Behavioral Couple Therapy (Christensen & Jacobson, 1998). Either of these evidence-based models could be adapted to address post-deployment couple adjustment, and assist soldiers to further integrate into their family settings. When a mental health condition exists, it is especially important to incorporate a spouse or significant partner into treatment if possible. This is because mental health conditions exacerbate relationship problems, and when a soldier believes that he or she is a burden in the relationship/family, suicide risks rise. Having a spouse/partner who understands a mental health condition and related symptoms may also help a service member feel understood, valued, and less alone. Directly talking about these issues in couples' treatment could help couples relate more supportively and reduce suicide risk.

Limitations and Future Directions

One limitation of this study is that suicide was only assessed at 6 and 12 month time points. Our understanding would be strengthened if we also had pre-deployment assessment of

suicide risk. Even though our study assesses suicide at two time points, we cannot infer causal relationships given that it is difficult to control for suicide risk at the 6-month assessment. In addition, earlier assessments would have allowed a deeper understanding of the direction of the found associations. Although the link between relationship satisfaction and suicide risk is significant, currently it is not possible to determine if higher relationship satisfaction led to less suicide risk, or if greater suicide risk led to lower relationship satisfaction. In order to further explore this relationship, future studies should measure both suicide risk and relationship satisfaction among military couples across multiple time points throughout the deployment cycle. The scale we used to measure suicide risk, the SBQ-R has some limitations in terms of assessing suicide over time. Three of the four items, as we noted earlier, could be answered similarly to the 6-month assessment at 12-months, even if a soldier became more suicidal in the 6-12 month window. This is because two of these items refer to lifetime suicidal thoughts and behaviors. Although some studies indicate that the SBQ-R has good sensitivity (e.g., Osman et al., 2001; Sabo, Gunderson, Najavits, Chauncey, & Kisiel, 1995), study finding should be replicated using a different measure of suicidality. An additional shortcoming to address is the use of a non-probability sample in that we were limited to one state's National Guard population.

References

- Allen, E. S., Rhoades, G. K., Stanley, S. M., & Markman, H. J. (2010). Hitting home: Relationships between recent deployment, posttraumatic stress symptoms, and marital functioning for army couples. *Journal of Family Psychology, 24*(3), 280-288.
doi:10.1037/a0019405
- Baumeister, R. (1991). *Meanings of Life*. New York: Guilford.
- Beach, S., & Whisman, M. (2012). Affective disorders. *Journal of Marital and Family Therapy, 38*, 201-219. doi:doi:10.1111/j.1752-0606.2011.00243.x
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research & Therapy, 34*(8), 669-673.
- Blow, A. J., Gorman, L., Ganoczy, D., Kees, M., Kashy, D. A., Valenstein, M., . . . Chermack, S. (2013). Hazardous drinking and family functioning in National Guard Veterans and spouses postdeployment. *Journal of Family Psychology, 27*, 303-313.
doi:10.1037/a0031881
- Bryan, C., Cerele, J., & Bryan, A. (2017). Exposure to suicide is associated with increased risk for suicidal thoughts and behaviors among National Guard military personnel. *Comprehensive Psychiatry, 77*, 12-19. doi:10.1016/j.comppsy.2017.05.006
- Bryan, C., Hernandez, A., Allison, S., & Clemans, T. (2013). Combat Exposure and Suicide Risk in Two Samples of Military Personnel. *Journal of Clinical Psychology, 69*(1), 64-77.
doi:doi:10.1002/jclp.21932
- Bryan, C., & Rozek, D. (2018). Suicide prevention in the military: a mechanistic perspective. *Current Opinion in Psychology, 22*, 27-32. doi:10.1016/j.copsy.2017.07.022

- Bush, N. E., Reger, M. A., Luxton, D. D., Skopp, N. A., Kinn, J., Smolenski, D., & Gahm, G. A. (2013). Suicides and Suicide Attempts in the U.S. Military, 2008–2010. *Suicide and Life-Threatening Behavior*, 43(3), 262-273. doi:10.1111/sltb.12012
- Cacioppo, J. T., Hawkey, L. C., Crawford, L. E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., . . . Berntson, G. G. (2002). Loneliness and health: potential mechanisms. *Psychosom Med*, 64(3), 407-417.
- Caine, E. D. (2017). Suicide and Attempted Suicide in the United States During the 21st Century. *JAMA Psychiatry*, 74(11), 1087-1088. doi:10.1001/jamapsychiatry.2017.2524
- CDC. (2017). Suicide: Consequences. Retrieved from <https://www.cdc.gov/violenceprevention/suicide/consequences.html#2>
- Cheung, Y. B., Law, C. K., Chan, B., Ka Yuet, L., & Yip, P. S. F. (2006). Suicidal ideation and suicidal attempts in a population-based study of Chinese people: Risk attributable to hopelessness, depression, and social factors. *Journal of Affective Disorders*, 90(2), 193-199. doi:10.1016/j.jad.2005.11.018
- Christensen, A., & Jacobson, N. (1998). *Acceptance and Change in Couple Therapy: A Therapist's Guide to Transforming Relationships*. New York: Norton.
- Chu, C., Hom, M., Stanley, I., Gai, A., Nock, M., Gutierrez, P., & Joiner, T. (2018). Non-suicidal self-injury and suicidal thoughts and behaviors: A study of the explanatory roles of the interpersonal theory variables among military service members and veterans. *Journal of Consulting and Clinical Psychology*, 86(1), 56-68. doi:10.1037/ccp0000262
- Cohen, S. (2004). Social Relationships and Health. *American Psychologist*, 59(8), 676-684. doi:10.1037/0003-066X.59.8.676
- Curtin, S., Warner, M., & Hedegaard, H. (2016). Increase in suicide in the United States, 1999-

2014. NCHS data brief, no 241. Hyattsville, MD: National Center for Health Statistics.
- Davila, J., Karney, B. R., Hall, T. W., & Bradbury, T. N. (2003). Depressive symptoms and marital satisfaction: within-subject associations and the moderating effects of gender and neuroticism. *Journal of Family Psychology*, 17(4), 557-570. doi:10.1037/0893-3200.17.4.557
- Dear, B. F., Titov, N., Sunderland, M., McMillan, D., Anderson, T., Lorian, C., & Robinson, E. (2011). Psychometric comparison of the generalized anxiety disorder scale-7 and the Penn State Worry Questionnaire for measuring response during treatment of generalised anxiety disorder. *Cognitive Behaviour Therapy*, 40(3), 216-227. doi:10.1080/16506073.2011.582138
- Department of Veterans Affairs. (2016). VA suicide prevention program, facts about veteran suicide, July 2016. Washington, DC: Department of Veterans Affairs.
- Dillman, D., Smyth, J., & Christian, L. (2009). Internet, mail, and mixed-mode surveys: The tailored design method. New York: Wiley.
- Durkheim, E. (1897). *Suicide: A study in sociology*. New York: The Free Press.
- Franklin, K. (2016). Department of Defense Quarterly Suicide Report, calendar year 2016 4th quarter. Defense suicide prevention office (DSPO). Washington, DC: Department of Defense.
- Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the Couples Satisfaction Index. *Journal of Family Psychology*, 21(4), 572-583. doi:10.1037/0893-3200.21.4.572
- Gerst-Emerson, K., & Jayawardhana, J. (2015). Loneliness as a Public Health Issue: The Impact of Loneliness on Health Care Utilization Among Older Adults. *American Journal of*

- Public Health, 105(5), 1013-1019. doi:10.2105/ajph.2014.302427
- Gorman, L., Blow, A. J., Ames, B., & Reed, P. (2011). National Guard families after combat: Mental health, use of mental health services, and perceived treatment barriers. *Psychiatric Services*, 62(1), 28-34. doi:10.1176/ps.62.1.pss6201_0028
- Griffith, J. (2012). Suicide in the Army National Guard: An empirical inquiry. *Suicide and Life-Threatening Behavior*, 42(1), 104-119. doi:10.1111/j.1943-278X.2011.00075.x
- Griffith, J. (2017). A Description of Suicides in the Army National Guard During 2007–2014 and Associated Risk Factors. *Suicide and Life-Threatening Behavior*, 47(3), 266-281. doi:10.1111/sltb.12275
- Gunnell, D., Harbord, R., Singleton, N., Jenkins, R., & Lewis, G. (2004). Factors influencing the development and amelioration of suicidal thoughts in the general population: Cohort study. *The British Journal of Psychiatry*, 185(5), 385-393. doi:10.1192/bjp.185.5.385
- Hoge, C. W., Ivany, C. G., & Adler, A. B. (2017). Suicidal behaviors within army units: Contagion and implications for public health interventions. *JAMA Psychiatry*, 74(9), 871-872. doi:10.1001/jamapsychiatry.2017.1908
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci*, 10(2), 227-237. doi:10.1177/1745691614568352
- Hyman, J., Ireland, R., Frost, L., & Cottrell, L. (2012). Suicide Incidence and Risk Factors in an Active Duty US Military Population. *American Journal of Public Health*, 102(Suppl 1), S138-S146. doi:10.2105/AJPH.2011.300484
- Johnson, S. (2004). *The practice of emotionally focused couple therapy: Creating connection* (Second ed.). New York: Brunner-Routledge.

- Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Kaslow, N. J., Thompson, M. P., Brooks, A. E., & Twomey, H. B. (2000). Ratings of family functioning of suicidal and nonsuicidal African American women. *Journal of Family Psychology*, 14(4), 585-599. doi:10.1037/0893-3200.14.4.585
- Kazan, D., Calear, A. L., & Batterham, P. J. (2016). The impact of intimate partner relationships on suicidal thoughts and behaviours: A systematic review. *Journal of Affective Disorders*, 190, 585-598. doi:10.1016/j.jad.2015.11.003
- Khaylis, A., Polusny, M., Erbes, C., Gewirtz, A., & Rath, M. (2011). Posttraumatic stress, family adjustment, and treatment preferences among National Guard soldiers deployed to OEF/OIF. *Military Medicine*, 176, 126-131. doi:10.7205/MILMED-D-10-00094
- Kouros, C. D., Papp, L. M., & Cummings, E. M. (2008). Interrelations and moderators of longitudinal links between marital satisfaction and depressive symptoms among couples in established relationships. *Journal of Family Psychology*, 22(5), 667-677. doi:10.1037/0893-3200.22.5.667
- Kposowa, A. J. (2000). Marital status and suicide in the National Longitudinal Mortality Study. *Journal of Epidemiology and Community Health*, 54(4), 254-261. doi:10.1136/jech.54.4.254
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606-613. doi:10.1046/j.1525-1497.2001.016009606.x
- Martin, A., Rief, W., Klaiberg, A., & Braehler, E. (2006). Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. *General Hospital Psychiatry*, 28(1), 71-77. doi:10.1016/j.genhosppsych.2005.07.003

- McLaughlin, J., O'Carroll, R. E., & O'Connor, R. C. (2012). Intimate partner abuse and suicidality: a systematic review. *Clinical Psychology Review*, 32(8), 677-689.
doi:10.1016/j.cpr.2012.08.002
- McLean, C. P., Zang, Y., Zandberg, L., Bryan, C. J., Gay, N., Yarvis, J. S., & Foa, E. B. (2017). Predictors of suicidal ideation among active duty military personnel with posttraumatic stress disorder. *Journal of Affective Disorders*, 208, 392-398.
doi:10.1016/j.jad.2016.08.061
- Nock, M. K., Deming, C. A., Fullerton, C. S., Gilman, S. E., Goldenberg, M., Kessler, R. C., . . . Ursano, R. J. (2013). Suicide Among Soldiers: A Review of Psychosocial Risk and Protective Factors. *Psychiatry*, 76(2), 97-125. doi:10.1521/psyc.2013.76.2.97
- Nock M.K., Hwang I, Sampson N, Kessler R.C. (2010). Mental disorders, comorbidity, and suicidal behaviors: Results from the National Comorbidity Survey Replication. *Molecular Psychiatry*;15(8):868–876. doi: 10.1038/mp.2009.29.
- Nock M.K., Hwang I, Sampson N, Kessler R.C., Angermeyer M, Beautrais A, Williams D.R. (2009). Cross-national analysis of the associations among mental disorders and suicidal behavior: Findings from the WHO World Mental Health Surveys. *PLOS Medicine*, 6:e1000123. doi: 10.1371/journal.pmed.1000123.
- Office of Suicide Prevention. (2016). *Suicide Among Veterans and Other Americans 2001–2014*. Washington, DC: U. S. Department of Veterans Affairs.
- Olfson, M., Blanco, C., Wall, M., & et al. (2017). National trends in suicide attempts among adults in the united states. *JAMA Psychiatry*, 74(11), 1095-1103.
doi:10.1001/jamapsychiatry.2017.2582

- Osman, A., Bagge, C. L., Gutierrez, P. M., Konick, L. C., Kopper, B. A., & Barrios, F. X. (2001). The Suicidal Behaviors Questionnaire-Revised (SBQ-R): validation with clinical and nonclinical samples. *Assessment*, 8(4), 443-454. doi:10.1177/107319110100800409
- Pietrzak, R. H., Goldstein, M. B., Malley, J. C., Rivers, A. J., Johnson, D. C., & Southwick, S. M. (2010). Risk and protective factors associated with suicidal ideation in veterans of Operations Enduring Freedom and Iraqi Freedom. *Journal of Affective Disorders*, 123(1), 102-107. doi:10.1016/j.jad.2016.08.061
- Ramchand, R., Acosta, J., Burns, R. M., Jaycox, L. H., & Pernin, C. G. (2011). The War Within: Preventing Suicide in the U.S. Military. *Rand Health Q*, 1(1), 2.
- Renshaw, K., & Campbell, S. (2011). Combat veterans' symptoms of PTSD and partners' distress: The role of partners' perceptions of veterans' deployment experiences. *Journal of Family Psychology*, 25(6), 953-962. doi:10.1037/a0025871
- Rozanov, V., & Carli, V. (2012). Suicide among War Veterans. *International Journal of Environmental Research and Public Health*, 9(7), 2504-2519. doi:10.3390/ijerph9072504
- Sabo, A. N., Gunderson, J. G., Najavits, L. M., Chauncey, D., & Kisiel, C. (1995). Changes in self-destructiveness of borderline patients in psychotherapy: A prospective follow-up. *Journal of Nervous and Mental Disease*, 183(6), 370-376. doi:10.1097/00005053-199506000-00004
- Schoenbaum, M., Kessler, R. C., Gilman, S. E., Colpe, L. J., Heeringa, S. G., Stein, M. B., . . . Cox, K. L. (2014). Predictors of suicide and accident death in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS): results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *JAMA Psychiatry*, 71(5), 493-503. doi:10.1001/jamapsychiatry.2013.4417

- Selby, E. A., Anestis, M. D., Bender, T. W., Ribeiro, J. D., Nock, M. K., Rudd, M. D., . . . Joiner, T. E., Jr. (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(3), 298-307. doi:10.1016/j.cpr.2009.12.004
- Spitzer, R., Kroenke, K., Williams, J., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, 166, 1092-1097.
- Ursano, R. J., Kessler, R. C., Naifeh, J. A., & et al. (2017). Risk of suicide attempt among soldiers in army units with a history of suicide attempts. *JAMA Psychiatry*, 74(9), 924-931. doi:10.1001/jamapsychiatry.2017.1925
- Ursano, R. J., Kessler, R. C., Stein, M. B., & et al. (2016). Risk factors, methods, and timing of suicide attempts among us army soldiers. *JAMA Psychiatry*, 73(7), 741-749. doi:10.1001/jamapsychiatry.2016.0600
- Valenstein, M., Gorman, L., Blow, A. J., Ganoczy, D., Walters, H., Kees, M., . . . Dalack, G. W. (2014). Reported Barriers to Mental Health Care in Three Samples of U.S. Army National Guard Soldiers at Three Time Points. *Journal of Traumatic Stress*, 27(4), 406-414. doi:10.1002/jts.21942
- Weathers, F., & Litz, B. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. Annual Meeting of the International Society for Traumatic Stress Studies. TX: San Antonio.
- Weathers, F., Litz, B., Herman, J., Huska, J., & Keane, T. (1993). The PTSD Checklist (PCL): Reliability, validity and diagnostic utility. Paper presented at the 9th Annual Conference of the ISTSS, San Antonio, TX.
- Whisman, M., & Baucom, D. (2012). Intimate Relationships and Psychopathology. *Clinical*

Child and Family Psychology Review, 15(1), 4-13. doi:10.1007/s10567-011-0107-2

- Whisman, M., & Uebelacker, L. (2006). Impairment and distress associated with relationship discord in a national sample of married or cohabiting adults. *Journal of Family Psychology*, 20(3), 369-377. doi:10.1037/0893-3200.20.3.369
- Wyder, M., Ward, P., & De Leo, D. (2009). Separation as a suicide risk factor. *Journal of Affective Disorders*, 116(3), 208-213. doi:10.1016/j.jad.2008.11.007

Author Manuscript

Table 1. Means and proportions for study sample (individual n = 712)

Variable	N (%)	M	SD
Depression^a		4.84	5.36
Anxiety^b		4.31	4.98
PTSD^c		30.24	15.16
Couple Satisfaction^d		61.55	17.17
Suicide Risk^e		3.8	1.78
Age			
18-21	36 (5.1)		
22-30	272 (38.2)		
31-40	194 (27.3)		
41-50	165 (23.2)		
51-60+	45 (6.3)		
Gender			
Female	55 (7.7)		
Male	657 (92.3)		
Ethnicity			
African American	40 (5.6)		
Caucasian	607 (85.5)		
Hispanic	25 (3.5)		
Native American	6 (.9)		
Asian American	6 (.9)		
Multi-ethnic	22 (3.1)		
Other	4 (.6)		
Education			
High school/GED	177 (24.9)		
Some college	382 (53.7)		
Bachelors or higher	153 (21.5)		
Military Rank			
E1-E4	268 (37.6)		
E5-E6	263 (36.9)		
E7-E9	86 (12.1)		
O1-O3	49 (6.9)		
O4-O9	27 (3.8)		
WO1-5	19 (2.7)		
Marital Status			
Married	515 (72.3)		
Cohabiting	36 (5.1)		
Other	161 (22.6)		
Family Income			
Below \$25,000	170 (23.9)		
\$25,001 to \$50,000	250 (35.1)		

\$50,001 to \$75,000	168 (23.6)
\$75,001 to \$100,000	66 (9.3)
Over \$100,000	58 (8.2)

^aDepression total score possible values ranged from 0 to 27

^bAnxiety total score possible values ranged from 0 to 21

^cPTSD total score possible values ranged from 17 to 85

^dCouple Satisfaction total score possible values ranged from 0 to 81

^eSuicide Risk total score possible values ranged from 3 to 18

Author Manuscript

Table 2. Standardized coefficients for multiple regression models of items at 6 months post deployment predicting soldier Suicide Risk at 12 months post deployment

Variable	Suicide Risk		Suicide Risk		Suicide Risk		Suicide Risk	
	b	SE	b	SE	b	SE	b	SE
	Main Model				Interaction Models			
Gender ^a	.048	.145	.028	.139	.030	.143	.050	.148
Age ^b								
18-21 years	.011	.181	.029	.175	.025	.182	-.031	.183
31-40 years	.023	.104	.033	.100	.114	.103	.073	.106
41-50 years	.102	.125	.104	.119	.190	.122	.139	.127
Over 50 years	.083	.196	.065	.188	.101	.193	.092	.201
Income ^c								
\$25,001 to \$50,000	.058	.104	.040	.100	.032	.102	.002	.105
\$50,001 to \$75,000	.189	.119	.167	.115	.119	.118	.110	.122
\$75,001 to \$100,000	-.031	.158	-.024	.152	-.093	.155	-.142	.160
Over \$100,000	.124	.166	.105	.159	.052	.163	.041	.169
Relationship Length	-.033	.054	-.022	.052	-.016	.053	-.029	.055
Relationship Status ^d	.105	.102	.083	.098	.155	.100	.149	.103
Hazardous Alcohol Use	.088	.078	.070	.075	.106	.077	.141	.079
Couple Satisfaction (CSI)	-.107*	.042	-.059	.043	-.096*	.042	-.125*	.042
Depression	.204*	.080	.225*	.042				
Anxiety	.038	.078			.191*	.042		
PTSD	.025	.061					.161*	.043
Depression*CSI			-.103*	.033				
Anxiety*CSI					-.082*	.032		
PTSD*CSI							-.092*	.035
F Total (DF)	5.13 (16,622)		6.17 (15,647)		5.20 (15,649)		4.82 (15,627)	
R ²	.117		.125		.107		.103	

^a Male = 0; Female = 1

^b Age reference group = 22-30 years

^c Income reference group = under \$25,000

^d Married = 1; Other = 0

*p<.05

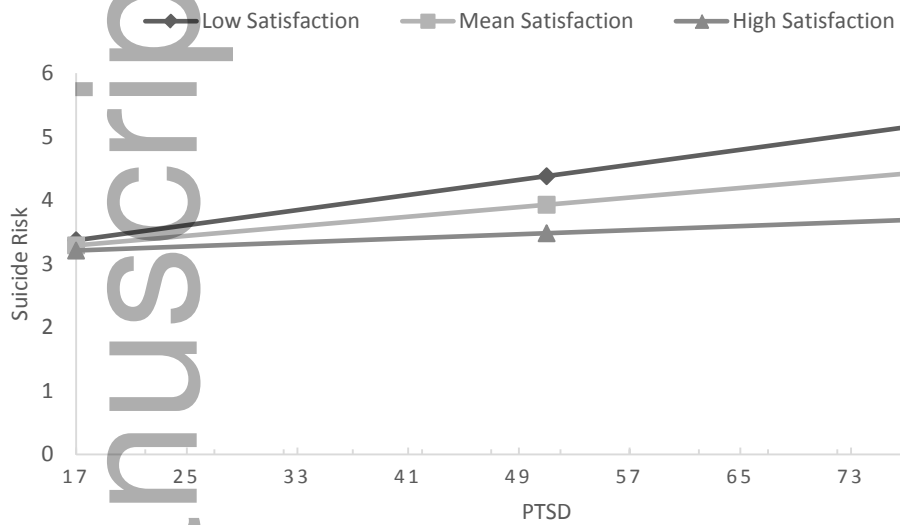


Figure 1. PTSD at 6 months post-deployment predicting Suicide Risk at 12 months post-deployment at varying levels of Couple Satisfaction (i.e., moderator). Couple Satisfaction shown at low (mean-1SD), mean, and high (mean+1SD).

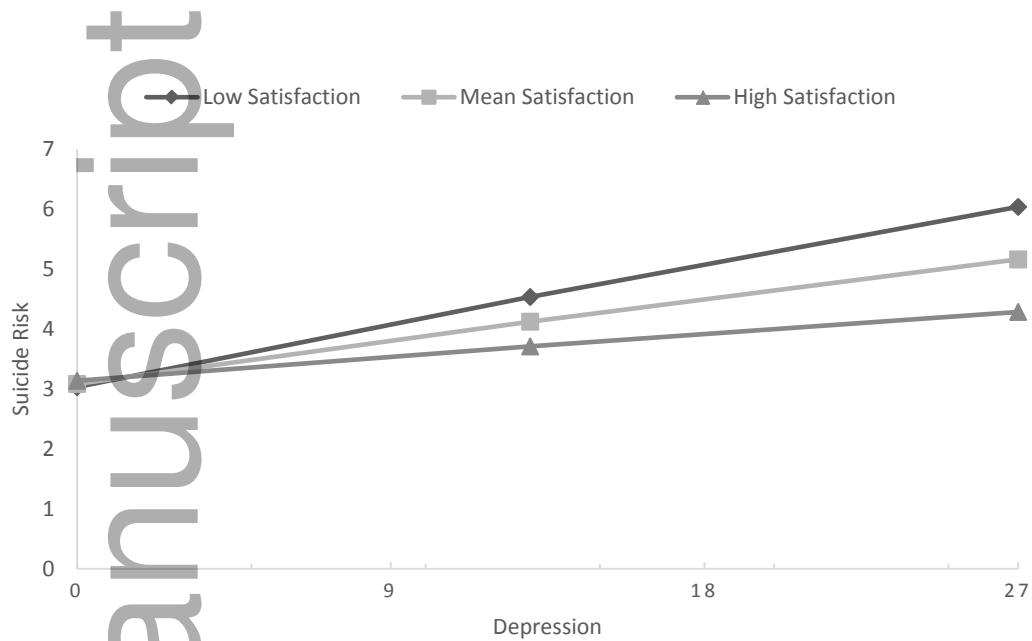


Figure 2. Depression at 6 months post-deployment predicting Suicide Risk at 12 months post-deployment at varying levels of Couple Satisfaction (i.e., moderator). Couple Satisfaction shown at low (mean-1SD), mean, and high (mean+1SD).

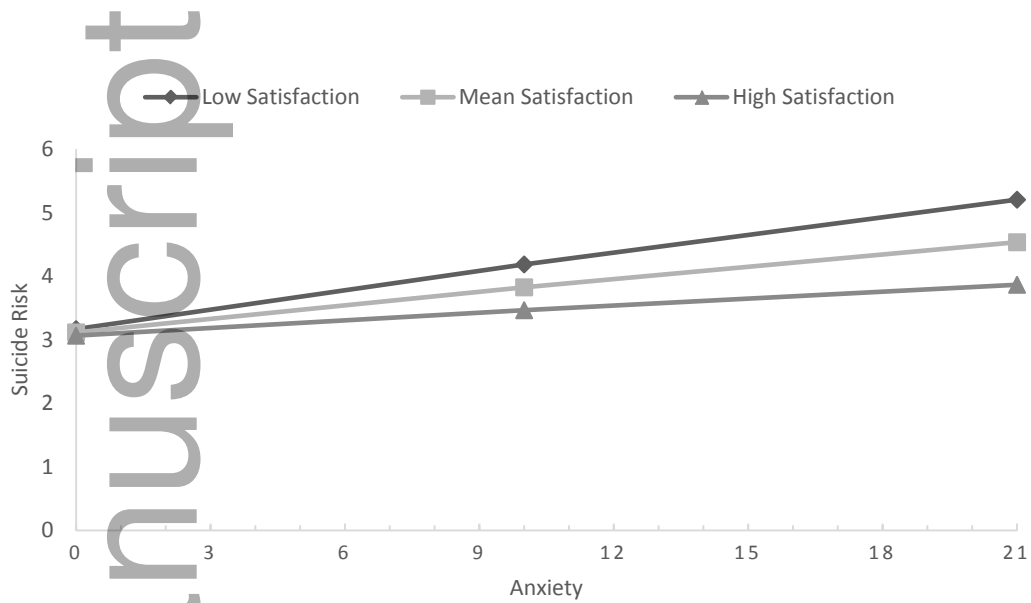


Figure 3. Anxiety at 6 months post-deployment predicting Suicide Risk at 12 months post-deployment at varying levels of Couple Satisfaction (i.e., moderator). Couple Satisfaction shown at low (mean-1SD), mean, and high (mean+1SD).