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# Depression Symptoms and Marital Quality in Vietnam-Era Veterans: Does the Presence of Higher Post-Traumatic Stress Symptoms (PTSS) Matter?

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Depression Symptoms and Marital Quality in Vietnam-Era  
Veterans: Does the Presence of Higher Post-Traumatic  
Stress Symptoms (PTSS) Matter?

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A thesis submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Master of Science

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## ABSTRACT

### Depression Symptoms and Marital Quality in Vietnam-Era Veterans: Does the Presence of Higher Post-Traumatic Stress Symptoms (PTSS) Matter?

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Using data from 617 Vietnam-era veterans, this study aimed to better understand the relationships between depression symptoms, post-traumatic stress symptoms, and overall marital quality. Results indicated that depression symptoms and PTSS each had a negative relationship with marital quality when considered individually. The association between depression symptoms and marital quality persisted when PTSS was accounted for. However, the significant association between PTSS and marital quality dropped out. Further, PTSS did not moderate the association between depression symptoms and marital quality. The current study suggests that depression symptoms and PTSS overlap in relation to marital quality among Vietnam-era veterans, with depression symptoms playing a major role. Future research should address samples across various age groups, different war campaigns, and among veterans with higher levels of clinical distress.

Keywords: Vietnam-era veterans, post-traumatic stress, depression, marital quality

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## Introduction

Chris Kyle is considered by some to have been the most effective military sniper in United States history, having been officially credited with over 160 confirmed kills in the line of duty. His life has been chronicled in a bestselling autobiography and experienced by many who have watched a major motion picture based on that book. A self-proclaimed cowboy from Texas who loved his country, and to a greater extent the men he served with, he was the first to admit that his success as a member of an elite Navy SEAL team did not come without dire consequences. He suffered from depressive symptoms which affected him internally and impacted his marriage and family relationships. In addition, he had suffered many symptoms of what could be classified as post-traumatic stress disorder (PTSD) which would ultimately contribute to his untimely death at the hands of a fellow veteran allegedly suffering from a clinical level diagnosis of that same psychological condition (Kyle, McEwen, & DeFelice, 2013).

Chris Kyle's experience with depression symptoms and post-traumatic stress symptoms (PTSS) is not unique. There are over 19 million military veterans in the United States today, each having their own personal military service experiences. These experiences range from full close quarters combat to noncombat support roles. Many veterans experience trouble upon reintegrating into civilian life, especially when the conflict that they participate in is unpopular at home. Vietnam-era veterans, regardless of their experiences or service-roles, faced this trouble upon their immediate return from service due large scale protests against military service of any kind (Bonior, Champlin, & Kolly, 1984). After having served their country, the veterans of that era found themselves largely marginalized from mainstream society, as opposed to the reception of veterans of previous conflicts.

Currently there are about seven million veterans that served in the Vietnam-era (U.S. Census Bureau, 2013). Studies of male Vietnam-era veterans have shown increased lifetime prevalence rates of clinical depression about three times higher than their civilian counterparts (veteran prevalence rate = 4.5%, civilian prevalence rate = 1.5%; Jordan et al., 1991). Veterans are also at a risk of about two to three times higher (14-20%) than the general public (7%) to develop a clinical level of PTSS (U.S. Department of Veterans Affairs, 2014). Research has shown that both depression symptoms and elevated PTSS have been linked with lower ratings of marital quality and higher levels of marital distress (Coyne, Thompson, & Palmer, 2002; Jordan et al., 1992; Kulka et al., 1990). Further, the rate of divorce among veterans with clinical levels of PTSS is twice that of veterans without PTSS (Kulka et al., 1990; Price & Stevens, 2014). Because disruption in family stability has been linked to lower financial security and poorer overall health (Larson & Halfon, 2012; Vaus, Gray, Qu, & Stanton, 2014), identifying ways to improve marital quality could positively impact the lives of veterans and their family members.

In addition to the effects of depression symptoms and PTSS on a marriage relationship, these two conditions are frequently expressed simultaneously, especially among veteran populations. Comorbidity rates for clinical diagnoses of depression and PTSD among veterans range from 36 to 50 percent (Bleich, Koslowsky, Dolev, & Lerer, 1997; Campbell et al., 2007; Ramsawh et al., 2014). According to a report commissioned by the Congressional Budget Office (Bass & Golding, 2014), spending on Veterans Administration disability compensation was \$54 billion in 2013, amounting to 70 percent of the Veterans Benefits Administration budget. The same report noted that four percent of that total disability spending in 2013 was directly due to high rates of PTSS. Specifically among Vietnam-era veterans, the total number of veterans

receiving disability benefits had increased by more than 60 percent since 2000. The same report estimates that the total VA disability spending for 2015 will be \$64 billion.

Although research has addressed the impact of depression symptoms on marital quality, and of PTSS on marital quality, little attention has been given to the combined impact of these factors in the marriages of veterans, who have an increased risk of experiencing these psychological challenges. A limited number of studies have examined the prevalence of comorbid depression symptoms and PTSS (Shalev et al., 1998), yet none have addressed these in connection with marriage relationships. In addition, Vietnam-era veterans are moving into later life when retirement often leads to increased time with their spouse and extended families. Using data from 617 married Vietnam-era veterans that participated in the Life and Family Legacies Study (REF), the current study evaluates the associations between depression symptoms and marital quality as well as the moderating effect of PTSS on that relationship in order to fill in this gap in the research.

### **Theoretical Background**

Family stress theory provides a framework for understanding how depression symptoms are associated with marital quality, and how that link might differ for someone with PTSS. Various family stress theories suggest that stressors can impact family relationships depending on perceptions of stress and available resources (Burr, 1982; McCubbin & Patterson, 1983). Karney and Bradbury's Vulnerability-Stress-Adaptation model of marriage (1995) provides further guidance in understanding the impact of stressors on relationships in the context of enduring vulnerabilities. Specifically, Karney and Bradbury state "capacity for adapting to stressful circumstances also will be influenced by the *enduring vulnerabilities* that individuals possess" (1995, emphasis added, p. 23). Thus, the effect of a stressor on an outcome is

sometimes modified by an enduring characteristic or vulnerability. Specifically, when a husband experiences depression symptoms (such as feeling down, self-rumination) his marital quality may suffer through negative impacts on communication patterns, rituals, and conflict resolution skills. When that same husband also has the enduring vulnerability of PTSS (such as withdrawal, hyper-vigilance, anger), the impact of depression symptoms on his marriage may be compounded. The increased self-focus and rumination (depression symptoms) may be exacerbated by the presence of PTSS. For example, a ruminative spouse who has been in combat in the past may be forced to relive that experience (i.e. flashbacks) as they turn inward. In other words, turning inward (depression) can be detrimental to marriage quality; turning inward and reliving trauma (PTSS) may be worse.

In short, the impact of depression symptoms on marital quality may differ for someone with PTSS compared to someone without that enduring vulnerability. Combining aspects from these family stress theories, a conceptual model for the current study (see Figure 1) suggests that depression symptoms act as a stressor on marital quality, with PTSS as a moderator of that association.

### **Depression Symptoms**

According to DSM-V criteria (American Psychiatric Association, 2013) depression is characterized by sadness, diminished interest in activities and friends, and overall feelings of worthlessness among other symptoms. Most people readily identify pervasive sadness as a symptom of depression. A consistent feeling of gloom and despair may weaken one's ability to enjoy any positive aspect of life. Reduced interest in activities and others may manifest itself as a husband who will not attend any social activities with his wife. Sadness and diminished social activity could also influence one's self-worth. Feeling unappreciated and unimportant by those

around you can influence the amount of time you spend focused on anything other than yourself. A clinical diagnosis of a major depressive disorder requires that five or more symptoms be present simultaneously for at least two weeks (American Psychiatric Association, 2013). However, symptoms associated with depression may have a significant effect without reaching a clinical diagnostic threshold. Depressive symptoms may act individually or collectively to influence the way one responds to daily stressors.

Depression symptoms affect people in various ways. Studies have found that higher levels of depressive symptoms are significantly linked with lower levels of physical functioning (Roshanaei-Moghaddam, Katon, & Russo, 2009; Schwarz, Shen, Eisenberg, Mallon, & Phan, 2011). Additionally, researchers have found that depression symptoms are associated with reduced social interaction, especially in men (Blanco & Barnett, 2014; Breslin, Gnam, Franche, Mustard, & Lin, 2006)

### **Depression Symptoms and Veterans**

Service in the armed forces is inherently dangerous both psychologically and physically. Studies of Vietnam-era veterans have estimated lifetime prevalence rates of clinical depression to be as many as two to three times higher than civilians (Jordan et al., 1991). Studies have also shown associations of increased acute and chronic health conditions for veterans, especially those who serve during times of armed conflict (Brooks, Laditka, & Laditka, 2008; Lew et al., 2009). For many veterans the process of reintegrating into civilian society and familial relationships can be a difficult adjustment (Sayer et al., 2010), that may sometimes trigger depressive symptoms. For many veterans mental health and marital concerns arise in the years beyond their immediate release from deployment or service (Bliese, Wright, Adler, Thomas, &

Hoge, 2007; Milliken, Auchterlonie, & Hoge, 2007). This later debut of concerns may indicate that depressive symptoms and their effects persist over time.

### **Depression Symptoms and Marital Quality**

Depression symptoms can negatively impact many of the processes involved in marriage relationships. People who experience depressive symptoms and respond in ruminative ways may repetitively focus on negative emotions and worry about why they feel the way they do, while increasing their feelings of ineffectiveness (Nolen-Hoeksema, 2000) and overall negativity (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998). Depressive symptoms such as these may influence a person to focus on themselves. The inward focus-on-self aspect of depression symptoms may lead to withdrawals from interpersonal maintenance routines that a healthy marriage relationship commonly requires. Studies have linked this type of self-focused behavior with spousal emotional withdrawal, changes in relational perception and expectations, and overall reduced marital satisfaction (Marchand, 2004; McCabe & Gotlib, 1993; Uebelacker, Courtnage, & Whisman, 2003). Constant worry, negativity, dysphoria, and loss of self-esteem that depression embodies have also been linked to lower expressions of affection, reduced instance of physical intimacy, and higher complaints about the marriage relationship (Caughlin, Huston, & Houts, 2000; Coyne et al., 2002; Goff, Crow, Reisbig, & Hamilton, 2007). In summary, when one spouse experiences depression symptoms, various emotional, behavioral, and physical aspects of the marriage relationship can be impacted.

### **Post-traumatic Stress Symptoms**

Post-traumatic stress symptoms (PTSS) are symptoms that are associated with post-traumatic stress disorder (PTSD). PTSD is a trauma/stressor disorder that can potentially be disabling which, according to the DSM-V, involves “exposure to actual or threatened death,

serious injury, or sexual violence” and leads to “irritable behavior...reckless or self-destructive behavior... (and) hyper vigilance” (American Psychiatric Association, 2013, p. 271). The three main categories of PTSS involved in a clinical assessment for PTSD are intrusion, hyper-arousal, and avoidance. Intrusion symptoms refer to way that memories of the traumatic experiences “intrude” into everyday life. For example, a soldier who survived a military battle involving explosions and traumatic injuries may re-experience the event through “flashbacks”. Flashbacks are commonly triggered by a specific verbal or visual cue related to the traumatic experience. Normal events, such as a firework show, may trigger a flashback to exploding mortars and artillery from the past traumatic experience. Trauma survivors may exhibit hyper-arousal symptoms in an attempt to plan for and avoid reliving traumatic experiences. Hypervigilance may manifest itself, for example, as a trauma surviving veteran that jumps at any loud sounds, always sits with his back towards a wall while in public places, or who is quick to anger over minor unexpected events. Avoidance is typified by behavior aimed to not only avoid re-experiencing the trauma, but to possibly avoid any unpredictable experience at all. At its worst, a combat veteran suffering from avoidance symptoms may not leave their house at all for fear of the unexpected.

### **PTSS and Veterans**

Among the general population of the United States, the adult prevalence rate over a lifetime for a clinical diagnosis of PTSD is 7.8 percent (National Center for PTSD, 2013). The same researchers estimate that around 30 percent of male Vietnam-era veterans will suffer from a clinical diagnosis of PTSD during their lifetime. Additionally, the National Vietnam Veterans Readjustment study (NVVRS), conducted from 1986-88, reported that more than half of all male Vietnam-theater veterans have suffered from “clinically serious stress reaction symptoms” and

that about 15% of them were “current” cases of PTSD (Kulka et al., 1990; National Center for PTSD, 2013). These percentages are not small or inconsequential when considering that over three million men served in Vietnam.

The NVVRS was conducted when the majority of the veterans were between 10 and 20 years removed from active duty in the Vietnam Theater of operations. The decades following military experience may be considered an incubation period in which the unseen effects of trauma exposure are increasing their potential to be manifested. In studies on veterans of previous conflicts, Port, Engdahl, and Frazier (2001) found that many older veterans are less likely to experience clinical levels of PTSD in earlier life, but are likely to experience an increase in PTSS levels in later life. This delayed onset of post-traumatic stress symptoms may be more prevalent than is currently known, and thus may be impacting marriage at a higher rate than anticipated.

### **PTSS and Marital Quality**

Many studies have linked higher instances of post-traumatic stress symptoms (PTSS) with decreases in marital and relationship satisfaction. Caselli and Motta (1995) found that PTSS and combat exposure were negatively associated with measures of marital satisfaction. Similarly, among various groups of veteran and active-duty couples, higher levels of PTSS were significantly associated with lower reports of couple functioning and satisfaction (Klaric et al., 2011; Melvin, Gross, Hayat, Jennings, & Campbell, 2012). These and other studies suggest a common link between PTSS and marital quality.

According to the DSM-V, post-traumatic stress symptoms can impair social function. Researchers have found that two consequences of PTSS are decreased social function (Zatzick et al., 1997) and interpersonal problem-solving skills (Schnurr, Lunney, Bovin, & Marx, 2009). In

order for a marriage to be satisfactory, both social functioning and problem-solving skills need to be present to repeatedly negotiate and solve daily problems that arise. Additionally, higher PTSS has been associated with higher levels of anger, aggression, and hostility (Jakupcak et al., 2007), all of which are not conducive to healthy marital processes (Baron et al., 2006; Lawrence & Bradbury, 2001).

### **Interaction of Depressive Symptoms and PTSS Symptoms**

The interaction of specific depression symptoms and PTSS symptoms may have a unique combined effect. Regarding depression, although depression is commonly associated with symptoms of dysphoria, some suggest that depression can lead to an unhealthy and maladaptive focus on the self. Specifically, Beck (1967) suggested as part of his Cognitive Model of Depression that individuals may develop cognitive processes involving egoistic biases or preferences to internal thoughts. That is, depressed individuals may become self-focused as a means of psychological protection and preference. In other words, the thoughts and attitudes of those experiencing depression symptoms may be further turned toward themselves, not necessarily by choice. Interpersonal relationships, such as marriage, may then suffer as the distressed spouse may be less apt to focus on outward aspects of life.

Some post-traumatic stress symptoms may also exacerbate the effect of turning inwards and emotional isolation. Specifically, post-traumatic stress symptoms include the mental replaying of negative experiences, proclivity to avoid and withdraw from others, and feelings of hyper arousal (American Psychiatric Association, 2013). PTSS may subject a person who is psychologically turning inward because of depressive symptoms to experience the relived traumatic experience more frequently. Additionally, a person who psychologically turns inward, only to find the ugliness of reliving traumatic experiences, may report a different level of marital

quality. This potentially dangerous cycle of inward thought and internal trauma re-experience may magnify the initial effects of depressive symptoms on marriage quality. Marriage quality may especially suffer for a person with higher depressive and PTSS compared to someone with lower levels of either depressive symptoms or PTSS.

### **Current Study**

Based on family stress theory, the current study fills a gap in the literature by addressing the marital quality outcomes of Vietnam-era veterans. Various studies have established links between depression and marital quality (Fincham, 1997) and PTSS and marital quality (Caselli & Motta, 1995), but not the interaction of those factors on marital quality. In the immediate decades following the end of the Vietnam War, the U.S. Department of Defense commissioned the NVVRS in order to assess the psychological outcomes of the veterans of that era (Jordan et al., 1991, 1992; Kulka et al., 1990; Weiss et al., 1992). However, few, if any, recent studies (in the last 10 years) have addressed these topics within the context of veterans approaching later life. Important ramifications of veteran service on family relationships may be going unnoticed because of the general absence of research on the long-term impact of depression symptoms and PTSS on marital relationships involving Vietnam-era veterans.

Due to the last 25 years of United States involvement in armed conflict, there are approximately five million young veterans in the United States (U.S. Census Bureau, 2013). Although military experience often has an immediate impact on life, only time will tell how these young veterans' marriage and family relationships will be impacted in their later years by their past service (Elder, Shanahan, & Clipp, 1994; MacLean & Elder, 2007). To this end, researchers are in a unique position to better understand the family relationship implications of PTSS among younger and future cohorts of veterans. That is, by understanding the impact of

depression symptoms and PTSS on marriage relationships of the Vietnam-era cohort, that information might later apply to future generations of veterans and their families. The current study aims to accomplish just that: understand the impact of depression symptoms and PTSS on the marital quality of veterans who are now decades removed from military service and exposure to combat trauma.

### **Hypotheses**

The purpose of this study is to explore how the presence of elevated PTSS moderates the association between depression symptoms and marital quality. To address this purpose, the following three hypotheses are proposed:

1. *Increased depressive symptoms will be negatively associated with marital quality.*

Depressive symptoms have been linked to negative marital outcomes (REF).

Symptoms such as overall sadness, inward-turning thoughts, and interpersonal negativity may influence the amount of investment that the affected spouse is able to devote to the marriage relationship. This decreased relationship investment may then be associated with decreased marital satisfaction.

2. *Increased PTSS will be negatively associated with marital quality.* Increases in PTSS have been associated with higher levels of anger, aggression, and hostility (Jakupcak et al., 2007). Additionally, PTSS has been linked to a lower ability to solve interpersonal problems (Nezu & Carnevale, 1987). High levels of negativity within a marriage and a diminished ability to solve the conflict that may result could influence a couple to withdraw from one another. This withdrawal may reduce overall marital quality.

3. *PTSS is expected to moderate the relationship between depression symptoms and marital quality.* Depression symptoms have been linked with a turn to self-focused thought patterns. Beck's model (REF) provides insight on how self-focused thought may become cyclical in its nature. The inward-turn of one who suffers from depressive symptoms may be especially destructive depending on what exists within that person. A key component of PTSS is the mental re-experience of traumatic experiences. A person who suffers from both depressive symptoms and PTSS may also turn inward and only find the ugliness of relived trauma.

### **Method**

#### **Sample**

The sample was drawn from the Life and Family Legacies Study (LFLS; Call, Otto, & Spenner, 1982). The original study began as the Educational and Occupational Aspirations Study in 1966, with surveys completed by high school juniors and seniors enrolled in a stratified sample of public high schools in Washington state (original N = 6,729) (Call et al., 1982). Follow-up surveys with the same sample were conducted in 1980 (N = 5991; Otto, Call, & Spenner, 1981) and 2010 (N = 3348). Nearly half of the males in the original study were Vietnam veterans or Vietnam-era veterans and all were in their sixties (range of ages: 63-66) at the time of the 2010 survey. In 2010 the surveys were distributed by mail. Those who did not respond to the mail survey were contacted by telephone and given the opportunity to complete the survey over the phone (n = 403). From among all of the 2010 respondents who completed the survey, only those that were married and veterans (N = 617) were included in the sample for the current analyses. The 2010 survey included questions about major life events, family life, and health issues.

## Measures

**Marital quality (MQ).** Marital quality was assessed by using part of the Marriage and Adjustment Balance Scale that was developed by Orden and Bradburn (1968). The scale included 10 questions that asked about marital satisfactions and another 10 questions asked about marital tensions. Each question was answered by “yes” or “no”, and the total of the satisfaction items was added to the reverse-coded total of the tension items in order to create a scale from 0 to 20, in which a higher score indicated higher marital quality. MQ from 2010 is used to measure the outcome. Cronbach’s alpha for this scale was .73, indicating adequate reliability.

**Depression symptoms (DEP).** Depression symptoms were assessed by using five questions from the mental component summary portion of the SF36 Health questionnaire. The questions addressed aspects of depression including energy level, feeling down or blue, and feelings of calmness or happiness. The scale responses ranged from *All of the time (1)* to *None of the time (6)*, with 3 items being reverse-coded in order for higher overall scores to indicate higher depressive symptoms. Responses were used to create a latent variable, with factor loadings significant and above .44. Cronbach’s alpha for this scale was .80, indicating good reliability.

**Post-traumatic stress symptoms (PTSS).** Post-traumatic stress symptoms (PTSS) were measured using a list of 10 problems and complaints that people occasionally had in response to stressful situations within the last 30 days. The 10 items came from the PTSD Checklist (PCL) that was based on the 17 clinical symptoms of PTSD, as outlined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The PCL is a self-reported questionnaire that addresses the full range of DSM-IV based symptoms including the three symptom groups of PTSS: five intrusion symptoms, seven numbing/avoidance symptoms, and five hyper-arousal

symptoms (Weathers, Litz, Herman, Huska, & Keane, 1993). However, researchers have suggested that PTSS and depression symptoms could be one construct, measuring the same conceptual items (Forbes et al., 2011; O'Donnell, Creamer, & Pattison, 2004). In order to reduce potential overlap between PTSS and DEP, seven questions were omitted from the original PTSS scale. Four of these questions were eliminated based on wording that was similar to items that ask about depression. The other three questions were found to cross-load in a factor analysis including both PTSS and DEP items. The remaining ten questions covered aspects such as repeated memories of stressful experiences, avoiding talking about stressful experiences, and feelings of being "super-alert" or "on guard". Responses ranged from "not at all" = 0 to "extremely" = 4. The average level of PTSS in the sample was fairly low (mean = 4.17; range = 0 – 39), indicating that not many of the participants reported high levels of PTSS. A latent variable was constructed from the 10 remaining items with all factor loadings being significant and above .56. This measure was used to assess instance of PTSS. Cronbach's alpha for this scale was .93, indicating strong reliability.

### **Control Variables**

Control variables used in the current study include education level, annual household income, marital duration (in decades, and including its squared term), number of times married, having a service-related disability, and combat veteran status (see table 1). The average education level of the sample was between two and three years of college, with more than 80% of the sample reporting at least some college experience. The average yearly household income of the sample was coded as a measure of 1-15. The average for the sample was 11.19 (SD = 3.10). In dollars, this is equivalent to a little over \$70,000 (SD = \$30,000). The average marriage duration for the sample was a little less than 31 years, with close to 90% of the sample in their

first or second marriage. About 16% of the sample reported a service-related disability, such as chronic back pain or diseases attributed to chemical exposure. Lastly, close to half (48.93%) of the sample reported being involved in an active combat zone during their military service.,

### **Analyses**

Descriptive statistics were used to explore the central tendencies of the target variables (see Table 1). Next, zero order correlations were estimated between all of the study variables to explore their bivariate associations (see Table 2). To address the research hypotheses for this study, latent variable multiple regression models were estimated using *Mplus* (version 7.3). PTSS and DEP were modeled as latent variables, with each indicator being grand-mean centered. As seen in Table 1, the amount of missing data in the modeled variables is substantial in some cases (see last column of Table 1). For example, almost 24% of the sample ( $n = 148$ ) were missing data for the marital duration question. Respondents were not directly asked marital duration, but this information was calculated from a question about marital history that many respondents seemed to interpret as only being relevant when multiple marriages occurred. Rather than assume this was the case, however, we left this variable as missing where no clear indication was available. In addition, the number of times married was used as a control variable to partially account for the missing marital duration data. Among the three main variables of interest the percent missing reported in Table 1 indicates the percent missing on any one item for each construct. Very few participants were missing on all items for each construct (DEP  $n = 10$ ; MQ  $n = 14$ ; PTSS  $n = 8$ ). To account for the effect that missing data may have, full-information maximum likelihood estimation (FIML) techniques were used. All valid cases on the given  $x$  variable were used in the analyses to estimate the coefficient and standard errors that represented the relationship between the variables of interest (control or independent) and the outcome

variable. This was done by estimating the means and intercepts of each of the variables in the models shown in Table 3. Each model controlled for education level, household annual income, marital duration (including its squared term), number of times married, having a service-related disability, and whether or not the respondent had been involved in direct military combat. A graphical representation of the overall conceptual model can be seen in Figure 1.

### Results

Zero-order correlations between study variables indicated significant associations between DEP, PTSS, and MQ variables. These correlations were in expected directions, with higher DEP being correlated with higher PTSS, and higher DEP and PTSS being correlated with lower MQ. The main study variables were also related to some of the demographic controls. Specifically, DEP was negatively associated with income and positively associated with number of times married and service-related disability. This suggests that those reporting higher income experienced less DEP. In addition, those who reported being married a higher number of times and those that reported having a service-related disability experienced higher levels of DEP. Similarly, PTSS was negatively associated with both education level and income, suggesting that those with higher education and income experienced lower PTSS. PTSS was also positively related to service-related disability and combat-veteran status.

Regression analyses examined the main effects of depression symptoms and PTSS separately in relation to marital quality. The first regression model included the main effect of depression symptoms as a predictor of marital quality. This model fit the data appropriately ( $\chi^2 = 37.81$  (df = 34),  $p = .32$ ; CFI = .99; RMSEA = .01). The relationship between DEP and MQ was negative and statistically significant ( $b = -2.02$ ,  $p < .001$ ,  $z$ -value = -8.13), suggesting that a one unit increase in depression symptoms was related to a 2 point (or about two-thirds of a standard

deviation) decrease in overall marital quality (see Model 1 of Table 3). This model accounted for approximately 20% of the variance in MQ ( $R^2 = .20$ ).

As seen in Model 2 of Table 3, the next model included the main effect of PTSS as a predictor of marital quality. Fit indices for his model suggested adequate fit to the data ( $\chi^2 = 221.43$  (df = 99),  $p < .001$ ; CFI = .97; RMSEA = .05). The relationship between PTSS and MQ was also found to be negative and statistically significant ( $b = -1.19$ ,  $p < .001$ ,  $z$ -value = -5.77), suggesting that as respondents report higher PTSS, they also report lower marital quality. In other words, a one unit increase in PTSS was associated with a decrease of 1.19 points (or about two-fifths of a standard deviation) in MQ. This model accounted for approximately 11% of the variance in MQ ( $R^2 = .11$ ).

The next model combined the two prior models by including the main effects of both DEP and PTSS (see Model 3 of Table 3). This model fit the data reasonably well ( $\chi^2 = 270.93$  (df = 169),  $p < .001$ ; CFI = .98; RMSEA = .03). Results indicated that although PTSS was no longer significantly associated with MQ when DEP was in the model ( $b = -0.07$ ,  $p = .82$ ,  $z$ -value = -0.23), DEP was still negatively associated with MQ ( $b = -1.97$ ,  $p < .001$ ,  $z$ -value = -6.16) after taking into account PTSS. Specifically, a one unit increase in DEP was associated with a decrease of 1.97 points (a little over three-fifths of a standard deviation) in MQ. The only control variables that were significantly associated with MQ were marital duration ( $b = -2.03$ ,  $p < .01$ ,  $z$ -value = -3.27) and its squared term ( $b = 0.39$ ,  $p < .01$ ,  $z$ -value = 3.15), suggesting that marital duration has a curvilinear relationship with MQ. Specifically, the relationship starts negatively (as per the negative coefficient of marital duration), with a positive upswing (as per the positive squared coefficient) for longer duration marriages. This model accounted for approximately 21% of the variance in MQ ( $R^2 = .21$ ).

The final model included the main effects of DEP, PTSS, and introduced the interaction between these two predicting marital quality. The only model fit indicators available in Mplus using latent variable interactions were the AIC and BIC statistics. Both of these indices increased slightly in the final model (smaller values typically suggest a better fit), and the interaction between DEP and PTSS was not significantly associated with MQ ( $b = 0.08, p = .72, z\text{-value} = 0.35$ ; see Model 4 of Table 3).

Follow-up analyses were performed using Stata 14 and Mplus to explore the overlap issues between PTSS and DEP. Factor scores were calculated for PTSS and DEP and then used in a regression model to check for collinearity. Both the variance-inflation factor (VIF) and tolerance diagnostics for PTSS and DEP were found to be within acceptable cutoff points ( $> 10$  for VIF;  $< .1$  for tolerance) indicating the absence of high collinearity. In addition, a mediation model in which DEP accounts for the association between PTSS and MQ was tested. The model was estimated using bootstrapping (5000) to adjust standard errors in order to find correct indirect effects. PTSS was found to have a statistically significant indirect effect on MQ through DEP ( $b = 0.59, p < .001, z\text{-value} = 8.55$ ).

### **Discussion**

This study focused on three hypotheses in an attempt to better understand the relationships between depression symptoms, post-traumatic stress symptoms, and overall marital quality. The first two hypotheses proposed that DEP and PTSS would each have a negative relationship with marital quality. The third hypothesis proposed that PTSS would have a moderating effect (interaction) of the association between depression symptoms and marital quality. The results of this study supported both the first and second hypotheses. However, the third hypothesis was not supported by the results of this study.

Depression symptoms were found to have a statistically significant negative relationship with marital quality. This finding is in harmony with past research that has linked depressive symptoms such as withdrawal and self-focus with lower reported marital satisfaction (Marchand, 2004; Uebelacker et al., 2003). Theoretically, depressive symptoms seem to be stressor that may affect the processes that couples employ to address their concerns within the marital relationship (McCubbin & Patterson, 1983). Perhaps depression functions as "colored" mental lens that either distorts or sharpens the acuity of already existent marital quality factors, similar to Bradbury and Fincham's (1990) idea of attributions in marriage. Positive activities may be distorted or disdained, while negativity and withdrawal from social activity could become more focused for a spouse with depressive symptoms. As time passes, the ability to correct this mental vision defect may decrease. These findings are especially important for the participants in this study because of their potential increased risk of depression symptoms as veterans (Jordan et al., 1991).

Post-traumatic stress symptoms were similarly found to have a significant negative relationship with overall marital quality. This finding lends support for past studies that have linked increased PTSS with lower marital quality (Klaric et al., 2011; Melvin et al., 2012). These findings are especially relevant for the current sample because of its exclusive veteran population. Veterans are typically prone to higher rate of PTSS and thus may be at risk for reduced marital quality without being aware of that connection. In addition, Vietnam-era veterans, some of whom are 40 years removed from active duty, are reaching later-life. Port and colleagues (2001) have suggested that PTSS sometimes increases in later life, perhaps as work responsibilities begin to wane. Studies of World War II and Korean War veterans approaching the age of the veterans in this study have suggested that retirement may be a factor in reemergence of PTSS (Lipton & Schaffer, 1986; Nichols & Czirr, 1986). As formal work

responsibilities cease and free time increases, older veterans may find themselves ruminating on past traumatic experiences they had previously suppressed and forgotten. Further, as older adults look back on their life, it is common to conduct a “life review” and to evaluate choices and experiences (see Erickson ego integrity vs. despair; see life review research).

When both depression symptoms and PTSS were included in the regression model, depression symptoms remained significantly associated with marital quality, while PTSS was no longer statistically related to marital quality. The bivariate correlation between depression symptoms and PTSS was strong ( $r = .63$ ), indicating substantial overlap between the two constructs (Bleich et al., 1997; Ramsawh et al., 2014). This overlap exists despite removing items from the PTSS scale that seemed to tap depression symptoms. Further none of the depression items appeared to be tapping aspects of PTSD. It may be that depression mediates the association between PTSS and marital quality. That is, PTSS is associated with marital quality, but only through depression. Formal mediation analysis conducted as a follow-up to the original models in the study indicate that this may be the case (see results section). PTSS was found to have a significant indirect effect on MQ through DEP. Individuals that experience PTSS may be more prone to experiencing depression symptoms as well. That is, veterans experiencing PTSS symptoms may be at greater risk of comorbid depression, which would explain the robust correlation between the two. Although it is less intuitive that depression symptoms in later life would be associated with a greater risk for PTSS (new incidences and/or a resurgence of symptoms from prior trauma), little is known about how depression and PTSS interact across many years.

The statistical interaction of depression symptoms and PTSS was not significantly related to marital quality. Although frequently comorbid (Bleich et al., 1997; Ramsawh et al., 2014),

findings from this study suggested that elevated levels of PTSS did not exacerbate or attenuate the relationship between depression symptoms and marital quality. In other words, the presence of PTSS and depression symptoms did not appear to have a cumulative impact on marital quality.

### **Limitations and Future Research**

The current study was conducted using data that was fairly homogenous in some characteristics. First, the sample was originally drawn from a specific geographic location. Although the sample is representative of that location, it is less representative of veterans across the nation or even veterans of the Vietnam-era, especially with regard to race/ethnicity. Studies have noted multiple differences for racial minorities (African-American, Hispanic, American Indian) in psychological responses to military service (Jordan et al., 1991; U.S. Department of Veterans Affairs, 2014). Future studies need to examine how depression and PTSS relate with marital quality among veterans of various race/ethnic backgrounds.

Additionally, research that addresses specific marital processes may be beneficial for the overall understanding of relationships between PTSS, depression, and marital quality. Study of specific marriage processes such as problem solving, conflict resolution, and shared intimacy may better reveal the effects of past trauma exposure and current depressive symptoms. Recent research on younger veterans may serve as a template to conduct research on older veteran cohorts (see Bennett, Lundberg, Zabriskie, & Eggett, 2014; Breyer et al., 2014). However, the marriage processes of older veterans may be different from younger cohorts; many are retiring, taking on grandparent roles, and confronting chronic health concerns. Methodological strategies may need to be modified for research on later life veteran cohorts.

Research using clinical populations who are seeking treatment for clinical depression, PTSD, or both may be helpful in attempting to understand potential combinations in relation to marital quality. Analysis of clinical levels of symptoms using the current dataset was not ideal as few individuals reported clinical levels of distress. Using a clinical approach to code responses to the PCL in the current sample, only 36 of the 617 veterans reached clinical levels of PTSS (i.e., PTSD). Models using this approach were not estimable (models not shown in this manuscript, but are available upon request). No clinical cutoffs were available for the depression measure used in the study. Future studies with such data available could lead to further insights in how depression and PTSD interact in relation to marriage.

Questions also arise about the directionality of the relationships between depression symptoms, PTSS, and marital quality. Ideally, longitudinal data could be used to expand on the findings of this study. Unfortunately, longitudinal data was not available for the specific variables in the current study. Future longitudinal work would advance our understanding of these associations.

### **Conclusion**

Few recent studies have addressed the Vietnam-era veteran cohort in regard to their marital and family relationships. The importance of examining this group is increasing as Vietnam-era veterans move into their later years where PTSS may return or increase (Port et al., 2001). The long term impact of past trauma experiences of older veterans is not well understood by researchers and clinicians alike. The current study may clarify how depression symptoms and PTSS overlap in relation to marital quality among Vietnam-era veterans. Studies that are looking into the current impacts of recent trauma among younger cohorts of veterans are numerous. However, the impact of those same traumatic experiences forty years from now is largely

unknown. Vietnam-era veterans are now entering later life as retired spouses with more free time to spend with spouses and extended family. They may also be grandparents interacting more frequently with children and grandchildren. Investigations into the impact that military service has on the mental and emotional health, as well as marital quality of Vietnam-era veterans may be crucial. Results of this study suggest that mental health screenings and assessments may be important parts of older veteran healthcare.

Increasing numbers of young veterans, not unlike Chris Kyle, are returning every day from current battlefields. In financial terms, spending on veterans' healthcare will only increase as past veteran cohorts age, and new cohorts of veterans return home. Researchers are now in a unique situation to study an older group of veterans in order to understand what these new veterans may encounter as they age. As a result, further research on the relationship of depression symptoms, post-traumatic stress symptoms, and marital quality among Vietnam-era veterans is needed.

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*Table 1.* Means, Standard Deviations, and Ranges for Main Study Variables and Controls

	Mean or %	SD	Range	n	Missing Data %
Marital Quality (MQ)	15.83	3.14	0-20	525	14.91% <sup>a</sup>
Depression symptoms (DEP)	1.96	0.73	1-6	511	17.18% <sup>a</sup>
Post-traumatic stress symptoms (PTSS)	4.17	6.53	0-39	593	4.05% <sup>a</sup>
Education (Edu)	4.78	2.02	1-8	612	0.81%
Income (Inc)	11.19	3.10	1-15	564	8.59%
Marital duration (Mdur)	3.09	1.09	0.1-4.4	469	23.99% <sup>b</sup>
Marital duration (MdurS)	10.71	5.60	0.01-19.36	469	23.99% <sup>b</sup>
Times married (XMar)	1.54	0.79	1-6	584	5.35%
Service-related disability (SVDI)	15.74%			610	1.13%
Combat veteran (Comb)	48.93%			605	1.94%

*Notes.* <sup>a</sup>Missing percentages were calculated based on having missing data from at least one item of the scales indicated. The percent of missing on all items for a given scale was much smaller (see reported numbers in text).

<sup>b</sup>Marital duration was calculated from responses to questions about prior marriage (marital history)

Table 2. *Latent Variable Zero-order Correlations of Study Variables*

	MQ	DEP	PTSS	Edu	Inc	Mdur	MdurS	XMar	SVDI
MQ									
DEP	<b>-.42***</b>								
PTSS	<b>-.28***</b>	<b>.63***</b>							
Edu	.01	-.07	<b>-.16***</b>						
Inc	.08	<b>-.16**</b>	<b>-.12**</b>	<b>.42***</b>					
Mdur	-.04	-.05	-.02	-.04	<b>-.10*</b>				
MdurS	.01	-.06	-.02	-.05	<b>-.10*</b>	<b>.98***</b>			
XMar	.01	<b>.11*</b>	<b>.17***</b>	-.05	.03	<b>-.69***</b>	<b>-.70***</b>		
SVDI	-.08	<b>.23***</b>	<b>.43***</b>	-.07	-.06	-.07	-.06	<b>.15***</b>	
Comb	.01	.07	<b>.20***</b>	<b>-.19***</b>	-.05	.08	.08	-.01	<b>.22***</b>

*Notes.* MQ = Marital quality, DEP = Depression symptoms, PTSS = Post-traumatic stress

symptoms, SVDI = Service-related disability. Comb = Combat veteran, Mdur = Marital duration, MdurS = Marital duration-squared, XMar = Times married, Edu = Education level, Inc = Income.

Model Fit for Measurement Model wherein correlations were estimated:  $\chi^2 = 607.83$  (df = 243),  $p < .001$ ; CFI = .96; RMSEA = .05.

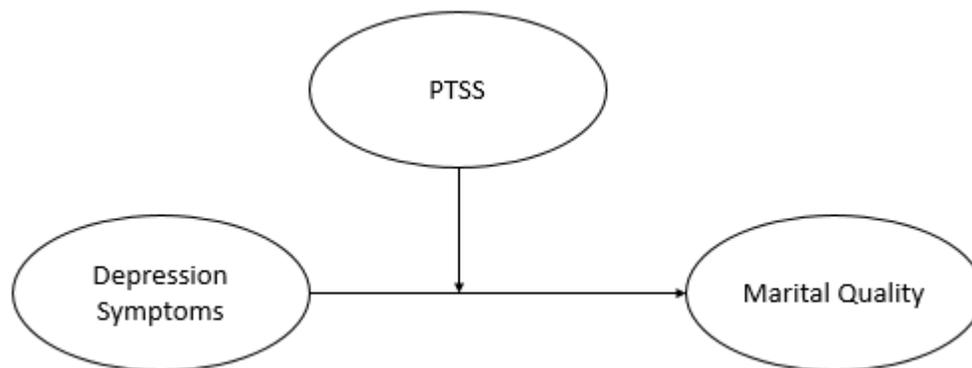
\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 3. *Coefficients of Study Variables in each model on Marital Quality*

	Model 1 DEP b(se)	Model 2 PTSS b(se)	Model 3 DEP & PTSS b(se)	Model 4 Interaction b(se)
Edu	-0.02(0.07)	-0.07(0.07)	-0.03(0.07)	-0.03(0.07)
Inc	0.01(0.05)	0.07(0.05)	0.02(0.05)	0.02(0.05)
Mdur	<b>-1.98**(0.63)</b>	<b>-2.23**(0.66)</b>	<b>-2.03**(0.62)</b>	<b>-2.03***(0.55)</b>
MdurS	<b>0.38**(0.13)</b>	<b>0.45**(0.13)</b>	<b>0.39**(0.12)</b>	<b>0.39***(0.11)</b>
Xmar	0.24(0.26)	0.29(0.27)	0.25(0.26)	0.25(0.25)
SVDI	-0.02(0.37)	0.13(0.41)	-0.04(0.40)	-0.03(0.42)
Comb	0.18(0.27)	0.32(0.28)	0.15(0.27)	0.15(0.26)
DEP	<b>-2.02***(0.25)</b>		<b>-1.97***(0.29)</b>	<b>-1.98***(0.35)</b>
PTSS		<b>-1.19***(0.21)</b>	-0.07(0.32)	-0.15(0.41)
Interaction				0.08(0.22)
$\chi^2$ (df)	37.81 (34)	<b>221.13***(99)</b>	<b>270.93***(169)</b>	a
CFI (RMSEA)	.99 (.01)	.97 (.05)	.98 (.03)	a
AIC (BIC)	19941.02 (20250.76)	24255.29 (24653.58)	30603.71 (31178.95)	30605.56 (31185.22)
# of parameters	70	90	130	131
$r^2$	<b>.20***</b>	<b>.11***</b>	<b>.21***</b>	a

Notes. <sup>a</sup> Absolute fit statistics and  $r^2$  not available in Mplus with latent variable interactions.

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Figure 1. *Conceptual Model of Study*

*Notes.* Demographic control variables are included in the statistical analyses.