

HIS AND HERS: HOW MILITARY SPOUSES EXPERIENCE PHYSICAL,  
PSYCHOLOGICAL, AND RELATIONAL HEALTH

by

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Within military couples, military personnel and their civilian spouses experience both common and unique complexities due to their connection to the military; however, the literature to date has only scratched the surface in investigating how the health of both members of the couple is influenced by this experience. The purpose of the present study was to extend what is currently known about the interface between biological, psychological, and relational health for military couples. Trends within the literature reveal that civilian spouses often face significant challenges as a result of their connection to the military at a comparable level to their military husbands. The present study found that distress, depression, and physiological stress were significant predictors of wives' relational health factors (i.e., marital quality and marital satisfaction), but did not predict husbands' relational health. It is recommended that systemic assessments be developed to fully capture how each spouse's individual experiences inform the couple's relational health. In addition, general mental health assessments, including distress screenings, should be implemented regularly for civilian spouses seeking services at military medical facilities. Lastly, primary care military medical clinics should adopt an integrated care model to consider and treat medical and mental health concerns concurrently.



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## PREFACE

This thesis is comprised of five chapters that cover a wealth of information with regard to military couples' biological, psychological, and relational health. Although I do not have personal experience with military couples, through my education in the East Carolina University Marriage and Family Therapy master's program and in my experience with medical family therapy, I have discovered a deep-rooted passion for this work. As a marriage and family therapist, I have spent the past two years focusing on the complexities of couple relationships and how couples navigate life stresses, and have been impressed with numerous military couples' ability to find sources of strength and resiliency in the face of significant challenges. Further, the willingness of the military personnel and their spouses to share their personal stories with me has acted to enrich my experience in working with this population, as well as my process in crafting this thesis. I am hopeful that this research will assist other professionals in developing a better understanding of the health of both military spouses across the biopsychosocial domains, and will inform future research, policy, and clinical practice when working with the military population.

## CHAPTER 1: INTRODUCTION

### **Introduction**

Currently there are approximately 3.6 million employees within the Department of Defense, of which 1.4 million men and women are classified as active duty (Department of Defense [DoD], 2010). Within this population, 56% are married, 44% have children, and 5% are single parents (DoD, 2010). In a study by Hogan and Seifert (2010), military personnel who were between the ages of 23-35 and who served less than two years in active duty had a higher probability of being married than their civilian counterparts. In fact, military personnel and their spouses are three times more likely to be married at an earlier age than their comparable civilian counterparts (Hogan & Seifert, 2010). Given that over half (51.5%) of active duty personnel are 25 years of age or younger (DoD, 2010) and that younger marriages are more likely to end in divorce (Hogan & Seifert, 2010), this population is especially at risk for marital concerns (Karney & Crown, 2007).

Many marriages begin while in the military, and for some, marital life in the military has been viewed as stressful, yet successful (Baptist et al., 2011); however, for others it has ended in divorce (Hogan & Seifert, 2010). In 2009, 3.6% of officers and enlisted personnel sought a divorce (DoD, 2010). Hogan and Seifert (2010) reported that the probability of divorce increased significantly for those who have served more than two years on active duty. The Agency Group within the DoD (2008) noted:

Comparing these statistics to civilian divorce rates is difficult, officials said, but most sources agree that about 50 percent of first marriages end in the United States. The highest incidence of civilian divorce is within the 20- to 29-year-old population, which

also makes up the largest percentage of the military. (Service Programs Strive to Strengthen Military Marriages, Curb Divorce section, para. 7)

By reporting the age range of 25 years of age or younger as the largest age group enlisted in the military (DoD, 2010) along with divorce statistics across all ages of military couples in all branches, concerns about marital health are punctuated. In other words, the relationship between the age range of personnel and an increased risk for divorce for military couples is likely given that younger marriages (e.g., those who are 20 and younger at time of marriage) have a greater likelihood for divorce when compared to partners who marry in their mid to late 20s.

Being in the military influences military personnel, civilian spouses, and marriages in unique ways. While there are certain experiences that directly involve one partner (e.g., deployment, physical health challenges, or psychological symptoms), overtime these experiences may exacerbate the health of their partner and ultimately the relationship. The health and stability of military marriages is a product of the individual health factors of both partners, as well as the relationship itself. Therefore, both individual and relationship factors that affect the health of military marriages will be explored below.

### **Health of Military Personnel**

When considering biological health, the reports of military personnel may range from having few or no health concerns to experiencing significant injury and pain. Military personnel, especially those who have recently returned from combat, commonly experience significantly more health concerns compared to civilian populations (Fisher, 2007). Military personnel often experience changes or challenges to their physical health, such as physiological stress (i.e., heart rate variability, Smith et al., 2011; Tan et al., 2009), pain (Haskell, Heapy, Reid, Papas, & Kerns, 2006; MacGregor, Dougherty, Mayo, Rauh, & Galarneau, 2012), traumatic brain injury (TBI)

(Fisher, 2007), amputations (Fisher, 2007), and other medical conditions (Haskell et al., 2010). Unfortunately, these health factors are often accompanied by emotional and mental health challenges (Asmundson, Stein, & McCreary, 2002; Pietrzak, Russo, Ling, & Southwick, 2011).

In examining mental health, researchers have shown that military personnel, when compared to civilians, often have higher rates of depression (Sayers, Farrows, Ross, & Oslin., 2009; Tsai, Pietrzak, Southwick, & Harpaz-Rotem, 2011), levels of psychological stress (Allen, Rhoades, Stanley, & Markman, 2010), anger problems (Bliese, Wright, Adler, Thomas, & Hoge, 2007), and other general mental health issues (Warner, Appenzeller, Warner, & Grieger, 2009). An examination of these complications with comorbid health conditions by Boscarino (2004) further punctuates the complex ways that military populations experience biopsychorelational health issues. Specifically, Boscarino asserts, “the degree of exposure, social variables, individual history, and other factors appear significant in determining the impact of traumatic events on mental health” (2004, p. 142). Evidence of these biopsychorelational links are also found in research on inflammation and relational health conducted by Kiecolt-Glaser, Gouin, and Hantsoo (2010). They concluded, “depression is reliably associated with relationship conflict and lower social support, providing one psychological mechanism through which close relationships influence inflammation” (Kiecolt-Glaser et al., 2010, p. 34). From this, it appears that it is difficult to tease out one aspect of health (i.e., biological, psychological, social) without also recognizing other components of health. The health of the military personnel is further influenced by the health of the civilian spouse.

### **Health of Civilian Spouses**

While military personnel often experience various health concerns specific to their roles in the military, civilian spouses may also struggle with biological as well as psychological and/or

social health concerns. Civilian spouses' biological health may be significantly affected by their connection to the military via their spouse. Civilian spouses of military personnel have been shown to struggle with physical symptoms, such as headaches, changes in their menstrual cycle, difficulty sleeping, and changes in body weight (Dimiceli, Steinhardt, & Smith, 2010), especially during times of separation from their spouse. In addition, physiological stress (Menchaca & Dehle, 2005) is a common challenge to civilian spouses' physical health, requiring higher levels of self-regulation and potentially resulting in additional adverse health outcomes (Smith et al., 2011).

Civilian spouses also experience common psychological and relational health concerns. These psychosocial concerns include, but are not limited to, depression (Eaton et al., 2008; Warner et al., 2009), caregiver burden (Warner et al., 2009), psychological distress (Allen et al., 2010), and family separation (McLeland, Sutton, & Schumm, 2008). In fact, many times spouses of military personnel have a different, and often worse, perception of their marital functioning (e.g., confidence in the relationship, positive bonding, and satisfaction with sacrifice) than their partner (Allen et al., 2010). Additional concerns stem from the added pressure on wives to conform to the image of an "ideal wife" set by the military (e.g., to support their partner's military service and to be proud of their partner's military service) (Eran-Jona, 2011) and put aside their own challenges or apprehensions. Wives tend to be less able to develop independent careers; rather, they have accommodated to the role and social expectations around their husbands' military involvement (Eran-Jona, 2011), which may potentially influence the marital relationship.

## **Health of Military Relationships**

In addition to military personnel and their spouses' individual experiences, there are additional complexities that couples in the military face that can both negatively and positively influence the marital relationship. Researchers have found that military couples may experience domestic violence (Sayers et al., 2009), family violence (Sayers et al., 2009), divorce (Hogan & Seifert, 2010), regular relocation (Eran-Jona, 2011), negative emotional health (Mansfield, 2010; Renshaw, Rodrigues, & Jones, 2008), trauma and secondary-trauma (Figley, 1988; Goff, Crow, Reisbig, & Hamilton, 2007; Warner et al., 2009), division of labor and role conflict (Eran-Jona, 2011) and marital dysfunction (Allen et al., 2010; Mattson, Paldino, & Johnson, 2007; Sayers et al., 2009). Researchers also posit that the demands of military life (such as deployments) might restrict the ability of spouses to maintain closeness and intimacy (Karney & Crown, 2007).

The unpredictability of deployment can contribute further to the stress on military couples (Schumm, Bell, & Gade, 2000). More specifically, during times of deployment, exposure to combat can later disrupt the process of developing, maintaining, and negotiating intimate and meaningful marital relationships for many couples (Lantz & Gregoire, 2000). All of these factors have the capability of severely affecting a couple's relational health (Allen et al., 2010; McLeland et al., 2008; Renshaw et al., 2008) and ultimately can alter the trajectory of even the healthiest of marriages.

Although many military marriages experience the negative effects of these biological, psychological, and social risk factors, many couples have also developed "adaptive processes" to manage the stresses unique to the military lifestyle (Karney & Crown, 2007, p. #). Karney and Crown (2007) assert that, "adaptive processes refer to all the ways that spouses interact, communicate, resolve problems, provide support, and understand each other" (p. 24). These

authors conclude, “the contemporary military experience contains elements that are likely to benefit marriages” (Karney & Crown, 2007, p. 57-58), such as support from the military, opportunities for personal, career, and financial growth, and a supportive community.

Additionally, Karney and Bradbury (1995) have examined specific traits of strong marriages and found that spouses who were characterized as having strength and resilience (e.g., higher levels of education, positive childhood environment, absence of psychopathology) tended to fair better in relationships than spouses who had traits of risk and vulnerability (e.g., have criminal records, use illegal substances). While military couples often face many sources of stress that are unique to the military life, there are many healthy, resilient couples in the military who have developed strategies for coping and overcoming constraints (Karney & Crown, 2007).

### **Conceptual Models**

Given the distinct strengths, complexities, and stressors that military couples experience compared to their civilian counterparts, both members of the couple may be at higher risk for adverse effects across biological, psychological, and relational domains. One of the models that was utilized to ground this thesis is the biopsychosocial model, proposed by George Engel (1977). This holistic approach examines how different systems connect to and influence each other, and holds that no single element can be fully explored without also exploring and considering the other domains of experience. Through this model, Engel posits that biological, psychological, and social experiences are interconnected and have the ability to influence one another. Engel (1977) notes, “A medical model must also take into account the patient, the social context in which he lives, and the complementary system devised by society” (p. 132). Although researchers are united in concluding that military involvement has the capability of influencing marriages (Baptist et al., 2011; Hogan & Seifert, 2010; Karney & Bradbury, 1995;

Karney & Crown, 2007), it is not yet clear how marriages, specifically in terms of marital quality and satisfaction, are altered by life in the military. While there are many factors that could be assessed via the social realm, the couple relationship was the primary focus that was explored for this thesis, and because the couple was the unit of analysis, the language of *biopsychorelational* is used throughout the remainder of the document (Lewis, Lamson, & Lesueur, 2012).

A second model that informs this thesis is the ‘trauma transmission model’ (Adelman, 1995; Figley, 1995). This model asserts that when one spouse experiences a traumatic event, the other spouse may also develop symptoms resulting from the experience. For example, Arzi, Solomon, and Dekel (2000) found that spouses of trauma survivors often exhibit symptoms of stress, anxiety, depression, isolation, poor relationship quality, and lowered levels of intimacy compared to wives married to military personnel without any known trauma history. Further, Nelson, Wangsgaard, Yorgason, Higgins Kessler, and Carter-Vassol (2002) identified seven themes that correspond with trauma transmission, including: polarized emotional roles, extreme pursuer-distancer patterns, rules of secrecy surrounding the trauma, individual trauma symptoms for the primary survivor, individual issues for the non-traumatized partner, emphasis on the parental role of the non-traumatized partner, and an impact on other subsystems. It is important to note that the non-traumatized spouse may experience lesser, equal, or perhaps even greater symptom severity compared to their partner. Although the couple may present with difficulties connected to only one spouse’s history of trauma, this model draws attention to the experience of the non-traumatized spouse as well.

### **Purpose**

This study was conducted in order to provide information on how the individual biological, psychological, and relational experiences of military personnel and their civilian

wives influence ratings of marital satisfaction and marital quality (i.e., the couple dyad). Specifically, the “his” and “hers” biological, psychological, and relational outcomes of military couples were explored. In an effort to assess the influence of biological and psychological health factors on marital relationships of military couples; the researcher examined levels of physiological stress, pain, depression, and distress in both partners. In addition, biological and psychological factors were examined in relation to their contribution to the couples’ marital health (marital quality and satisfaction). These variables were selected because they have received attention recently within military literature with regard to military couples (Allen et al., 2010; Asbery & Martin, 2012; Ein-Dor, Doron, Solomon, Mikulincer, & Shaver, 2010; Smith et al., 2011)

### **Summary**

The literature to date highlights a variety of factors known to significantly influence military personnel and their civilian spouses (Allen et al., 2010; Barnes, Davis, & Treiber, 2007). However, there is limited research that focuses on the vulnerabilities of biological and psychological health on military relationships. Given that a large number of civilian spouses are female and a large enrollment of military personnel are males (85.7% of active duty personnel are male) (DoD, 2010); this study has isolated civilian spouses who are females and military personnel who are male, but acknowledges that males may be spouses of military personnel as well.

The models that formed the foundation for this work were the biopsychosocial model (Engel, 1977) and the trauma transmission model (Adelman, 1995; Figley, 1995). These models have recognized how multiple factors influence individual perceptions and functioning as well as the functioning in relationships. Thus, this thesis addresses gaps in the literature by examining

similarities and differences in the experiences of military personnel and their civilian spouses as well as gaining a better understanding how biopsychorelational factors influence marital quality and satisfaction. Additionally, this study set out to examine what variables (i.e., pain, physiological stress, or distress) best predicted military couples' reports of their marital health.

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## CHAPTER 2: LITERATURE REVIEW

### **Introduction**

Military involvement introduces many unique factors into the lives of individuals as well as couple relationships. Military personnel may experience difficulties across biological, psychological, and social domains of health. In addition to the experiences of the military personnel, civilian spouses may also experience effects from their connection to the military, including negative physical, emotional, and relational health outcomes. Interestingly, researchers have found that the effects that civilian spouses experience across these domains often reflect the experiences, symptoms, or diagnoses of the military service members (Bevans et al., 2011; Menchaca & Dehle, 2005; Zwahlen et al., 2011). The strains that result from each spouse's biological, psychological, and emotional experiences then have the capacity to influence the couples' relational health (Kiecolt-Glaser, Bane, Glaser, & Malarkey, 2003; Menchaca & Dehle, 2005). More specifically, the mental health of husbands and wives may differ, consequently altering both spouses' physical health and the quality and satisfaction of the marriage. Because of the unique complexities experienced by each spouse (on an individual level), the quality and satisfaction of the marriage may be perceived differently for husbands and wives, which could further complicate each partner's overall health or advancement in the military.

The purpose of this literature review was to provide an overview of the research that has compared military personnel and their civilian spouses on various biological, psychological, and relational factors. Specifically, heart rate variability, pain, depression, distress, marital quality, and marital satisfaction will be discussed. These concepts will be discussed in relation to a) the military personnel, b) the civilian spouse, and 3) the couple. This literature review is intended to

punctuate specific biological, psychological, and relational health challenges and strengths that military couples endure within their marriage, and the ways in which these elements influence each partner and ultimately their partnership.

### **Biological Health of Military Personnel and Their Civilian Spouses**

#### **‘His’ and ‘Hers’ Experiences of Physiological Stress**

There are a variety of factors that fall under the category of biological and physical health (e.g., genetic influences, physical ailments). Some aspects of biological health include metrics such as body mass index, blood pressure, or levels of physiological stress (such as those measured through Heart Rate Variability [HRV]). Researchers show that measuring the variability in an individual’s heart rate (HRV) is a successful way to obtain information on the physiological influence of stress (Keary, Hughes, & Palmieri, 2009; Smith et al., 2011) as it relates to overall health. Tan et al. (2009) explains, “Research indicates that HRV reflects the degree to which cardiac activity can be modulated in the face of changing situational demands” (p. 1238). Healthy physiological functioning allows individuals to adapt to unpredictable situations via multiple internal control mechanisms (Voss, Boettger, Schulz, Gross, & Bar, 2011). According to Dulleck, Ristl, Schaffner, and Torgler (2011), HRV is altered during decision-making processes and, “the heart rates of anxious participants react more strongly to such situations than do the heart rates of less anxious participants” (p. 118). Physiological reactions also occur in response to mental stress, as evidenced through either increased sympathetic or decreased parasympathetic activity (Dullek et al., 2011). Thus, for this thesis, heart rate variability has been included as a biomarker to measure the relaxation and stress response (sympathetic and parasympathetic responses) of the autonomic nervous system.

**Physiological stress and military personnel.** Experiencing a high level of physiological stress, as measured by one's HRV, has the potential to affect military personnel and their civilian spouses in a significant way. As previously discussed, a person's capacity for self-regulation, psychological reactivity, and various health factors are all related to the level of variability in his or her heart rate (Tan et al., 2009).

Heart rate variability (HRV) is a component of the autonomic nervous system (ANS) that is often used as an indicator of ANS dysregulation. Specifically, ANS dysregulation is characterized by, "a high baseline state of hyperarousal and decreased parasympathetic activity" (Tan et al., 2009, p. 1238). The ANS is associated with greater capacities to regulate stress and emotional arousal, attention, and positive emotions, (Tan et al., 2009). The two components of the ANS, the sympathetic branch and the parasympathetic branch, serve different functions. The sympathetic branch prepares the body for action (e.g., increases HR, blood pressure, and stimulates sweat glands), while the parasympathetic branch is active during resting processes (e.g., regulates digestion, increases relaxation, and conserves energy). Tan et al. (2009) explains that when the ANS is dysfunctional, it is "characterized by a high baseline state of hyperarousal and decreased parasympathetic activity" (p. 1238). Within HRV, there are six components that are considered, including: low-frequency (LF) (the stress response), very low-frequency (extreme stress response), high-frequency (HF) (the relaxation response), LF/HF (the ratio of stress response to relaxation response), SDNN (the standard deviation of r-r heart beat), and Power (the total autonomic nervous system strength).

Previous researchers have measured heart rate variability in a military sample and conclude that military personnel have a markedly decreased SDNN, indicating that they experience increased ANS dysregulation (Tan et al., 2009). As a result, military personnel who

have depressed parasympathetic activity and increased hyperarousal may have internal systems that are less able to regulate the ramifications of stress on their ANS. Smith et al. (2011) arrived at a similar conclusion about physiological stress for the military personnel. They found that the participants' resting level of heart rate was positively associated with their marital quality, concluding that heart rate variability works as a self-regulatory process that contributes to couples' functioning. However, the civilian partner's unique experiences must also be considered in relation to the military personnel.

**Physiological stress and civilian wives.** Relatively little information is available with regard to the influence of physiological stress on wives' health and functioning. One study by Horsten et al. (1999) investigated the relationship between psychological and social risk factors (e.g., anger, isolation, and depressive symptoms) and HRV in women, and found a significant inverse relationship between isolation and anger and healthy HRV functioning. Specifically, these authors report that wives who are socially isolated from others and unable to relieve their anger tend to have decreased heart rate variability, as compared to wives who were socially active and have effective outlets to manage their emotions (Horsten et al., 1999). It is logical to conclude that this finding extends to wives of military personnel who often face isolation from the community and their extended families (Eaton et al., 2008). In addition, Kiecolt-Glaser and Newton (2001) note that there are gender differences between spouses of military dyads and highlight the significant relationships found between women's relational characteristics (e.g., being more attentive than men to the emotional state of their relationship) and their physiological health status, potentially leading to additional health complications (e.g., high blood pressure, hypertension, ulcers).

**Physiological stress and couples.** Links between marital functioning and physiological stress are found in previous research, highlighting the intertwined nature of biological, psychological, and relational components of health (Kiecolt-Glaser & Newton, 2001). Specifically, researchers show that conflict within marital relationships evokes increases in heart rate and blood pressure, which are labeled as cardiovascular responses (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007). Marital quality is also negatively linked to cortisol levels, which is the body's stress hormone, and other factors in the immune system (Kiecolt-Glaser et al., 2005). Thus, by using physiological stress to assess for one's biological state, interpersonal processes and biological experiences are examined simultaneously, providing a rich amount of data on an individual's (i.e., each partner's) overall health.

Studies report that physiological stress is experienced differently for men and women (Smith et al., 2011). Wives, as opposed to husbands, tend to have a more critical lens of marital functioning and often take an active role in seeking change and addressing problems, which can become taxing and thus requiring a higher level of self-regulation (Menchaca & Dehle, 2005). Previous researchers (e.g., Menchaca & Dehle, 2005) have specifically investigated the relationship between physiological arousal, measured by HRV, and marital quality. They found that wives, more so than husbands, experienced changes in their physiology (particularly their heart rate) when discussing problem areas, which accounted for the significant variance in the negative marital quality but not the positive marital quality scores (Menchaca & Dehle, 2005). However, the relationship between negative marital quality and physiological outcomes was not seen for husbands. Thus, it seems as though wives' judgments of the negative quality of their marriage is significantly related to increases in physiological effects during problem solving tasks (Menchaca & Dehle, 2005). Smaller changes in physiological effects (e.g., heart rate

elevation, skin conductance level) are found in response to aspects of positive marital quality for wives, as opposed to negative marital quality. The authors summarized this information by saying, "...husbands' arousal may impact what they do. Wives' arousal may control how they think and feel about the relationship without an associated impact on how they behave during interactions with their husbands" (Menchaca & Dehle, 2005, p. 127). Thus, husbands tend to respond through action while wives' responses tend to be more emotion-focused. This research was not conducted with military couples, so it is not known how the results would differ when involving a sample of couples from the military population; however, it is logical to suggest that military couples may be affected in a similar way.

Previous researchers have concluded that individuals often experience a larger increase in heart rate when experiencing distress compared to those not directly facing distress (Smith et al., 2011). In the study by Smith et al. (2011), spouses' levels of heart rate variability were compared as they underwent positive, neutral, and negative marital tasks. Resting high-frequency (HF)-HRV was found to be positively associated with marital quality by acting as a self-regulatory resource to facilitate relationship functioning (Smith et al., 2011). The results indicated that the husbands' resting heart rates were correlated both with their own and their wives' marital quality as compared to wives' resting heart rates (Smith et al., 2011). The authors stated, "wives who displayed a larger decrease in resting HF-HRV after the negative task appeared to have (a) faced a greater challenge posed by their husbands' negative affect, and (b) engaged in more directive efforts to manage it" (Smith et al., 2011, p. 113). The authors speculate that husbands might face more favorable marital outcomes due to the greater effect that wives experience in their HF-HRV as a result of negative marital interactions. The findings lead to the conclusion that wives may be more significantly impacted than their husbands in terms of

their physiological arousal and especially in how they perceive the quality of the relationship. Though military couples were not the population analyzed in the study by Smith et al. (2011), these findings may extend to military couples as well.

To further demonstrate the relationship between physiological stress and overall functioning, Finkel, DeWall, Slotter, Oaten, and Foshee (2009) reported that a lack of self-regulatory resources increases the risk of aggressive behavior toward intimate partners. These authors concluded that if one spouse is experiencing high levels of physiological stress, the other spouse and the marital relationship are likely to be negatively impacted as well (e.g., through increased aggression or intimate partner violence). This study, along with many others, depicts the relationship between physiological stress and marital health as being bidirectional in nature (Smith et al., 2011), although not necessarily in a linear way. Due to the significant levels of stress that both members of the couple experience, military personnel and their civilian wives may experience even greater levels of physiological stress and effects on their internal regulatory systems. However, physiological stress isn't the only biological component of health that has been focused on in military populations, experiences with pain is another common challenge. Like physiological stress, research supports that pain may be experienced differently (i.e., directly experiencing pain vs. experiencing the ramifications of one's' spouse's pain), though still significant, for each member of a military couple (Miaskowski, Zimmer, Barrett, Dibble, & Wallhagen, 1997).

### **'His' and 'Hers' Experiences of Pain**

Pain is reported as one of the most common reasons that military personnel seek medical attention (Haskell, Heapy, Reid, Papas, & Kerns, 2006). In a report on pain management, it is noted that attitudes concerning pain and pain management have changed in the past few decades

(e.g., physicians today are more likely to be proactive in patients' pain management), yet pain is still the most common symptom documented by patients seen in medical settings (Buckenmaier & Griffith, 2010). Common sources of pain in the military population include combat injuries (Clark, Bair, Buckenmaier, Girona, & Walker, 2007), musculoskeletal issues (Haskel et al., 2006), and lower back pain (Spevak & Buckenmaier, 2011). Pain is often much more than an individual experience, it has a systemic nature. The experience of pain is shown to influence psychological well being, social responsibilities, and family life for individuals experiencing pain as well as for their spouses (Haskell et al., 2006). Thus, researchers have investigated pain directly experienced by a patient and consider the effects of pain on caregivers in a collection of studies.

**Pain and military personnel.** The experience of continuous pain often leads to mental and emotional changes, such as increases in irritability, anger, or nervousness (Spevak & Buckenmaier, 2011). The two primary types of pain reported by military personnel are lower back pain (53%) and extremity pain (23%) (Spevak & Buckenmaier, 2011). Additionally, previous researchers have reported that for military personnel returning from OEF/OIF, 42% of pain-related problems involved physical impairments, 34% influenced emotional functioning, and approximately 80% had some form of traumatic brain injury (Clark et al., 2007).

Although the experience of pain is unique to each individual, the impact of pain often affects the system surrounding the person (e.g., spouses). A study by Miaskowski et al. (1997) assessed the congruency between patients' report of the intensity of their pain and their partner's reports. The study aimed to examine the differences between the reports by patients and their partners on pain intensity, duration scores, and mood states, and to consider how these differences influenced patients' health statuses. The importance of this study was to capture the

dyadic relationship between those experiencing pain and the effects on their significant others. Although this study did not include a military sample, the unit of analysis did include couples.

The researchers found that 30% of the dyads were congruent (i.e., both participants reported approximately the same level of pain) in their perception of the level of pain the patient was experiencing. Therefore, 70% of the dyads' reports were incongruent, meaning that the family caregiver either overestimated or underestimated the intensity of the patient's pain. Specifically, there were significant differences between partners in reports of patients' pain scores, mood states, and psychological well being. To highlight the significance of this finding, Miaskowski et al. (1997) discussed ramifications that incongruent dyads often face as a result of their differing perceptions. Patients of incongruent dyads, compared to congruent dyads, were found to have greater mood disturbances, poorer interpersonal well being, higher levels of anger and fatigue, and poorer nutritional status (Miaskowski et al., 1997). These findings denote that both patients and partners in non-congruent dyads face deleterious outcomes due to their incongruent pain perceptions. Thus, it appears that patients who are out of sync with their partner with regard to their perceptions of pain face a variety of detrimental outcomes that may contribute to the development of additional health concerns.

**Pain and civilian wives.** Spouses and other people in close relationship with the person in pain often experience adverse effects as well (e.g., depression or psychological distress). In addition, spouses frequently report higher levels of tension and depression, higher levels of total mood disturbances, and lower health status scores than those not in the role of the caregiver (Miaskowski et al., 1997). When considering the congruence between spouses' pain perceptions, along with negative outcomes for patients in incongruent dyads, partners also report significantly higher levels of caregiver strain than partners of congruent dyads (Miaskowski et al., 1997). So,

when the spouse and patient disagree more about the level of pain the patient is experiencing, the dyad may be more likely to experience increased conflict, decreased positive connection, and more overall strain on the relationship. In the study by Miaskowski et al. (1997), there were no significant differences found between congruent and incongruent dyads in terms of spouses' health status or any of the health concepts (i.e., ratings of pain, control, optimism, and will to live). The partners of non-congruent dyads who overestimated the patient's pain reported less bodily pain (personally) and rated their health status higher than those who underestimated the patient's level of pain (Miaskowski et al., 1997).

Other researchers (e.g., Adelman et al., 2004) also reveal a significant discrepancy between patients and their partners' ratings in areas of patient energy, suffering, and weariness. Consistent with other research, Adelman et al. (2004) found that spouses typically rated patients' experiences of pain as worse than patients' ratings of their own suffering. This discrepancy has been found to exacerbate both the patient's symptoms as well as the partner's experiences of feeling burdened. When considering the application of this research to military populations, research by Adelman et al. (2004), as well as the study conducted by Miaskowski et al. (1997), suggest that civilian wives of military personnel are at an increased risk of experiencing detrimental effects in their overall quality of life based on their husbands' experiences of pain from the military involvement. For some, these effects may take the form of increased levels of anxiety or dependency, for others, it may lead them toward marital disconnection or increased conflict. Although these study samples did not include the military population, the effects of patient-partner incongruence may be applicable to military couples where one member is experiencing significant pain. Also, it is not clear in the current literature what contributes to the

development of incongruent perspectives or even ways that dyads can become more in sync and congruent with one another.

### **Psychological Health of Military Personnel and Their Civilian Spouses**

When researching factors pertaining to health, psychological influences, specifically depression and distress, necessitate additional exploration to better understand the experiences of both military personnel and their civilian spouses. These factors are shown to make an impression on both spouses as well as on their marital relationship (Mansfield et al., 2010; Zwahlen et al., 2011). It has been well documented in the literature that both members in military couples regularly experience psychological symptoms affecting their overall health (Asbery & Martin, 2011; Felker, Hawkins, Dobie, Gutierrez, & McFall, 2008; Iverson et al., 2009; Verdeli et al., 2011). It is reported that depression and distress are common experiences that influence the health of both members of military couples (Eaton et al., 2008; Zwahlen et al., 2010), particularly in their levels of alcohol use (Eaton et al., 2008; Felker et al., 2008), healthcare utilization (Tsai, Pietrzak, Southwick, & Harpaz-Rotem, 2011), development and application of cognitive coping mechanisms (Tsai et al., 2011), amount and quality of sleep (Warner, Appenzeller, Warner, & Grieger, 2009), and occurrence of intimate partner violence (Rotunda, O'Farrell, Murphy, & Babey, 2008). Thus, depression and distress are discussed below in relation to the military personnel, civilian spouse, and their marriage.

#### **'His' and 'Hers' Experiences of Depression**

**Depression and military personnel.** Military involvement has the capability of altering the psychological health of military personnel in a variety of ways. Current research illustrates significantly high levels of mental illness (e.g., depression) in military personnel, and in particular for those who have recently returned from deployment (Warner, Warner, Breitbach, &

Rachal, 2007). In addition, it is reported that most entry-level active duty personnel are simultaneously entering into the unpredictable military environment and experiencing an increased risk for the onset of depression due to their younger age (Warner et al., 2007). These same authors argue that risk factors, such as family psychiatric history, might interact with environmental factors and make military personnel more vulnerable for developing depression or depressive symptoms. Consequently, military personnel may experience a decline in their psychological health in the context of their military involvement. In particular, the period surrounding deployment is identified as significantly correlated with an increased risk of developing mental health concerns (Bliese, Wright, Adler, Thomas, & Hoge, 2007; Sayers, Farrows, Ross, & Oslin, 2009).

To put things in perspective, lifetime rates of depression are 7-12% for civilian men and 20-25% for civilian women, whereas more than one-third of military men report some level of depressive symptoms (Warner et al., 2007). Time surrounding deployment has also been investigated with regard to depression rates for military personnel. Hoge et al. (2004) reported less than 12% of military personnel were diagnosed with depression pre-deployment, and 15% met criteria for depression post-deployment. While a large percentage (over 25% of military personnel seeking primary care) of military personnel are diagnosed with either depression or anxiety disorders each year, less than 50% of military personnel receiving regular primary care also receive mental health treatment (Warner et al., 2007), which can add to the systemic challenges associated with poor psychological health or life in the military.

Several researchers have documented mental health concerns in relation to deployment cycles. Bliese et al. (2007) concluded that reports of mental health problems, such as depression, were significantly higher 120 days after returning from deployment than directly after return.

Unfortunately, in the research by Felker et al. (2008), over 19% of military personnel who returned from a deployment reported a mental health problem; however, only 35% of these personnel accessed mental health services within a year of returning home. There are several challenges common to military personnel that coincide with diagnoses of depression, including marital distress (Renshaw, Rodrigues, & Jones, 2008), alcohol abuse (Iverson et al., 2009), and family problems (Sayers et al., 2009). When left undiagnosed or untreated, symptoms can exacerbate and systemically influence the spouse of the personnel (Verdeli et al., 2011).

**Depression and civilian wives.** According to Eaton et al. (2008), civilian spouses often face an abundance of stresses, including adjusting to a mobile lifestyle, isolation from family and communities, adjustment to the rules and regulations of military life, household duties, and childrearing, among other concerns. However, civilian spouses are often not offered the same level of psychological care services as military personnel, and they often do not receive the same amount of social and emotional support (Eaton et al., 2008) as their partner. As a result, these difficulties may affect the long-term mental health of the civilian spouse, the well being of their family, and the military member's social support during the period surrounding deployment (Verdeli et al., 2011).

Recent literature (Eaton et al., 2008; Sayers et al., 2009; Warner et al., 2007) has been published with a focus on military dyads in relation to concerns with depression, and concludes that life in the military has often added complexities into the world of civilian wives. Many times, the influences of military life on civilian spouses are overlooked and minimized. For example, in research by Eaton et al. (2008), it was found that approximately 20% of civilian spouses of military personnel screened positive for depression, while 8% screened positive for major depression via both diagnostic criteria and functional impairment. These authors

concluded that the percentage of spouses with military partners who screened positive for major depression in their study is comparable to the reported rates of depression among military personnel who have returned home from war, a shocking concern about the prevalence of depression in military couples. Moreover, Renshaw et al. (2008) noted that civilian spouses' levels of depression might be related to their perception of their partner's symptoms. The results from this study reveal a stronger relationship between spouses' perceptions of their husbands' symptoms and their own psychological and marital functioning than the impact of military personnel's self-reports of their symptoms (Renshaw et al., 2008). These authors noted that approximately half of their sample of wives met the criteria that indicated a possibility for clinical depression.

Stress experienced with preparation for a deployment is another common focus within the research that provides a more in depth examination of the psychological health of civilian wives, specifically with regard to depression (e.g., Mansfield et al., 2010; Warner et al., 2009). In the study by Warner et al. (2009), a relatively high rate of depressive symptoms that fit the criteria for moderate or severe depression was found among the sample of civilian spouses. Forty-three percent of the civilian spouses who were preparing for deployment experienced depressive symptoms equivalent to the moderate or severe criteria set forth on the Patient Health Questionnaire scale (PHQ-9) (Spitzer, Kroenke, & Williams, 1999). Additionally, elevated rates of depression (70% of the spouses) were seen among civilian spouses during their partner's deployment.

Previous researchers have found that military wives' mental health problems were correlated with the length of their spouse's deployment (Mansfield et al., 2010). However, other literature indicates that these rates were influenced by experiences with prior deployments

(Warner, Appenzeller, Warner, & Grieger, 2009). Contrasting both Mansfield et al. (2010) and Warner et al. (2009), Asbery and Martin (2012) found that military spouses' levels of depression were not higher than their civilian counterparts, regardless of the length or history of their spouse's deployment. Rather, they conclude that the lack of difference between military and civilian wives in levels of depression might be a result of an increased amount of social support during their spouses' deployment period. Although these findings contradict the findings of other researchers (e.g., Mansfield et al., 2010), all of the literature to date unites in their consideration of the influence that depression has on both spouses of the military couples.

The current literature highlights the period around deployment, in particular, in relation to depression rates for military personnel and their civilian spouses. Though researchers have arrived at different conclusions, it remains clear that the deployment cycle is influential in both male military personnel and their civilian wives' mental health status. In line with patient and caregivers' experiences with depression, experiences of psychological distress are reported with similar trends and detrimental effects on both members of the couple dyad. It has been shown via previous research that military life elevates the typical level of stress to distress, often due to economic strains, emotional stress, the need for support, marital conflict, and combat exposure (Allen, Rhoades, Stanley, & Markman, 2010). As may be expected, distress is often transferred between partners and becomes more of a relational experience.

### **'His' and 'Hers' Experiences of Distress**

The experience of distress is one that has the capability to stunt an individual's, couple's, or family's functioning in a number of aspects. Distress has generally been defined as a multifactorial emotional experience involving psychological, emotional, social, and spiritual components that may interfere with one's ability to cope with stress (Vachon, 2006). Distress

may be viewed as a relational experience that affects the larger system around the individual; as individuals endure distress, their loved ones (e.g., primary caregivers or spouses) are often equally distressed (Zwahlen et al., 2011). This phenomenon has been labeled ‘secondary traumatic stress’ (STS) by some researchers (Figley, 1988). Ein-Dor, Doron, Solomon, Mikulincer, and Shaver (2010) explain that spouses of veterans who have experienced war trauma are at risk of developing similar symptoms of stress (i.e., symptoms that mimic post-traumatic stress disorder), as well as anxiety, depression, low self-esteem, and feeling overburdened. These researchers state that military personnel often repeatedly disclose negative thoughts, feelings, and experiences from traumatic events to their partner, which may overwhelm the civilian spouse and increase the civilian spouse’s levels of distress, compassion fatigue, and caregiver burden, which may result in STS (Ein-Dor et al., 2010). However, this experience may be considered post-traumatic stress for both partners, as opposed to secondary-traumatic stress for the non-traumatized spouse, given the newly considered criteria for the DSM-V (Moran, 2013).

**Distress and military personnel.** It has been reported in previous research that a positive relationship exists between combat exposure and higher levels of psychological distress (McCuaig-Edge & Ivey, 2012). As military personnel are subjected to the stress and traumatic experiences of war, they tend to experience more overall difficulty (e.g., symptoms of PTSD, difficulty coping) as a result of these stressors. Furthermore, McCuaig-Edge and Ivey (2012) concluded from their research study that the military personnel’s appraisal of the stressor influenced the development of distress. Thus, how military personnel understand and make sense of their experiences in war contribute to the level of distress they may experience. The authors hypothesize that this relationship may be due partly to habituation as a result of more

frequent exposure to combat experiences or as a result of pre-deployment training (McCuaig-Edge & Ivey, 2012).

Previous researchers have also looked at differences in rates of distress across different contexts. For example, it is reported that distress rates are higher among war-zone deployed troops than those who stayed stateside, across all ethnicities and genders (Sutker, Davis, Uddo, & Ditta, 1995). Specifically, this study reported that troops deployed overseas often experience a lack of energy and fatigue, which was concluded as being a result of their distress due to combat exposure as well as their physical discomfort (Sutker et al., 1995). Although the current literature highlights commonalities that are understood to contribute to distress experienced by military personnel, multiple variables are reported that moderate the relationship between stressors and the development of psychological distress for military personnel, including resilience, personality, self-efficacy, coping styles, and social support (McCuaig-Edge & Ivey, 2012).

**Distress and civilian wives.** Although spouses experience high levels of distress, the (research and clinical) focus has typically remained on the other partner where the distress originated; thus, the spouse in the caregiver role often receives little support to improve well being (Zwahlen et al., 2011). When left untreated, a distressed spouse's overall health is compromised (Bevans et al., 2011). For example, many wives report experiencing mental images or dreams about their husband's war experiences, or avoiding activities, people, or places that remind them of their husband's experience (Ein-Dor et al., 2010). Moreover, during deployment periods, civilian spouses left at home often experience increased levels of distress due to their concern over their spouse's safety, maintenance of their household, day-to-day functioning as a single parent, and strains on their marriage (Mansfield et al., 2010).

A study by Zwahlen et al. (2011), which assessed the levels of distress for both cancer patients and their spouses, found that 34% of male patients and 32% of female patients reported distress levels between three and four on the distress thermometer. Furthermore, 29% of male partners and 50% of female partners reported distress levels between four and five on the distress thermometer. Each of these ranges represent clinically significant distress. These statistics suggest that the distress levels of spouses, especially for females, are approximately equal to or surpass the level of distress experienced by the patients. In terms of couples, 51% of the dyads indicated significant distress scores that met clinical significance (Zwahlen et al., 2011). Gender was found to inform the results of this study in a unique way; women in this study experienced the highest rates across multiple roles. Specifically, it is suggested that women, both in the patient and in the partner role, report higher levels of distress than men. While this study focused on cancer patients, it is likely that outcomes for other chronic conditions (e.g., post traumatic stress disorder or traumatic brain injury) may yield similar results.

The high rate of distressed female partners is also notable. The significant findings from the Zwahlen et al. (2011) study indicate that male patient-female partner relationships might be at the highest risk for experiencing considerable distress, which is important when accounting for the number of male military personnel who return from deployments with injuries or medical conditions. Because it is not known how involvement in the military may affect each person's experience of distress, the implications of these results should be applied with caution. However, these results are important in the consideration of how civilian spouses may be affected by their experiences connected to the military in terms of their distress.

In agreement with Zwahlen et al.'s (2011) conclusions, Bevans et al. (2011) assert that it is vital to assess the spouse as well as the patient because the level of caregiver psychological

distress is shown to be comparable to, if not higher than, the patients' levels of distress. The results from the study by Bevans et al. (2011) found similar rates of distress for spouses and patients. On a scale ranging from zero (not distressed) to ten (extremely distressed), 60% of caregivers vs. 52% of patients reported a score of four or above and 44% of spouses and 40% of patients reported a score of five or above often, which was classified as moderate to extremely distressed. This data indicates that distress is often experienced at similar levels for both patients and their partners. A positive correlation was also found between the reported number of problems and the level of distress for both patients and their partners. The strongest relationships between problems and distress for both patients and spouses were found for emotional and physical problems (Bevans et al., 2011), indicating that both spouses of military couples experience a direct link between their physical health and their emotional experiences. In summary, spouses' experiences of distress, surprisingly, appear to be equal, if not higher than, the patients' experiences of distress (Bevans et al., 2011; Zwahlen et al., 2011). Thus, it is vital that both partners' distress levels are considered in order to grasp a bigger picture of the couple's overall functioning.

**Distress and couples.** In addition to individual effects of distress, the presence of distress also causes deleterious effects on relationships for many couples, and may trigger conflicts or further exacerbate fears, uncertainties, and suffering in marital relationships (Zwahlen et al., 2011). Moreover, the experience of distress is often transmitted through interactions and processes in the family system, especially between spouses (Zwahlen et al., 2011). Specifically, distressed couples may also experience communication difficulties, decreased closeness and intimacy, changes in their sexual activity, and difficulty negotiating adjustments to roles, as a result of the combination of biological, psychological, and social

factors (Zwahlen et al., 2011). In addition, Ein-Dor et al. (2010) hypothesizes that the security felt within the relationship may predict the transference of distress symptoms between partners; thus, couples with insecurities may be more likely to develop STS (e.g., spousal distress, compassion fatigue, and caregiver burden) than couples who feel more secure in their relationship. Specifically, couples with higher levels of relational anxiety are also likely to report more significant reverberations from their war-related stress than their less anxious counterparts (Ein-Dor et al., 2010). So, spouses that have relational anxiety may become overwhelmed by their military spouse's traumatic experiences and may find it difficult to regulate their own emotional experience, leading to higher levels of distress.

Campbell and Renshaw (2012) took a more in-depth look into communication difficulties with regard to deployment, and notes that couples' communication about deployment is associated with both distress and benefits for both partners. Specifically, the results indicated that communication was not significantly associated with increased levels of distress; however, for couples in which the military personnel had clinically significant levels of post-traumatic stress disorder (PTSD) symptoms, communication with their partners about deployment was significantly associated with more psychological distress (Campbell & Renshaw, 2012). The authors conclude that it is important for couples to approach the topic of traumatic events in conversation very carefully to maximize couple benefits and minimize the potential for increasing either partner's distress levels.

By assessing both partners simultaneously, factors specific to couples' relational health are revealed. As previously mentioned, there may be many factors that influence military personnel and civilian spouses' health (e.g., depression, distress) as well as their relationships, so

a holistic understanding of the couple is necessary. For this study, marital quality and satisfaction represented two concepts reflective of relational health.

### **Relational Health of Military Personnel and Their Civilian Spouses**

Parallel to how certain factors shape each member of the couple individually (e.g., depression, pain, distress, HRV), there are additional factors that govern military couples' relational health. It should be noted that these individual and relational factors often have a bidirectional relationship and may overlap (Johnson & Booth, 1998). Previous researchers have provided information on the benefits of marriage for both spouses (Allen et al., 2010; Kiecolt-Glaser, Gouin, & Hantsoo, 2010; Kiecolt-Glaser & Newton, 2001). For example, researchers suggest that marriage is associated with lowered morbidity and mortality rates across a variety of acute and chronic conditions (e.g., cancer, heart attacks) for both spouses (Kiecolt-Glaser & Newton, 2001). When examining couples' relational health, it is important to consider how military involvement often informs both spouses' perceptions of the quality of their marriage and their level of satisfaction with their relationship (McLeland, Sutton, & Schumm., 2008; Schumm, Bell, & Gade, 2000).

### **Marital Quality**

Individuals' perceptions of both positive and negative qualities of one's partner, feelings toward the partner, and feelings about the relationship are all indicators of the perceived quality of a marriage (Fincham & Linfield, 1997; Mattson, Paldino, & Johnson, 2007). Although much of the research to date has explored the implications of individuals' negative perceptions of the quality of their marriages, there are several studies that focus on the benefits of what Fincham and Beach (2010) have termed 'relationship flourishing' (i.e., a positive perception of one's marriage as being characterized by intimacy, growth, and resilience). Interestingly, research has

uncovered a link between positive marital quality and lower levels of stress, depression, and blood pressure when compared with couples that had lower marital quality (Holt-Lunstad, Birmingham, & Jones, 2008). Karney and Bradbury (1995) concluded that it is logical that the implications of negative events on couples will likely depend on strengths of their relationship to buffer the impact. With regard to military couples specifically, Schumm et al. (2000) report that separation during deployment often influences a couple's level of contentment with their marriage, though their general sense of the intrinsic quality of their marriage is not significantly impacted. Thus, it appears that military couples typically rate the quality of their marriage high, even in the midst of experiencing other stresses in their relationship. In addition, it is also said that individuals in military marriages report higher marital quality when their views on roles in the relationship (i.e., traditional or modern sex-role preferences) are congruent with their partners' views (Bowen & Orthner, 1983). Another factor found to influence the perceived level of marital quality is how supportive the military is of the serviceman's family responsibilities (Cabrera, Bliese, Hoge, Castro, & Messer, 2010).

In order to gather a full assessment of a couple's functioning, it is critical to assess the quality of a marriage, integrating both the positive and negative thoughts and feelings about each partner and the relationship. This is distinctly different from marital satisfaction and marital adjustment. Fincham and Linfield (1997) and Locke and Wallace (1959) discussed how examining the positive and negative ratings of marital quality account for the unique variance in maladaptive attributions and self-reports of couples' behavior beyond what other marital assessment tools account for. Hence, a two-dimensional approach to marital quality is more informative than commonly used one-dimensional measures. By examining both positive and

negative ratings of partners, more detailed information on the perception of the quality of military marriages is collected.

**Assessing for marital quality using a multi-dimensional approach.** The study by Mattson et al. (2007) is an expansion of the research that was conducted previously by Fincham and Linfield (1997). Mattson et al. (2007) explored how the Positive and Negative Quality in Marriages Scale (PANQIMS) apply to couples during the engagement period. In the analysis of the results, the PANQIMS is broken down into positive marital quality (PMQ) and negative marital quality (NMQ) subsets. The authors conclude that the two constructs gather distinctly different data and should be assessed separately. Mattson et al. (2007) noted that positive relationship quality involves ratings of positive qualities of partner, positive feelings toward partner, and good feelings about the relationship. Negative relationship qualities, on the other hand, involve ratings of negative qualities of partner, negative feelings toward partner, and bad feelings about the relationship. Furthermore, the PANQIMS can be viewed in terms of ambivalence (high positive and high negative ratings) and indifference (low positive and low negative ratings) (Menchaca & Dehle, 2005). Thus, a two-dimensional approach is better equipped to assess dyadic behavior and reveal different information regarding a spouse's rating of his or her relationship (Mattson et al., 2007).

Menchaca and Dehle (2005) explained, “a multidimensional approach for measuring attitudes (like marital quality) is more informative and can account for multiple paths to a given attitude” (p. 199). They clarify that attitudes and affect may not be clearly reflected within one-dimensional constructs and by separating the dimensions, greater information can be obtained.

## **‘His’ and ‘Hers’ Experiences of Marital Quality**

Two popular perspectives have developed within the literature with regard to the relationships of military couples: (a) military couples tend to face more detrimental outcomes than civilian couples due to the hardships of life in the military (Riggs, Byrne, Weaters, & Litz, 1998) or (b) involvement in the military develops certain strengths or tolerance to cope with hardships and allow the couple to function at a level comparable to civilian couples (Schumm & Hammond, 1986). The results of a study by Schumm and Hammond (1986) lend support to the latter notion that military couples are no more disadvantaged than other civilian couples in terms of marital quality and functioning. These findings revealed that the military husbands reported high levels of emotional intimacy and low apprehension about marital communication as compared to the civilian husbands, whereas the military and civilian wives displayed no difference across any variables (Schumm & Hammond, 1986).

In contrast to the findings by Schumm and Hammond (1986), research conducted by Riggs et al. (1998) examined the effects of military involvement on marital quality and found that the presence of severe symptoms of stress was associated with the quality of intimate relationships. For military personnel, their scores on relationship quality measures were found to be strongly associated with their symptom severity (Riggs et al., 1998). Furthermore, similar patterns were seen for the civilian wives, though the correlations tended to be smaller in magnitude (Riggs et al., 1998). Thus, there are contradicting findings in research on the effects of military involvement on couples’ ratings on the quality of their marriage.

As previously discussed, along with marital quality, marital satisfaction needs to be addressed to fully explore the relational health of couples. While some assessments focus on marital quality and consider the positive and negative aspects of marital relationships, measures

that examine marital satisfaction focus on the degree to which each spouse is satisfied with his or her relationship and one another.

### **Marital Satisfaction**

Marital satisfaction among military couples has become an increasingly important focus in current literature, as more information surfaces about the implications of marital health on military dyads. More specifically, past researchers have uncovered a link between experiences within the marital relationship and other areas of health (McLeland et al., 2008; Schumm, Crock, Likcani, Akagi, & Bosch, 2008). The term ‘marital satisfaction’ encompasses each partner’s satisfaction with his or her marriage, spouse as a partner, and the relationship with his or her spouse (Schumm et al., 2008). This focus in current literature is considered to be imperative because couples’ levels of satisfaction with their relationship has the capability of altering both the military personnel and the civilian spouse in a multitude of ways (e.g., levels of depression, levels of distress, psychological symptoms), which may then manifest itself across different contexts (McLeland et al., 2008; Renshaw et al., 2008; Schumm et al., 2008). For example, the stress induced by military deployments and other military involvement amplifies the marital strains felt by many couples (Renshaw et al., 2008; Schumm et al., 2008). In addition, the current literature on the levels of marital satisfaction for military couples provides insight into the timing of deployment and its implications on the marital satisfaction of military couples.

### **‘His’ and ‘Hers’ Experiences of Marital Satisfaction**

When comparing levels of marital satisfaction between partners, Renshaw and colleagues (2008) discovered that wives report higher levels of marital satisfaction on average than their military husbands. Within this research, when specifically considering the deployment trajectory, rates of marital satisfaction for military personnel declined between the period before

joining the military unit and prior to deployment, stayed consistent throughout deployment, and then returned to a higher level after returning home (Schumm et al., 2000). It appears as though marital satisfaction levels of military personnel often fluctuate throughout the period of deployment, but are not permanently lowered from the deployment cycle.

McLeland et al. (2008) investigated the impact of pre-deployment and post-deployment on military couples' levels of marital satisfaction. Specifically, the researchers aimed to assess whether or not marital satisfaction is affected by preparation for deployment or the aftermath of deployment when the military personnel return home. For the purpose of this study, five different groups of people were compared: civilian, non-alerted military, alerted military, pre-deployment military, and post-deployment military. Results indicated that those who were anticipating an upcoming deployment or recovering from a recent deployment had lower levels of marital satisfaction than civilians or non-alerted personnel (McLeland et al., 2008), contrasting Schumm et al.'s (2000) earlier work. Furthermore, marital satisfaction scores lowered more during a deployment compared to pre or post deployment periods. Separation from loved ones during deployment also resulted in a decrease in marital satisfaction, and the stress involved in preparing for and recovering from deployment influenced one's level of marital satisfaction. McLeland and colleagues (2008) suggest that the changes seen in individuals' levels of marital satisfaction might be due to increased lengths of time away from one's spouse or as a response to mental health concerns or adjustments after deployment periods. Thus, several researchers deduce that recent deployment is related to higher levels of stress, which has the ability to influence couples' experience of marital satisfaction and functioning (Hoge et al., 2004; McLeland et al., 2008).

Contrasting these findings, Allen et al. (2010) concludes that there is no association between recent deployment and any aspect of relationship satisfaction or functioning. Although deployment was not found to be an influencing factor in this study, there are some experiences (e.g., PTSD) that are consistently cited as negatively influencing marital satisfaction (Allen et al., 2010; Baptist et al., 2011). Allen et al. (2010) states that husbands who recently deployed are likely to have higher levels of PTSD than those without a history of recent deployment, and conclude that increased levels of PTSD are indirectly related to decreased marital functioning for both husbands and wives. The relationship between husbands' stress and marital satisfaction was statistically significant for both husbands and wives (husbands had a  $-.39$  correlation and wives had a  $-.27$  correlation). Moreover, experience with traumatic events increases the likelihood of reporting lowered rates of marital satisfaction (Goff, Crow, Reisbig, & Hamilton, 2007). Though much of the research to date has focused on the period of time surrounding deployment, couples' experiences of marital satisfaction is also influenced by other aspects of military involvement (e.g., long working hours, division of roles) (Eran-Jona, 2011).

Marital quality and marital satisfaction collectively make up important aspects of the relational component of overall couple health. Though each component (biological, psychological, and relational health) may be viewed independent from one another, the blend of each factor together creates interrelated channels and processes that influence couples and their marital relationships.

### **The Interface of Biopsychorelational Health of Military Couples**

The literature to date exposes a gap in research that this study has sought to fill. First, though there is a plethora of research examining both marital satisfaction and marital quality, there is a lack of research that integrates relational and biological as well as psychological

components into the same study, especially with military couples. The two conceptual models utilized to ground this thesis, the biopsychosocial model (Engel, 1977) and the trauma transmission model (Adelman, 1995; Figley, 1995), support the notion that one's health is multifaceted, with each domain (i.e., biological, psychological, relational) informing another, and is transmitted simultaneously between relationship partners. Second, due to the fact that marital satisfaction and marital quality assess different elements of marriages, it is important to consider both relational components in research. Third, the collection of research reviewed in this section lends support for the notion that biological and psychological factors have the capability of influencing military couples, though the findings from various studies are limited to specific content issues (e.g., domestic violence [Dunford, 2000; Kotrla & Dyer, 2008; Neidig, 1986; Schumm et al., 2000; Stanley et al., 2005]; substance use [Bray et al., 2010; Rotunda, O'Farrell, Murphy, & Babey, 2008]; PTSD [Asmundson, Stein, & McCreary, 2002; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010]). Lastly, there is a multitude of literature that demonstrates the need for military health to be considered via an interwoven nature of health and punctuates the need for a systemic perspective on health and relationships. For example, research by Menchaca and Dehle (2005) found associations between physiological arousal (HRV) and marital quality. Specifically, these authors found that physiological arousal accounted for more variance in negative marital quality than positive marital quality (Menchaca & Dehle, 2005). In addition, Kiecolt-Glaser et al. (2003) found a significant relationship between physiological stress and marital conflict. One more example is the link that has been discovered between marital satisfaction and general health status for men and women (Goff et al., 2007; Kiecolt-Glaser & Newton, 2001). As demonstrated throughout this literature review, each variable intermingles with one another, and thus each must be viewed in a systemic light.

## Summary

Within military dyads, military personnel and their civilian spouses experience both common and unique complexities, via strengths and challenges, due to their connection to the military. Although the military personnel are the ones to directly experience deployments, combat, post-traumatic stress disorder, reintegration back into their family, or coinciding physical or mental health issues, the civilian wives are also at an increased risk for physical, mental, and emotional issues. Many of the studies described in this literature review comment on the presence of a caregiver effect and note how both members of the dyad are impacted in a multitude of ways (e.g., depression, psychological distress, physical health) (Asbury & Martin, 2011; Verdeli et al., 2011), even in instances in which only one spouse directly experiences the effect (e.g., pain) (Ein-Dor et al., 2010). Researchers have found a reciprocal nature to pain and distress; whereby caregivers often become significantly strained and experience deleterious effects along with the suffering patient or loved one (Miaskowski et al., 1997).

Although the literature reveals significant links among biopsychorelational health factors for both members of military dyads, there is a limited amount of information specific to levels of pain, distress, and marital quality for military couples. The lack of research in these particular areas demonstrates a predominant need for future research to be conducted, such as this study. This focus of research is imperative because it is evident that involvement in the military has the capability of effecting couples' marital quality and satisfaction as well as their physical and emotional well being. Thus, it is vital to gain further knowledge and clarity on factors contributing to military marriages. By addressing the interwoven nature of military couples' health along the biopsychorelational continuum, further support of both members of the couple to address their specific needs becomes possible.

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## CHAPTER 3: METHODOLOGY

### **Project Aims and Rationale**

This thesis was a part of a larger investigation concerning the physical, psychological, emotional, and relational health of military personnel and their spouses within a military medical system. Within the larger research study, information was gathered through self-report and physiological assessments for both members of the couple. While the larger study was based on a couple's intervention through the use of integrated care, the focus of this study was to better understand the "his" and "hers" biological, psychological, and relational outcomes of military couples, prior to intervention. Specifically, this study assessed wives' and husbands' responses on measures of physiological stress (i.e., heart rate variability), pain, depression, and distress in relation to marital quality and satisfaction.

Permission was given to the primary author of this thesis by the primary investigator of the larger study to access the baseline data. The larger study was conducted at a medical center for military personnel and their families, and is located on a base in a southeastern state of the U.S. This clinic acted as a primary care facility for military families (including Air Force and Army service members and Veterans).

### **Sample**

The participants enrolled in the study were recruited through a military medical center by family therapy researchers. The two criteria for inclusion for this thesis were that at least one participant needed to be active duty, reserve, or retired and the participants must be currently married. Inclusion criteria for participating couples was that the couple was married, had one partner who was active duty, and neither person had a serious mental health condition (i.e., severe clinical depression, suicidal ideation assessed by the PHQ-9, severe PTSD assessed using

the PTSD Checklist or serious cognitive delays). Indicators for exclusion included a) an overall PHQ-9 score above fifteen or a score above zero on question nine (assessing suicidality) or b) comments by either partner that they were receiving marital therapy. Additionally, data were not collected while the service member was deployed. Both members of the couple were required to sign an informed consent prior to participation. The total sample consisted of 76 couples recruited from the medical center, though ten couples did not meet criteria for inclusion in study analysis due to exceeding mental health cutoff points or as a result of receiving marital therapy.

## **Measures**

Physical, psychological, and relational health data were collected from male military personnel and their spouses through a variety of means. For this thesis, six variables were assessed: 1) participants' Heart Rate Variability (HRV), 2) pain levels based on the Visual Analog Scale (VAS) (Aitken, 1969; Jensen & Karoly, 2001), 3) depression levels based on the Patient Health Questionnaire (PHQ-9) (Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, & Williams, 1999), 4) distress levels based on the Distress Thermometer (DisT) (Roth et al., 1998), 5) marital quality based on the Positive and Negative Quality in Marriage Scale (PANQMS) (Fincham & Linfield, 1997), and 6) marital satisfaction based on the Kansas Marital Satisfaction Scale (KMSS) (Schumm, 1983) (Appendix A).

**Heart rate variability.** Heart rate variability (HRV), used to measure physiological stress, reflected data on the physical state of the participants. A sensor was used to monitor the levels of participants' autonomic nervous system (including both sympathetic and parasympathetic systems). The level of physiological stress present affects HRV; when individuals are experiencing stress, their heart rate fluctuates in an irregular or erratic way, whereas when individuals are feeling relaxed, their heart rate steadies into a more uniform

pattern. Past research has found HRV to be related to multiple health concerns, such as diabetes, coronary artery disease, hypertension, and heart failure (Malik, 1998). Heart rate variability has been used both in military studies (Norris, Morris, Ozdas, Grogan, & Williams, 2005) and in research with civilian couples (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007; Smith et al., 2011), but there is a lack of research that has used HRV to assess both members of military couples.

**Pain.** Pain, the second variable being measured, was reported by the participants using the pain scale (VAS) (Aitken, 1969). The pain scale (VAS) is a one-item scale that ranges from zero ('no pain') to ten ('excruciating pain'). Participants reported their level of pain experienced within the past week. The VAS has not been previously used with military couples in research, but it has been utilized in medical contexts. This scale is appropriate for this study because it is brief and a sensitive form of detecting levels of pain (Seymour, Simpson, Charlton, & Phillips, 1985).

**Depression.** The third variable, depression, was measured using The Patient Health Questionnaire (PHQ-9) (Spitzer et al., 1999). The PHQ-9 has been cited many times as a highly accepted measure to assess the severity of depression. This measure was developed in accordance to the *Diagnostic and Statistical Manual of Mental Disorders, IV-TR* criteria for diagnosing depression (American Psychiatric Association, 2000). There are nine questions that make up this measure and the participant's total score indicates a provisional diagnosis of the severity of depressive symptoms. This tool has been found to be both a valid and reliable measure for assessing the presence and severity of depressive symptoms ( $\alpha = .89$  internal,  $\alpha = .86$  test-retest) (Spitzer et al., 1999) with an overall sensitivity of 84% and a specificity of 72% (Kroenke et al., 2001). Additionally, this tool has previously been used in numerous military

studies (Eaton, Hoge, Messer, Whitt, & Cabrera, 2008; Felker, Hawkins, Dobie, Gutierrez, & McFall, 2008; Sayers et al., 2009).

**Distress.** The fourth variable, distress, was measured with the Distress Thermometer (DisT). The Distress Thermometer assessed participant's overall distress using a 10-point scale, ranging from zero ('no distress') to ten ('extreme distress'). This scale, originally created by the National Comprehensive Cancer Network (NCCN), was intended to assess multiple types of distress, including: psychological, social, and spiritual (nonphysical) (Holland & Bultez, 2007). Similar to the VAS scale, The DisT has also not been previously used in research with military couples, but has been used in medical contexts (Bevans et al., 2011; Mitchell, 2010).

**Marital Quality.** Marital assessments were conducted to examine the remaining two variables, the level of marital quality and satisfaction participants report. By including these variables, data were gathered to provide insight into the attributes of the participants' relationships. The Positive and Negative Quality in Marriage Scale (PANQIMS) examined the quality of marriages (Fincham & Linfield, 1997). This scale asked participants to examine the degree to which certain aspects or qualities about their partners are positive or negative using a 10-point scale ranging from zero ('not at all') to ten ('extremely'). Specifically, participants were asked to consider their partners' positive or negative qualities and ignore the other ones and evaluate how positive or negative they are. Additionally, the participants were asked how they feel about their partner's qualities, and their feelings toward the partner and the relationship. This scale has been verified by previous research as being a reliable measure of marital quality ( $\alpha = .91$  for positive marital quality and  $\alpha = .91$  for negative marital quality) (Mattson, Paldino, & Johnson, 2007). This measure has not been used in previous research where the military couple served as the unit of analysis.

**Marital Satisfaction.** In conjunction with the PANQIMS, the Kansas Marital Satisfaction Scale (KMSS) is a three-item scale that measures the level of satisfaction a participant feels with his or her spouse (Schumm, 1983; Schumm et al., 1986). Responses to the three items range from ‘extremely dissatisfied’ to ‘extremely satisfied’ on a 7-point scale. Previous researchers have established the validity of this measure (Schumm et al., 1985) and reliability with a high degree of internal consistency ( $\alpha = .95$ ) (Mitchell et al., 1983). Additionally, this tool has previously been used for other studies involving military samples (Green & Harris, 1992; Kolibas, 2007).

### **Procedure**

For this thesis, only a segment of the baseline data from a larger military study was analyzed. The procedure for collecting this set of data was as follows. Individuals who met the inclusion and exclusion criteria for the study were asked whether they were interested in participating in the study. If only one partner was present, the researcher explained the purpose of the study and assessed whether or not the potential participant was interested. If he or she was interested, the researcher encouraged the participant to invite his or her spouse to their next medical appointment. The researcher then called the military personnel with a reminder notice before his next medical appointment. Informed consent was not obtained until both the husband and the wife were at the research appointment.

If both members of the couple were present, and consented to participate during a medical visit, the researcher then brought the couple into the research room (i.e., a room that included two desks and no form of decorations, such as pictures or other things that may distract or influence a participant’s responses or heart rate variability). The room was kept private for the couple and was in a separate hallway, away from the medical appointment rooms.

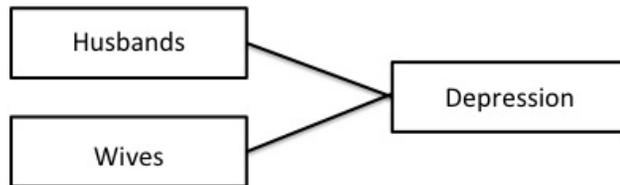
Assessments were completed with both the military personnel and his spouse simultaneously. As one person completed the self-report questionnaire, his or her partner was connected to the HRV monitor located on the other side of a desk. A divider was placed between the couple to maintain confidentiality. After the two assessments were completed, the partners switched and completed the other assessment. Thus, both members of the couple completed the physiological and paper-and-pencil assessment measurements during the research visit.

Heart Rate Variability was collected through a blue tooth technology sensor attached to the participant's finger and the data were recorded through a HRV software program (Biocon Technologies; HRV Live!). This monitor measured the heart rate rhythms and allowed the researcher to determine the level of stress the participant was experiencing as a function of autonomic nervous system reactivity. These data were collected for twelve minutes to gather enough information to accurately report the level of physiological stress for each participant. When both participants completed their part (i.e., either the survey or HRV data collection), the spouses switched and completed the alternate assessment.

### **Research Hypotheses**

As evidenced by the review of literature on the implications of involvement in the military for both civilian wives and their military spouses, it has been revealed that civilian wives often demonstrate symptoms at an equal, if not greater, severity as their military husbands (Verdeli et al., 2011). Thus, the current study investigated the degree to which civilian wives, in comparison to their military husbands, experienced symptoms of depression, physiological stress, distress, and pain, and how these variables contributed to and affected their marital quality and marital satisfaction. The research hypotheses for this study included:

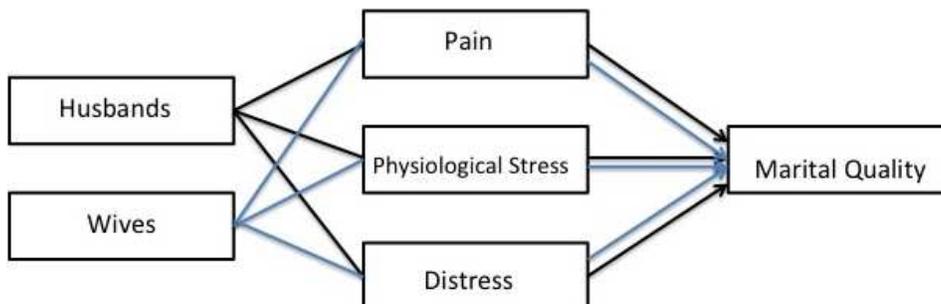
1. There will be no significant differences between the PHQ-9 scores of civilian wives and their military husbands.



2. Pain (VAS pain scale), Distress (DisT distress scale), and HRV will be related to husbands' and wives' marital quality.

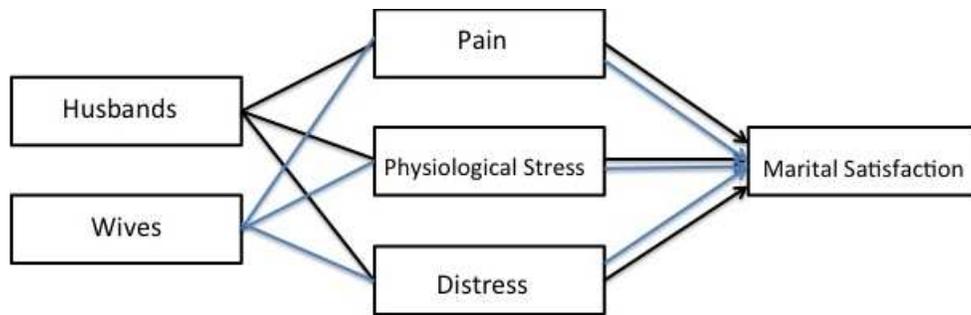
2a) As pain, distress, and physiological stress increase, positive marital quality (PMQ) will decrease.

2b) As pain, distress, and physiological stress increase, negative marital quality (NMQ) will also increase.



3. Pain (VAS pain scale), Distress (DisT distress scale), and HRV will be related to husbands' and wives' marital satisfaction.

3a) As pain, distress, and physiological stress increase, marital satisfaction will decrease.



### **Analysis**

Multiple statistical tests were conducted according to the hypotheses to examine the relationships between the variables being assessed. Specifically, a paired t-test was conducted to investigate if there were significant differences between spouses for mean depression score (H1). To analyze the relationships between marital quality, as a response variable, and pain, physiological stress, and distress, as explanatory variables, for both husbands and wives (H2) and marital satisfaction, as a response variable, and pain, physiological stress, and distress, as explanatory variables, for both husbands and wives (H3), linear regressions were conducted. The two regressions served to examine which explanatory variables most predicted marital quality and marital satisfaction for military husbands and civilian wives separately.

### **Summary**

The focus of this thesis was to examine differences for wives compared to husbands on their experiences of physiological stress, level of pain, depression, and level of distress. Additionally, this thesis aimed to demonstrate that these factors were negatively correlated with marital quality and satisfaction. This thesis was inspired by the larger study, which has been constructed around the goal of strengthening the healthcare services for military couples.

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## CHAPTER 4: HIS AND HERS: MILITARY COUPLES EXPERIENCES OF BIOLOGICAL, PSYCHOLOGICAL, AND RELATIONAL HEALTH

Currently there are approximately 3.6 million employees within the Department of Defense, of which 1.4 million men and women are classified as active duty (Department of Defense [DoD], 2010). Within this population, 56% are married, 44% have children, and 5% are single parents (DoD, 2010). Given that over half (51.5%) of active duty personnel are 25 years of age or younger (DoD, 2010) and that younger marriages are more likely to end in divorce (Hogan & Seifert, 2010), this population is especially at risk for marital concerns (Karney & Crown, 2007).

Many marriages begin while in the military, and for some, marital life in the military has been viewed as stressful, yet successful (Baptist et al., 2011); however, for others it has ended in divorce (Hogan & Seifert, 2010). In 2009, 3.6% of officers and enlisted personnel sought a divorce (DoD, 2010), and the probability of divorce increases significantly after two or more years of active duty status (Hogan & Seifert, 2010). Involvement in the military has the capacity to influence military personnel, civilian spouses, and their marriages in considerable ways (e.g., physical and mental health problems and resiliency). Thus, the health and stability of military marriages is a product of individual biopsychosocial health factors for both partners, as well as the relationship itself.

### **Conceptual Models**

Given the distinct strengths, complexities, and stressors that military couples experience compared to their civilian counterparts, both members of the couple may be at higher risk for adverse effects across biological, psychological, and relational domains. A model that was utilized to ground this thesis is the biopsychosocial model, proposed by George Engel (1977).

This holistic approach examines how different systems connect to and influence each other, and holds that no single element can be fully explored without also exploring and considering the other domains of experience. Through this model, Engel (1977) posits that biological, psychological, and social experiences are interconnected and have the ability to influence one another. Engel (1977) notes, “A medical model must also take into account the patient, the social context in which he lives, and the complementary system devised by society” (p. 132). Although researchers are united in concluding that military involvement has the capability of influencing marriages (Baptist et al., 2011; Hogan & Seifert, 2010; Karney & Bradbury, 1995; Karney & Crown, 2007), it is not yet clear how marriages, specifically in terms of marital quality and satisfaction, are altered by life in the military. While there are many factors that could be assessed via the social realm, the couple relationship was the primary aspect that was explored for this thesis, and because the couple was the unit of analysis, the language of *biopsychorelational* is used through the remainder of the document (Lewis, Lamson, & Lesueur, 2012).

A second model that informs this thesis is the ‘trauma transmission model’ (Adelman, 1995; Figley, 1995). This model asserts that when one spouse experiences a traumatic event, often the other spouse will also develop symptoms resulting from the experience. For example, Arzi, Solomon, & Dekel (2000) found that spouses of trauma survivors often exhibit symptoms of stress, anxiety, depression, isolation, poor relationship quality, and lowered levels of intimacy. Further, Nelson, Wangsgaard, Yorgason, Higgins Kessler, and Carter-Vassol (2002) have seven themes that correspond with trauma transmission, including: polarized emotional roles, extreme pursuer-distancer patterns, rules of secrecy surrounding the trauma, individual trauma symptoms for the primary survivor, individual issues for the non-traumatized partner, emphasis on the

parental role of the non-traumatized partner, and an impact on other subsystems. It is important to note that the non-traumatized spouse may experience lesser, equal, or perhaps even greater symptom severity compared to their partner. Although the couple may present with difficulties connected to only one spouse's history of trauma, this model draws attention to the experience of the non-traumatized spouse as well.

### **Purpose**

This study was conducted in order to provide information on how the individual biological, psychological, and relational experiences of military personnel and their civilian wives influence ratings of marital satisfaction and marital quality (i.e., the couple dyad). Specifically, the "his" and "hers" biological, psychological, and relational outcomes of military couples were explored. In an effort to assess the influence of biological and psychological health factors on marital relationships of military couples; the researcher examined levels of physiological stress, pain, depression, and distress in both partners. In addition, biological and psychological factors were examined in relation to their contribution to the couples' marital health (marital quality and satisfaction). These variables were selected because they have received attention recently within military literature with regard to military dyads (Allen et al., 2010; Asbery & Martin, 2012; Ein-Dor, Doron, Solomon, Mikulincer, & Shaver, 2010; Smith et al., 2011)

### **Literature Review**

Life in the military can be full of frequent and unexpected changes for military personnel as well as for their spouse. Many military personnel experience difficulties across biological, psychological, and social domains of health throughout and following their careers, which systemically may influence or be influenced by their civilian spouse's well being. Interestingly,

researchers show that symptoms experienced by civilian spouses often reflect the experiences, symptoms, or diagnoses of the military spouse (Bevans et al., 2011; Menchaca & Dehle, 2005; Zwahlen, Hagenbuchm, Jenewein, Carley, & Buchi, 2011). The strains that result from each spouse's biological, psychological, and emotional experiences then have the capacity to influence the couples' relational health (Kiecolt-Glaser, Bane, Glaser, & Malarkey, 2003; Menchaca & Dehle, 2005).

### **Biological Health of Military Personnel and Their Civilian Wives**

The biological health of military personnel can range from having few or no health concerns to experiencing significant injuries (e.g., amputations) (Fisher, 2007). Military personnel, especially those who have recently returned from combat, commonly experience significantly more health concerns compared to civilian populations (Fisher, 2007). Although military personnel often experience various health concerns specific to their roles in the military, civilian spouses may also struggle with biological health concerns, such as headaches, changes in their menstrual cycle, difficulty sleeping, and changes in body weight (Dimiceli, Steinhardt, & Smith, 2010).

Researchers have shown that measuring the variability in an individual's heart rate (HRV) is a successful way to obtain information on the physiological influence of stress on overall health (Keary, Hughes, & Palmieri, 2009; Smith et al., 2011). Specifically, heart rate variability functions as a biomarker to measure the relaxation and stress response (sympathetic and parasympathetic responses) of the autonomic nervous system (ANS). Previous researchers have concluded that military personnel tend to have a markedly decreased standard deviation of normal beat-to-beat intervals (SDNN), indicating that they experience increased ANS dysregulation (Tan et al., 2009). As a result, military personnel may have internal systems that

are less able to regulate the ramifications of stress on their ANS, which then has the capacity to extend onto their couple relationship functioning (Smith et al., 2011). Wives, on the other hand, tend to have a more critical lens of their relationship functioning, which requires a higher level of self-regulation (Menchaca & Dehle, 2005). As a result, wives may be more significantly impacted than their husbands in terms of their physiological arousal and especially in how they perceive the quality of the relationship.

In line with physiological stress, research has supported that pain may be experienced differently (i.e., directly experiencing pain vs. experiencing the ramifications of one's spouse's pain), though still significant, for each member of a military couple (Miaskowski, Zimmer, Barrett, Dibble, & Wallhagen, 1997). Pain has been reported as one of the most common reasons that military personnel seek medical attention (Haskell, Heapy, Reid, Papas, & Kerns, 2006). The two primary types of pain found among military personnel are lower back pain (53%) and extremity pain (23%) (Spevak & Buckenmaier, 2011). The experience of pain is shown to influence psychological well being, social responsibilities, and family life for individuals experiencing pain as well as for their spouses (Haskell et al., 2006). The spouses of individuals who experience pain frequently report higher levels of tension and depression, higher levels of total mood disturbances, and lower health status scores than those who do not have a spouse in pain (Miaskowski et al., 1997).

### **Psychological Health of Military Personnel and Their Civilian Wives**

The physical health challenges that military personnel and their spouses commonly face are often accompanied by emotional and mental health challenges, such as depression (Tsai, Pietrzak, Southwick, & Harpaz-Rotem, 2011), excessive alcohol use (Eaton et al., 2008), psychological stress (Allen, Rhoades, Stanley, & Markman, 2010), development of coping

mechanisms (Tsai et al., 2011), and amount and quality of sleep (Warner, Appenzeller, Warner, & Grieger, 2009). To put things in perspective, lifetime rates of depression for civilian men are 7-12% and 20-25% for civilian women, whereas more than one-third of military men report some level of depressive symptoms (Warner et al., 2007). Although a large percentage (over 25% of military personnel seeking primary care) of military personnel are diagnosed with either depression or anxiety disorders each year, less than 50% of military personnel receiving regular primary care also receive mental health treatment (Warner et al., 2007), which can add to the systemic challenges associated with poor psychological health or life in the military (e.g., deployment).

Although military personnel often experience various health concerns specific to their roles in the military, civilian spouses may also struggle with psychological and social health concerns. Civilian spouses are likely to experience depression (Eaton et al., 2008; Warner et al., 2009), caregiver burden (Warner et al., 2009), psychological distress (Allen et al., 2010), and family separation (McLeland, Sutton, & Schumm, 2008). In addition, the presence of distress may trigger conflicts or further exacerbate fears, uncertainties, and suffering, and may hinder effective communication and feelings of closeness and sexual activity between partners (Zwahlen et al., 2011). In fact, many times spouses of military personnel have a different, and often worse, perception of their marital functioning (e.g., confidence in the relationship, positive bonding, and satisfaction with sacrifice) than their partner (Allen et al., 2011).

### **Health of the Couple Relationship**

In addition to military personnel and their spouses' individual experiences, there are additional complexities (e.g., regular relocation, trauma and secondary-trauma, marital dysfunction) that couples in the military face that can both positively and negatively influence

the marital relationship (Allen et al., 2010; Eran-Jona, 2011). Researchers posit that the demands of military life (such as deployments) might restrict the ability of spouses to maintain closeness and intimacy (Karney & Crown, 2007). Interestingly, research has uncovered a link between positive marital quality and lower levels of stress, depression, and blood pressure when compared with couples who had lower marital quality (Holt-Lunstad, Birmingham, & Jones, 2008). All of these factors have the capability of severely affecting a couple's relational health and ultimately can alter the trajectory of even the healthiest of marriages.

Two popular perspectives have developed within the literature with regard to the relationships of military couples: (a) military couples tend to face more detrimental outcomes than civilian couples due to the hardships of life in the military (Riggs, Byrne, Weaters, & Litz, 1998) or (b) involvement in the military develops certain strengths or tolerance to cope with hardships and allow the couple to function at a level comparable to civilian couples (Schumm & Hammond, 1986). Schumm and Hammond (1986) lent support to the latter notion that military couples are no more disadvantaged than other civilian couples in terms of marital quality and functioning, whereas Riggs et al. (1998) found that the presence of severe symptoms of stress was associated with the quality of intimate relationships. Thus, the literature to date has revealed contradicting findings in research on the affect of military involvement on couples' ratings on the quality of their marriage.

When comparing levels of marital satisfaction between partners, Renshaw, Rodrigues, and Jones (2008) noted that wives reported higher levels of marital satisfaction on average than their military husbands. The experience of deployment has been punctuated throughout the literature as significantly linked with couples' experiences of marital satisfaction (Goff, Crow, Reisbig, & Hamilton, 2007; Hoge et al., 2004; McLeland et al., 2008). In an examination of

marital satisfaction rates surrounding the deployment period in particular, several researchers have noted that recent deployment is related to higher levels of stress, which has the ability to influence couples' experience of marital satisfaction and functioning (Hoge et al., 2004; McLeland et al., 2008). Moreover, an inverse relationship was found between traumatic experiences and the reported rates of marital satisfaction (Goff et al., 2007). McLeland and colleagues (2008) suggested that the changes seen in individuals' levels of marital satisfaction might be due to increased lengths of time away from one's spouse or as a response to mental health concerns or adjustments after deployment periods. This focus in literature is considered to be imperative because couples' levels of satisfaction with their relationships has the capability of altering both military personnel and civilian spouses' biopsychorelational health and functioning (McLeland et al., 2008; Renshaw et al., 2008; Schumm, Crock, Likcani, & Bosch, 2008).

### **The Interface of Biopsychorelational Health**

The literature to date exposes a gap in research that this study has sought to fill. The collection of research reviewed in this article lends support for the notion that biological and psychological factors have the capability of influencing military couples, though the findings from various studies are limited to specific content issues (e.g., domestic violence [Schumm, Bell, & Gade, 2000; Stanley et al., 2005]; substance use [Bray et al., 2010; Rotunda, O'Farrell, Murphy, & Babey, 2008]; and PTSD [Asmundson, Stein, & McCreary, 2002; Shea, Vujanovic, Mansfield, Sevin, & Liu, 2010]). In addition, there is a multitude of literature (Kiecolt-Glaser et al., 2003; Kiecolt-Glaser & Newton, 2001; Menchaca & Dehle, 2005) that demonstrates the need for military health to be considered via an interwoven nature of health and punctuates the need for a systemic perspective on health and relationships. Thus, this study was developed to

provide new insight into the biological, psychological, and relational experiences of military personnel and their civilian wives.

### **Method**

This study was a part of a larger investigative effort concerning the physical, psychological, emotional, and relational health of military personnel and their spouses within a military medical system. Information was gathered through self-report and physiological measures for both members of the couple. Although the larger study was based on a couple's intervention through the use of integrated care, the focus of this study was to better understand the "his" and "hers" biological, psychological, and relational outcomes of military couples, prior to intervention. The larger study was conducted at a medical center for military personnel and their families, and is located on a base in a southeastern state of the U.S. This clinic acted as a primary care facility for military families (including Air Force and Army service members and Veterans).

### **Sample**

Participants were recruited through a military medical center by family therapy researchers. The two criteria for inclusion in the study were that at least one participant needed to be active duty, reserve, or retired and the participants must be currently married. Inclusion criteria for participating couples was that the couple was married, had one partner who was active duty, and neither person had a serious mental health condition (i.e., severe clinical depression, suicidal ideation assessed by the PHQ-9, severe PTSD assessed using the PTSD checklist or serious cognitive delays). Indicators for exclusion included a) an overall PHQ-9 score above fifteen or a score above zero on question nine (assessing suicidality) or b) comments by either partner that they were receiving marital therapy. Additionally, data were not collected while the service member was deployed. Both members of the couple were required to sign an

informed consent prior to participation. The total sample consisted of 76 couples recruited from the medical center, though ten couples did not meet criteria for inclusion in the analysis.

## **Measures**

Physical, psychological, and relational health data were collected from male military personnel and their spouses through a variety of means. For this study, the following variables were assessed: 1) participants' Heart Rate Variability (HRV), 2) pain levels based on the Visual Analog Scale (VAS) (Aitken, 1969; Jensen & Karoly, 2001), 3) depression levels based on the Patient Health Questionnaire (PHQ-9) (Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, & Williams, 1999), 4) distress levels based on the Distress Thermometer (DisT) (Roth et al., 1998), 5) marital quality based on the Positive and Negative Quality in Marriage Scale (PANQMS) (Fincham & Linfield, 1997), and 6) marital satisfaction based on the Kansas Marital Satisfaction Scale (KMSS) (Schumm, 1983) (Appendix A).

**Heart rate variability.** Heart rate variability (HRV), used to measure physiological stress, reflected data on the physical state of the participants. A sensor was used to monitor the participants' autonomic nervous system (including both sympathetic and parasympathetic systems). The level of physiological stress present affects HRV; when individuals are experiencing stress, their heart rate fluctuates in an irregular or erratic way, whereas when individuals are feeling relaxed, their heart rate steadies into a more uniform pattern. Malik (1998) has found heart rate variability to be related to multiple health concerns, including diabetes, coronary artery disease, hypertension, and heart failure. Heart rate variability has been used both in military studies (Norris, Morris, Ozdas, Grogan, & Williams, 2005) and in research with civilian couples (Nealey-Moore, Smith, Uchino, Hawkins, & Olson-Cerny, 2007; Smith et

al., 2011), but there is a lack of research that has used HRV to assess both members of military couples.

**Pain.** Pain, the second variable measured, was reported by the participants using the pain scale (VAS) (Aitken, 1969). The VAS is a one-item scale that ranges from zero ('no pain') to ten ('excruciating pain'). Participants reported their level of pain experienced within the past week. The VAS has not been previously used with military couples in research, but it has been utilized in medical contexts. This scale is appropriate for this study because it is brief and a sensitive form of detecting levels of pain (Seymour, Simpson, Charlton, & Phillips, 1985)

**Depression.** The third variable, depression, was measured using The Patient Health Questionnaire (PHQ-9) (Spitzer et al., 1999). The PHQ-9 has been cited many times as a highly accepted measure to assess the severity of depression. This measure was developed in accordance to the *Diagnostic and Statistical Manual of Mental Disorders, IV-TR* criteria for diagnosing depression (American Psychiatric Association, 2000). There are nine questions that make up this measure and the participant's total score indicates a provisional diagnosis of the severity of depressive symptoms. This tool has been found to be both a valid and reliable measure for assessing the presence and severity of depressive symptoms ( $\alpha = .89$  internal,  $\alpha = .86$  test-retest) (Spitzer, Kroenke, & Williams, 1999) with an overall sensitivity of 84% and a specificity of 72% (Kroenke et al., 2001). The Chronbach's alphas for this measure were .76 for husbands and .71 for wives. Additionally, this tool has previously been used in numerous military studies (Eaton et al., 2008; Felker, Hawkins, Dobie, Gutierrez, & McFall, 2008; Sayers et al., 2009).

**Distress.** The fourth variable, distress, was measured with the Distress Thermometer (DisT). The Distress Thermometer assessed participant's overall distress using a 10-point scale,

ranging from zero ('no distress') to ten ('extreme distress'). This scale, originally created by the National Comprehensive Cancer Network (NCCN), was intended to assess multiple types of distress, including: psychological, social, and spiritual (nonphysical) (Holland & Bultez, 2007). Similar to the VAS scale, The DisT has also not been previously used in research with military couples, but has been used in medical contexts (Bevans et al., 2011; Mitchell, Meader, & Symonds, 2010).

**Marital quality.** Marital assessments were conducted to examine the remaining two variables, the level of marital quality and satisfaction participants report. By including these variables, data was gathered to provide insight into the attributes of the participants' relationships. The Positive and Negative Quality in Marriage Scale (PANQIMS) examined the quality of marriages (Fincham & Linfield, 1997). This scale asked participants to examine the degree to which certain aspects or qualities about their partners are positive or negative using a 10-point scale ranging from zero ('not at all') to ten ('extremely'). Specifically, participants were asked to consider their partners' positive or negative qualities and ignore the other ones and evaluate how positive or negative they are. Additionally, the participants were asked how they feel about their partner's qualities, and their feelings toward the partner and the relationship. This scale has been verified by previous research as being a reliable measure of marital quality ( $\alpha = .91$  for positive marital quality and  $\alpha = .91$  for negative marital quality) (Mattson, Paldino, & Johnson, 2007). The Chronbach's alphas for positive marital quality were reported at .93 for husbands and .92 for wives, and for negative marital quality was .82 for husbands and .90 for wives. This measure has not been used in previous research where the military couple served as the unit of analysis.

**Marital satisfaction.** In conjunction with the PANQIMS, the Kansas Marital Satisfaction Scale (KMSS) is a three-item scale that measures the level of satisfaction a participant feels with his or her spouse (Schumm, 1983; Schumm & Hammond, 1986). Responses to the T items range from ‘extremely dissatisfied’ to ‘extremely satisfied’ on a 7-point scale. Previous researchers have established the validity of this measure (Schumm et al., 1985) and reliability with a high degree of internal consistency ( $\alpha = .95$ ) (Mitchell, Newell, & Schumm, 1983). The Chronbach’s alphas for this measure were .97 for husbands and .96 for wives. Additionally, this tool has previously been used with military samples (Green & Harris, 1992; Kolibas, 2007).

### **Procedure**

Couples who gave consent to participate were brought into a research room that was kept private for the couple and was in a separate hallway, away from the medical appointment rooms. Assessments were completed with both the military personnel and his spouse simultaneously. As one person completed the self-report questionnaire, his or her partner was connected to the HRV monitor located on the other side of a desk. A divider was placed between the couple to maintain confidentiality. After their first assessment was completed, the partners switched and completed the other assessment. Thus, both members of the couple completed the physiological and paper-and-pencil assessment measurements at the research visit.

### **Research Hypotheses**

1. There will be no significant differences between the PHQ-9 scores of civilian wives and their military husbands.
2. Pain (VAS pain scale), Distress (DisT distress scale), and HRV will be related to husbands’ and wives’ marital quality.

2a) As pain, distress, and physiological stress increase, positive marital quality (PMQ) will decrease.

2b) As pain, distress, and physiological stress increase, negative marital quality (NMQ) will also increase.

3. Pain (VAS pain scale), Distress (DisT distress scale), and HRV will be related to husbands' and wives' marital satisfaction.

3a) As pain, distress, and physiological stress increase, marital satisfaction will decrease.

## **Analysis**

Multiple statistical tests were conducted according to the hypotheses to examine the relationships between the variables being assessed. Specifically, a paired t-test was conducted to investigate if there were significant differences between spouses for mean depression score (H1). A linear regression was used to analyze the relationships between marital quality, as a response variable, and pain, physiological stress, and distress, as explanatory variables, for both husbands and wives (H2). An additional linear regression examined the link between marital satisfaction, as a response variable, and pain, physiological stress, and distress, as explanatory variables, for both husbands and wives (H3). The purpose of these regressions was to provide information on which explanatory variables were the best predictors for marital quality and marital satisfaction for military husbands and for civilian wives.

## **Results**

### **Preliminary Tests**

Prior to conducting any analyses to investigate the hypotheses, information on the demographic variables of the study sample were examined (Table 1). A total of 66 couples met

the study inclusion criteria and made up the sample. Of these 66 couples, the mean age for husbands was 36.02 years and 35.08 years for wives. The majority of participants were non-Hispanic white (72.7% of males and 65.2% of females), followed by African-American (16.7% of males and 12.1% of females), Hispanic (4.5% of males and 7.6% of females), Asian-American (6.1% of females), Biracial (1.5% of males), and those who identified as 'other' (4.5% of males and 7.6% of females). Additionally, the majority of participants had completed some college (66.7% of males and 51.5% of females), and fell under the husband-military-only couple type (77.3% of the couples). Although we recognize that the military-husband civilian-wife couple type was not the only dyad represented within this study's sample, the military-husband-only dyad type was the focus for this article. There was one individual with an outlying value of 258.00 in the SDNN component of HRV (5.7 standard deviations above the mean) that was excluded from further statistical analysis.

Additionally, descriptive statistics were performed to summarize the distribution of this study's research variables (Table 2). The mean measures between husbands and wives were compared and summary statistics of the variables revealed a large effect size for depression, indicated by a Cohen's *d* of (.53), with wives having a higher mean score ( $M=3.84$ ,  $SD=3.34$ ) than husbands ( $M=2.14$ ,  $SD=3.02$ ) There was also a medium effect size for standard deviation of normal to normal (SDNN) (i.e., r-r heartbeat) indicated by a Cohen's *d* of (.44), with a higher mean score for husbands ( $M=69.40$ ,  $SD=35.21$ ) than wives ( $M=53.76$ ,  $SD=35.43$ ) (Orwin, 1983).

Bivariate correlation coefficients were used to quantify the strength and direction of association between variables for husbands (below the diagonal) and wives (above the diagonal) (Table 3). Specifically, the relationships between the physical (pain), emotional (marital satisfaction, positive marital quality (PMQ), negative marital quality (NMQ)), psychological

(depression, distress), and physiological variables (HRV) were assessed. Six variables that measure HRV were used: Very Low Frequency (VLF), Low Frequency (LF), High Frequency (HF), Ratio of Low Frequency/High Frequency (LF/HF), Standard Deviation of r-r heart beat (SDNN), and Total Autonomic Nervous System strength (Power).

The bivariate correlations revealed clusters among the six HRV variables and among the marital health measures (i.e., marital satisfaction, PMQ, and NMQ). Specifically, all six physiological health variables significantly correlated with one another for both husbands and wives. With regard to the marital health cluster, all three variables (marital satisfaction, PMQ, and NMQ) appeared to be significantly correlated to one another for both husbands and wives, though, interestingly, the two marital quality variables (PMQ and NMQ) were not significantly correlated with one another for wives.

For husbands, statistically significant positive relationships ( $p < .05$ ) existed between pain and depression, distress and depression, and PMQ and marital satisfaction. Thus, in these relationships, as one variable increased, the other also increased. Statistically significant negative relationships were found between NMQ and marital satisfaction, and PMQ and NMQ. For these variables, as husbands' reported higher levels of NMQ, they tended to report lower levels of marital satisfaction and PMQ, and vice versa.

For wives, statistically significant positive relationships ( $p < .05$ ) were found between depression and distress ( $r = .551$ ), distress and NMQ, depression and NMQ ( $r = .394$ ), and marital satisfaction and PMQ ( $r = .442$ ). As wives' experienced higher levels of depression and distress, they also reported higher levels of NMQ. Also, not surprisingly, husbands' high levels of reported marital satisfaction were correlated with high levels of PMQ ( $r = .414$ ). As for significant negative relationships for wives, correlations were found between distress and marital

satisfaction ( $r = -.290$ ), and NMQ and marital satisfaction ( $r = -.484$ ). Thus, as wives experienced more distress and NMQ, their reported rates of marital satisfaction declined. Interestingly, pain was not significantly correlated with any other study variables for wives, but it was positively correlated with depression for husbands ( $r = .268$ ).

### **Hypothesis #1**

A paired t-test was conducted to investigate whether husbands and wives differ in their levels of depression. The analysis revealed a significant difference between husbands ( $M = 2.19$ ,  $SD = 3.08$ ) and wives ( $M = 3.81$ ,  $SD = 3.35$ ) in reported levels of depression (Table 4), where wives reported higher levels of depression. The analysis showed a significance below the .05 level (.004):  $t(61) = -3.19$ ,  $p < .005$  (two-tailed). The eta-squared statistic (.13) indicated a large effect size. This data revealed that there was a significant difference between spouses of military couples with regard to their levels of depression, which countered the proposed hypothesis one. Specifically, wives, as opposed to husbands, on average reported experiencing higher levels of depressive symptoms, as evidenced by the higher mean.

### **Hypothesis #2**

Hierarchical regressions were originally proposed to identify the best predictor of husbands' and wives' reported marital quality, when comparing HRV, pain, and distress. Three HRV variables (i.e., Standard deviation of r-r heart beat [SDNN], high frequency [HF], and Total Autonomic Nervous System strength [Power]) were selected as a result of the preliminary bivariate correlational tests, due to their significance when correlated with other HRV variables. For the purposes of these hierarchical regressions, these three HRV variables were used to measure overall HRV effect alongside the other explanatory variables pain and distress. Due to

the significant correlations found between depression and the marital health variables, depression was also included in the hierarchical regressions for hypothesis two and three.

To examine marital quality, positive marital quality (PMQ) and negative marital quality (NMQ) were separated to gather a more accurate picture of the effects of the exploratory variables. To conduct the hierarchical regressions for hypothesis two and three, the variables were entered in steps beginning with the psychological variables (depression, then distress) and then the biological variables (HF, SDNN, Power, and Pain). For husbands, no models were statistically significant at  $p < .05$  in predicting their PMQ; however, the variable SDNN was significant within the third model (Table 5). No models or individual variables were statistically significant in predicting husbands' NMQ. Although past literature has identified depression, distress, pain, and physiological stress as common experiences for military personnel, these results suggested that these variables did not significantly influence husbands' experiences of marital quality.

Alternatively, for wives, though their psychological and biological factors were not significant in predicting their levels of PMQ, they were statistically significant for predicting NMQ with  $R^2$  change of .57,  $F(5,45) = 3.63$ ,  $p < .01$  (see Table 5). Based on linear regression results, as the wives' score of depression increased by one unit, the reported level of negative marital quality was expected to also increase by 0.96 units; as distress increased by one unit, the level of negative marital quality was expected to increase by 0.92 units; and as their physiological stress, indicated by their HRV Power, increased by one unit, their negative marital quality was expected to decrease by -0.01 units. This data revealed that wives' experiences of depression, distress, and physiological stress, largely contributed to their assessment of the negative quality of their marriages.

### **Hypothesis #3**

Linear regression analysis was conducted following the adaptations of hypothesis 3, as discussed above, to examine the predictive ability of depression, distress, physiological stress, and pain on marital satisfaction for husbands and wives of military dyads (table 5). The results of this regression indicated that no variables were statistically significant predictor of marital satisfaction for husbands. In contrast, distress was significant in predicting marital satisfaction for wives in both the second ( $\beta = -0.67$ ) and third ( $\beta = -0.67$ ) models, with a  $R^2$  change of .26,  $F(6,45) = 2.62, p < .05$ . As the reported score of distress increased by one unit, wives' levels of marital satisfaction was expected to decrease by -0.67 units, and remained significant at  $p < .01$  even after biological factors were included in the regression. It appears that wives' experiences of distress contributed to their reported levels of marital satisfaction in a negative way; as distress levels increased, reported marital satisfaction decreased.

### **Discussion**

This study has addressed the gaps in the literature through an investigation of both spouses' individual experiences and how they contribute to their perception of their marital quality and satisfaction. The biopsychosocial model, proposed by Engel (1977) and the trauma transmission model (Adelman, 1995; Figley, 1995) were utilized to ground this research. The two theories came to life and demonstrated the intertwined nature of couples' health through the significant finding of the relationship between wives' distress and marital health factors.

The preliminary tests from this study revealed several statistically significant correlations between the variables assessed, including two notable clusters within the HRV variables and the marital health variables. The paired t-test revealed a significant difference between military personnel and their civilian spouses in terms of their reported levels of depression. Specifically,

wives reported experiencing depressive symptoms more often than husbands. It is hypothesized that this could be due to the difference in resources available to each spouse. Eaton et al. (2008) reported that civilian spouses do not receive the same level of psychological care services or emotional support as military personnel, which may result in the larger presence of depressive symptoms for civilian spouses. Alternatively, it is logical that military wives may be more likely to report their experiences of depressive symptoms, whereas military personnel may fear the potential ramifications (e.g., in social relationships or in their military career trajectory) of reporting such difficulties.

Distress was not found to predict husbands' positive or negative marital quality, though it was statistically significant in predicting wives' negative marital quality. As wives' distress levels increased, their experiences of the negative qualities of their partner and of their marital relationship also increased, and vice versa. As for marital satisfaction, distress was also a statistically significant predictor of marital satisfaction for wives, but not for husbands. For wives, as their experiences of distress increased, their reported level of satisfaction with their marriage decreased, and vice versa.

The role of distress in military marriages is noteworthy. The preliminary tests conducted for this study indicate that husbands report a greater mean score for negative marital quality ( $M=26.42$ ) than wives ( $M=25.83$ ), however wives' standard deviation and variance in scores were significantly greater as opposed to husbands' scores. The results of this study suggest that although military personnel and their civilian wives both report experiencing distress with regard to their connection to the military, women, as opposed to men, tend to be more disturbed by their experiences of distress in a way that interferes with their perceptions of the quality and

satisfaction of their marital relationship. Although the sources of distress are not known and are likely to differ for each couple, this result is indicative of an area of need that requires attention.

### **Limitations**

Due to the complexities involved in investigating a sample within this population (e.g., the difficulty of getting both members together for research and medical appointments), this study utilized a convenience sample recruited through a family medical clinic. Additionally, the majority of data were collected via self-report measures, increasing the risk of social desirability biases influencing the results. Another limitation of the present study is that the results may have shown a more realistic picture of the continuum of health in military couples if those with significant mental health conditions had not been removed from the data set (per the exclusion criteria). Interestingly, five out of the ten couples who were excluded based on the study criteria had at least one spouse with a severe mental health rating and five were receiving marriage therapy. Further, an unexpected outcome was the number of dual military couples in the sample (i.e., couples that did not fit the military husband, civilian wife couple type) and future research is needed to investigate potential differences between these couple types. Lastly, future research would benefit from involving multiple branches of the military, as well as tightening the inclusion criteria to avoid other variables influencing the results.

### **Implications**

This study provides further support to the notion that both members of military couples experience significant effects, both on an individual and relational level, across the biopsychorelational health continuum. The military medical system has recently begun to focus on the effects of military involvement on marriages, though the medical and the psychological, emotional, and relational services still remain separate in many respects. Based on this study, it

is recommended that military medical clinics and providers adopt a systemic lens of practice through the inclusion of both members of the couple in treatment. Further, utilization of an integrated care model (i.e., a team consisting of multiple professionals with different expertise working collaboratively to provide overarching care [Patrick, Hebert, Green, and Ingram, 2011]) within the medical system would assist providers in capturing and attending to patients' multifaceted health concerns. An increased presence of systemically trained mental health providers (e.g., Medical Family Therapists) is recommended to work in collaboration with other medical providers to provide services to both military personnel and civilian wives. Medical Family Therapists would be appropriate for implementing an integrated care model because they are trained relationally to work across the domains of the biopsychosocial continuum and can attend to the unique experiences of each spouse (e.g., distress) and the implications on the couple relationship and larger systems.

In addition, future research focusing on military populations should include samples of couples and should be done through a systemic lens in order to better understanding the relational implications of being connected to the military. Furthermore, more research is needed on relational interventions to address the needs of both members of the couple. Lastly, researchers within military contexts or working with military populations would benefit from the development of a biopsychorelational assessment that could be used throughout the deployment cycle, prior to reintegration, and throughout the Veteran's Affairs system in order to capture a more in-depth picture of the interwoven nature of these variables for military personnel and their civilian wives.

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Table 1. *Demographic Information for Study Participants*

Demographic Variables	Frequency (%)	
	N=66 Husband	N=66 Wife
Age (Average)	36.02(10.57)	35.08(10.78)
Race		
Non-Hispanic White	48(72.7%)	43(65.2%)
African-American	11(16.7%)	8(12.1%)
Hispanic	3(4.5%)	5(7.6%)
Asian-American	---	4(6.1%)
Biracial	1(1.5%)	---
Other	3(4.5%)	5(7.6%)
Education		
Grade 9-11	---	4(6.1%)
GED/HS Diploma	10(15.2%)	13(19.7%)
Some College	44(66.7%)	34(51.5%)
College Graduate	11(16.7%)	13(19.7%)
Graduate School	1(1.5%)	1(1.5%)
Military Personnel		
Military	63(95.5%)	16(24.2%)
Civilian	3(4.5%)	50(75.8%)
Time in Service in Years (Average)	12.81(7.86)	8.59(7.95)
Couple Types		
Military-Military	12(18.2%)	
Husband military only	51(77.3%)	
Wife military only	3(4.5%)	

Table 2. *Descriptive Statistics of Variables (Husbands/ Wives)*

Item	M(SD)	Variance	Skewness	Kurtosis	Range	Cohen's  d	$\alpha$
Pain	1.56(2.12) <b>1.49(2.20)</b>	4.51 <b>4.83</b>	1.17 <b>1.42</b>	-.022 <b>.827</b>	7.0 <b>7.0</b>	.03	
HRV-VLF	692.24(1052.84) <b>287.18(244.51)</b>	1108479.57 <b>59784.28</b>	4.76 <b>1.90</b>	28.59 <b>3.91</b>	7512.80 <b>1140.50</b>	.12	
HRV-LF	573.52(685.16) <b>341.58(376.83)</b>	469448.66 <b>142003.95</b>	3.29 <b>1.93</b>	15.14 <b>3.62</b>	4373.90 <b>1743.50</b>	.35	
HRV-HF	421.28(611.92) <b>262.81(388.65)</b>	374446.44 <b>151049.10</b>	2.34 <b>2.94</b>	4.83 <b>10.13</b>	2505.50 <b>2174.20</b>	.21	
HRV-LF/HF	2.66(2.53) <b>2.36(1.83)</b>	6.41 <b>3.33</b>	2.17 <b>1.93</b>	4.68 <b>6.55</b>	11.70 <b>10.70</b>	.14	
HRV-SDNN	69.61(35.45) <b>50.56(24.54)</b>	1256.47 <b>601.41</b>	1.03 <b>1.12</b>	.53 <b>1.62</b>	153.80 <b>126.40</b>	.44	
HRV-Power	1687.19(1795.78) <b>875.13(836.39)</b>	3224830.99 <b>699556.55</b>	2.05 <b>1.72</b>	4.66 <b>2.74</b>	8571.60 <b>3573.10</b>	.24	
Distress (Analog)	2.40(2.37) <b>3.48(2.61)</b>	5.60 <b>6.83</b>	.81 <b>.51</b>	-.42 <b>-.45</b>	8.0 10.0	.20	
Depression	2.17(3.03) <b>3.81(3.35)</b>	9.21 <b>11.24</b>	1.92 <b>1.09</b>	4.08 <b>1.06</b>	14.0 <b>15.0</b>	.53	.76 <b>.71</b>
Marital Satisfaction	18.22(3.32) <b>18.03(3.67)</b>	11.05 <b>13.50</b>	-2.26 <b>-2.25</b>	7.29 <b>6.08</b>	18.0 <b>18.0</b>	.05	.97 <b>.96</b>
Positive Marital Quality	26.42(4.88) <b>25.83(6.34)</b>	23.81 <b>40.24</b>	-2.00 <b>-2.60</b>	4.63 <b>7.25</b>	23.0 <b>30.0</b>	.11	.93 <b>.92</b>
Negative Marital Quality	6.31(5.52) <b>7.80(7.38)</b>	30.44 <b>54.51</b>	1.02 <b>1.07</b>	.74 <b>.24</b>	24.0 <b>26.0</b>	.21	.82 <b>.90</b>

Cohen's *D* criteria: .1= small effect, .3=medium effect; .5=large effect

Table 3. *Bivariate Correlations Between Indicators for Husbands (below the diagonal) and Wives (above the diagonal)*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Pain	_	.121	.158	-.031	-.101	.203	-.060	.036	-.029	-.040	.017	-.043
2. Distress (Analog)	.154	_	.551**	-.290*	-.032	.394**	-.159	.022	-.061	.164	-.114	-.120
3. PH-Q	.268*	.533**	_	-.034	.086	.319*	.092	.112	.046	.018	.004	-.093
4. KMSS	-.139	-.118	-.160	_	.442**	-.484**	-.017	-.087	-.155	.120	-.119	-.064
5. PMQ	-.194	-.072	-.048	.414**	_	.003	-.043	-.030	-.030	.078	-.041	-.047
6. NMQ	.195	.212	.205	-.522**	-.293*	_	-.036	.059	.061	-.093	.046	.003
7. VLF	-.067	.128	.009	-.023	-.011	.128	_	.554**	.665**	-.134	.774**	.963**
8. LF	.029	-.131	-.131	.053	-.187	-.058	.292*	_	.723**	-.125	.819**	.725**
9. HF	.086	-.035	-.160	-.032	-.080	.020	.191	.731**	_	-.379**	.914**	.820**
10. LF/HF	-.072	-.075	.018	.149	.009	-.048	-.002	-.043	-.355**	_	-.337**	-.205
11. SDNN	.072	-.015	-.101	-.051	-.209	.072	.599**	.803**	.796**	-.226	_	.896**
12. Power	-.001	.013	-.099	-.004	-.105	.060	.762**	.801**	.730**	-.138	.928**	_

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

Table 4. Mean Scores, Standard Deviations, and Correlation as a Function of Gender for Depression (Husbands/Wives)

Item	Husbands (N=65)	Wives (N=65)	Correlation	<i>t</i>	$\alpha$
Depression	<i>M</i> ( <i>SD</i> ) 2.17(3.03)	<i>M</i> ( <i>SD</i> ) 3.81(3.35)	.154( <i>p</i> = .231)	-3.03( <i>p</i> = .004)	.775 <b>.706</b>

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

Table 5: Hierarchical Regressions for Husbands and Wives for Marital Indicator Variables

	Husbands PMQ				Wives PMQ		
	Model 1	Model 2	Model 3		Model 1	Model 2	Model 3
	B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )		B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )
1. Depression	.03(.23)	.07(.27)	.13(.27)	1. Depression	.19(.26)	.41(.33)	.44(.35)
2. Distress		-.09(.31)	-.064(.30)	2. Distress		-.47(.41)	-.46(.43)
3. HRVhf			.00(.00)	3. HRVhf			-.00(.00)
4. HRVSDNN			-.12(.05)*	4. HRVSDNN			.03(.10)
5. HRVPower			.00(.00)	5. HRVPower			.00(.00)
6. Pain			-.46(.31)	6. Pain			-.32(.43)
<hr/>							
	Husbands NMQ				Wives NMQ		
	Model 1	Model 2	Model 3		Model 1 **	Model 2 ***	Model 3**
	B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )		B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )
7. Depression	.27(.26)	.06(.30)	.00(.31)	1. Depression	.96(.30)*	.53(.36)	.70(.36)
8. Distress		.48(.34)	.45(.35)	2. Distress		.92(.45)*	.90(.45)
9. HRVhf			.00(.00)	3. HRVhf			.00(.01)
10. HRVSDNN			.02(.06)	4. HRVSDNN			.20(.11)
11. HRVPower			.00(.00)	5. HRVPower			-.01(.00)*
12. Pain			-.41(.36)	6. Pain			.56(.45)
<hr/>							
	Husbands KMSS				Wives KMSS		
	Model 1	Model 2	Model 3		Model 1	Model 2 **	Model 3 *
	B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )		B(SE $\beta$ )	B(SE $\beta$ )	B(SE $\beta$ )
13. Depression	-.18(.16)	-.16(.19)	-.16(.20)	1. Depression	-.06(.14)	.26(.16)	.21(.17)
14. Distress		-.04(.22)	-.04(.22)	2. Distress		-.67(.20)**	-.67(.21)**
15. HRVhf			.00(.00)	3. HRVhf			-.00(.00)
16. HRVSDNN			-.03(.04)	4. HRVSDNN			-.04(.05)
17. HRVPower			.00(.00)	5. HRVPower			.00(.00)
18. Pain			-.12(.23)	6. Pain			.04(.20)

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ ;  $\beta$  is unstandardized.

## CHAPTER 5: DISCUSSION

The biological, psychological, and emotional health of both military personnel and their civilian wives has gained attention in the recent literature (Boscarino, 2004; Menchaca & Dehle, 2005; Sayers, Farrows, Ross, & Oslin, 2009; Smith et al., 2011; Warner, Appenzeller, Warner, & Grieger, 2009). The intertwined nature of these variables has been investigated with regard to military couples' relational health and their perceptions of their marriage (Kiecolt-Glaser, Bane, Glaser, & Malarkey, 2003). This study was conducted to address the gaps within the literature by providing information on how the individual experiences of each member of military couples inform perceptions of marital quality and satisfaction within the couple dyad. An in-depth review of the literature was conducted to explore what is already known via research about each spouse's biological, psychological, and emotional experiences with regard to the military, and to demonstrate the complex interface of the variables encapsulated within the biopsychorelational continuum (i.e., physiological stress, pain, depression, distress, marital quality, and marital satisfaction).

The previous four chapters have each contributed in distinct ways to the examination of 'his' and 'hers' biological, psychological, and relational outcomes for military couples. Chapter one provided an introduction to the individual experiences of military personnel and civilian wives, as well as set the foundation for understanding these experiences in relation to the couple relationship. Chapter two included a thorough literature review that further explored the complexities, both strengths and challenges, that both spouses of military couples face. This review also provided a framework for understanding couples' individual experiences of their health through the consideration of how these experiences inform the dynamics of the couple relationship. Chapter three outlined the methodology and design that guided this study,

including the sample and measures utilized, as well as the procedure, research hypotheses, and analysis. Chapter four, a publishable manuscript, provided a background of the literature to date and punctuated the unique study results with the purpose of providing further insight into military couples' health and potential implications associated with the findings. The purpose of this chapter is to highlight some of the unique findings pertaining to distress on military couples, as well as consider the addition of an integrated care model within the standing medical model, and to provide research and policy recommendations for military contexts and research.

### **A Focus on Distress**

The results from this study contribute to the collection of literature on military couples' health and extend what is known about the experience of distress, in particular, for both members of the couple. Specifically, what is now understood about the inverse relationship between distress and marital health for civilian wives adds further support to the notion that military members and their spouses are often not adequately treated in healthcare facilities across the multiple domains of health. The interconnectedness between each domain of an individual's health is often overlooked in military healthcare, and as a result, treatment plans often fail to include vital pieces, such as relational influences, that contribute to a patient's health and functioning. The increased presence of distress, and the significant link between distress and wives' perceptions of their relational functioning in particular, have considerable effects on both members of the couple individually and may influence the future trajectory of the couple relationship. Over time, the magnitude of the effects of distress experienced by military personnel and civilian spouses has the capability of eroding marital functioning and may lead to divorce or additional significant health concerns. The effects of distress are evidenced in the findings from the present study, and the results support the current literature in emphasizing the

importance of assessing and treating both members of the military couple (Zwahlen, Hagenbuchm, Jenewein, Carley, & Buchi, 2011), as well as attending to the status of the couple relationship (Bevans et al., 2011).

## **Implications**

### **Clinical**

Due to the way that medical, psychological, and emotional health are intricately knitted together, as seen in the literature to date, treatment of one aspect of a person's health, while ignoring other areas of his/her biopsychorelational health, is no longer sufficient. The current state of the healthcare system is, for the most part, guided by an individual patient-centered focus (Hardstone et al., 2004), despite the recent literature that highlights the need for both members of the dyad to be considered concurrently. Integrated care, described as, "an integrated team consisting of multiple professionals with different expertise work collaboratively to provide comprehensive and coordinated care to meet the patient's needs" (Patrick, Hebert, Green, & Ingram, 2011, p. 987) adopts a systemic lens for viewing patients' health across multiple domains.

When mental health issues are presented within the medical context, the physical and psychological components of health are often viewed as independent from one another and a referral is made for the patient to receive mental health services elsewhere. Unfortunately, by taking this approach, it is not assured that patients will seek additional services, and their health concerns may go unassessed and undertreated, which is likely to have implications for the family system as a whole. Implementation of the integrated care model of practice takes into consideration multiple domains of a person's health and is prepared to respond to complex and multifaceted health concerns. Thus, a patient's physical health is no longer considered in

isolation; rather, medical providers utilize their resources (e.g., other mental health providers) to provide an overarching care that considers the interwoven nature of a patient's health.

Additionally, the same authors highlighted several benefits of the integrated care approach, including:

(1) can identify problems early, (2) can improve compliance, (3) splitting of providers by patient could be avoided, (4) will be able to break through resistance through interventions by the team, (5) the patient's presence during the meeting will enable the providers to confront issues as a team, provide alternate skills to cope and reinforce expectations for his progress, (6) enhanced therapeutic relationships will result in improved clinical outcomes, (7) integration of multiple providers will lessen errors and duplicate efforts, (8) this approach hopefully will lessen the number of crises and decrease providers' time spent to resolve them, (9) the caring approach by all team members will also provide a sense of satisfaction for the patient, and (10) the integration will also lessen burnout since the burden is shared by the team and not by one or two providers. (Patrick et al., 2011, p. 989).

For many patients, working with a team of providers may provide comfort, guidance, and additional resources that may not be available for those treated under the traditional medical model. Moreover, medical providers are often unable to assess for and treat psychosocial difficulties, as well as attend to relational symptoms within the short appointment window. Given the interpersonal nature of distress within marital relationships, integrated care may provide additional benefits for couples to consider all of their symptoms.

Further, the implementation of integrated care in military medical contexts encourages communication between health providers (Kitchiner & Bundred, 1996), enhances interprofessional collaboration (Atwal & Caldwell, 2002), provides updated knowledge and understanding for medical providers (Kitchiner & Bundred, 1996), is more cost-effective (Davis, Van Biesen, Nicholas, & Lameire, 2001), facilitates better management of patient care (Atwal & Caldwell, 2002), empowers patients (Davis et al., 2001), and is associated with better clinical outcomes (Davis et al., 2001). Hardstone et al. (2004) adds that by working from this collaborative model, patient care includes, “efficient use of staff, effective service provision, and improved quality of care” (p. 142). To explain further, Davis et al. (2001) clarified:

from the patient’s perspective, “greatest advantage” means to use, at each stage (where possible), the therapy associated with the best clinical outcomes. In that context, a holistic view of patient health—one that includes psychosocial aspects as advocated by the World Health Organization—is central. (p. 296)

Overall, the implementation of integrated care in military medical contexts provides additional benefits to patients’ quality of care and increases patients’ satisfaction with services, as well as further supports and provides learning opportunities for the medical providers. Specifically, the integrated care model supports a holistic understanding of health and appreciates the intertwined nature of patients’ biological, psychological, and relational experiences. It appears that military health clinics and VA Medical Centers are beginning to honor the integrated care model (Barber, Frantsve, Capelli, & Sanders, 2012). Thus, the recommendations put forward are an effort to address the need (e.g., levels of distress) reported by both military husbands and their civilian wives, and to continue to shape the military healthcare context toward enhancing the health and well being of military dyads.

## **Research**

There is a predominant need for researchers in Marriage and Family Therapy (MFT) and Medical Family Therapy (MedFT) to continue to contribute to systemic, relational, and biopsychosocial literature to further develop the understanding of couples' health, both on an individual level and on a relational level. The results of this study indicate that both biological and psychological factors predict civilian spouses' relational health; however, due to the limited significance found for biological factors, future research is needed to further explore these relationships. Further, it is recommended that systemic researchers conduct a more in-depth investigation of how mental health services (implemented by a MFT or MedFT provider via integrated care) may disrupt and lessen the relationship between civilian wives' experiences of distress and their perceptions of their marital health. Given the strong relationship between biological, psychological, and relational health concerns (Kiecolt-Glaser et al., 2003; Menchaca & Dehle, 2005), MFT and MedFT providers must become the front-runners in dyadic research pertaining to military couples' marital health. Additionally, it is recommended that similar research studies be implemented in medical healthcare contexts across the different military branches to gather relevant information on military couples' health and well being.

## **Policy**

As integrated care models are becoming more frequently implemented and utilized in healthcare facilities, the dramatic difference between individual- and dyad-focused treatment with regard to treatment plan adherence, recovery, and overall well being is becoming more evident (Barth, Schneider, & Von Känel, 2010). It is recommended that military medical clinics and providers adopt a systemic lens of practice through the inclusion of both members of the couple as a part of treatment. Further, by utilizing the integrated care model (i.e., use of medical

and mental health providers simultaneously during patient visits) within the larger medical system, treatment for patients is likely to be more successful at attending to health concerns that are multifaceted (Cummings, O'Donohue, & Ferguson, 2002). Through this expanded perspective, both members of the military couple are provided opportunities to gain individual services in the domains of biological, psychological, and emotional health, as well as attend to their marital health. With these considerations in mind, the following recommendations are presented:

1. Systemic assessments should be available as part of healthcare policy to fully capture how each partner's individual experiences informs the couple's relational health. These biopsychorelational assessments should be implemented regularly, particularly during deployment periods, as a first step to assist couples in managing the stress and unpredictability of this event (Lantz & Gregoire, 2000; Schumm, Bell, & Gade, 2000) and disrupt any subsequent medical health risks.
2. General mental health assessments, including distress screenings, should be implemented on a regular basis for civilian spouses seeking services at the military medical facilities, given the relationship found between distress and marital health.
3. Primary care military medical clinics should house a systemically focused professional, such as a MFT or MedFT, as a permanent member of the treatment team to collaborate with other medical providers as a routine component of patient care.

Military medical contexts that incorporate collaborative patient care via an integrated care model within the standing medical model are estimated to be more equipped to meet the complex needs of the population being served and ultimately alter the trajectories for military couples and their families. Additionally, recommendations for future policy changes foster a

focus on the couple relationship and suggest an implementation of assessments to gather information on both spouses' experiences of health and well being to inform the healthcare team of the specific needs requiring attention.

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## APPENDIX A: IRB CONSENT

**From:** Candia, Jessica CIV USAF AFMSA/SGE-C [mailto:Jessica.Candia@pentagon.af.mil] **Sent:** Friday, August 19, 2011 12:33 PM  
**To:** Lamson, Angela **Cc:** Bartoe, Chelsea L Maj USAF ACC 4 FW/JA; James, Amy D Capt USAF ACC 4 MDOS/SGOW  
**Subject:** Protocol FSG200110025H

Hello Ma'am,

My office has completed our review of the protocol FSG200110025H, "Integrated Care with Military Couples". Our human research protection compliance concerns have been resolved. Thus, we now concur with IRB approval of this activity. The activity can now begin, to the extent permitted by other applicable requirements.

Thank you for your assistance with this matter, and good luck with your research.

Sincerely, Jessica

**Jessica Candia, CIV, DAF Program Manager**  
**Research Oversight and Compliance Office**  
**5201 Leesburg Pike, Suite 1501B**  
**Falls Church, VA 22041 703-681-6311**  
**jessica.candia@pentagon.af.mil**

**From: Odam, Kimberly L Ms CIV USA MEDCOM USAMRMC**

**[mailto:Kimberly.Odam@us.army.mil]**

**Sent: Wednesday, May 23, 2012 12:52 PM**

**To: Lamson, Angela Cc: Duchesneau, Caryn L Ms CIV USA MEDCOM USAMRMC; 'Ashley.Fisher@tatrc.org'; Jennings, Dawn V CIV USA MEDCOM USAMRAA; Brosch, Laura R Dr CIV USA MEDCOM USAMRMC; Bennett, Jodi H Ms CIV USA MEDCOM USAMRMC; Odam, Kimberly L Ms CIV USA MEDCOM USAMRMC; Katopol, Kristen R Ms CTR US USA MEDCOM USAMRMC; 'jeffrey.stephenson@tatrc.org'; Kitchen, Susan E Ms CTR US USA MEDCOM USAMRMC; Cistola, David**

**Subject: A-17093.1 HRPO Approval for the Protocol (Proposal Log Number 10251005, Award Number W81XWH-11-2-0221) (UNCLASSIFIED)**

**Classification: UNCLASSIFIED**

**Caveats: NONE**

**SUBJECT: Initial Approval for the Protocol, "Integrated Care With Military Couples," Submitted by Angela L. Lamson, PhD, East Carolina University, Greenville, North Carolina, in Support of the Proposal, "Operation Re-entry NC," Submitted by David P. Cistola, MD, East Carolina University, Greenville, North Carolina, Proposal Log Number 10251005, Award Number W81XWH-11-2-0221, HRPO Log Number A-17093.1**

- 1. The subject protocol version 2 was approved by the East Carolina University (ECU) Institutional Review Board (IRB) on 15 May 2012. This protocol was reviewed by the U.S. Army Medical Research and Materiel Command (USAMRMC), Office of Research Protections (ORP), Human Research Protection Office (HRPO) and found to comply with applicable Department of Defense (DOD), U.S. Army, and USAMRMC human subjects protection requirements.**
- 2. This greater than minimal risk study is approved for the accrual of 200 subjects.**
- 3. The Principal Investigator has a duty and responsibility to foster open and honest communication with research subjects. The USAMRMC strongly encourages the Principal Investigator to provide subjects with a copy of the research protocol, if requested, with proprietary and personal information redacted as needed.**
- 4. Please note that a Research Monitor (RM) is required to be involved in DOD- supported research studies that are determined to pose more than minimal risk to subjects (DOD Instruction 3216.02, Nov 2011). If the duties of the RM could require disclosure of subjects' Protected Health Information outside a covered entity (i.e., the RM is not an agent of the covered entity), your institution may require the identity and location of the RM to be**

described in the study Health Information Portability and Accountability Act authorization.

**5. Please note the following reporting obligations. Failure to comply could result in suspension of funding.**

**a. Substantive modifications to the research protocol and any modifications that could potentially increase risk to subjects must be submitted to the HRPO for approval prior to implementation. The USAMRMC ORP HRPO defines a substantive modification as a change in Principal Investigator, change or addition of an institution, elimination or alteration of the consent process, change to the study population that has regulatory implications (e.g. adding children, adding active duty population, etc.), significant change in study design (i.e. would prompt additional scientific review), or a change that could potentially increase risks to subjects. All other amendments must be submitted with the continuing review report.**

**b. All unanticipated problems involving risk to subjects or others must be promptly reported by phone (301-619-2165), by email (HRPO@amedd.army.mil), or by facsimile (301-619-7803) to the HRPO. A complete written report will follow the initial notification. In addition to the methods above, the complete report can be sent to the U.S. Army Medical Research and Materiel Command, ATTN: MCMR-RP, 504 Scott Street, Fort Detrick, Maryland 21702-5012.**

**c. Suspensions, clinical holds (voluntary or involuntary), or terminations of this research by the IRB, the institution, the sponsor, or regulatory agencies will be promptly reported to the USAMRMC ORP HRPO.**

**d. A copy of the continuing review report and the re-approval notification by the ECU IRB must be submitted to the HRPO as soon as possible after receipt of approval. According to our records, it appears the current approval by the ECU IRB expires on 3 April 2013. Please note that the HRPO also conducts random audits at the time of continuing review and additional information and documentation may be requested at that time.**

**e. The final study report submitted to the ECU IRB, including a copy of any acknowledgement documentation and any supporting documents, must be submitted to the HRPO as soon as all documents become available.**

**f. The knowledge of any pending compliance inspection/visit by the Food and Drug Administration (FDA), Office for Human Research Protections, or other government agency concerning this research; the issuance of inspection reports, FDA Form 483, warning letters, or actions taken by any regulatory agencies including legal or medical actions; and any instances of serious or continuing noncompliance with the regulations or requirements must be reported immediately to the HRPO.**

**6. Please note: The USAMRMC ORP HRPO conducts random site visits as part of its responsibility for compliance oversight. Accurate and complete study records must be maintained and made available to representatives of the USAMRMC as a part of their responsibility to protect human subjects in research. Research records must be stored in a confidential manner so as to protect the confidentiality of subject information.**

**7. Do not construe this correspondence as approval for any contract funding. Only the Contracting Officer/Grants Officer can authorize expenditure of funds. It is recommended that you contact the appropriate contract specialist or contracting officer regarding the expenditure of funds for your project.**

**8. The HRPO point of contact for this study is Susan Kitchen, BS, Human Subjects Protection Scientist, at 301-619-1126 Susan.Kitchen@us.army.mil.**

**KIMBERLY L. ODAM, MS, CIP  
Human Subjects Protection Scientist  
Human Research Protection Office  
Office of Research Protections  
U.S. Army Medical Research and Materiel Command**

**Note: The official copy of this approval memo is housed with the protocol file at the Office of Research Protections, Human Research Protections Office, 504 Scott Street, Fort Detrick, MD 21702. Signed copies will be provided upon request.**

**Classification: UNCLASSIFIED**

**Caveats: NONE**

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**EAST CAROLINA UNIVERSITY**  
**University & Medical Center Institutional Review Board Office**  
1L-09 Brody Medical Sciences Building · Mail Stop 682  
600 Moye Boulevard · Greenville, NC 27834  
Office **252-744-2914**      **252-744-2914**      · Fax **252-744-2284** ·  
[www.ecu.edu/irb](http://www.ecu.edu/irb)

Notification of Continuing Review Approval

From: Social/Behavioral IRB  
To: [Angela Lamson](#)  
CC:  
Date: 4/5/2012  
Re: [CR00000276](#)  
[UMCIRB 11-0207](#)  
Integrated Care with Military Couples

I am pleased to inform you that at the convened meeting on 4/4/2012 of the Social/Behavioral IRB , this research study underwent a continuing review and the committee voted to approve the study. Approval of the study and the consent form(s) is for the period of 4/4/2012 to 4/3/2013.

The Social/Behavioral IRB deemed this study Greater than Minimal Risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The investigator must adhere to all reporting requirements for this study.

The approval includes the following items:

Name	Description	Modified	Version
<a href="#">Informed Consent Form- Control Group</a>	Consent Forms	11/4/2011 3:06 PM	0.01

<a href="#">Informed Consent Form- Experimental Group</a>	Consent Forms	11/4/2011 3:06 PM	0.01
<a href="#">Informed Consent: Provider</a>	Consent Forms	3/27/2012 1:34 PM	0.01
<a href="#">Military Questionnaire Packet</a>	Surveys and Questionnaires	11/4/2011 2:15 PM	0.01
<a href="#">Military Questionnaire Packet</a>	Interview/Focus Group Scripts/Questions	11/4/2011 2:15 PM	0.01
<a href="#">Military Questionnaire Packet</a>	Other Medical Procedures/Considerations	11/4/2011 2:33 PM	0.01
<a href="#">Military Questionnaire Packet</a>	Standardized/Non-Standardized Instruments/Measures	11/4/2011 2:11 PM	0.01
<a href="#">Recruitment Script</a>	Recruitment Documents/Scripts	10/26/2011 11:16 AM	0.01
<a href="#">Timeline and Intervention Guide</a>	Study Protocol or Grant Application	10/21/2011 3:14 PM	0.01
<a href="#">Updated processing form and other approved materials</a>	Additional Items	3/27/2012 1:36 PM	0.01
<a href="#">Updated Recruitment Script</a>	Recruitment Documents/Scripts	3/27/2012 1:32 PM	0.01

The following UMCIRB members were recused for reasons of potential for Conflict of Interest on this research study: None

The following UMCIRB members with a potential Conflict of Interest did not attend this IRB meeting: None

Note:

1. The Social/Behavioral IRB committee rated this study as greater than minimal risk because the interventions include motivational interviewing and solution focused questions (which exceed what would be part of a standard physical or psychological examination).
2. The Heart Rate Variability (HRV) is a sensor that poses no potential for physical harm.

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IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418  
 IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418 IRB00004973  
 East Carolina U IRB #4 (Behavioral/SS Summer) IORG0000418

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APPENDIX B: PERMISSIONS TO USE MEASURES

Measure	Date Original Permission Was Granted	Date Permission Granted For Publishing in This Thesis and Journal Article	Permission Granted From
Distress Thermometer	March, 2011	March 22, 2013	National Comprehensive Cancer Network (NCCN)
PANQIMS	March, 2011	March 16, 2013	Frank Fincham, PHD
KMSS	March, 2011	March 18, 2013	Wiley-Blackwell
VAS	Public Domain	Public Domain	Public Domain
PHQ-9	March, 2011	March 16, 2013	PHQ Screeners

APPENDIX C: MEASURES

**Biological Health**

1. What is your Height? \_\_\_\_\_
2. What is your Weight? \_\_\_\_\_
3. What is your BMI? \_\_\_\_\_
4. What is your blood pressure? \_\_\_\_\_ / \_\_\_\_\_
5. What is your average HRV? \_\_\_\_\_

\*This section will be completed by researcher

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**To be completed by the Participant.**

Please rate your pain below based on the problem/symptom that has brought you in today.

## Pain Scale



No Pain      Least Pain      Mild Pain      Moderate Pain      Severe Pain      Excruciating Pain



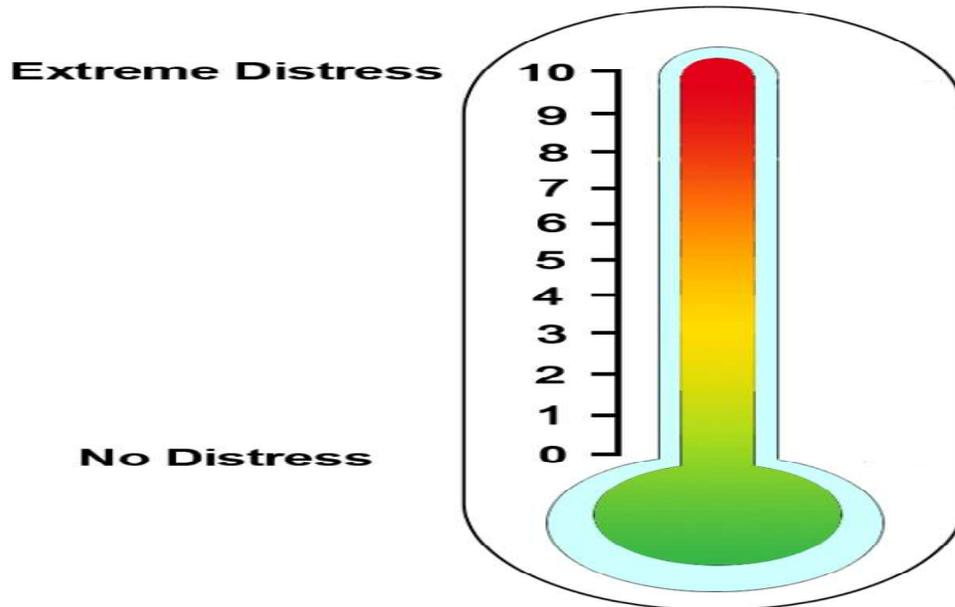
## Psychological Health Factors

Over the *last 2 weeks*, how often have you been bothered by any of the following problems?  
(use “✓” to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3

**To be completed by the Participant**

First please circle the number (0-10) that best describes how much distress you have been experiencing in the past week including today.



## Relational Health

Please mark the box that applies to you-On a scale from 0=Not at all to 10=Extremely

Part I

		0	1	2	3	4	5	6	7	8	9	10
		Not at all										Extremely
1.	Considering the positive qualities of your spouse, <i>and ignoring the negative ones</i> , evaluate how positive these qualities are.											
2.	Considering only negative feelings you have towards your spouse, <i>and ignoring the positive ones</i> , evaluate how these feelings are.											
3.	Considering the negative qualities of your spouse, <i>and ignoring the positive ones</i> , evaluate how negative these qualities are.											
4.	Considering only good feelings you have about your marriage, <i>and ignoring the bad ones</i> , evaluate how good these feelings are.											
5.	Considering only positive feelings you have towards your spouse, <i>and ignoring the negative ones</i> , evaluate how these feelings are.											
6.	Considering only bad feelings you have about your marriage, <i>and ignoring the good ones</i> , evaluate how bad these feelings are.											

		Extremely Dissatisfied	Very Dissatisfied	Somewhat Dissatisfied	Mixed	Somewhat Satisfied	Very Satisfied	Extremely Satisfied
1.	How satisfied are you with your marriage?							
2.	How satisfied are you with your husband/ wife as a spouse?							
3.	How satisfied are you with your relationship with your husband/ wife?							