2016

Navy Personnel and Effects of Select Factors on Posttraumatic Stress Disorder Symptomology

Thomas J. Palmer
Walden University

Walden University

College of Social and Behavioral Sciences

This is to certify that the doctoral dissertation by

Thomas Palmer

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Martha Giles, Committee Chairperson, Psychology Faculty
Dr. Tom Diebold, Committee Member, Psychology Faculty
Dr. Jesus Tanguma, University Reviewer, Psychology Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2016

Abstract

Navy Personnel and Effects of Select Factors on Posttraumatic Stress Disorder Symptomology

by

Thomas J. Palmer

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Organizational Psychology

Walden University

May 2016

Abstract

Since the establishment of the individual augmentee role within the U.S. Navy, little research has examined this nontraditional role associated with combat units. The majority of combat-related posttraumatic stress disorder (PTSD) research has been dedicated to Army and Marine Corps personnel with little research conducted on the Navy population. The purpose of this nonexperimental study was to identify the prevalence of combat-related PTSD symptomology for Navy personnel returning from an augmentee tour. The link between component and tour length and the presence of individual resilience factors on PTSD were examined. The theoretical foundation of this research included the cognitive link between the single and multiple exposures to traumatic events and the automatic conditioned responses related to the combat-related trauma using a retrospective view of archival datasets. Data analysis included a chi square test of independence and factoral analysis of variance to identify the combat-related PTSD symptoms and its associated variables. The sample size was a stratified random sampling of 570 cases. The results of this analysis support an association between location of tours and PTSD symptomology as well as a small effect between number of deployments and PTSD symptomology irrespective of status. These results will benefit the U.S. Navy enlisted personnel by increasing the awareness of a trend in combat-related PTSD, identify protective factors in resilience, and showcase the need for greater focus of these issues within Navy policy and leadership.

Navy Personnel and Effects of Select Factors on Posttraumatic Stress Disorder Symptomology

by

Thomas J. Palmer

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Organizational Psychology

Walden University

May 2016

Dedication

I dedicate this research to all the Enlisted men and women of the United States Navy who have answered the call to support the Global War on Terror and served on an Individual Augmentee tour. Your service and sacrifice is not unnoticed. I am humbled to have been a part of the United States Navy for 26 years and it is with a strong hope that this research will somehow make a difference in the lives of those who suffer from PTSD. God bless you all and your families.

Acknowledgments

As for most doctoral students facing dissertation, this process was extremely long and time consuming for me. First and foremost, I would never have developed into the man I am today without my God, Lord, and Savior. I am grateful for what you have given me and who was sacrificed for my sin. Lord, I am in awe of who you are and what you provide daily to someone so underserving.

Next, I would like to thank my wife Charolette. You are my helper, my companion, and my best friend. You have been with me all of my adult life, and I am eternally grateful for your patience, love, and inspiration. I love you with all my heart and soul. To my son Nick and daughter Sarah, you have grown up with me being tied to some type of educational material. Thank you for understanding in your own way why Dad couldn't spend a lot of time playing Legos or basketball. You are two of the best children that any father could have, and I love you both very much. To my Mom, Barbara and Dad, Wendell, I am grateful for you both stressing the importance of education in my life. You both are responsible for giving me the desire to pursue higher education, and I love you both for that.

I would also like to thank my Dissertation Chair, Dr. Martha Giles, for having the patience of a saint with me during this long process. At times, it felt that this would never come to completion. But you encouraged me, gave me space, allowed me to grow, and forced me to dig into the literature more than I thought possible. To my methods guru, Dr. Tom Diebold, you are gifted beyond my comprehension. Thank you both very much!

Finally I couldn't forget Dr. Chris Rennix and Ms. Tina Luse from the Navy and Marine Corps Public Health Center Epidemiology Department. Dr. Rennix, your efforts that provided the necessary data made this dissertation possible. Without you, I wouldn't have any data to analyze thus no dissertation. To Tina, you and the epidemiology crew took on my challenge and helped me through some of the most confusing parts of my analysis. Thank you all for your collective encouragement, hard work, and patience during this process.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Background

The U.S. military has been a global force directly responsible for missions in the air, on land, and on the sea for over 230 years (Eikenberry, 2013; Tanielian & Jaycox, 2008). These military men and women have been exposed to a multitude of experiences that range from extreme elation to psychological trauma and terror (Hamilton, 2007; Tanielian & Jaycox, 2008). In the U.S. military, there is a potential for exposure to combat regardless of service branch although each branch of the U.S. military has its specific mission. The mission of the U. S. Navy is to provide sea control, deterrence to sea aggression, sea-based forward presence, and to project power from the sea (Cutler, 2009; Hamilton, 2007; Rubel, 2013). After 2000, those traditional elements of mission began to blur with the creation of the U.S. Navy's individual augmentee program (Chief, 2000). In this study, I used the non-traditional role for the Navy and its personnel.

In the U.S. Navy, the individual augmentee program was created to support an increasing need to provide combat-related aid the other branches of service (i.e., Army, Marine Corps, and Air Force) in order for them to successfully accomplish their respective missions (Chief, 2000; Giardina, 2007). Active duty as well as reserve Navy personnel selected for an individual augmentee assignment were transferred from their current organization, given mission-related training in certain areas within the United States, and then sent to Iraq or Afghanistan to be attached to a U.S. Army, Marine Corps, or Air Force command or unit (Chief, 2000; Giardina, 2007). Those individual augmentee Navy personnel would complete a tour, or specific period of time outside of

the continental United States, and then return to their previous assignment or command (Chief, 2000; Giardina, 2007). In this study, individual augmentation was considered a nontraditional use of the Navy and its personnel.

The U.S. Navy has been engaged in supporting the Global War on Terrorism (GWOT) since September 11, 2001 (American Psychological Association [APA], 2007; Chief, 2000) through its implementation and use of the individual augmentee program, and it has not been until the last 10 years that the Navy assumed a more nontraditional role under this program. Through the individual augmentee program, the U.S. Navy has placed its personnel directly in support of land campaigns (Giardina, 2007). Between 2001 and 2010, 275,689 Navy personnel have deployed in support of the GWOT (DeFraites, Ritschard, & Vythilingam, 2011) that represents only 12.52% of the overall population of military who have deployed in support of contingency operations. Although this number appears to be insignificant, when contrasted with the overall population number for the U.S. Navy, this number represents an average of 8% of the U.S. Navy population was being used in a nontraditional role in support of the GWOT during any given year between 2001 and 2010.

What researchers have concluded is that there has been an increase in combat-related PTSD symptomology in Army and Marine Corps personnel (Shen, Arkes, Kwan, Tan, & Williams, 2010; Seal, Maguen et al., 2010) in addition to mental health care providers supporting the U.S. military (Dickstein et al., 2010; Gibbons, Hickling, & Watts, 2012; Kintzle, Yarvis & Bride, 2013). However, there is little research on any Navy individual augmentee personnel and how they have been affected by these tours. In

addition, research that includes reserve component personnel has been lacking. Researchers have shown that there is a relationship between number of combat tours and PTSD symptomology for Army and Marine Corps personnel (Shen Arkes et al., 2010; Seal Maguen et al., 2010); however, little research has been dedicated to Navy personnel. Finally, the impact on resilience factors from individual and organizational perspectives and PTSD symptomology have been studied as they relate to Army personnel (Meredith et al., 2011), but an in-depth study of Navy personnel as it relates to these topics is absent.

This study was conducted to further the understanding of component, location, tour number, and resilience factors as they relate to combat-related PTSD. Numerous research has been conducted on other branches of the military and the widespread effects of combat-related PTSD on mission capability (Hoge, Auchterlonie, & Milliken, 2006) and family problems (Erbes, Meis, Polusny, & Compton, 2011); however, no current published research exists on these topics that target Navy personnel.

History of the Problem

Historically, the U.S. Navy has engaged in military operations primarily from sea and air, and only specific organizations within the Department of the Navy have engaged in ground-specific missions (Cutler, 2009; Holland, 2000; Rubel, 2013). The elements of the Navy include special warfare (e.g., Sea, Air, and Land [SEAL]), Construction Battalion (CB), Explosive Ordinance Disposal (EOD) and Fleet Marine Force (FMF) Hospital Corpsman that work directly with the U.S. Marine Corps (Cutler, 2009; Holland, 2000). Those missions require trained personnel who undergo specialized courses of

instruction who are screened for an ability to withstand the rigors of combat or combat-related actions. It has only been since the engagement of the ground war in support of Operation Iraqi Freedom and Operation Enduring Freedom that Navy leadership has directed their personnel who have not been screened for such specialized training to support combat-related missions within Iraq and Afghanistan (Giardina, 2007). Such support is directed by written order identified as an augmentee order. For the purpose of this study, these programs were identified as Individual Augmentee (IA).

Statement of the Problem

Within the U.S. Navy's mission posture, there has been an increase in the nontraditional use of Navy personnel in support of combat operations in Iraq and Afghanistan (Boettcher, 2008). Both active duty and reserve component personnel have been, and currently are being, used in a more aggressive and land-specific posture that is often imbedded in U.S. Army and Marine Corps units. Other branches of the military (i.e., Army and Marine Corps) and their reserve counterparts have seen an increase in personnel that present with PTSD symptomology after either a single tour or multiple tours in Iraq and Afghanistan (Hoge et al., 2006; Tanielian & Jaycox, 2008). Personnel returning from combat tours often experience less difficulty in occupational, social, and personal roles upon returning home when individual and organizational resilience factors exist (Meredith et al., 2011).

It is not known whether active versus reserve component Navy personnel returning from individual augmentee tours in support of Operation Iraqi Freedom or Operation Enduring Freedom disproportionally present with having met or not met PTSD

criteria. It is also not known if having served in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both affect the rate of meeting PTSD criteria. Similarly, it is not known if the total number of prior deployments, active versus reserve status, leads to increased instance of PTSD with respect to Navy personnel. Finally, it is not known if individual resilience levels related to Navy physical readiness scores differ with respect to active versus reserve status, lead to increased instance of PTSD criteria. As all of these issues have a direct impact on Navy mission success and the future organization of the U.S. Navy, the current use of such personnel and potential redeployment may be unbeneficial to the continued organizational health of the Navy. This is especially relevant as all of the branches of military, which include the Navy, within the Department of Defense have reduced their number of personnel during the past 5 years.

Research Questions and Hypotheses

Literature about Navy combat-related PTSD, components, tours, and resilience provided the basis for this quantitative study. In support of the data usage agreement found in Appendix C, the data were obtained from the Navy and Marine Corps Public Health Center, Portsmouth, Virginia from the Post Deployment Health Reassessment (PDHRA) forms dated June 2005 and January 2008 and Navy Physical Fitness.

To address a Navy augmentee population, I investigated the following four research questions and associated hypotheses:

1. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in

support of Operation Iraqi Freedom or Operation Enduring Freedom?

$H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve).

$H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

2. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both?

$H_1$2: Postdeployment assessment of having met or not met PTSD criteria is dependent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

$H_0$2: Postdeployment assessment of having met or not met PTSD criteria is independent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

3. What is the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$3a: There is a main effect for PTSD assessment and total number of deployments.

$H_0$3a: There is no main effect for PTSD assessment and total number of deployments.

$H_1$3b: There is a main effect for component and total number of deployments.

$H_0$3b: There is no main effect for component and total number of deployments.

$H_1$3c: There is an interaction effect between PTSD assessment, component status, and total number of deployments.

$H_0$3c: There is no interaction effect between PTSD assessment, component status, and total number of deployments.

4. What is the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$4a: There is a main effect for PTSD assessment and physical readiness test scores.

$H_0$4a: There is no main effect for PTSD assessment and physical readiness test scores.

$H_1$4b: There is a main effect for component status and physical readiness test scores.

$H_0$4b: There is no main effect for component status and physical readiness test scores.

$H_1$4c: There is an interaction effect between PTSD assessment, component status, and physical readiness test scores.

$H_0$4c: There is no interaction effect between PTSD assessment, component status, and physical readiness test scores.

For the purposes of this quantitative study, a sample that was considered representative of the Navy target population was obtained. According to Bernard (2000), the term representative means to be in close approximation of characteristics of a group or population. The sample for this study included the electronic version of the PDHRA datasets contained in Portsmouth, VA. Because Navy personnel are required to participate in self-report questionnaires after deployment in support of combat operations in Iraq and Afghanistan, all personnel had the same chance of participating in the selected sample, which represented the population.

The estimated population of Navy personnel who completed the PHDRA self-report questionnaires from 2002 to 2010 was 79,000, with approximately 10,673 Navy personnel having served in a combat situation, and only 80% completed the self-report questionnaires (Office of Naval Information [ONI], 2009); therefore, the population sampling frame contained 8,500 cases. A power analysis for sample size and the sampling design is discussed in Chapter 3. For the purpose of this study, the dependent variable was PTSD symptomology as identified in the PHDRA dataset, and the independent variables included component, number of tours, and individual resilience data. A greater discussion of the variables will be provided in Chapter 3.

Purpose of the Study

Because there is an increase in the nontraditional use of U.S. Navy personnel in support of Operations Iraqi and Enduring Freedom (APA, 2007; Shen, Arkes et al., 2009), both active duty and reserve component Navy personnel are being used in a more aggressive and land-specific posture. Both active and reserve Army and Marine Corps personnel exhibit documented post-tour PTSD symptomology, and there may be an equal representation of combat-related, post-tour PTSD symptomology within the Navy population of returning augmentees. Additionally, personnel returning from combat tours often experience a lesser degree of occupational, social, and personal roles upon returning when individual resilience factors exist (Meredith et al., 2011). Resilience factors associated with physical fitness level and unit involvement have mitigating effects on posttour combat-related PTSD; however, this level of published research does not exist for active and reserve Navy personnel. The existence of any support was determined using PDHRA data obtained from the Navy and Marine Corps Public Health Center that includes component, symptomology for PTSD, multiple tours, and length of tour.

This study was conducted to determine whether active or reserve component Navy personnel returning from Operation Iraqi Freedom or Operation Enduring Freedom present disproportionally with having met or not met PTSD criteria. PTSD data were obtained using Questions 2 though 12 from the PHDRA (June 2005) form and Questions 2 through 14 from the PDHRA (January 2008) surveys. I wished to determine if serving in support of Operational Iraqi Freedom, Operation Enduring Freedom, or both affect the rate of meeting PTSD criteria. Additionally, this study was conducted to identify if the

total number of prior deployments differs with respect to active versus reserve status, having met PTSD criteria, or the interaction of these items. Finally, this research was conducted to identify if individual resilience factors like physical readiness scores differ with respect to active versus reserve status, having met PTSD criteria, or the interaction of these variables. More specific information will be provided in Chapters 2 and 3.

Theoretical Framework

PTSD carries a significant cognitive component (Ehlers & Clark, 2000; Ehring, Ehlers, & Glucksman, 2008; Foa, Keane, & Friedman, 2000); therefore, I addressed the PTSD prevalence rate as it relates to the cognitive processing model. Ehlers and Clark (2000) suggested the existence of automatic, conditioned responses generated by an environmental trigger related to the trauma. Such triggers like sounds, smells, and sights could reinforce the initial trauma and be further exacerbated by multiple tours in support of combat operations, thus increasing the potential for sustained PTSD symptomology (Miliken, Auchterlonie & Hoge, 2007; Riddle et al., 2007). Berg, Greiger, and Spira (2005) identified that the cognitive processing of a traumatic event may have a stronger effect on the development of PTSD, even more so than the specific number of traumatic exposures. What they posit is that the cognitive processes like the way the event is interpreted and encoded have a stronger effect on the development of PTSD more so than repeated exposure to the traumatic event.

Additional researchers focusing on the cognitive processing of traumatic events like Shen, Arkes, and Pilgrim (2009) claimed that there is a significant increase in the probability of a PTSD diagnosis if the deployment, and further exposure to potentially

traumatic events, is greater than 180 days to either Iraq or Afghanistan. In addition, Ehring et al. (2008) identified that "cognitive models of psychopathology postulate content specificity—that is, specific sets of cognitions are thought to be involved in the development and maintenance of each disorder" (p. 219). The contents of an individual's thoughts are directly linked to the cognitive factors in the prediction of PTSD. A more in-depth explanation of the cognitive aspects associated with PTSD will be provided in Chapter 2.

An additional aspect of this research is resilience. What researchers have shown is that there is a significant cognitive component associated with resilience. According to Fletcher and Sarkar (2013), early cognitive contributions to resilience, or hardiness, begins with "biopsychospiritual homeostasis," or a comfort zone, which is where a person is fully in balance physically, mentally, and spiritually (p. 12). This cognitive construct is placed out of balance when insufficient resources (i.e., protective factors) exist. When the traumatic event occurs, the result is often a return to homeostasis.

Resilience is often paired with research associated with the stress reaction. Richardson (2002), Connor and Davison (2003), and Efkildes (2008) posited that high levels of resilience are associated with a positive stress reaction. Additionally, Carver (1998) and Tusaie and Dyer (2004) further expanded the theoretical cognitive tie between cognition and appraisal of stimulus input (i.e., emotions). Fletcher and Sarkar (2013) and Winnie, Mak, Ng, and Wong (2011) found that there is a positive correlation between the strength of resilience and the way in which a person views the self, world, and the future.

More detail about the theoretical cognitive construct of resilience will be further explicated in Chapter 2.

Operational Definitions

Active component (AC): A U.S. military service member who is currently serving a period of military duty and receiving full monetary compensation and health care benefits. For enlisted personnel, the period of duty is typically a 4-year period. For commissioned officer personnel, the period is indefinite. For the purposes of this study, active component only included U.S. Navy enlisted personnel (Cutler, 2009).

Combat: For the purpose of this research, combat was considered any action associated with a military operation or war that involves two or more opposing forces where there is direct or indirect contact with such forces (Tanielian & Jaycox, 2008).

Combat zone: The area required by combat forces for the conduct of operations (DOD, 2010).

Command: The authority that a commander in the armed forces lawfully exercises over subordinates by virtue of rank or assignment (DOD, 2010).

Deployment: A term used to identify a period of time in which a military member is away from family in support of a military mission. The location is typically off-site location in a training or war-time capacity (Tanielian & Jaycox, 2008).

Global War on Terrorism (GWOT): A term used to identify a period of time after September 11, 2001 where the President of the United States declared an operation to reduce the effects or spread of any terrorist organization (Tanielian & Jaycox, 2008).

Individual augmentee (IA): An order to duty for any U.S. Navy service member that directly involves a mission that supports the GWOT. Such a period of duty is often less than 280 days including training (Chief, 2000). For the purpose of this research, the terms individual augmentee and augmentee were used interchangeably.

Operation Desert Shield: Combat operations beginning in August 1990 involving U.S. and coalition forces in Saudi Arabia (Tanielian & Jaycox, 2008).

Operation Desert Storm: Combat operations beginning in January 1991 involving U.S. and coalition forces involving the liberation of Kuwait (Tanielian & Jaycox, 2008).

Operation Enduring Freedom: Combat operations beginning in October 2001 involving a ground war in Afghanistan (Tanielian & Jaycox, 2008).

Operation Iraqi Freedom: Combat operations beginning in March 2003 involving a ground war in Iraq (Tanielian & Jaycox, 2008).

Pay grade: A stratified list of compensation based on accession into the military ranging from E1 to O10. Enlisted pay grades are identified with an "E," warrant officer pay grades are identified with a "WO," and commissioned officer pay grades are identified with an "O."

Personal health information: Information recorded about an identifiable individual that relates to the individual's health or to his or her health care history.

Post-tour: A period of time after the military person returns from an operation. For the purpose of this study, post-tour reflected the time directly after the combat tour in Iraq and Afghanistan.

Posttraumatic stress disorder (PTSD): A diagnosis associated with a traumatic experience followed by significant distress associated with re-experiencing the trauma, significant nightmares, or anxiety in such a manner that causes significant disruption (APA, 2000). Combat was the primary traumatic experience related to this study. More specific criteria are contained in Table 1. Historically, PTSD was referred to as "battle fatigue" or "shell shock."

Post-Deployment Health Assessment (PDHA): A document used to capture essential data pertaining to the physical and mental wellbeing of a military member returning 1 to 90 days postdeployment (Assistant, 2008; Chief, 2009, 2014). For the purposes of this study, the PDHA data was omitted as the necessary data were captured from PDHRA data.

Post-Deployment Health Reassessment (PDHRA): A document used to capture essential data pertaining to the physical and mental wellbeing of a military member returning 180 days postdeployment (Assistant, 2008; Chief, 2009, 2014). For the purposes of this research, both the June 2005 and January 2008 forms were used and analyzed.

Reserve component (RC): A U.S. military service member who is currently serving a reduced period of military duty typically 1 weekend per month and 2 weeks per year and receiving a reduced monetary compensation and health care benefits. The same period of duty applies to reserve component personnel as it does for active component personnel. For the purposes of this study, active and reserve only included U.S. Navy enlisted personnel (Cutler, 2009).

Reserve component mobilization order: An order to activate a Reserve Component Navy employee for a period of active duty in support of a specific mission or war (Chief, 2000).

Resilience: The capacity to adapt successfully in the presence of risk and adversity which aids in keeping military members and leaders fit for duty and to protecting the health and wellbeing of the military and their families (Meredith et al., 2011). For the purpose of this study, resilience factors included individual level (physical fitness) scores.

Assumptions, Limitations, Scope, and Delimitations

It was assumed that 100% of all Navy personnel returning from an augmentee tour would complete the PDHRA at the appropriate intervals both accurately and completely as directed by current Navy policy. Understanding the limitations of any self-report, it was further assumed that each respondent would be fully open and honest in answering each element of the PDHRA questionnaires. Inasmuch as both active and reserve personnel are required to complete the PDHRA surveys postdeployment, significant limitations existed with regard to the full compliance of all returning personnel to complete the survey (Tanielian& Jaycox, 2008). This issue was a limitation to this study. Additional limitations to this study included accurate depiction of mental state on self-reports (Hogue, Auchterlonie, & Milliken, 2006) and the potential for over reporting of PTSD symptomology (Baker et al., 2009) or malingering (Morel, 2008).

It is also assumed that all Navy personnel identified in this study had complete records associated with resilience factors as identified through physical fitness scores as

directed by current Navy policy (Chief of Naval Operations, 2011). With regard to resilience data, the absence of any reported resiliency scores predeployment made validation of these data difficult. I assumed that the identified resilience variables are direct indicators of the existence or absence of essential resilience factors. More specifically, Meredith et al. (2011) identified two of the three factors used in this study to have empirical support to resilience. Those factors were community- and unit-level factors, but physical fitness only carried a moderate support to resilience factors. In addition, the limited sample size could have created a significant issue on generalizability, thus rendering the results less robust.

The scope of this study included only active and reserve Navy personnel returning from an individual augmentee tour. The PDHRA dataset included a range of dates starting from September 1, 2002 which identified 10 months after the commencement of Operation Iraqi Freedom to December 1, 2010 which identified 3 months after the conclusion of Operation Iraqi Freedom. Although there additional data available for dates after December 1, 2010, this could potentially create an increase in Operation Enduring Freedom data, which could potentially skew the statistical results. The purpose of this delimiting date ensured that an equitable balance was obtained between both sets of data.

The resilience data included physical fitness assessment scores for dates up to 36 months post-tour. The delimiting date for the purpose of this study was December 30, 2013 which facilitated a full capture of 36 months of resilience data for active and reserve Navy personnel returning December 1, 2010. Any data obtained outside of the

aforementioned delimiting date were not considered within the scope of this study and were not included in the statistical analyses.

Significance of the Study

The impact of organizational significance related to this study is widespread. As more military are returning from combat tours in Afghanistan and Iraq with PTSD, or what Tanielian and Jaycox (2008) called the "invisible wound of war," leadership is being faced with the challenge of how to manage that population effectively (p. 1). This population of returning individual augmentees has become even more important as the Navy, along with the other branches of the military, have been congressionally mandated to reduce their personnel. Not only did this study provide support that a larger population is returning with PTSD symptomology, it also provides data that Navy leadership could use to remain mindful about the behaviors associated with this disorder and the impact on organizational behavior. In addition, attributes of resilience (e.g., individual levels) were identified that could result in Navy personnel receiving support that could become an adjunct to the care that they would not otherwise seek.

The social significance related to this study is equally widespread. The cost of care for military members and veterans suffering from PTSD is high (Friedman, 2004); according to Shiner, Drake, Watts, Desai, and Schnurr (2012), 2.1 million service members have served in support of OIF and OEF. This study provides information that may be used to predict a future medical burden for Navy medicine. Navy personnel and their families are forced to deal with the difficulties associated with PTSD, and not only does it have professional consequences for the Navy employee, it has interpersonal

consequences for the family (APA, 2007). Identifying the existence of PTSD symptomology, and the increased symptomology from second and subsequent tours, could create the impetus to modify the existing training starting from recruit through midcareer focusing on the rigors experienced in combat. This could be accomplished using more of an Army or Marine Corps model of combat training. Also, it is necessary to enhance training programs, adopt new policies, and leadership practices to support those programs and to increase funding for support programs that build resilience within this population.

Summary of Chapter 1

The U.S. Navy has been engaging in operations to support the GWOT since September 11, 2001, and Navy personnel have been used in a more nontraditional role in supporting land campaigns and detainee operations. Historically, only certain subpopulations of the Navy have screened and trained for combat operations or combat operation support with the expectation that those Navy personnel will serve in such combat-centric missions. The screening process for such Navy personnel is stringent and time consuming in addition to the follow-up training associated with such operations being lengthy in duration. During this screening and training process, it is paramount that those Navy personnel have the capability to withstand the rigors of combat.

For those Navy personnel who have not opted to work in a combat-centric job and have not been afforded the rigorous screening and training process, such exposure to combat operations could potentially have a detrimental effect on their psychological wellbeing (e.g., PTSD) especially when being faced with the possibility of multiple tours

in the Iraqi and Afghani areas of operation. This study was designed to measure the prevalence rates of active and reserve Navy personnel with PTSD symptoms using existing PDHRA data, the relationship between tour length and PTSD symptoms, and individual resiliency factors and PTSD symptomology.

Chapter 2 provides a comprehensive literature research strategy used to identify essential elements of PTSD symptomology, component and tour number, and resilience factors associated with the development of PTSD.

Chapter 2: Literature Review

Introduction

In the literature review, I present a review of research strategies and highlight research on the prevalence rates of PTSD from U.S. Navy groups containing both active duty and reserve component personnel on single and multiple tours. Next, a review of literature on the history of PTSD in the military, the creation of the PDHRA in addition to a discussion of the seminal research involving U.S. Navy active and reserve component personnel involved in combat operations is presented. Information will be provided on the impact of resilience in the military and its relationship to stress and trauma and PTSD. Finally, a review of the research method chosen to assist in establishing the prevalence rates of PTSD symptomology, component and tour number, and the existence of resilience factors will be presented.

Research Strategy

The research was conducted using multiple data mining efforts at the virtual library at Walden University. Comprehensive searches were conducted using EBSCO, OVID, Academic Search Premier, MEDLINE, Military and Government Collection, ProQuest, and PsycARTICLES databases. Several combinations and permutations of the following key words were used to identify essential documents necessary to this research: *posttraumatic, posttraumatic stress, posttraumatic stress disorder, stress disorder, PTSD, Army PTSD, Marine Corps PTSD, Air Force PTSD, Navy PTSD, Navy Reserve PTSD, mobilized reserve and PTSD, selected reserve and PTSD, combat stress, battle mind, battlemind, battle stress, military stress, military, stress, deployment, deployment stress,*

Navy, combat, Navy combat, Individual Augmentee, IA, post deployment, post deployment health, Post Deployment Health Assessment, PDHA, Post Deployment Health Reassessment, PDHRA, DD Form 2900, DD Form 2796, Electronic Deployment Health Assessment, EDHA, self-report, cognition, and *cognitive processing*. In addition, research was conducted using the aforementioned search engines for *military resilience, resilience, psychological resilience, resilience factors,* and *PTSD and resilience* in order to find the essential documents necessary for this dissertation.

Research using the Department of the Navy's Bureau of Medicine online library was used in addition to searching Google with the same aforementioned key phrases and words. Data were also obtained using the Department of Defense (DOD) publication library, the Secretary of Defense Publication website, the Department of the Navy publication website, the Military Deployment Health Center website, and the Veterans Affairs National Center for Posttraumatic Stress Disorder website. Additional resources for this research were the American Psychological Association's resources for PTSD.

Conceptualizing Combat and the Military

In combat, there are often injuries and casualties. What is depicted in the mainstream media is often the outward, physical injuries sustained during combat operations. Whether it is a traumatic amputation of a lower limb due to an improvised explosive device or scars because of burns while caught in a vehicle engulfed in flames during convoy operations, the injuries are clear and unambiguous. This type of injury is concrete, apparent, and carries with it a method of treatment. This is not the case for the psychological disorders sustained in combat like PTSD. PTSD is a diagnosis based on a

set of symptoms that cannot be seen, touched, or dissected (Tanielian & Jaycox, 2008). Although there is a presentation of symptoms associated with the diagnosis of PTSD, there are no specific, physical characteristics that a person suffering with PTSD presents to the world. A PTSD injury is unclear and ambiguous, and a physician cannot simply look at a patient and determine if PTSD exists. There is much more to the diagnostic process, and the treatment is equally multimodal in approach and emphasis.

Because the diagnosis and treatment of combat-related PTSD is difficult, such research about the disorder is equally imbalanced with an emphasis on the combat-centric branches of the U.S. Military. Research dedicated to the psychological effects of combat has been geared primarily toward the branches of the Army and Marine Corps (Baker et al., 2009; Milliken et al., 2007), and little research has been conducted on the U.S. Navy (Robinson, 2008; Tanielian & Jaycox, 2008). Prior to Operation Desert Storm, the U.S. Military has relied primarily on U.S. Army and Marine Corps personnel to conduct ground operations (Giardina, 2007). Shortly after September 11, 2001 the U.S. Navy personnel have begun to assume a more nontraditional role in combat operations. To date, minimal attention has been directed to the impact of combat-related stress (e.g., PTSD) on active duty and reserve components of the U.S. Navy personnel. Johnston and Dipp (2009), Sammons (2005), Sharkey and Rennix (2011), and Taylor (2014) targeted and publish articles on this population.

The combat operations of Operation Enduring Freedom and Operation Iraqi Freedom have created and difficult challenges for U.S. Military personnel (Hoge et al., 2006) and for U.S. Military behavioral health providers and support systems (Garcia et

al., 2014; Seal, Maguen et al., 2010; Tanielian & Jaycox, 2008). The vast majority of military combat-related PTSD research conducted have identified that PTSD has been one of the primarily diagnosed mental disorders (Tanielian & Jaycox, 2008). In addition, PTSD has been correlated with increases in combat tour intensity and repetition, and incidences of diagnosed PTSD have risen steadily with heavy combat typically being cited as a leading cause (Seal, Maguen et al., 2010; Tanielian & Jaycox, 2008).

The U. S. Military was created over 230 years ago as an essential and necessary step to ensure safety and the perpetuation of U.S. democracy (Cutler 2009; Eikenberry, 2013; Millett & Maslowski, 1994). The U.S. Military expanded and thrived to continue its varying missions both stateside and worldwide. The U.S. Military continues to thrive, especially in an environment of unspecific aggressors and guerrilla warfare, and it has not been since the Vietnam era that the U.S. Military has seen such unconventional means of warfare, unprecedented deployment pace (Belasco, 2007; Bruner, 2006), an emphasis on the effects of such combat trauma (Pietrzak, Pullman, Cotea, & Nasveld, 2013).

From a macro view, the U.S. Military, and more specifically the Navy, remains an important aspect of democracy (Cutler, 2009; Eikenberry, 2013; Millett & Maslowski, 1994). Although there are a myriad of reasons for its existence, from a global perspective and according to Holland (2000) and Luke (2013), there are only four: to uphold the constitution of the United States of America; project U.S. strength worldwide; to help facilitate the spread of democracy to those countries that desire it; and, according to Luke (2013), to "sustain unhindered global maritime commerce" (p. 16). Essentially, the U.S.

Navy's job is to ensure the protection of the open sea-lanes, those who operate there, and be strong enough to carry out those aforementioned missions.

There are men and women who are dedicated to support and defend the missions of the military. For the majority of time, these military men and women are supporting the mission when engaged in combat operations. Combat is the purpose for military training, and combat is often the impetus for difficulties for military personnel (Shen, Arkes et al., 2010; Tanielian & Jaycox, 2008).

In the past 10 years, research dedicated to PTSD and combat have supported the notion that U.S. Army and Marine Corps personnel were the most frequently sampled service members because they are the largest share of military personnel employed to support combat operations (Milliken et al., 2007, O'Bryant, 2006;Tanielian & Jaycox, 2008). However, the generalizability across branches of service cannot be assumed. In addition, an often underrepresented facet of the military with respect to PTSD research is the reserve component (Lapierre, Schwegler, & LaBauve, 2007; Milliken et al., 2007; Renshaw, 2010). Moreover, Lane, Hourani, Bray, and Williams (2012) found that deployment has a much greater impact on reserve component personnel than on their active duty counterparts. They found that reserve component personnel often did not have the readily available resources after deployment and demobilization to help mitigate the effects of postdeployment stress.

The Diagnostic and Statistic Manual of Mental Disorders 4th Edition Text Revision (*DSM-IV-TR*; APA, 2000) defined PTSD as an anxiety disorder that often develops after a direct or indirect exposure to a traumatic event or incident in which

severe physical harm either occurred or was threatened. PTSD also involves an individual's response of intense fear, horror, or helplessness in addition to the following symptoms occurring for more than 1 month and causing significant distress and/or impairment: re-experiencing the event, avoidance of stimuli related to the event, numbing of general responsiveness, and hyperarousal (APA, 2000). PTSD should not to be confused with an acute stress reaction or combat operational stress reaction. Tanielian and Jaycox (2008) reported that an additional distinction is often made between PTSD and either the acute stress reaction or combat operational stress reaction. They state the acute stress reaction is a transient disorder that develops in response to high levels of physical or mental stress. Conversely, combat operational stress reaction is any response to stress associated with battle that results in that service member being unable to remain on duty (Tanielian & Jaycox, 2008).

There is a need for military PTSD treatment. According to Tanielian and Jaycox (2008), "There is a substantial unmet need for treatment of PTSD and major depression among servicemembers following deployment" (p. 12). They content that many service members suffer with PTSD and major depression but go untreated due to unavailability of care of fear of stigma. Both the DOD and Veterans Affairs have experienced difficulty in attaining trained behavioral health professionals to fill either existing or new positions to treat veterans. In addition, Tanielian and Jaycox stated that with the potential for more than 300,000 new cases of behavioral health conditions, there is a need for additional treatment capacity (p. 13). With this ever increasing population, there not only is a need

for identifying and diagnosing PTSD and major depression but a need to treat those veterans as well.

Conceptualizing Resilience and the Military

Resilience, or psychological resilience, is important for the military community with respect to maintaining military fitness for duty and to protect the health and wellbeing of their respective families. Resilience is needed for a culture like the military because it could address the concerns about the stigma associated with needing help for psychological or behavioral problems (Meredith et al, 2011). Even in light of recent changes in DOD policy, some service members fail to take the steps necessary to experience confidentiality in seeking mental health assistance for emotional and behavioral problems. According to Meredith et al. (2011), leadership plays a pivotal role in creating a command climate in which it is acceptable to get help for psychological health concerns. Although attitudes and beliefs that foster resilience like independence, pride, and self-sufficiency are helpful, according to Meredith et al., they can also further complicate the process for military members seeking psychological assistance. Leadership can also influence individual appraisals associated with enhanced resilience and performance through modeling optimism to service personnel or by creating training opportunities designed to challenge service personnel (Bates et al., 2010). Meredith et al. stated that "an emphasis on strengths, such as fitness, thriving, and combating stress, has great potential for helping service personnel without the stigma that is typically associated with seeking help" (p. 5). Resilience often occurs when an emphasis is placed

on prevention as opposed to intervention (Meredith et al., 2011). Prevention helps with the stigma associated with seeking behavioral health services.

There are multiple characteristics associated with resiliency. Meredith et al. (2011) identified seven types of empirically based, individual-level factors that have been identified to promote resilience: positive coping, positive affect, positive thinking, realism, behavioral control, physical fitness, and altruism. Meredith et al. also identified four different resilience factors at the community level: belongingness, cohesion, group connectedness, and collective efficacy. Finally, Meredith et al. identified multiple, literature-based, unit-level factors that contributed to resilience: a strong and positive command climate, teamwork, and unit cohesion. However, three in particular are identified and are salient in this study. Meredith et al. identified, on the individual level, that physical fitness is identified as an ability of the body to function with a level of efficiency and effectiveness within life. On the community level, community is identified with and "including participation in spiritual/faith-based organizations" (Meredith et al, 2011, p. 6). On the unit level, resilience factors are identified as fostering "positive command climate, teamwork, and cohesion" (Meredith et al, 2011, p. 6). Each of these concepts is important in understanding resilience and the way human beings use such processes in working through life events like combat-related stress.

Review of Literature

Over 1,000 documents were identified spanning a history from World War I to the current Iraq/Afghanistan war. Much of the seminal research for contemporary PTSD was related to the Vietnam conflict (Holowka et al., 2012; Lenhardt, Howard, Taft, Kaloupek,

& Keane, 2012). The following literature review provides insight into the history of combat-related PTSD covering the span of the first Iraq war to include the effects of combat-related stress on war fighters starting with the first Gulf War (Southwick et al., 1995;Taft, Schumm, Panuzio, & Proctor, 2008) to the most current global war on terror to concluding with Operation Iraqi Freedom/Enduring Freedom (APA, 2007; Kintzle, Yarvis, & Bride, 2013).

Historical Concepts of Posttraumatic Stress Disorder

Ancient literature has several accounts of what can be called combat-related PTSD. Bentley (2005) identified that one of the earliest depictions of PTSD is by Herodotus in his writing of the battle of Marathon in 490 BC. During this battle, Herodotus mentioned an Athenian warrior who experienced blindness when he observed the death of a soldier standing next to him. This Athenian soldier, although blinded, was not visibly wounded anywhere on his body. Herodotus also described the epic battle of Spartan King Leonidas at Thermopylae who dismissed his men from joining into combat due to his observation that they were mentally spent from battle (Bentley, 2005). Nidiffer and Leach (2010) identified historical identification of PTSD in the late 1600s by Swiss military physicians who identified a group of behaviors that made up an acute combat reaction or PTSD identified as *nostalgia*. This was a term the Swiss military physicians used to identify a condition characterized by melancholy, disturbed sleep, incessant thinking of home, insomnia, weakness, anxiety, loss of appetite, cardiac palpitations, stupor, and fever (Bentley, 2005; Nidiffer & Leach, 2010). The German military physicians also identified similar behaviors and referred to it as *heimweh* or *homesickness*

(author, year). According to the German physicians, such symptoms originated from the soldiers longing for home. The French identified the same symptoms as *maladie du pays*, and the Spanish established a similar diagnoses called *estar roto or to be broken (Author, year)*.Such historical accounts of combat-related PTSD continue to occur from the siege of Gibraltar in 1727 where a soldier identified other soldiers who killed or wounded themselves due to extreme physical fatigue causing the soldiers to no longer have the ability to understand or even process simple instructions (Bentley, 2005).

Contemporary American Research and Concepts of Posttraumatic Stress Disorder

In the United States, PTSD was documented as occurring frequently. Friedman (2007) stated that throughout the 1800s, U.S. military doctors began diagnosing soldiers with what was identified as exhaustion following the stress of battle. This diagnosis was characterized by a “mental shutdown” related to an individual or group trauma (Friedman, 2007, p. 75). Friedman (2007) also discussed that 1900s WWI physicians identified overwhelming mental fatigue as "soldier’s heart" and "the effort syndrome" (p. 75). It was not until after WWI when the term shell shock emerged followed in WWII and the term combat fatigue (Bentley, 2005, para. 9; Friedman, 2007, p. 75). Both terms were used to describe military men who exhibited anxiety and stress as a direct result of combat-related trauma.

It was not until the American Psychiatric Association included a related diagnosis in the first edition of the DSM that combat-related trauma become a formal diagnosis. Andreasen (2010) stated that the first two editions of the *DSM* (I and II) identified PTSD under the category of "stress response syndrome" and was caused by "gross stress

reaction" (p. 68). The third edition of the *DSM* officially identified PTSD, and PTSD was placed under the subcategory of anxiety disorders. Friedman (2007) identified PTSD formulation as

> a traumatic event was conceptualized as a catastrophic stressor that was outside the range of usual human experience. The framers of the original PTSD diagnosis had in mind events such as war, torture, rape, the Nazi Holocaust, the atomic bombings of Hiroshima and Nagasaki, natural disasters (such as earthquakes, hurricanes, and volcano eruptions), and human-made disasters (such as factory explosions, airplane crashes, and automobile accidents). They considered traumatic events to be clearly different from the very painful stressors that constitute the normal vicissitudes of life such as divorce, failure, rejection, serious illness, financial reverses, and the like. (By this logic, adverse psychological responses to such "ordinary stressors" would, in DSM-III terms, be characterized as Adjustment Disorders rather than PTSD.) This dichotomization between traumatic and other stressors was based on the assumption that, although most individuals have the ability to cope with ordinary stress, their adaptive capacities are likely to be overwhelmed when confronted by a traumatic stressor. (p. 75)

Andreasen (2010) stated that the current edition of the *DSM* (i.e., *DSM-IV-TR*) categorizes PTSD under the newly written stress response category, but PTSD remains in the anxiety disorder category. Andreasen (2010) showed that this change continued when

the *DSM-IV* was finalized in 1994 and showcased a peace time definition of PTSD that expanded the scope of the traumatic experience to include a threat to self or others.

Additional research of this diagnosis makes it clear that a precipitating even must occur for the stress to occur. Friedman (2007) commented that PTSD is "unique among psychiatric diagnoses because of the great importance placed upon the etiological agent, the traumatic stressor" (p. 27). Friedman suggested that a PTSD diagnosis cannot be made unless the patient has fully met the stressor criterion, which means that the patient has been exposed to an historical event that is considered traumatic. Friedman also suggested that, in clinical experience with the diagnosis of PTSD, there are individual differences regarding the capacity to cope with traumatic stress which means that, for two people exposed to the same stressor, one may develop PTSD while the other may not. Friedman stated that this traumatic experience is filtered through both a cognitive and emotional process before it is appraised as a threat. This appraisal process is subjective to the person experiencing the trauma, and because of the differences, some are more protected than others. On the other hand, some are more vulnerable to traumatic effects than others and more susceptible to developing clinical symptoms after exposure to extremely stressful situations. Friedman (2007,) stated, "Although there is currently a renewed interest in subjective aspects of traumatic exposure, it must be emphasized that events such as rape, torture, genocide, and severe war zone stress are experienced as traumatic events by nearly everyone" (pp. 27-28). What can be surmised at this point is that the appraisal of such traumatic events can be generalized across multiple spectrums of the human existence.

The psychological cost of combat related stress has been clearly related to deployment length (Taft et al., 2008) and Erbes, Meis, Polusny and Compton (2011) identify a significant rise in PTSD symptoms directly related to component. In addition, Milliken et al. (2007) correlate a high incidence of PTSD symptoms with a relationship to reserve component personnel as does Kehle et al (2011); Meis, Barry, Kehle, Erbes, and Polusny (2010).

Research has been dedicated to identifying future difficulties associated with combat related trauma (e.g., PTSD). Friedman (2004); Hoge et al (2006); and Sammons (2005), all identify major concerns in the capability of treating PTSD within the Department of Defense. In addition, Tanielian and Jaycox (2008) stress the high degree of personal, professional, and societal issues that arise from such difficulties associated with PTSD.

Theoretical Cognitive Aspects of Posttraumatic Stress Disorder

For the purposes of this study, an exhaustive list of cognitive theories of PTSD will not be presented. This section will present a more "prototypical" set of cognitive theory. The two theories provided in this study are schema-based theory and an associative-network-based theory.

Schema-Based Theories - According to Fiske and Linville (1980), the term *schema* is commonly used to refer to a way of mentally representing knowledge. Often it is the purpose of schemas to provide an organization of information at various levels of abstraction. Such organization is found to provide an order to the complexities of life through a coding of "the commonalities and regularities of those experiences and the

representation of them in the mind" (Dalgleish, 2004, p. 228). Further described by Maclin (2012), schemas are highly enduring mental frameworks that determine how experienced phenomena are perceived and conceptualized thus aiding us to organize large amounts of information efficiently.

Researchers of schema based theory as it relates to combat PTSD posit the explanatory power achieved by assuming a single representational format and exploring the range of its application to a form of psychopathology (Hawke & Provencher, 2011). This model has two main principles that explain "the content and nature of schematic representations determines how all new information is processed and that new, schema-incongruent information is problematic to such processing" (Dalgleish, 2004, p. 239).

Associative Network Theories - According to Dalgleish (2004, p. 239), "network theories in psychopathology promote a single aspect of mental representations as a parsimonious way of explaining a diverse set of data. Whereas the strength of schema theories is the organization of abstracted knowledge, the principal advantage of a network theory is the connectivity between different representations." What researchers show about network theories is that it provides a representation of how previously thought unrelated pieces of mental information activates each other and leads to a generation of affect (e.g., Bower, 1981).

Theoretical concepts like this have an attractiveness to combat related PTSD research in those core features of intrusive images and thoughts, and powerful emotions triggered by a host of cues about the combat trauma. Current researchers identify a highly developed network theory established by Foa and Kozak (1986) and further developed by

Foa (2011). This theory is posited to be a fear network, or an associative network in long-term memory, that consists of three elements that include stimulus information about the feared object(s); information about cognitive, behavioral, and physiological reactions to the feared object(s); and information that links these stimulus and response elements together (Dalgleish, 2004). Foa (2011) proposed that in disorders like PTSD, the fear network is highly pathological and acts as a "fear program" that is activated when one or more of the elements in the network is encountered, producing a fear reaction.

According to Dalgleish (2004), the PTSD related associative fear networks are essentially "traumacentric" in that the networks are representations of the trauma, including any stimuli that tangentially relate to it. Researchers of this theory depart from schema associated theory in that schemas represent the generalized concepts of "world, self, and others against which the trauma and its implications are evaluated" (Dalgleish, 2004, p. 239).

Gender and PTSD

The issue of gender has been recognized as an important issue regarding the impact of combat related PTSD. This literature review identified that the influence of gender on combat related PTSD may originate from many factors to include poor health, gender specific treatment, and response to trauma. Even though there is strong evidence that gender plays a role in responses to stress and trauma, gender specificity is not well incorporated into research in the area of combat related PTSD (Lasiuk & Hegadoren, 2006). With the understanding that most combat related PTSD research has been conducted in male veteran samples, there is growing empirical evidence that combat

related PTSD is associated with poor health in women as well (Calhoun, Wiley, Dennis, & Beckham, 2009; Dutra et al, 2011).

Although some researchers suggest a relationship between gender differences in responses to trauma, it is often absent in trauma studies, thus making cross-study comparisons and interpretations difficult (Lasiuk & Hegadoren, 2006). Gender differences in combat related PTSD has also been associated with higher rates of preexisting anxiety disorders or major depressive disorders in women and with trauma exposure in women before age 15 (Hassija et al., 2012). According to Wells et al, (2010), an ever increasing population of female veterans from Operation Iraqi Freedom and Operation Enduring Freedom are being diagnosed with PTSD.

A study conducted by Pollack, Boyer, Betsinger, and Shafer (2009) identified gender as a predictor of attrition from the military provided valuable data pertaining to the perception of treatment and stigma associated with PTSD. The researchers in this study focused specifically on the impact of "premilitary interpersonal trauma" on attrition during U.S. Marine Corps recruit training. What Pollack et al, found was the attrition rate was significantly higher for female recruits than for male recruits that may conclude that female recruits experience greater stress in training and, if they do complete training, carry this added stress into the war zone, contributing to a greater onset of PTSD (2009).

Additional research was conducted to examine gender differences in quality of life among individuals with combat related PTSD. According to Schnurr and Lunney (2008), the overall quality of life was poor in men and women, and in general they did not differ in quality of life or in how PTSD was associated with quality of life; the few

statistically significant differences were small and not of clinical relevance. For both men and women, numbing was associated with reduced quality of life, and they suggested that quality of life should receive increased attention in research and clinical efforts to help veterans with PTSD.

Tolin and Foa (2006) analyzed, in a review of 25 years of research, gender differences in trauma and PTSD. Meta-analyses of studies yielding sex-specific risk of potentially traumatic events and PTSD indicated that female participants were more likely than male participants to meet criteria for PTSD, although they were less likely to experience PTSD (Tolin & Foa, 2006). Females were more likely than males to experience sexual assault and child sexual abuse, but less likely to experience accidents, nonsexual assaults, witnessing death or injury, disaster or fire, and combat or war (Tolin & Foa, 2006).

Although psychological symptoms in the armed forces have increased over time regardless of gender, the association between gender and psychological symptoms has not changed over time, and according to Hoglund and Schwartz (2014), the deployment effect in women was similar to that described in men. It is a fact that female military members have served in past wars, but their typical position was often far from direct combat which resulted in few of them experiencing traumatic events that caused the onset of PTSD. This is no longer the case, and according to Street et al,, "The post-deployment adjustment of our nation's growing population of female Veterans seems comparable to that of our nation's male Veterans" and thus female military members are now returning from Iraq or Afghanistan with PTSD (2013, p. 556).

Military Combat and Posttraumatic Stress Disorder

A number of researchers documented associations between combat exposure and PTSD diagnoses or related symptoms. Studies of Vietnam veterans have found significant relationships between combat exposure and PTSD (Holowka et al., 2012; Lenhardt et al., 2012). Similar relationships have been found in Gulf War Veterans as well (Taft et al., 2008; Vogt, Samper, King, King& Martin, 2008). Researchers have continued to accumulate a similar association in Operation Iraqi Freedom and Operation Enduring Freedom veterans (Seal et al., 2010; Sundin et al., 2010; Thomas et al., 2010). Researchers in two longitudinal studies of these veterans have shown the incidence of PTSD is two to three times higher among those who were exposed to combat as compared with those who did not experience significant combat exposure (Smith et al., 2008)

In the conflicts in Iraq and Afghanistan there is an increased reliance on Reserve and National Guard soldiers, and these groups have been shown to have differential outcomes as compared to active-duty soldiers. Santiago et al. (2010) reported active component soldiers as having similar rates of alcohol misuse in comparison to Guard members but 44% higher odds of drinking and driving and 56% lower odds of entering treatment. Santiago et al. (2010, p. 578) contend that this could be due to active component soldiers having greater access to substance abuse services on base as opposed to reserve components who return home to their community.

Milliken et al. (2007) found that among recently returned soldiers from Iraq that active duty soldiers reported alcohol problems at 11.8% and rates of Reserve/Guard

soldier's alcohol problems were 15.0%. There have been several possible explanations why Reserve/National Guard soldiers fare worse after deployments including, inadequate training and preparation of soldiers, increased stress due to transitions between civilian and military occupations, lack of unit cohesiveness, and reduced access to supports and prevention programs (Milliken et al., 2007).

In previous conflicts National Guard/Reservists whose health may not be optimal prior to deployment, and which may not have been deployed in prior conflicts, are now being called upon. This could explain the association between prior studies that researchers have found an association between Reservist status and psychological disorders (Iversen, et al., 2008). Officers and elite forces are generally more highly trained, more cohesive, display better fitness and generally have lower rates of PTSD than lower ranks and reservists (Iverson, Fear, Ehlers et al., 2008).

Researchers of Gulf War veteran studies found differences in levels of postdeployment mental health and psychosocial problems among National Guard/Reserve service members as opposed to active duty troops (Taft et al., 2008; Vogt et al., 2008). The overall rate of mental health problems reported for National Guard and Reserve service members has been estimated at 42%, as compared to active duty member's rates at 20% (Milliken et al., 2007; Tanielian & Jaycox, 2008).

Military Non-Combat Action and Posttraumatic Stress Disorder

Although there is very little research on military, and more specifically, Navy non-combat action and PTSD, a few articles surfaced that identified situations that have occurred during normal operations at sea that have resulted in traumatic actions being

linked to PTSD. According to Berg, Grieger, and Spira (2005), they conducted research on an incident involving the U.S. Navy research submarine USS Dolphin that experienced flooding and shipboard fires resulting in the crew abandoning ship. Many of the crew experienced significant trauma associated with being swept overboard and remaining in the water for extended periods of time. According to Berg et al. (2005), no member required hospitalization and none were identified as having overt psychological symptoms requiring immediate treatment.

Seven months after the incident, 22 crew-members were surveyed using the Impact of Events Scale Revised (lES-R). As a result, 91% of the crew met the criteria for PTSD. They also concluded that high levels of PTSD were associated with previous traumatic exposure that anecdotally supports the notion that multiple tours in combat resulting in trauma could result in an increase in PTSD symptomology.

Historical Concepts of Resilience

The concept of psychological resilience owes its genesis to a number of fields to include developmental and childhood psychopathology. Much of the initial work associated with resilience occurred in the mid-1900s as *hardiness*. Frankl (1960), Binswanger (1963), and Heidegger (1986) identified this concept of *hardiness* as a capability to view meaning even through painful or difficult times coupled with a desire to live life to the fullest extent. It is often thought of in existential terms like *umwelt* or the physical world, *mitwelt* or the social world, and *eigenwelt* or self-specific world (Frankl, 1960).

Kobasa (1979, p. 4) further identified the term hardiness as a personality type and defined it by contrasting it with what they stated was the "nonhardy existential neourtic" personality type. The concept of hardiness is additionally described as an individual who is proactive, abides by a sense of meaning, and vigorous. After this seminal research, a greater expanse of research has been accomplished on the impact of hardiness and the effects on health and performance the results of which support hardiness as a significant moderator on the impact of stress (Contrada, 1989; Wiebe, 1991; Kardum, Hudek-Knežević, & Krapić, 2012; Maddi et al,. 2006). More specifically to this research, hardiness has been further associated with combat exposure stress during the Gulf War as a significant moderator or stress buffer during combat operations (Bartone, 2000; Britt, Adler, & Bartone, 2001; Wood et al., 2011; Wood, Britt, Wright, Thomas, & Bliese, 2012).

Beginning in the early 1970s, much of the researchers in childhood psychopathology found that despite being raised in extreme poverty and other adverse circumstances, some children had surprisingly normal developmental trajectories (Garmezy, 1991; Werner, 1995; Bonanno & Mancini, 2008). According to Meredith, et al (2011), much of the literature about trauma embraced "resilience as a construct, with attention to differences in resilience between children and adults as well as between chronic and acute stressors." Nucifora (2007, p. 33) suggests that community resilience can be constructed in the aftermath of school violence "by having credible authorities explain what happened and discuss common reactions to crisis" (Nucifora, 2007, p. 33), facilitate and foster strong community bonds throughout the impacted area (Sherrieb,

Norris, & Galea, 2010), or through fostering compensatory strategies to facilitate problem solving to prevent or alleviate the negative emotional consequences of stressful life circumstances (Meredith, et al, 2011). Additionally Hutchinson and Hurley (2013) commented that community resilience constructed after workplace violence can be established through strong leadership coupled with emotional intelligence.

Contemporary American Research and Concepts of Resilience

Psychological resilience is also tied to the positive psychology movement which places more of a focus on what keeps people healthy from a psychological perspective from what makes people psychologically ill (Cohrs, Christie, White, & Das, 2013). Kobau et al. (2011) suggest that the study of positive psychology includes three qualities: positive emotions, positive individual traits, and positive institutions. Positive emotions are identified as contentment with the past, happiness in the present, and hope for the future (Watson, Brymer & Bonanno, 2011). Positive individual traits involve virtues and strengths, courage, creativity, compassion, and resilience. Positive institutions incorporate the study of the actions that encourages better communities, strong work ethic, leadership, tolerance and teamwork (Meredith, et. al, 2011).

According to Bartone (2006), resilience or hardiness, is a global trait perspective that often effects how individuals view themselves, others, or the physical world around them. Bartone's research posits that psychological resilience transcends individual personality traits and is more likened to a process that involves an interaction between a person, his or her past experiences, and the context of his or her current life. Levine, et al. (2009) and Luthar, Cicchetti, and Becker noted that their remains much debate regarding

the "conceptualizations of resilience as a personal trait versus a dynamic process" and contend that the term "resilience reserved to describe the process of adjustment after experiencing significant adversity" (2000, p.543). The support for this distinction is based on the potential issues surrounding labeling individuals as either having or lacking the specific trait of resilience could result in feelings of inadequacy in coping resources. Such discussion supports the notion that resilience is less of a personality trait and more of a process that can be improved through training and education (Bartone, 2006).

Theoretical Cognitive Aspects of Resilience

Fletcher and Sarkar (2013, p. 14) commented that early cognitive contributions to the study of the state of "biopsychospiritual homeostasis," or a comfort zone, which is where a person is fully in balance with respect to physically, mentally, and spiritually. The "disruption from this homeostatic state occurs if an individual has insufficient resources (i.e., protective factors) to buffer him or her against stressors, adversities, or life events. In time, an individual who has experienced disruption will adjust and begin the reintegration process" (Fletcher & Sarkar, 2013, p. 15). According to Fletcher and Sarkar (2013), this cognitive process leads to one of potentially four results: resilient reintegration, homeostatic reintegration, reintegration with loss, and dysfunctional reintegration. All four outcomes move along a continuum where the disruption causes a person to either attain additional cognitive factors leading to homeostasis, remaining within their comfort zone to move through the disruption, mental accommodation and acceptance of a lower level of accommodation, to the lowest level resulting in destructive behaviors.

Much of the emphasis by researchers associated with resilience focus on the stress reaction (Connor & Davison, 2003; Efkildes, 2008; Richardson, 2002) and cognition and cognitive appraisal of emotions (Carver, 1998; Tusaie & Dyer, 2004) are extremely important parts of the stress process as it relates to resilience (Fletcher and Sarkar, 2013). The study conducted by Winnie, Mak, Ng, and Wong (2011) found that there exists a correlation between the strength of resilience and the way in which we view the self, world, and the future. This concept of resilience was defined as a positive cognitive triad by Winnie et al. (2011), and identified that "positive cognitions are important factors that contribute to the effect of trait resilience on well-being." Winnie et al, (2011) also found cognitive, behavioral components like defeating negative beliefs of the future and *decatastrophizing* techniques to be effective in enhancing resiliency.

Meredith et al. (2011) found that several cognitive domains had a strong correlation with high levels of resilience. The domains stretched along a continuum of individual, community, and unit level factors. From an individual level, they identified six types of evidenced based individual level factors that demonstrated the capacity to promote resilience: positive thinking, positive affect, positive coping, realism, behavioral control, and altruism. Additionally, they found that physical fitness was another high-level contributor to resilience, and for the sake of this study, it was considered an individual level factor outside of the cognitive theory model (Meredith et al., 2011). As a point of clarification, this individual level factor of physical fitness will be considered as the body's ability to function efficiently and effectively throughout the life domain, and two

contemporary studies conducted by Palmer (2008) and Maddi, (2007) found that resilience was correlated with physical fitness.

The study conducted by Meredith et al. (2011) also identified several community level factors associated with resilience: belongingness, cohesion, group connectedness, and collective efficacy. For the purpose of this study, the focus was on cohesion as it directly relates to both community level and unit level factors. Based on the research by Calhoun and Tedeschi (2003) and Tedeschi (2011), belongingness was associated with low levels of PTSD and high well being scores. More specific detail about this factor will be provided in Chapter 3. Meredith et al. (2011) also found a strong correlation with aspects of unit level factors of positive command climate, teamwork, and cohesion to high levels of resilience. Much of current literature shows that certain aspects of military life, including strong and positive command climate, teamwork, and unit cohesion, are important for keeping service members resilient and is associated with low levels of PTSD. The unit level factors identified as positive command climate, teamwork, and unit cohesion were outside the scope of this study and not included.

Although there is still debate as to whether or not resilience should be conceptualized as a dynamic-cognitive process (Levine et al., 2009;Luthar et al., 2000), it is noted that more support for this notion exists than for the antithesis; therefore for the purpose of this study, the concept of resilience as it relates to combat related PTSD was conceptualized as a cognitive process.

Gender and Resilience

Tolin and Foa (2006) conducted an investigation to determine the differences in vulnerability to PTSD, sex differences in that vulnerability, and any contributing factors to that vulnerability. Although not directly identified as a topic of research, current research on this topic makes the term resilience synonymous with vulnerability associated with trauma. Tolin and Foa (2006) found that male and female participants often differ in the range of responses to traumatic events and therefore have differing levels of resilience. In the review of trauma literature, the differences in resilience related responses to trauma were often related to the severity of traumatic symptoms and not necessarily linked to the difference in gender. In addition, Tolin and Foa (2006) found that female participants were more likely to report using coping/resilience strategies than male counterparts.

In a departure from the aforementioned literature, Simmons (2010) commented that women are often at greater risk to develop adverse reactions to trauma like PTSD. Simmons (2007, p.385) also stated "Women are generally considered to be at greater risk than men for being diagnosed with PTSD." Simmons provided several explanations for such a gender imbalance that include differences in the types of trauma experienced, inflated rates due to methodological gender bias, socially defined social roles and confounding stressors, biological differences, and differences in cognitive perceptions of traumatic events (Simmons, 2007).

Ong, Zautra, and Reid (2010) supported the notion described by Simmons (2007) through their research on gender differences and resilience. Using a sample of 95 women and men with chronic pain, they completed resilience assessments and found that "women reported greater use of pain catastrophizing compared to men, similar to other

studies of maladaptive response" however "women also benefited more than men from positive emotion" which is a finding that is consistent with other hypotheses from their colleagues. In addition, Ong et al. (2010, p.518) determined "psychological resilience suggest that changing the appraised personal significance of catastrophic thinking (e.g., vis-a`-vis reframing and perspective taking) may be one effective means by which to cultivate positive emotions in the midst of stress" for both male and female participants.

Bonanno, Galea, Bucciarelli and Vlahov (2007) conducted a study on gender and resilience using a sampling of adults residing in New York State, New Jersey, and Lower Fairfield County in Connecticut six months after the terrorist act in September, 2011. In their final assessment of the data, they found that women were 43% less likely to measure higher in resilience than in the sampling of men. Using this data, gender emerged as a strong resilience predictor (Bonanno, et al., 2007) especially when associated with symptoms of trauma (e.g. PTSD); however, they did not offer any specifics to the reduced likelihood of resilience when associated with women. Additional research conducted by Rodriguez-Llanes, Vos, and Guha-Sapir (2013) further supported the supposition of reduced resilience when associated with women. This issue is a topic for future study and outside the scope of this research.

Military Combat and Resilience

According to Meredith et al. (2011), the concept of resilience has been the foundation of the Defense Centers of Excellence (DCOE) for Psychological Health and Traumatic Brain Injury Resilience Program. Bowles and Bates (2010) comment that this program was initiated in 2007 in an effort to shift the psychological paradigm found

within the United States military. This model supported the innovative notion of constructing a culture of resilience driven by unit and medical leadership in an effort to increase service member readiness along with enhancing support for families. This paradigm shift was initially conceived by the United States Marine Corps and adopted by the Centers of Excellence to "depict the processes of resilience and reintegration as involving early intervention (in order to maintain resilience) and recovery (in order to return to resilience upon reintegration)" (Meredith, 2011, n.p.). One of the primary features of this concept is the identification of specific levels of functioning ranging from optimal to ill. Additional features of this continuum are

> the intersection of different audiences for targeting interventions (leaders, warriors, families, and medical personnel), and the continuum of interventions tied to restored functioning. This model integrates the following points: (1) psychological health and fitness is just as important as physical health, (2) the system "pushes to the left" across the continuum of optimal, reacting, injured, and ill functional states and supported resilience in every stage of this effort, (3) leaders and front line support agencies play a key role in resilience-building measures, (4) service members and unit leaders (with support from medical) have the greatest involvement in optimizing mission-ready state, maintaining this state when faced with challenges and stressors, and developing strategies that allow individuals and units to return to mission-ready state if they begin to react, (5) the responsibility and involvement of medical personnel

> increases as service members shift to the right of a mission-ready state, (6) recovery (shifting back to the mission-ready state) is facilitated, encouraged, and promoted from every point on the continuum through extensive supportive elements from community, unit/leadership, family, and personal growth (Meredith, et al., 2011, n.p.).

As supported by the research conducted by Bartone (2006), education and training on the concept of resilience will potentially keep them at high levels of functioning; however, others who identify as presenting with significant stress reactions may need additional risk mitigation (Meredith, et al., 2011). According to the DCOE (2013), a lesser number may suffer from significant distress and require a more intensive behavioral health intervention to aid in recovery and eventual reintegration with their command. The DCOE program on resilience is ultimately designed to keep military personnel (e.g. individuals and leadership) and their families psychologically fit throughout the various phases of deployment (e.g. predeployment, action in theater, and postdeployment).

Military Non-Combat and Resilience

A tremendous degree of research has been conducted on the concept of resilience during military activities with much of the emphasis on pre and post-combat activities. Given the paucity of research dedicated to United States Navy resilience during such operations, the vast majority of data has been conducted by the United States Army and Marine Corps. With respect to non-combat related resilience research, the United States military has conducted studies that span the range of initial recruit training (Novaco, Cook, & Sarason, 1983; Weatherill, Vogt, Taft, King, King, & Shipherd, 2011), training

and non-combat related operations (Eid & Johnsen, 2002; Johnson & Dipp, 2009), extended sea operations (Cordle & Shattuck, 2013) to individual level attributes of resilience and unit level leadership factors that foster resilience (Maddi et al., 2012; Maddi, 2007; Palmer, 2008).

Scientists in the United States Navy began conducting research on resilience while researching incidents that occurred at sea or in port. According to Nasky, Hines, and Simmer (2009), they conducted a study following the October 12, 2000 suicide bombing of the USS Cole (DDG-67) while it was in port. The Naval Medical Center Portsmouth Special Psychiatric Rapid Intervention Team conducted assessments for 190 crewmembers assigned to the ship during the incident. Through their research, they found that Navy personnel who were higher ranking, older in age, and male were more likely to exhibit resilience and not develop symptoms of PTSD; whereas, lower ranking, younger, female Navy personnel were less likely to exhibit resilience and actually develop symptoms of PTSD.

During the study conducted by Berg, Grieger, and Spira (2005, p.45), they found that lower degree of "peritraumatic dissociatation" symptoms [and a potentially higher degree of resilience] was consistent with previous studies that showed "with previous studies which showed that more highly screened, better trained, and experienced military' members have lower levels of dissociative symptoms than age-matched peers with less experience and training when exposed to the same high stress environment."

Cordle and Shattuck (2013) identified the need to better understand the impact of resilience programs and operational effectiveness while at sea. They found that a typical

United States Navy ship may lose approximately 5% of the crew to some type of stress-related issue which is often associated with fatigue. What they found was in order for the crew to remain resilient, they must be given opportunities to exercise and be given stable sleep schedules within the constraints of the operational work day at sea. As evidenced onboard the USS San Jacinto (CG-56) in 2010, a stable, resilience supporting environment was established which resulted in the crew having shorter duty related watches which allowed for a higher degree of focus and lesser degree of fatigue (Cordle & Shattuck, 2013). According to Cordle and Shattuck (2013), the Navy has only started to find the usefulness of programs to improve resilience, but in doing so the Navy can promote an environment that improves the personnel's ability to help prepare for and process stressful situations and continue to perform their duties.

What is clear is that a good degree of effort has been put forth in researching combat and non-combat actions and the impact on resilience. All branches of the United States military have conducted a fair degree of research on these topics for reasons that are all too clear. In order for our military to be operationally capable and ready to conduct any mission, it is essential for those personnel to exhibit high degrees of resilience. If those personnel do not exhibit factors that are associated with high degrees of resilience, it is paramount for such an organization like the United States Navy to foster programs that help improve those individual and unit level factors associated with high degrees of resilience. For the purposes of this study, the focus of resilience was on individual level factors and unit level factors.

What has been observed over the past decade was that the DOD has implemented numerous programs and policies to foster an environment of psychological resilience among military members. Much of the research has shown the value of this concept, very little has been researched on the effectiveness of each program. Meredith and her colleagues (2011) have conducted a comprehensive study of over 270 articles directly related to resilience and they identified that effectiveness of any resilience program can be broken down into four specific levels: individual, family, organization, and community. This seminal research has laid the groundwork for the military to begin the long process of evaluating those specific policies and procedures against empirically based research. This report created by Meredith et al. (2011, n.p.) has "shed light on the factors that foster psychological resilience" and presented in a fashion that is easily applied to the branches of the military. This research provides the military with evidence-informed practices that clearly promote "factors that foster psychological resilience." The need to break each factor down into the four specific levels was an attempt to distil the information down into practical domains that could clearly translate to military policy and programs.

For the purpose of this study, one domain was focused on: the individual. Although Meredith et al. (2011) did not include physical fitness in the initial study, but they incorporated a post hoc search and found a strong association between physical fitness and psychological resilience. For the purpose of this research, the focus was on physical fitness. Palmer (2008) identified physical fitness as an essential element associated with psychological resilience within military families and service members. Ritchie, Watson,

and Friedman (2006) found that physical fitness was correlated with high levels of psychological resilience when faced with high levels of trauma. Maddi (2007) found an equally high correlation with resilience and military physical training programs. The validity to this specific individual level factor is subsumed with the understanding that the military, more specifically the Navy, must ensure that their employees maintain a level of physical fitness. This is codified in Navy policy (Chief, 2011) that directs each Navy employee to maintain a level of fitness that directly supports the mission.

Although outside the scope of this research, unit level resilience factors are pertinent to the overall discussion of military resilience. From a unit level domain, several specific aspects have been captured that promote resilience. Meredith and her colleagues (2011, n.p.) found that "certain aspects of military life, including strong and positive command climate, teamwork, and unit cohesion, are important for keeping service members resilient." Meredith et al. (2011) found that positive command climate helped to facilitate and foster intra-unit interaction, building esprit de corps within the unit, and fostered flexibility and cohesion within the team resulting in a sustained commitment to the overall mission and to each other.

Much of the research found that positive command climate contributed to psychological resilience, and two studies in particular showed the strongest correlation to resilience. Campbell, Campbell, and Ness (2008) found that leadership who support and empower their employees through showing them meaning to their work also foster a sense of personal cohesion. Bates et al. (2010) found that leadership who reinforce self-

efficacy and promote positive social climate experienced employee psychological well-being and an increased level of resilience and job satisfaction.

Although not considered in this research, additional organization/unit level factors pertinent to the discussion of resilience are teamwork and unit cohesion. The central focus to this level is that team members must be able to share a "common mindset that facilitates use of information toward common goals to aid decisions" and much of the contemporary research associated with teamwork and resilience found that **"**work coordination and flexibility among team members, was identified in seven documents as related to resilience" (Meredith, et al., 2011, n.p.). From those seven documents, only two provided strong evidence that teamwork is correlated with psychological resilience. Patton (2006) provided research that showed how effective teamwork (i.e. information sharing) enhanced resilience to stress both during the response to a stressor and post-incident response.

From a perspective of unit cohesion, Eid and Johnsen (2002) found that resilience was promoted though strong interpersonal bonds and a sustained commitment to each other and the mission when associated with a submarine accident at sea. Brailey et al. (2007) found that unit cohesion provided strong levels of psychological resilience, predicted PTSD symptoms, and further refined the association between PTSD and stress among military members at the unit level. The validity to these specific unit level factors is subsumed with the understanding that the military, more specifically the Navy, must ensure that their employees maintain a level of teamwork and positive command climate. This is codified in Navy policy (Chief, 2011) that encourages each Navy employee to

foster strong levels of teamwork and command climate to ensure each employee is competitive for promotion and ready to assume positions of greater responsibility.

Summary of Chapter 2

Much of the contemporary literature supports the growing concern for our military population returning from combat with behavioral concerns. According to Tanielian and Jaycox (2008), they comment that there is a high degree of unmet treatment need for service-members returning from deployment. The possibility exists for more than 300,000 new mental health cases to occur this year for service-members returning from deployment, and with that population come a commensurate need in treatment capacity.

This chapter provided a comprehensive literature review associated with capturing the prevalence rates of post traumatic stress disorder from United States Navy groups containing both active duty and reserve component personnel on single and multiple tours, the conceptualization of combat in the military, and the association with behavioral and organizational health issues like combat related PTSD.

What this chapter showed is that through the past ten years of research dedicated to PTSD and combat, the notion of Army personnel being the largest share of military personnel supporting Operation Iraqi Freedom and Operation Enduring Freedom (Tanielian& Jaycox, 2008), most of the research cannot be generalized to the Navy population especially those in the Reserve Component.

This chapter also identified the concept of resilience, the research of resilience in the United States military, and the relationship between resilience and PTSD. Multiple

characteristics of resilience to include physical fitness, positive command climate, teamwork, and unit cohesion were provided. What was also discussed is the important role of leadership in fostering a climate of resilience. Such a climate has a second order effect in reducing the stigma associated with seeking behavioral health services.

Historical concepts of both PTSD and resilience were provided in addition to contemporary research associated with PTSD and resilience. Highlighted in this chapter were the psychological cost of combat related stress and the correlation of PTSD symptoms for both active and reserve component personnel (Kehle et al., 2011; Meis et al., 2010). Theoretical cognitive aspects of PTSD (e.g. schema and associative network) and resilience were also provided as a means to provide a deeper understanding of the cognitive ties between the two concepts. Psychological resilience was also defined as it relates to the military in both combat and non-combat situations.

In an effort to further describe the concept of PTSD and resilience, the topic of gender was introduced. The issue of gender has been recognized as an important issue regarding the impact of combat related PTSD, and that much of the literature shows that combat related PTSD may originate from many factors to include poor health, gender specific treatment, and response to trauma. Even though there is strong evidence that gender plays a role in responses to stress and trauma, gender specificity is not well incorporated into research in the area of combat related PTSD (Lasiuk & Hegadoren, 2006) or resilience (Schnurr & Lunney, 2008; Tolin & Foa, 2006). The differences in vulnerability to PTSD, sex differences in that vulnerability, and any contributing factors to that vulnerability as it relates to resilience was discussed (Tolin & Foa, 2006; Simmons,

2007). Further discussion was presented on the theoretical cognitive aspects of resilience from the aspect of *biopsychospiritual homeostasis* (Fletcher & Sarkar, 2013) and cognition and cognitive appraisal of emotions (Carver, 1998; Tusaie & Dyer, 2004).

Military combat, military non-combat action, and PTSD were also identified and discussed. With respect to military combat and PTSD, a discussion of behavioral health problem reporting differences between active and reserve component personnel was conducted. Although there is very little research on military, and more specifically, Navy non-combat action and PTSD, a few articles were identified that have resulted in traumatic actions being linked to PTSD. An introduction to the DCOE was given and the initiatives within that organization to change culture within the military were explained (Meredith, 2011). Military non-combat and resilience was further explained to include research spanning initial recruit training (Novaco, Cook, & Sarason, 1983; Weatherill et al., 2011), training and non-combat related operations (Eid & Johnsen, 2002), extended sea operations (Cordle & Shattuck, 2013) to individual level attributes of resilience and unit level leadership factors that foster resilience (Maddi, 2007; Palmer, 2008). In addition, Navy-specific research was provided directly related to incidents that occurred at sea (Nasky, Hines, & Simmer, 2009; Berg, Grieger, & Spira, 2005; Cordle & Shattuck, 2013).

The concepts of resilience as defined within the domains of individual and unit/organization were introduced. As an individual level factor, physical fitness was identified as an essential element associated with psychological resilience within military families and service members (Palmer, 2011) and Ritchie, Watson, and Friedman (2006)

found that physical fitness was correlated with high levels of psychological resilience when faced with high levels of trauma.

Unit and organizational aspects were introduced that have been captured that promote resilience. As related to resilience, the concepts of command climate, unit esprit de corps building and cohesion (Meredith, et al., 2011) and fully engaged and empowering leadership (Campbell, Campbell, & Ness, 2008) were introduced. In addition, teamwork and unit cohesion are provided as factors associated with resilience (Meredith, et. al, 2011; Patton, 2006). The unit level factors of interpersonal bonds (Eid & Johnsen, 2002) and unit cohesion (Brailey, et al., 2007) were also included as they relate to resilience. The validity of each factor in this research was also provided as it relates directly to Navy policy and captured in corporate data systems.

Literature identifying the history of PTSD in the military, the creation of the Post Deployment Health Assessment (PDHA) and Post Deployment Health Reassessment (PDHRA) Surveys in addition to a discussion of the seminal research involving United States Navy active and reserve component personnel involved in combat operations were presented. Information was provided on the impact of resilience in the military and its relationship to PTSD. Within Chapter 3, a review of the research method will be provided along with methodologies, design, and procedures will be provided. Finally, a brief review of the research method chosen to assist in establishing the prevalence rates of PTSD symptomology, combat tour number and component, and existence of resilience factors will be presented.

Chapter 3: Research Method

Introduction

According to research conducted during the past 12 years, Operation Enduring Freedom and Operation Iraqi Freedom have created challenges to military personnel, behavioral health providers, leadership, organizations, and supporting systems (Garcia et al., 2014; Hoge et al. 2006; Seal, Maguen et al., 2010; Tanielian & Jaycox, 2008). Tanielian and Jaycox (2008) stated that PTSD has been identified as a diagnosed mental disorder and is correlated with increases in combat tour intensity and repetition. PTSD has risen steadily, with heavy combat typically being cited as a leading cause of PTSD (Seal, Maguen et al., 2010). With the nontraditional use of Navy personnel in the past decade to support more of a combat related role, this study posits that Navy personnel will equally be identified with PTSD.

Prior studies have researched the rate of PTSD among Navy personnel and deployment intensity (Shen et al., 2009). This study is different along several dimensions. First, in previous studies conducted throughout the past 12 years, scholars examined military personnel with a limited focus on Navy personnel. In this study, a comprehensive examination was conducted on the PTSD symptomology, tour numbers, and components on Navy personnel. Second, previous studies limited the information to PDHA data completed by military personnel supporting Global War on Terror missions. In this study, I identified this as a potential limitation, excluded the PDHA, and included the PDHRA dataset. Lastly, this study was focused on the active duty and reserve component population (i.e., people who are still serving in the military during the study

period, including ones with PTSD diagnoses), and my results gave a sense of the mental health readiness amongst those two populations.

Within this section, a description of research methodology is provided; the research design will be explained; and statistical analysis, sampling, and ethical procedures will be provided and detailed.

Research Methodology

The research for designing this quantitative study involved a review of current research that focused on the individual military branches and PDHRA data. A review of the data provided by Milliken et al. (2007) facilitated a basic understanding of the individual services and how their personnel fall into the categories identified in this paper. However, the nucleus of this research is on how issues like component, dates of return, and multiple tours effect active and reserve Navy personnel, so the study was conducted by using the Department of the Navy data from the PDHRA databases (DON, 2008).

In order to establish any statistical association to the above variables, the use of a nonexperimental, quantitative study, chi square test of independence and factoral analysis of variance (ANOVA) was used. The data contained in the PDHRA (DD Form 2900 June 2005), which identified information about personnel returning to the United States 180 days after the war, were identified with an emphasis on component (active and reserve), tours (single and multiple), location of tour (Iraq, Afghanistan, or both), and the 12 questions/statements (#2, 5, 5a, 6, 6a, 8, 9a-9d, 11a, and 12) related to PTSD symptomology and level of severity. Additionally, the PDHRA (DD Form 2900 January

2008), which was updated in 2008, was used to also identify information about personnel returning to the United States 180 days after the war, with an emphasis on component (active and reserve), tours (single and multiple), location of tour (Iraq, Afghanistan, or both), and 12 questions/statements (#2, 4, 7, 7a, 8, 8a, 11, 12a, 12b, 12c, 12d, and 14a) related to PTSD symptomology and level of severity.

Both data sets were used to determine the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom. A 2x2 chi square test of independence was used to determine the proportional difference in active versus reserve personnel meeting PTSD criteria. With respect to the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both, a 3x2 chi square test of independence was conducted to determine the proportional differences in tour history type meeting PTSD criteria. Regarding the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component, a 2x2 factoral ANOVA was conducted to determine the mean differences in total number of deployments between the assessment of having met or not met PTSD criteria, active versus reserve status, and the

interaction of these main effects. Finally, the extent of group mean differences of the average of six semiannual, postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component was conducted using a 2x2 factoral ANOVA to determine mean differences in averaged physical readiness scores between assessment of having met or not met PTSD criteria, active versus reserve status, and the interaction of these main effects.

Within the scope of this research, both the dependent and independent variables were PTSD symptoms identified on PDHRA surveys and were recoded as a cumulative PTSD symptoms category of if all diagnostic criteria are met. For the purpose of this research, the variable of PTSDSYMP was a dichotomous variable created based on responses from Questions 2, 5, 5a, 6, 6a, 8, 9a-9d, 11a, and 12 of the June 2005 PDHRA and Questions 2, 4, 7, 7a, 8, 8a, 11, 12a, 12b, 12c, 12d, and 14a of the January 2008 version of the PDHRA. Once the weighted responses were captured and the criteria were met for PTSD, this variable was coded as 1 meaning PTSD criteria were met or 0 meaning that PTSD criteria were not met. The use of this dichotomous variable was necessary as I wished to identify whether or not diagnostic criteria was met for PTSD. This variable was used for Research Questions 1 through 4. For Hypotheses 1 and 2, PTSDSYMP was a dichotomous dependent variable. For Hypotheses 3 and 4, PTSDSYMP was a dichotomous independent variable.

The following research questions and hypotheses were posed for this study:

1. What is the nature and extent of association between postdeployment

assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom?

$H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve).

$H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

2. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both?

$H_1$2: Postdeployment assessment of having met or not met PTSD criteria is dependent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

$H_0$2: Postdeployment assessment of having met or not met PTSD criteria is independent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

3. What is the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve

component?

$H_1$3a: There is a main effect for PTSD assessment and total number of deployments.

$H_0$3a: There is no main effect for PTSD assessment and total number of deployments.

$H_1$3b: There is a main effect for component and total number of deployments.

$H_0$3b: There is no main effect for component and total number of deployments.

$H_1$3c: There is an interaction effect between PTSD assessment, component status, and total number of deployments.

$H_0$3c: There is no interaction effect between PTSD assessment, component status, and total number of deployments.

4. What is the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$4a: There is a main effect for PTSD assessment and physical readiness test scores.

$H_0$4a: There is no main effect for PTSD assessment and physical readiness test scores.

$H_1$4b: There is a main effect for component status and physical readiness test scores.

$H_0$4b: There is no main effect for component status and physical readiness test scores.

$H_1$4c: There is an interaction effect between PTSD assessment, component status, and physical readiness test scores.

$H_0$4c: There is no interaction effect between PTSD assessment, component status, and physical readiness test scores.

The variable STATUS was coded as a dichotomous variable and was created based on responses from Status Prior to Deployment on both the June 2005 and January 2008 versions of the PDHRA form. Only two responses were recorded: 1 for Active Duty and 2 for Selected Reserve-Reserve-Unit. Any other response reported for this variable was not used as it was outside the scope of this research. The use of this dichotomous variable was necessary as I wished to identify whether a service member was either on active duty or in a reserve component status. This variable was also used for Research Questions 1, 3, and 4.

The variable TOURHIST was a 3-level categorical variable created based on responses from Total Deployments in Past 5 Years on both the June 2005 and January 2008 versions of the PDHRA. Only three responses were recorded: OIF was recorded for responses given for tours in support of Operation Iraqi Freedom (OIF), OEF was recorded for responses given for tours in support of Operation Enduring Freedom (OEF), and BOTH were recorded for responses given for tours in support of both OIF and OEF. This variable was used for Research Question 2.

The variable TOTALDEPL was coded as a metric variable created based on the total of all Total Deployments in Past 5 Years (OIF and OEF) reported on both the June 2005 and January 2008 versions of the PDHRA. All tours in support of OIF and OEF were captured and recorded as a calculated total from 1-10. This variable was used for Research Question 3.

The variable PFAAVERAGE was coded as a metric variable created based on the average of Physical Fitness Assessment scores for six cycles recorded after the augmentee tour. All scores were obtained after the final augmentee tour was captured and recorded. Maddi (2007) and the Navy's Physical Readiness Program (CNO, 2011) identified that higher physical readiness scores are representative of higher levels of resilience. For descriptive purposes of this research only, the scores from 0.00 to 2.99 were considered as individual resilience not present as lower scores equal to and below the category of Good represent lower individual resilience levels, and scores from 3.00 to 5.00 were considered as individual resilience present as scores equal to Excellent or greater represent higher individual resilience levels. This variable was used for Research Question 4.

For Hypotheses 1 and 2, PTSDSYMP was a dichotomous dependent variable. For Hypotheses 3 and 4, PTSDSYMP was a dichotomous independent variable. Additionally, for Hypothesis 1, STATUS was a dichotomous independent variable, and for Hypotheses 3 and 4, STATUS was a dichotomous independent variable. For Hypothesis 2, TOURHIST was a 3-level categorical independent variable. For Hypotheses 3 and 4, TOTALDEPL and PFAAVERAGE respectively were metric dependent variables created

using data obtained from both versions of the PDHRA and physical fitness data. Further explanation and description of variable usage is provided in Appendices A and B.

Individual resilience data further defined as individual physical fitness scores were included during this study. According to the Naval Center Combat Operations and Stress Control (2011), "physical exercise builds mind health as well as body health. It releases endorphins and other so-called happy hormones that lift moods and apparently increase the brain's ability to learn from, and adapt to, stressful situations" (para. 6). Physical fitness data included elements from the Navy Physical Fitness Assessment program (CNO, 2011). This program was established by the Chief of Naval Operations over 3 decades ago to assess the physical fitness of each employee and to ensure that any deficiencies identified in the assessment were documented and remediation plans were put into effect. According to the CNO (2011), "the Navy utilizes a holistic approach to overall wellness via exercise, nutrition, weight control, tobacco cessation, prevention of alcohol abuse, and health and wellness education" (p. 2). Although the intent of this program was to contribute to the overall wellness of Navy personnel, the primary focus of the program is to ensure that all Navy personnel have the tools to maintain a high level of physical fitness. This program was designed to help the employee increase his or her physical fitness capability, thus making the employee a much more effective war-fighter. These data included individual assessments with the range of dates starting September 1, 2002 which identified 10 months after the commencement of Operation Iraqi Freedom to December 1, 2010 which identified 3 months after the conclusion of Operation Iraqi Freedom. The data elements were the overall physical readiness testscore.

This is a 5-tiered scoring system based on the overall performance in three categories designed to assess cardio-respiratory fitness, muscular strength, and endurance. The five scores range from Outstanding, Excellent, Good, Satisfactory, and Failure. For Outstanding and Excellent scores, this depicts a high level of physical fitness that correlate to a high capability and functioning level. Good and Satisfactory scores depict a lower level of physical fitness and correlates to a lesser capability and functioning level. Finally, the score of Failure relates to an inability to perform to a minimum standard and correlates to an inability to maintain minimum physical fitness standards thus the lowest functioning level.

For the purpose of this research, physical fitness data were considered an individual level factor that considers the bodily capability to function effectively and efficiently within life domains. As it relates to resilience, there are several types of evidenced-based individual level factors that have been shown to promote resilience: positive coping, positive affect, positive thinking, realism, behavioral control, altruism, and physical fitness (Meredith et al., 2011). In addition, several reports have provided support for physical fitness being a highly beneficial aspect of resilience (Deuster & Silverman, 2013). According to Palmer (2008), a correlation was identified between physical fitness and resilience factors within the military family construct, and Maddi (2007) found that, throughout the training process, highly fit military personnel scored higher on a hardiness assessment than the less physically fit counterparts. As this factor relates to this study, scores of Outstanding and Excellent were considered high on the resilience scale.

Research Design

In order to establish any relationship to the researched variables, the use of a nonexperimental, quantitative study was used. Demographic data like component status and service branch were captured during this research and were included in this study. Within the scope of this research, the independent variables were considered PTSD symptoms present (PTSDSYMP), component (STATUS), and location of operation (TOURHIST). For the purpose of this study, these data for all but TOURHIST were considered metric data. The variable TOURHIST was considered a 3-level categorical variable. The dependent variables were considered PTSD symptoms present (PTSDSYM); total number of deployments in support of OIF, OEF, or both (TOTALDEPL); and the average physical fitness scores after the final tour (PFAAVERAGE). The data associated with physical readiness tests have a hierarchy of value, but due to the calculation of these data into an average, these data were considered metric as well.

Participants of the Study

For this study, all of the data were considered retrospective and archival in nature. There was no direct contact with any subjects who had completed the PDHRA forms, nor was there any attempt at obtaining any data unnecessary to this study. Based on the data usage agreement (Appendix C), all of the information was screened by the Navy and Marine Corps Public Health Center and rendered de-identified and anonymized. For the purpose of this study, the participants were primarily active and reserve enlisted Navy personnel who had completed single and multiple tours in support of Operation Iraqi

Freedom and Operation Enduring Freedom. There was no attempt to filter out data related to other combat support missions as they could potentially further support the hypotheses of this study. In addition, all pertinent demographic data including service branch and component were included in this study.

Measures

The sampling frame (Bernard, 2000), or list of units of analysis from which this study is based and generalized from, was the dataset contained within the PDHRA databases (DON, 2008[2]). Given the nature, size, and heterogeneity of the sample considered, the sampling method being used for this study was a stratified, random sample. This was based on the assumption that the PDHRA dataset is relatively heterogeneous as it relates to combat deployment. PDHRA datasets were linked to the physical readiness test by SSN. Once the data elements were obtained and matched, the data was stripped of any Personally Identifiable Information, combined into a singular data set and a unique study identification number was assigned, and the statistical analyses were completed using SPSS ©.

The population data considered within this study was highly important when ascertaining the sample size. Currently, the total population of the United States Navy to include both active and reserve personnel is approximately 600,000 (ONI, 2010), and since 2002, approximately 79,000 Navy personnel have served on an augmentee tour with a total of 10,673 identified as serving in a combat related ground support role (ONI, 2009). According to the Chief of Naval Operations (CNO, 2009), 20% of those Navy personnel deployed on an augmentee tour are not in compliance with completing the

PDHRA. Given this data, the size of my population was 80% of the 10,673 that was approximately 8,500 respondents to the PDHA and PDHRA. For the purpose of this study, no treatment was used.

The range of dates the research included September 1, 2002 which identifies 10 months after the commencement of Operation Iraqi Freedom to December 31, 2010 which identifies 3 months after the conclusion of Operation Iraqi Freedom. The intent in using the range of dates was to capture all relevant (e.g. combat related PTSD) PDHRA data 10 months after Operation Iraqi Freedom (e.g. accounting for a 280 day IA tour) and any combat related PTSD data 3 months post tour after the ending of Operation Iraqi Freedom (Office of National Security, 2010).

Sampling Strategy and Sample Size

The use of over 8,500 cases for the purpose of this research was too unweilding; therefore, the process where cases were sampled involved a stratified random sample from that population. According to Riggio (2013, p.23), a stratified sampling is a strong sampling method that not only ensures the sample is "representative of the population from which it is drawn," but that this sampling process "protects against any sorts of biases in the choice or participants for study." Furthermore, César and Carvalho (2011) state that stratified sampling improves the efficiency of sample design. This process ensured an equal number of cases in tour history type (i.e. equal number of cases served in OIF, OEF, and both) as well as equal number of cases of active and reserve in each of the tour history categories.

This stratified random sample described above included 570 total cases sampled from the 8,500 total cases received and contained 190 cases of OIF service (of which 95 were active duty and 95 were reserve), 190 cases of OEF service (of which 95 were active duty and 95 were reserve), and 190 cases that served in both OIF and OEF (of which 95 were active duty and 95 reserve).

A power analysis for sample size was conducted for the most stringent of the proposed analyses—the 2x2 factoral ANOVA. The alpha and power parameters were set at traditional levels of .05 and .95, respectively. Interaction effects have been found to typically be small (Chaplin, 1991), so sample size was calculated for detecting an eta-squared effect size of .02 (Cohen, 1988). With these parameters and an expected medium-sized omnibus factoral ANOVA effect (i.e., $R^2 = .13$) (Cohen, 1988), the minimum targeted sample size is 344. However, because the sampling frame was large, the goal was to extract a sample of 570, which corresponds to power = .95 to decrease the probability of Type II error but also limit the likelihood of an even larger sample detecting statistically significant effects that are, for practical purposes, of trivial importance.

Research Questions

The research questions were used with the understanding that United States Navy personnel have been used in a much more nontraditional manner than ever before. Researchers have identified an increase in personnel that present with PTSD symptomology after either a single tour or multiple tours in Iraq and Afghanistan for other branches of the military (i.e. Army and Marine Corps) and their reserve

counterparts (Hoge, et al., 2006; Tanielian & Jaycox, 2008). What is not available in current research is the level of PTSD symptomology on Navy active or reserve personnel returning from single or multiple augmentee orders.

What current researchers have identified was personnel returning from combat tours often experience less difficulty in occupational, social, and personal roles upon returning home when specific individual and organizational resilience factors exist (Meredith, et al., 2011); however, there exists an absence in research that specifically identifies Navy personnel returning from augmentee tours, difficulties in the aforementioned roles, and specific individual resilience factors.

Using this data, specific support was provided to the following issues of what is not available in current research. Contemporary researchers do not identify whether active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom disproportionally present with having met or not met PTSD criteria. What is also unknown in current research is whether or not having served in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both affect the rate of meeting PTSD criteria. Similarly, what is unknown is whether or not the total number of prior deployments differs with respect to active versus reserve status, having met PTSD criteria, or the interaction of these. Finally, current researchers have yet to identify if physical readiness scores differ with respect to active versus reserve status, having met PTSD criteria, or the interaction of these.

Research questions and hypotheses claimed within the scope of this research were as they relate to:

1. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom?

$H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve).

$H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

1. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom?

$H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve).

$H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

2. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both?

$H_1$2: Postdeployment assessment of having met or not met PTSD criteria is dependent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

$H_0$2: Postdeployment assessment of having met or not met PTSD criteria is independent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

3. What is the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$3a: There is a main effect for PTSD assessment and total number of deployments.

$H_0$3a: There is no main effect for PTSD assessment and total number of deployments.

$H_1$3b: There is a main effect for component and total number of deployments.

$H_0$3b: There is no main effect for component and total number of deployments.

$H_1$3c: There is an interaction effect between PTSD assessment, component status, and total number of deployments.

$H_0$3c: There is no interaction effect between PTSD assessment, component status, and total number of deployments.

4. What is the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$4a: There is a main effect for PTSD assessment and physical readiness test scores.

$H_0$4a: There is no main effect for PTSD assessment and physical readiness test scores.

$H_1$4b: There is a main effect for component status and physical readiness test scores.

$H_0$4b: There is no main effect for component status and physical readiness test scores.

$H_1$4c: There is an interaction effect between PTSD assessment, component status, and physical readiness test scores.

$H_0$4c: There is no interaction effect between PTSD assessment, component status, and physical readiness test scores.

The decision matrix contained in Figures 1 and 2 provide the data elements contained in the PDHRA data sets as they relate to the diagnostic criteria for PTSD (APA, 2000). If all necessary diagnostic criteria were met from Table 1in both the June 2005 and January 2008 PDHRA data sets, then a positive diagnosis for PTSD was recorded. Appendecis A and B provide a “crosswalk” between the PTSD diagnostic

criteria captured in Table 1, the decision matrices for meeting PTSD diagnostic critera found in Figures 1 and 2, and the physical fitness assessment/resilience data rationale.

Ethical Considerations

The collection of this data had minimal risks associated with it and no adverse risk to participants. It provided enough evidence to allow sufficient conclusions to be attained. As archival data was used, there was no monetary exchange for participation in this study. All participant data was obtained from the Navy and Marine Corps Public Health Center, Portsmouth, Virginia center based on the data usage agreements, letter of cooperation, confidentiality agreement, EpiData Center Project /Task Request Form, and Defense Health Agency Data Sharing Agreement Application (Appendix C). The data was compiled from the Department of the Navy PDHRA data pool, or EDHA, and all information related to individual Navy personnel (e.g. Name, Social Security Number, and Command Name) was removed prior to any statistical analysis.

Given the requirement for all Navy personnel who have completed a deployment to fill out both PDHRA forms and the nature of the data being obtained, there was no requirement for informed consent. The Department of the Navy maintains extremely high ethical standards when it comes to capturing and collecting data, maintaining that data, and providing it to entities outside the Department of the Navy and Department of Defense. The Department of the Navy is directed by higher authority to include the Privacy Act of 1974 to maintain confidentiality in the collection and storage of Personally Identifiable Information and Protected Health Information.

Based on the Department of the Navy Data Usage Agreement and the Defense Health Agency Data Sharing Agreement Application (Appendix C), no direct interaction with any subjects occurred in this study. The only data used in this study was archival in nature. Because this study involved archival data, my role involved only the analysis of the data. I was not involved in program delivery, collection, or input of the data from the field. Once obtained by the Navy and Marine Corps Public Health Center, all the data was maintained and protected in accordance with Walden University policy, the United States Privacy Act of 1974 and existing Department of the Navy Privacy Act policy.

Procedures

Strict adherence to all Walden University policy was conducted throughout the data gathering, storage, and report process. Based on the criteria for the PHDRA datasets and the availability of all data related to this research, a list of social security numbers was not needed to be provided to the Chief of Naval Operations (N170) staff by the Navy/Marine Corps Public Health Center via digitally signed and encrypted e-mail to pull historical physical fitness scores from the Physical Readiness Information Management System (PRIMS). As the data was all available from one source, it was no longer required for the physical readiness data to be linked to the social security numbers provided. The data was not transmitted to the Navy/Marine Corps Public Health Center via digitally signed and encrypted e-mail, compiled with PDHRA datasets, sanitized for any PII, and transmitted to the researcher via digitally signed and encrypted e-mail. Communication with the Navy and Marine Corps Public Health Center, Portsmouth, Virginia was accomplished to obtain receipt of the archival dataset. In accordance with

current Navy policy, additional Department of the Navy Institutional Review Board processes was completed in collaboration with the Navy and Marine Corps Public Health Center and the Bureau of Navy Medicine and Surgery. Once the data was identified, it was immediately sanitized to ensure all Personally Identifiable Information and Protected Health Information was removed. The data was maintained on an external hard drive and password protected to ensure a high level of security and will be deleted five years after completion of the proposed research. This plan received approval from the Navy and Marine Corps Public Health Center and the Bureau of Navy Medicine and Surgery prior to obtaining data. No participant information was provided by the Navy and Marine Corps Public Health Center; thus, it was not included in the findings. Finally, the sharing of research with relevant stakeholders will eventually be summative in nature and no individual data will be offered or described.

Data Collection

The data was collected from the Navy and Marine Corps Public Health Center. PDHRA and Physical Fitness Assessment information was transmitted by the Navy and Marine Corps Public Health Center using the Safe File Exchange process. All data received by the Navy and Marine Corps Public Health Center contained all necessary data elements for this study. Specific criteria was associated with the June 2005 PDHRA form (DD Form 2900) to include component (active and reserve), tours (single and multiple), and twelve questions/statements (#2, 5, 5a, 6, 6a, 8, 9a-9d, 11a, and 12) related to PTSD symptomology. In addition, the data contained in the January 2008 PDHRA (DD Form 2900), was identified with an emphasis on component (active and reserve),

tours (single and multiple), and the twelve questions/statements (#2, 4, 7, 7a, 8, 8a, 11, 12a, 12b, 12c, 12d, and 14a)related to PTSD symptomology.

In Tanielian and Jaycox (2008), both PDHRA assessments contain the PrimaryCare–PTSD (PC-PTSD), which is a 4-item subscale of the PCL with yes/no response options. The PC-PTSD 4 item subscale identifies whether or not the respondent has experienced an event that was "so frightening, horrible, or upsetting that, in the past month" that resulted in the respondent having "nightmares about it or thought about it when you did not want to," "Tried hard not to think about it or went out of your way to avoid situations that reminded you of it," "Were constantly on guard, watchful, or easily startled," and/or "Felt numb or detached from others, activities, or your surrounding" (Prins, et al., 2004). According to Prins et al. (2004), they suggest that the results of the PC-PTSD should be considered a positive response if a respondent answers, "yes" to any three of the four items.

According to Prins et al. (2004, p. 12), "reporting "yes" to two of the four items can be used to identify cases with a sensitivity of 0.91 and specificity of 0.72, meaning that 91 percent of cases of PTSD are correctly identified, although 28 percent of those without PTSD screen positive for the disorder." Tanielian and Jaycox (2008) identified that the PDHA and PDHRA forms also contain statements from the PHQ-2, which is a subscale of the PHQ-9, that contain the two specific questions relating to depressed mood and anhedonia.

According to Kroenke, Spitzer, and Williams (2003), the PHQ-2 measures the existence of depressed mood and anhedonia by requiring the respondent to answer the

following questions on a 4-point Likert scale (0 – Not at all, 1 – Several days, 2 – More than half the days, 3 – Nearly every day) "Over the past two weeks, how often have you been bothered by any of the following problems? Little interest or pleasure in doing things" and "Feeling down, depressed, or hopeless." A positive response to one of these questions is valid for identifying cases of major depression with a sensitivity of 0.83 and specificity of 0.92, meaning that83 percent of cases of major depression are correctly identified, and 8 percent of those without the disorder screen positive for it" (Kroenke, Spitzer & Williams, 2003).

With respect to the data contained within the PDHRA (DD Form 2900), the variables that support a positive finding of PTSD were directly associated with all the criteria being met for a ICD-9 diagnosis of309.81 Posttraumatic Stress Disorder (PTSD). The data sets contained in both PDHRA consist of interval variables (e.g. date of departure from theater), ordinal variables (e.g. during the past 4 weeks, how difficult have emotional problems made it for you to do your work? Not difficult at all, somewhat difficult, very difficult, extremely difficult) and nominal dichotomy variables (e.g. problems sleeping or still feeling tired? Yes/No).

Research Question 1 posits: What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom? The process to address research question 1 was: Using variables STATUS (June 2005 and January 2008) of Active Duty = 1 and Selected Reserve = 2, and PTSDSYMP (June 2005 and January

2008) of Present = 1 and Absent = 0, the analysis was computed using a 2x2 chi square test of independence. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as Others = 0 was be considered in this calculation as it is outside the scope of this research.

Research Question 2 posits: What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both? The process used to address research question 2 was: Using variables TOURHIST (June 2005 and January 2008) of OIF = Tour in Operation Iraqi Freedom, OEF = Tour in Operation Enduring Freedom, or BOTH = Tour in Both OIF and OEF, and PTSDSYMP (June 2005 and January 2008) of Present = 1 and Absent = 0; the analysis was computed using a 3x2 chi square test of independence. The responses from variables of PDHRAOIF, PDHRAOEF, and PDHRABOTH recorded as OIF, OEF, or BOTH. A response of "No" was not considered in this process as it is outside the scope of this research.

Research Question 3 posits: What is the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component? The process to address research question 3 was: Using variables TOTALDEPL (June 2005 and January 2008) of 1-10 representing the number of total deployments, PTSDSYMP (June 2005 and January

2008) of Present = 1 and Absent = 0, and STATUS of Active Duty = 1 and Selected Reserve = 2, the analysis was computed using a 2x2 factoral ANOVA. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as Others = 0 was not considered in this calculation as it is outside the scope of this research.

As identified in Chapter 2, researchers have put forth a strong effort to study combat and non-combat actions and the impact on resilience. The Army and Marine Corps have conducted a fair degree of research on these topics for reasons that are all too clear. In order for our military to be operationally sound and ready to conduct any mission, it is essential for those personnel to exhibit high degrees of resilience. If those personnel do not exhibit factors that are associated with high degrees of resilience, it is paramount for such an organization like the United States Navy to foster programs that help improve those individual and unit level factors associated with high degrees of resilience. For the purposes of this research, the focus of resilience was on individual level factors but not unit level factors.

For the purpose of this research, one domain was focused on: the individual. Cornum, Matthews, and Seligman (2011), Deuster and Silverman (2013), and Palmer (2008) all identified physical fitness as an essential element associated with psychological resilience within military families and service members, the need to identify data elements that provide this insight is paramount. The Department of the Navy (Chief, 2011) has created policy directly related to the physical fitness of its employees and though its enforcement has maintained a repository of data that did provide the essential elements for this study. Those data were provided by the Navy and Marine

Corps Public Health Center and pulled from the Physical Readiness Information Management System (PRIMS).

These data included the cycle number for the physical fitness assessment, the physical fitness scores, and the overall physical fitness assessment score on all enlisted and officer personnel who were identified with PDHRA datasets for the range between September 1, 2002 which identifies 10 months after the commencement of Operation Iraqi Freedom to December 31, 2010 which identifies 3 months after the conclusion of Operation Iraqi Freedom. The validity to this specific individual level factor was subsumed with the understanding that the military, more specifically the Navy, must ensure that their employees maintain a level of physical fitness. This is codified in Navy policy (Chief, 2011), which directs each Navy employee to maintain a level of fitness that directly supports the mission.

Research Question 4 posits: What is the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component? The process to address research question 4 was: Using variables PFAAVERAGE, PTSDSYMP (June 2005 and January 2008) of Present = 1 and Absent = 0, and STATUS of Active Duty = 1 and Selected Reserve = 2, the analysis was computed using a 2x2 factoral ANOVA. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as Others = 0 was not considered in this calculation as it is outside the scope of this research.

Data Analysis

Statistical analysis was completed using SPSS © software and all generated reports was screened for validity and included in this study. Reports were provided in tabular format in accordance with APA Publication Manual (2010) and further explained in Chapter 4 of this study.

Summary of Chapter 3

The methodology for this study included the use of deidentified and anonymized archival data from the Navy and Marine Corps Public Health Center. This process was conducted to identify the prevalence rates of combat related PTSD in returning Navy personnel, the effects of component, single and multiple tours, and individual resilience factors associated with identified personnel. A non-experimental, quantitative study, chi square test of independence was used to identify the nature and extent of association between PTSD symptomology and component as it relates to answers provided on the June 2005 and January 2008 PDHRA data sets; and to identify the nature and extent of association between PTSD symptomology and support of OIF, OEF, or both. A factoral ANOVA was used to identify the extent and group mean differences between the total number of individual augmentee deployments, PTSD symptomology, and component; and to identify the nature and extent of association betweenthe individual resilience factors, PTSD symptomology, and component. Ethical concerns, specific to confidentiality and storage of data, was addressed appropriately, leading to Institutional Review Board approval and access to the data.

Quantitative research methods, data collection, and analyses were appropriate for obtaining insight into the existence of PTSD symptomology, component and single/multiple tours, and resilience factors. The link between the United States Navy personnel and these variables has yet to be identified in current literature and this research was conducted to fill a significant gap in this literature. With a better understanding of the link between prevalence data associated with PTSD symptomology, service components, location of tours, number of tours, and the individual factor of resiliency, the results of this study provide information to leadership that could be used to enhance policy designed to foster stronger resilience programs within the Department of the Navy.

In general, the information obtained accomplished two goals. First, it provided for a recognized gap in the literature with respect to PTSD symptomology, component, tour length, and resilience specific to Navy employees supporting combat operations. Second, it provided essential data to inform Navy leadership to effect change within their organization. Future implications for this research are that this information could support modifications to existing policy related to augmentee tours and to address Navy specific resilience policies and programs that could aid senior leadership in the challenge of how to manage that population effectively. This population of returning individual augmentees has become even more important as the Navy, along with the other branches of the military, have been congressionally mandated to reduce their personnel.

Chapter 4: Results

Review

U.S. Military personnel to include individuals and leadership have faced challenges both in combat and non-combat roles. Garcia et al. (2014) and Hoge et al. (2006) highlighted that both Operation Enduring Freedom and Operation Iraqi Freedom have manifested in challenges to military personnel, behavioral health providers, leadership, organizations, and support systems. The diagnosis of PTSD has risen steadily, and its impact has been felt within all facets of the military. Researchers have focused on combat-centric branches of the military often leaving out the U.S. Navy. The purpose of this research was to capture data specifically targeting U.S. Navy personnel who supported the GWOT through an individual augmentee role, which is a different role for a Navy member along several important dimensions.

This study provides a comprehensive examination on the PTSD symptomology, tour numbers, and component and excludes the PDHA and includes the PDHRA dataset in an effort to identify more specific diagnostic support to PTSD symptomology. Lastly, in this study, I focused on the active duty and reserve component population (i.e., people who are still serving in the military during the study period, including ones with PTSD diagnoses), and my results provided information on the mental health readiness amongst those two populations.

The research questions and hypotheses targeted variables associated with PTSD symptomology, tour types, number of tours, and individual resilience scores. I focused on

the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom. The hypotheses and research questions are listed below:

1. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom?

$H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve).

$H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

2. What is the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both?

$H_1$2: Postdeployment assessment of having met or not met PTSD criteria is dependent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

$H_0$2: Postdeployment assessment of having met or not met PTSD criteria is independent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both).

3. What is the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$3a: There is a main effect for PTSD assessment and total number of deployments.

$H_0$3a: There is no main effect for PTSD assessment and total number of deployments.

$H_1$3b: There is a main effect for component and total number of deployments.

$H_0$3b: There is no main effect for component and total number of deployments.

$H_1$3c: There is an interaction effect between PTSD assessment, component status, and total number of deployments.

$H_0$3c: There is no interaction effect between PTSD assessment, component status, and total number of deployments.

4. What is the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component?

$H_1$4a: There is a main effect for PTSD assessment and physical readiness test scores.

$H_0$4a: There is no main effect for PTSD assessment and physical readiness test scores.

$H_1$4b: There is a main effect for component status and physical readiness test scores.

$H_0$4b: There is no main effect for component status and physical readiness test scores.

$H_1$4c: There is an interaction effect between PTSD assessment, component status, and physical readiness test scores.

$H_0$4c: There is no interaction effect between PTSD assessment, component status, and physical readiness test scores.

This chapter will provide a brief discussion of the participant demographics, a review of the research questions and hypotheses testing, the analyses of each research question and hypotheses, and a summary of the data.

Participant Demographics

For this study, a retrospective and archival data set was used with no direct contact with any subjects who had completed the PDHRA forms. The data were screened by the Navy and Marine Corps Public Health Center and were rendered de-identified and anonymized. The participants were either active or reserve enlisted Navy personnel who had completed a single or multiple tours in support of Operation Iraqi Freedom and Operation Enduring Freedom. Specific data like service branch and component were pertinent to this study and those data were retained; however, gender and pay grade were outside of this study and were not included in the analyses.

The U.S. Navy has supported Operations Iraqi Freedom and Enduring Freedom since both operations began. The Chief of Naval Operations (2009) identified that approximately 79,000 Navy personnel have served on an augmentee tour with a total of 10,673 identified as having served in a combat-related ground support role (ONI, 2009) with only 20% of those Navy personnel deployed on an augmentee tour not in compliance with completing the PDHRA. Given these data, the size of my population was 80% of the 10,673, which equated to 8,500 respondents from the PDHRA. As the use of over 8,500 cases for the purpose of this research was unrealistic, the sampling method used for this study was a stratified, random sample of 570 total cases sampled from the 8,500 total cases received, which contained 190 cases of OIF service (of which 95 were active duty and 95 were reserve), 190 cases of OEF service (of which 95 were active duty and 95 were reserve), and 190 cases that served in both OIF and OEF (of which 95 were active duty and 95 were reserve).

In defining the individual augmentees, monthly personnel rosters were extracted from the Defense Manpower Data Center (DMDC) between January 1, 2002 and December 31, 2010 for all active duty and reserve Navy personnel, excluding officers. As the data extract did not identify any officer personnel coded as completing an Individual Augmentee (IA) tour (DON, 2015b), enlisted data were only used. Only records with a primary service occupation code or a duty service occupation code indicative of an IA were retained, as defined by Chapter 4 of Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards (DON, 2015a). The time period in which a service member was an IA was determined by using the file date associated with

the monthly DMDC record. Any gap in IA service greater than 92 days was defined as a new IA service period. No service member had more than three IA service periods.

Regarding PDHRA data, the self-reported PDHRA completed by the service members identified as IAs were obtained from the electronic Deployment Health Assessment (eDHA) database. To ensure that the feature E of PTSD symptomology was met, only PDHRAs with a provider certification date within 210 days of the IA service period end date and those indicating deployments to Afghanistan, Iraq, or both were retained for analysis. PDHRAs with survey completion dates prior to the IA service begin date were excluded from analysis. In order to avoid any duplication of data, if a service member completed more than one PDHRA, only the most recently certified form was retained.

Theater arrival and departure dates were estimated for PDHRAs completed using the month and year provided. PDHRAs completed less than 32 days after the theater departure date were excluded from analysis as this identified personnel who did not enter theater and who did not complete an IA tour. Nulls and blanks were coded as missing values, and a new variable was created to flag which version of the PDHRA was completed by the respondent.

A stratified random sample of IAs with PDHRA data was identified using simple random sampling without replacement. The samples were stratified by operation (Operation Enduring Freedom, Operation Iraqi Freedom, or both) and by component (reservist or active duty). A total of 95 individuals were identified from each of the six stratifications, resulting in a total of 570 service members.

Regarding individual resilience data, data from the PRIMS were matched to the roster of IAs with PDRHAs. Only those records indicating a Physical Readiness Test (PRT) that occurred 30 days prior to the end of the deployment, as reported on the PDHRA, or later were retained. Records without a personnel ID were deleted. For cycles with more than one PRT during the timeframe, only the most recent PRT record was kept. Cycles were identified by the season (spring or fall) and by the year it was taken.

Only six cycles were retained per individual. The first PRT identified within 365 days of the reported end date of deployment was considered the 6-month cycle. Subsequent cycles were designated as 12, 18, 24, 30, or 36 month cycles. If no record was identified during a cycle period, the performance result was left as not available. Chief (2011) identified Navy Physical Readiness scores on a continuum from fail to outstanding. Performance results designated as outstanding, outstanding low, outstanding medium, outstanding high, or maximum were given a value of 4. Results designated as excellent, excellent low, excellent medium, or excellent high were given a value of 3. Results designated as good, good low, good medium, or good high were given a value of 2. Results designated at satisfactory, pass, partial pass, USMC pass, satisfactory high, or satisfactory medium were given a value of 1. Any performance result designated as fail was given a value of 0. These results were used to calculate an average. Performance results not available, identified as not applicable, or identified as a medical waiver were not given a value. A total of 511 individuals were identified with individual resilience scores, and 59 were missing data.

Research Questions and Hypotheses Testing

As this was research using archival data, there was no need to identify a specific time for data collection. There was no recruitment for any subjects nor was there a need to calculate response rates. Although the data collection was time consuming, as there were some issues associated with access to the data, once the Data Usage Agreement was finalized, the coordination for the data extract went rather quickly.

There was only one identified discrepancy in the data collection associated with the identification of officer personnel data. The archival data set did not have data to identify officer personnel who had completed an IA tour (Chief, 2015). For the purposes of this research, those data were recognized, and only enlisted personnel data identified as completing an IA tour were used (Chief, 2015). No other issues were identified, and the assigned epidemiologist provided biweekly updates on the procedures and status on the data mining effort.

Research Question 1

This first question addressed in this research was to identify the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom. The intent of this question was to identify whether or not there was an association between categorical variables (active and reserve personnel and the existence of PTSD symptomology). The process to address this research question was accomplished using variables STATUS (June 2005 and January 2008) of *Active Duty* = 1 and *Selected*

Reserve = 2, and PTSDSYMP (June 2005 and January 2008) of *Present* = 1 and *Absent* = 0. The analysis was computed using a 2x2 chi square test of independence. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as Others = 0 was not considered in this calculation as it was outside the scope of this research.

The following SPSS© syntax for research question 1 was used:

```
CROSSTABS
  /TABLES=PTSDSYMP BY STATUS
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT ROW COLUMN TOTAL
  /COUNT ROUND CELL.
```

resulting in the information identified in Tables 1 and 2.

The resulting information did not violate the assumption of the chi-square concerning the minimum expected cell frequency of 5 or greater. In this analysis, 0 cases were missing giving 570 valid cases to analyze. The crosstabulation in Table 1 identified a higher degree of PTSTSYMP for those in STATUS = 2 than STATUS = 1. A slightly higher but nonsignficant percentage of personnel was identified with PTSD symptomology in the reserve component (4.2%) than on active duty (2.5%). Table 2 identifies a Yates Continuity Correction value of .351 which was computed only for a 2x2 table. In addition, the phi coefficient value is .049 that showed a very small effect based on Cohen (1988) criteria. A chi-square test for independence (with Yates Continuity Correction) indicated no significant association between STATUS and

PTSDSYMP, x^2 (1, n = 570) =.87, p=.351, *phi* = .05. The result does not show a significant association between active and reserve component Navy personnel and the existence of PTSD symptomology.

This result fails to support $H_1$1: Postdeployment assessment of having met or not met PTSD criteria is dependent of component status (i.e., active vs. reserve), but supports $H_0$1: Postdeployment assessment of having met or not met PTSD criteria is independent of component status (i.e., active vs. reserve).

Research Question 2

The second research question was to identify the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both. The intent of this question was to address the possible association between PTSD symptomology for those Navy personnel who served in OIF, OEF, or both OIF and OEF. The process to address this research question was accomplished using variables TOURHIST (June 2005 and January 2008) of *OIF* = Tour in Operation Iraqi Freedom, *OEF* = Tour in Operation Enduring Freedom, or *BOTH* = Tour in Both OIF and OEF, and PTSDSYMP (June 2005 and January 2008) of *Present* = 1 and *Absent* = 0; the analysis was computed using a 3X2 chi square test of independence. The responses from variables of PDHRAOIF, PDHRAOEF, and PDHRABOTH recorded as *OIF*, *OEF*, or *BOTH*. A response of *No* was not considered in this process as it was outside the scope of this research.

The following SPSS© syntax for research question 2 was used:

```
CROSSTABS
  /TABLES=PTSDSYMP BY TOURHIST
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT ROW COLUMN TOTAL
  /COUNT ROUND CELL.
```

resulting in the information identified in Tables 3 and 4.

The resulting information did not violate the assumption of the chi-square concerning the minimum expected cell frequency of 5 or greater. In this analysis, 0 cases were missing giving 570 valid cases to analyze. The crosstabulation (Table 3) identified a higher percentage of PTSDSYMP for TOURHIST of OIF and BOTH than OEF. This means a higher percentage of personnel were identified with PTSD symptomology that completed tours in support of Operation Iraqi Freedom (2.6%) and tours in support of both Operation Iraqi Freedom and Operation Enduring Freedom (5.8%) than those who completed tours in support of Operation Enduring Freedom (1.6%). Table 4 identifies a Pearson Chi-Square value of .059 which is computed for a 2x3 table. In addition, the Cramer's V value is .100 that shows a small to medium effect based on Cohen (1988) criteria. A chi-square test for independence (with Cramer's V) indicated a nearly significant association between TOUHIST and PTSDSYMP, χ^2 (2, n = 570) = 5.662, p=.059, *Cramer's V* = .100. Based on an adjusted standardized residual of 2.3 (p< .05), more of those than statistically expected who served in both OIF and OEF met PTSD criteria.

This result cautiously supports $H_1 2$: Postdeployment assessment of having met or not met PTSD criteria is dependent of tour history type (i.e., Operation Iraqi Freedom, Operation Enduring Freedom, or both.

Research Question 3

The third research question was to identify the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component. The intent of this question was to explore the factors of number of deployments and status that affect the prevalence of PTSD symptomology. The process to address this research question was accomplished using variables TOTALDEPL (June 2005 and January 2008) of 1-10 representing the number of total deployments, PTSDSYMP (June 2005 and January 2008) of *Present* = 1 and *Absent* = 0, and STATUS of *Active Duty* = 1 and *Selected Reserve* = 2, the analysis was computed using a 2x2 factoral ANOVA. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as *Others* = 0 was not considered in this calculation as it was outside the scope of this research.

The following SPSS© syntax for research question 3 was used:

```
UNIANOVA TOTALDEPL BY PTSDSYMP STATUS
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /PLOT=PROFILE(PTSDSYMP*STATUS)
```

```
/EMMEANS=TABLES(PTSDSYMP) COMPARE ADJ(LSD)
/EMMEANS=TABLES(STATUS) COMPARE ADJ(LSD)
/EMMEANS=TABLES(PTSDSYMP*STATUS)
/PRINT=ETASQ HOMOGENEITY DESCRIPTIVE
/CRITERIA=ALPHA(.05)
/DESIGN=PTSDSYMP STATUS PTSDSYMP*STATUS.
```

resulting in the information identified in Tables 5, 6, 7, 8 and 9.

A two-way between-groups analysis of variance was conducted to explore the impact of PTSDSYMP and STATUS on levels of TOTALDEPL. In Table 6, the interaction effect between PTSDSYMP and STATUS was not statistically significant, F (1, 566) = 1.01, p = .32. Tables 7 and 8 show there was a statistically significant main effect for TOTALDEPL and PTSDSYMP, F (1, 566) = 6.07, p = .01; however, the effect size was small (partial *eta squared* = .01). In Table 9, there was not a statistically significant main effect for STATUS F (1, 566) = .04, p = .85. In the Levene's Test of Equality of Error Variances, there was a significant difference across groups; however, the result violated the homogeneity of variances assumption thus suggesting the variance of TOTALDEPL across the groups was not equal. No post hoc comparisons were conducted due to fewer than three groups in each independent variable. Using the aforementioned analyses, the results show no significant difference in PTSD symptomology on the number of deployments and active and reserve status. However, the result of the main effects shows a small effect between the number of deployments and PTSD symptomology.

This result supports $H_1$3a: There is a main effect for PTSD symptomology and total number of deployments, and fails to support $H_0$3a: There is no main effect for PTSD symptomology and total number of deployments. This result fails to support $H_1$3b: There is a main effect for component and total number of deployments, and supports $H_0$3b: There is no main effect for component and total number of deployments. Finally, this result fails to support $H_1$3c: There is an interaction effect between PTSD symptomology, component status, and total number of deployments, and supports $H_0$3c: There is no interaction effect between PTSD symptomology, component status, and total number of deployments.

Research Question 4

The fourth research question was to identify the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component. The intent of this question was to explore the effects of individual resilience and status that affect the prevalence of PTSD symptomology. The process to address this research was accomplished using variables PFAAVERAGE, PTSDSYMP (June 2005 and January 2008) of *Present* = 1 and *Absent* = 0, and STATUS of *Active Duty* = 1 and *Selected Reserve* = 2, the analysis was computed using a 2x2 factoral ANOVA. The response from the variable of Status Prior to Deployment (June 2005 and January 2008) as *Others* = 0 was not considered in this calculation as it was outside the scope of this research.

The following SPSS© syntax for research question 3 was used:

```
UNIANOVA PFAAVERAGE BY PTSDSYMP STATUS
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /PLOT=PROFILE(STATUS*PTSDSYMP)
  /EMMEANS=TABLES(PTSDSYMP) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(STATUS) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(PTSDSYMP*STATUS)
  /PRINT=ETASQ HOMOGENEITY DESCRIPTIVE
  /CRITERIA=ALPHA(.05)
  /DESIGN=PTSDSYMP STATUS PTSDSYMP*STATUS.
```

resulting in the information identified in Table 10, 11, 12 and 13.

A two-way between-groups analysis of variance was conducted to explore the impact of PTSDSYMP and STATUS on levels of PFAAVERAGE. The interaction effect between PTSDSYMP and STATUS was not statistically significant, F (1, 507) = .34, p = .59 (Table 11). Table 11 also shows that there was not a statistically significant main effect for PTSDSYMP, F (1, 507) = .29, p = .59, and there was not a statistically significant main effect for STATUS F (1, 507) = 1.39, p = .24. In the Levene's Test of Equality of Error Variances, there was not a significant difference across groups; therefore, the result maintained the homogeneity of variances assumption suggesting the variance of PFAAVERAGE across the groups was equal. No post hoc comparisons were conducted due to fewer than three groups in each independent variable. Using the

aforementioned analyses, the results show no significant difference in PTSD symptomology on the presence of individual resilience and active and reserve status.

This result fails to support $H_1$4a: There is a main effect for PTSD symptomology and physical readiness test scores, but does support $H_0$4a: There is no main effect for PTSD symptomology and physical readiness test scores. The result fails to support $H_1$4b: There is a main effect for component status and physical readiness test scores, and supports $H_0$4b: There is no main effect for component status and physical readiness test scores. The result fails to support $H_1$4c: There is an interaction effect between PTSD symptomology, component status, and physical readiness test scores, but does support $H_0$4c: There is no interaction effect between PTSD symptomology, component status, and physical readiness test scores.

Analyses

The analysis of each research question was made with the following assumptions. First, the PTSD symptomology PDHRA data reported was made using a self-report thus assumed that the information was truthful and accurate associated with each respondent. The individual resilience data extracted from the PRIMS database was entered by personnel directly responsible for administering the Physical Readiness program and are evaluated regularly to ensure accuracy in administering the program Navy-wide thus assumed that the information was accurate associated with each respondent.

Overall what was found through this research was there exists no significant association between active and reserve component Navy personnel and the existence of PTSD symptomology. This supports the null hypothesis from research question 1. The

data from the analysis of research question 2 does show a nearly significant association between location of tours and the existence of PTSD symptomology that cautiously supports the alternate hypothesis from this question. The data from the analysis of research question 3 showed a small main effect between the number of deployments and PTSD symptomology that supports one alternate hypothesis from this question but fails to support the other two. Finally, the analysis of data from the fourth research question showed no significant difference in PTSD symptomology on the presence of individual resilience and active and reserve status that supported all three null hypotheses.

These analyses show a need for the modification to the statistical model with respect to research question 3. In order to accommodate the issue of variance, it is recommended to set a more stringent significant level at $p = .01$. Regarding research question 1, 2, and 4; there are no recommendations to adjust any statistical model using the existing data. Any further identification of additional statistical tests or new hypotheses that emerged from the analysis of these data is identified in chapter 5.

Summary

The data provided in Tables 1 through 12 leads to some interesting conclusions as they relate to the four research questions; however, all hypotheses are not all fully supported. Research question 1 was proposed to identify the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support of Operation Iraqi Freedom or Operation Enduring Freedom. The data are slightly higher but a nonsignficant percentage of personnel were identified with PTSD

symptomology in the reserve component (4.2%) than on active duty (2.5%); therefore, the null hypothesis is supported.

Research question 2 was proposed to identify the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both. Based on an adjusted standardized residual of 2.3 ($p < .05$), the data was analyzed to conclude a nearly significant association between location of tours and the existence of PTSD symptomology; therefore, the alternate hypothesis is cautiously supported.

Research question 3 was proposed to identify the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component. The data were analyzed and showed no significant difference in PTSD symptomology on the number of deployments and active and reserve status; however, the result of the main effects shows a small effect between the number of deployments and PTSD symptomology. Alternate hypothesis 1 is supported; however, the null hypotheses 2 and 3 are supported.

Finally, research question 4 was presented to identify the extent of group mean differences of the average of six semi-annual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between

active versus reserve component. The data showed no significant difference in PTSD symptomology on the presence of individual resilience and active and reserve status; therefore, the data supported all three null hypotheses.

This research and data analysis provided important insight into the issues of PTSD symptomology, branch of service, number of deployments, location of deployments, and individual resilience that was absent in current literature. However, there were areas within the current research that could have been used differently and other data that fell outside the scope of this research that could have provided for a stronger analysis and are identified in chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Initial Discussion

In the previous chapters, I identified combat-related PTSD as a multifaceted disorder. It is a process in which a series of experiences has altered the methods a person uses for cognition, memory, and emotion and can negatively affect the manner in which interactions occur within an intrapersonal and interpersonal level. I also identified a literature review of PTSD, combat PTSD, theoretical constructs of PTSD from a cognitive perspective, and research associated with resilience from a military and nonmilitary perspective.

Since 2003, over 39,000 patients have been diagnosed with PTSD with a resulting $63.8 million being spent on "direct and purchased care for PTSD patients" and "$13.1 million on prescription costs for all prescriptions filled after a diagnosis of PTSD" (Fischer, 2009, n.p). With the potential ending of the current operations in Iraq and Afghanistan, the cost is expected to increase with the number of personnel returning from combat across the branches of the military.

Both active and reserve Army and Marine Corps personnel exhibit documented post-tour PTSD symptomology; yet, it is not known if there will be an equal representation of combat-related post-tour PTSD symptomology within the Navy population of returning augmentees. In addition, much of the research targeting the population of active and reserve Army and Marine Corps personnel shows that resilience factors associated with physical fitness level and unit involvement have mitigating effects

on post-tour combat-related PTSD; however, this level of research exists minimally for active and reserve Navy personnel.

This study was conducted to determine whether active or reserve component Navy personnel returning from Operation Iraqi Freedom or Operation Enduring Freedom present disproportionally with having met or not met PTSD criteria. PTSD data were obtained using Questions 2 through 12 from the PHDRA (June 2005) form and Questions 2 through 14 from the PDHRA (January 2008) surveys. I also looked to determine if serving in support of Operational Iraqi Freedom, Operation Enduring Freedom, or both affected the rate of meeting PTSD criteria. Additionally, this study was conducted to identify if the total number of prior deployments differs with respect to active versus reserve status, having met PTSD criteria, or the interaction of these items. Finally, this research was conducted to identify if individual resilience factors like physical readiness scores differ with respect to active versus reserve status, having met PTSD criteria, or the interaction of these variables.

The research method was fully explained in Chapter 3, and the key findings of this research found in Chapter 4 helped to confirm the results of some of the existing research and failed to support some of the hypotheses proposed. The specific findings and related research is provided in the next section.

Research Questions and Review of Major Findings

Research question 1 looked to identify the nature and extent of association between postdeployment assessment of having met or not met PTSD criteria for active versus reserve component personnel returning from individual augmentee tour in support

of Operation Iraqi Freedom or Operation Enduring Freedom. The data does show a slightly higher but nonsignificant association between active and reserve component Navy personnel and the existence of PTSD symptomology; therefore, the null hypothesis is accepted.

There is a correlation between component and the existence of PTSD symptomology (Baker et al., 2009; Milliken et al., 2007). Additionally, Lane, Hourani, Bray, and Williams (2012) found that deployment has a much greater impact on reserve component personnel than on their active duty counterparts. The result of this research supports some of the existing knowledge of combat PTSD for the other branches of the military and extends the knowledge associated with combat-related PTSD symptomology and component for Navy personnel returning from an individual augmentee tour.

In Research Question 2, I looked to identify the nature and extent of an association between postdeployment assessment of having met or not met PTSD criteria for personnel who served an individual augmentee tour in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both. The data does show a nearly significant association between location of tours and the existence of PTSD symptomology based on an adjusted standardized residual of 2.3 ($p < .05$); therefore, the alternate hypothesis is cautiously accepted.

PTSD has been correlated with increases in combat tour intensity associated with OIF, and repetition and incidences of diagnosed PTSD has risen steadily with heavy combat typically being cited as a leading cause (Seal, Maguen et al., 2010; Tanielian & Jaycox, 2008). This result of this research supports the knowledge associated with

combat-related PTSD symptomology and the location of combat-related tours for other branches of the military and extends the knowledge for Navy personnel returning from an individual augmentee tour.

In Research Question 3, I looked to identify the extent of group mean differences of total number of individual augmentee deployments between the dates of September 1, 2002 and December 31, 2010 in support of Operation Iraqi Freedom or Operation Enduring Freedom between most recent postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component. The data shows no significant difference in PTSD symptomology on the number of deployments and active and reserve status; however, the result of the main effects shows a small effect between the number of deployments and PTSD symptomology. Alternate Hypothesis 1 is accepted; however, the null hypotheses 2 and 3 are accepted as well.

Increasing numbers of combat-related tours correlated to higher incidents of PTSD diagnoses. The result of this research supports existing research related to this topic for the other branches of the military and also extends the knowledge associated with number of combat-related tours and PTSD symptomology for Navy personnel returning from individual augmentee tours.

Finally, in Research Question 4, I looked to identify the extent of group mean differences of the average of six semiannual postdeployment physical readiness tests between postdeployment assessment of having met or not met PTSD criteria and between active versus reserve component. The data shows no significant difference in PTSD

symptomology on the presence of individual resilience and active and reserve status; therefore, all three null hypotheses are accepted.

There is a strong relationship between individual resilience and PTSD symptomology but a small relationship between physical fitness resilience and PTSD (Meredith et al., 2011). These data supports the existing knowledge associated with combat-related PTSD symptomology and individual resilience as it relates to the other branches of the military; conversely, it extends the knowledge of this topic area as it relates to Navy personnel returning from an individual augmentee tour.

Theoretical Implications of Major Findings

The theoretical foundation associated with this research was the cognitive link between the single and multiple exposures to traumatic events and the automatic conditioned responses related to combat-related trauma. PTSD has a significant cognitive component (Ehlers & Clark, 2000; Ehring et al., 2008; Foa et al., 2000); therefore, I addressed the prevalence rate as it relates to the cognitive processing model. Ehlers and Clark (2000) suggested the existence of automatic, conditioned responses generated by an environmental trigger related to the trauma. Such triggers like sounds, smells, and sights could reinforce the initial trauma and be further exacerbated by multiple tours in support of combat operations, thus increasing the potential for sustained PTSD symptomology (Miliken et al. 2007; Riddle et al., 2007).

Researchers have also shown the existence of a relationship between the number of combat tours and PTSD symptomology for Army and Marine Corps personnel (Seal et al., 2010; Shen et al., 2010); Lane et al. (2012) found that deployment has a much greater

impact on reserve component personnel than on their active duty counterparts. In all four of the research questions, I sought to address this cognitive component using multiple statistical approaches.

Using the same cognitive theoretical component, I also sought to identify an association with PTSD and resilience. With respect to resilience, there is a significant cognitive component associated with this concept. According to Fletcher and Sarkar (2013), early cognitive contributions to resilience, or hardiness, begins with "biopsychospiritual homeostasis," or a comfort zone where a person is fully in balance with respect to physically, mentally, and spiritually (p. 12). This cognitive construct is placed out of balance when insufficient resources (i.e., protective factors) exist. Fletcher and Sarkar (2013) and Winnie et al. (2011) found that is a positive correlation between the strength of resilience and the way in which a person views the self, world, and the future. Meredith et al. (2011) did not include physical fitness in the initial study, but they incorporated a post hoc search and found a strong association between physical fitness and psychological resilience. In an attempt to further expand on the topic of PTSD and resilience, in Research Question 4, I addressed this issue.

An exhaustive effort was taken throughout the process of this research to ensure that the findings and interpretations fell well within the boundaries of the data presented and did not exceed the scope of what was approved by the IRB. After a limitation of access to data was identified, an amended protocol was submitted to the IRB and was subsequently approved. Strict adherence was kept to the Walden University Research

Ethics Planning Worksheet, Research Ethics Review Application, and Data Use Agreement (Appendix C).

Limitations of the Study

As in any research conducted, there were limitations to this study. Sample size, use of self-report archival data, and the absence of pretest data related to resilience scores all established some degree of limitation to this study. With regard to sample size, 570 cases in the sample exceeded the minimum sample size of 344 according to Cohen (1988); however, a larger sample size could have yielded greater variation in the number of tours in support of Operation Iraqi Freedom, Operation Enduring Freedom, or both; or greater variation in individual resilience scores as identified in individual physical fitness assessment scores.

As far as the validity and reliability of the data is concerned, the use of the PDHRA data is supported across the DOD in identifying potential cases of post-combat PTSD and the need for psychological services. However, the data are captured using a self-report function, which brings into question the validity of the data itself. Bickman et al. (2009) report the need for greater confidentiality and discussion of the stigma associated with disclosing a behavioral health issue through the PDHRA process. Understanding the limitations of any self-report, it was assumed that each respondent would be fully open and honest in answering each element of the PDHRA questionnaires. Because both active and reserve personnel are required to complete the PDHRA surveys postdeployment, significant limitations exist with regard to the full compliance of all

returning personnel to complete the survey (Tanielian & Jaycox, 2008). This issue was a limitation to this study.

With regard to the resilience data as identified using the physical fitness assessment test scores postdeployment, the absence of any reported resiliency scores predeployment makes validation of these data difficult. The assumption was that the identified resilience variables were direct indicators of the existence or absence of essential resilience factors. Meredith et al. (2011) identified two of the three factors used in this study to have strong, empirical support to resilience. Those factors were community- and unit-level factors, but physical fitness only carried a moderate support to resilience factors. One final limitation was associated with the individual resilience scores as identified in the physical fitness assessment test. I used the mean test scores from a 3-year period directly after the combat-related tour; however, a more robust analysis could have been conducted if the actual six scores were used. The same statistical method could have been applied, but the result may have yielded greater results.

Additional issues related to this study were related to the statistical methods used in determining significance. Using a *p* value of .01 could yield a more robust result, reduce the likelihood of a Type I error, but also increase the likelihood of a Type II error.

Interpretations of Findings

Significant Results

Research Question 2 addressed the association between location of tours and PTSD symptomology. The result of this analysis is nearly significant. I found an association between location of tours and the existence of PTSD symptomology and

alternate hypothesis $H_1$2 is accepted with caution. Research question 3 addressed the association between number of tours, status, and PTSD symptomology. The result of this analysis is significant. The results show no significant difference in PTSD symptomology on the number of deployments and active and reserve status. However, the result of the main effects shows a small effect between the number of deployments and PTSD symptomology irrespective of status. With respect to research question 3, alternate hypothesis $H_1$3a is accepted.

Non-significant Results

Research Question 1 addressed the association between component and PTSD symptomology. The result of this analysis is not significant. The result does show a slightly higher but nonsignficant percentage of personnel was identified with PTSD symptomology in the reserve component (4.2%) than on active duty (2.5%). The null hypothesis is accepted. Research Question 4 addressed the association between PTSD symptomology, individual resilience, and status. The result of this analysis was not significant. The results show no significant difference in PTSD symptomology on the presence of individual resilience and active and reserve status; there was no interaction effect between PTSD symptomology, component status, and physical readiness test scores; therefore, the null hypotheses were all accepted.

Implications for Social Change

The potential for impact to positive social change at the organizational and policy levels of the Department of the Navy are very high. The impact of organizational significance related to this study is widespread. As more military are returning from

combat tours in Afghanistan and Iraq with PTSD, or what Tanielian and Jaycox (2008, p. 1) call the "invisible wound of war", leadership is being faced with the challenge of how to manage that population effectively. This population of returning individual augmentees has become even more important as the Navy along with the other branches of the U.S. Military have been congressionally mandated to reduce the number of personnel. Not only did this study provide support that a significant population of Navy personnel is returning with PTSD symptomology, it also provided specific data that Navy leadership could use to remain mindful about the behaviors associated with this disorder and the impact on organizational behavior. Although this research did not support the specific attribute of individual resilience associated with PTSD symptomology, there exists opportunity for further research that could support the need for new or revised physical fitness policy.

The impact of social significance related to this study is widespread. The cost of care for military members and veterans suffering from PTSD is staggering (Friedman, 2004); and according to Shiner et al. (2012), 2.1 million service members have served in support of Operations Iraqi Freedom and Enduring Freedom. This study supports the need for an increase in availability of care to those Navy personnel who are returning from individual augmentee tours, which will undoubtedly cause an increased medical burden for Navy Medicine.

Additional organizational changes supported by this research could be to modify the existing training starting from recruit through mid-career focusing on the rigors experienced in combat. This could be accomplished utilizing more of an Army or

Marine Corps model of combat training. Through this research, it is now clear how necessary it is to enhance training programs, adopt new policies and leadership practices to support those programs, and increase funding for support programs that build resilience within this population.

Recommendations

Based on the research conducted in this study, several recommendations are provided for future research. There is a high value in utilizing the archival data provided by the Navy and Marine Corps Public Health Center to identify a population that disclosed PTSD symptomology using the PDHRA self-report forms. Although those Navy personnel may not ultimately be diagnosed with PTSD, future research on some of the key indicators associated with those U.S. Navy personnel who are identified with PTSD symptomology could prove useful in reducing the impact of those symptoms either on an individual on organizational level. From a cognitive theory perspective, research could be conducted using the Armed Services Vocational Aptitude Battery (ASVAB) to identify potential cognitive factors that could predict the prevalence of PTSD symptomology.

Conclusion

I believe it was necessary to conduct this research on several fronts. First, this research was conducted in an effort to fill some of the gap in the current literature directly related to the U.S. Navy population that experience PTSD symptomology. What I provided with this research was that there exists a significant portion of Navy reserve personnel who have returned from an individual augmentee tour that have PTSD

symptomology. Secondly, this research shows that a stronger percentage of Navy personnel returning from Iraq or multiple tours in both Iraq and Afghanistan identified with PTSD symptomology. Third, I presented through this study that an effect exists between the number of deployments and PTSD symptomology irrespective of component status.

Cumulatively, this supports the need for further, future research with this population. All branches of the U.S. Military have important roles in the defense of this nation. With such a high level of research being conducted with other branches on the impact of PTSD from an individual level spreading out to an organizational perspective, it is clear that the same degree of emphasis should be placed on the active and reserve component of the U.S. Navy. In an ever-expanding need to control the 71% of the Earth's surface that is water, the U.S. Navy personnel who make that happen must be given the attention via additional research that they deserve. They, along with the other U.S. Military personnel, deserve the best of what psychological research can provide.

References

American Psychiatric Association. (2000). *The diagnostic and statistical manual of mental disorders* (4th ed.).Washington, DC: Author.

American Psychological Association. (2007). *The psychological needs of U.S. Military service members and their families: A preliminary report*. Retrieved from http://www.apa.org/releases/military_health.html

American Psychological Association. (2008).APA resources for PTSD. Retrieved from http://www.apa.org/topics/topicptsd06b.html#resources/

Andreasen, N. C. (2010). Posttraumatic stress disorder: A history and a critique Andreasen PTSD history. *Annals of The New York Academy Of Sciences*, *1208*(1), 67-71. doi:10.1111/j.1749-6632.2010.05699.x

Assistant Secretary of Defense. (2005). Post-deployment health reassessment. Retrieved from www.pdhealth.mil/dcs/default.asp

Assistant Secretary of Defense. (2008). Implementation of revised DD Forms 2796 and 2900. Retrieved from www.pdhealth.mil/dcs/default.asp

Assistant Secretary of Defense. (2010). Mental health assessments for members of the armed forces deployed in connection with a contingency operation. Retrieved from www.pdhealth.mil/dcs/default.asp

Baker, D. G., Heppner, P., Afari, N., Nunnink, S., Kilmer, M., Simmons, A.,… Bosse, B. (2009). Trauma exposure, branch of service, and physical injury in relation to mental health among U.S. veterans returning from Iraq and Afghanistan. *Military Medicine, 174*(8), 773-778. http://dx.doi.org/10.7205/MILMED-D-03-3808

Bartone, P. T. (2000). Hardiness as a resiliency factor for United States forces in the gulf war. In J. M.Violanti, D. Paton, & C. Dunning (Eds.), *Posttraumatic stress intervention: Challenges, issues, and perspectives* (pp. 115–133). Springfield, IL: Thomas.

Bartone, P. T. (2006). Resilience under military operational stress: Can leaders influence hardiness? *Military Psychology, 18*, 131-148. doi: 10.1207/s15327876mp1803s_10

Bates, M. J., Bowles, S, Hammermeister, J, Stokes, C, Pinder, E, Moore, M,…Burbelo, G. (2010). Psychological fitness. *Military Medicine*, 21-38. http://dx.doi.org/10.7205/MILMED-D-10-00073

Belasco, A. *The cost of Iraq, Afghanistan, and other Global War on Terror Operations Since 9/11*. Washington, D.C.: Congressional Research Service, 2007.

Bentley, S. (2005, March/April). A short history of PTSD: From Thermopylae to Hue soldiers have always had a disturbing reaction to war. Retrieved from http://www.vva.org/archive/TheVeteran/2005_03/feature_HistoryPTSD.htm

Berg, J. S., Greiger, T. A., & Spira, J. L. (2005). Psychiatric symptoms and cognitive appraisal following the near sinking of a research submarine. *Military Medicine, 170* (1), 44-47. Retrieved from http://publications.amsus.org/doi/pdf/10.7205/MILMED.170.1.44

Bernard, H. R. (2000). *Social research methods: Qualitative and quantitative approaches* (pp.143-183). Thousand Oaks, CA: Sage Publications.

Bickman, L., Leslie, M. W., Vides, D. A. A. R., Hargraves, R. P., Lambert, W. E., Breda, C. S., Tempesti, T., ... VANDERBILT UNIV NASHVILLE TN SCHOOL OF EDUCATION. (2009). Program Evaluation of Post-Deployment Health Assessment (PDHA) and Reassessment Processes (PDHRA) Processes. Ft. Belvoir: Defense Technical Information Center.

Binswanger, L. (1963). *Being in the world: Selected papers of Ludwig Binswanger.* New York, NY: Basic Books.

Boettcher, D. (2008). How to prepare for IA deployment. *U.S. Naval Institute Proceedings*, *134* (4), 80-81.

Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology*, *75* (5), 671-682. doi: 10.1037/0022-006X.75.5.671

Bonanno, G. A. & Mancini, A. D. (2008).The human capacity to thrive in the face of potential trauma. *Pediatrics, 121,* 369–375. Retrieved from http://pediatrics.aappublications.org/content/121/2/369

Bowles, S. V., & Bates, M. J. (2010). Military organizations and programs contributing to resilience building. *Military Medicine, 175*(6), 382-385. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20572467

Bower, G. H. (1981).Mood and memory. *American Psychologist*, *36*, 129–148. doi: 10.1037/0003-066X.36.2.129

Britt, T. W., Adler, A. B., & Bartone, P. T. (2001). Deriving benefits from stressful events: The role of engagement in meaningful work and hardiness. *Journal of Occupational Health Psychology, 6,*53–63. doi: 10.1037/1076-8998.6.1.53

Bruner, E. F. *Military Forces: What is the appropriate size for the United States?* Washington, D.C.: Congressional Research Service, 2006. Retrieved from http://www.au.af.mil/au/awc/awcgate/crs/rs21754.pdf

Bureau of Navy Medicine (2008).Bureau of Navy Medicine Online [Electronic Version]. Retrieved from https://nmo.med.navy.mil/.

Calhoun, L.G., and Tedeschi, R.G. (2003). Routes to posttraumatic growth through cognitive processing. In D. Paton, J.M. Violanti, and L.M. Smith (Eds.). *Promoting capabilities to manage posttraumatic stress*, Charles C. Thomas Publisher, Ltd.: Springfield, Illinois.

Calhoun, P., Wiley, M., Dennis, M., & Beckham, J. (2009). Self-reported health and physician diagnosed illnesses in women with posttraumatic stress disorder and major depressive disorder. *Journal of Traumatic Stress, 22,* 122-130. http://dx.doi.org/10.1002%2Fjts.20400

Campbell, D., Campbell, K., Ness, J. (2008). Resilience through leadership. In B.J. Lukey and V. Tepe (Eds.), *Biobehavioral resilience to stress*, CRC Press: Boca Raton, FL.

Carlson, B. E., Stromwall, L. K.,& Lietz, C. A. (2013). Mental health issues in recently returning women veterans: Implications for practice. *Social Work, 58*(2), 105-114. doi: 10.1093/sw/swt001

Carver, C.S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues, 54*(2), 245–266. doi: 10.1111/j.1540-4560.1998.tb01217.x

César, C. C., & Carvalho, M. S. (2011). Stratified sampling design and loss to follow-up in survival models: Evaluation of efficiency and bias. *BMC Medical Research Methodology, 11*(1), 99-107. doi: 10.1186/1471-2288-11-99

Chaplin, W. F. (1991). The next generation in moderation research in personality psychology. *Journal of Personality, 59,* 143-178. doi: 10.1111/j.1467-6494.1991.tb00772.x

Chief of Naval Operations (2000). Individual Augmentation (IA) Policy and Procedures, OPNAVINST 1001.24 [Electronic Version]. Retrieved from http://www.public.navy.mil.

Chief of Naval Operations (2009). Post deployment health re-assessment update, April 2, 2009. [Electronic Version]. Retrieved from http://www.public.navy.mil/bupers-npc/reference/messages/Documents/NAVADMINS/NAV2009/NAV09297.txt

Chief of Naval Operations (2011).Physical Readiness Program, OPNAVINST 6110.1J. [Electronic Version].Retrieved from http://doni.documentservices.dla.mil/Directives/06000%20Medical%20and%20Dental%20Services/06-100%20General%20Physical%20Fitness/6110.1J.pdf.

Chief of Naval Operations. (2014). Deployment Health Assessment Process, OPNAVINST 6100.3A. [Electronic Version]. Retrieved from http://doni.documentservices.dla.mil/Directives/06000%20Medical%20and%20Dental%20Services/06-100%20General%20Physical%20Fitness/6100.3A.pdf.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohrs, J., Christie, D. J., White, M. P., & Das, C. (2013). Contributions of positive psychology to peace: Toward global well-being and resilience. *American Psychologist*, *68* (7), 590-600. http://psycnet.apa.org/doi/10.1037/a0032089

Connor, K. M., & Davidson, J. R. T. (2003). Development of anew resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety, 18*, 76–82. doi: 10.1002/da.10113

Contrada, R. J. (1989). Type A behavior, personality hardiness, and cardiovascular responses to stress. *Journal of Personality and Social Psychology, 57*, 895–903. http://psycnet.apa.org/doi/10.1037/0022-3514.57.5.895

Cordle, J., & Shattuck, N. (2013). A sea change in standing watch. *U.S. Naval Institute Proceedings*, *139*(1), 34-39. Retrieved from http://www.usni.org/magazines/proceedings/2013-01/sea-change-standing-watch

Cornum, R., Matthews, M. D., & Seligman, M. P. (2011). Building resilience in a challenging institutional context. *American Psychologist*, *66*(1), 4-9. http://psycnet.apa.org/doi/10.1037/a0021420

Cutler, T. J., (Ed.). (2009). *The Bluejacket's Manual* (24th ed.). (pp. 17-24). Naval Institute Press, Annapolis, MD.

Dalgleish, T. (2004). Cognitive approaches to posttraumatic stress disorder: The evolution of multirepresentational theorizing. *Psychological Bulletin, 130* (2), 228–260. http://psycnet.apa.org/doi/10.1037/0033-2909.130.2.228

Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (2013). Integrative health and wellness. [Electronic Version]. Retrieved from http://www.dcoe.mil/PsychologicalHealth/Integrative_Health.aspx.

DeFraites, R., Ritschard, H., & Vythilingam, M. (2011, January). *Keeping tabs: DoD's response to psychological risks: Lessons learned from health assessments*. Presentation at the Military Health System Conference, National Harbor, MD.

Department of Defense (2010).*Dictionary of military terms, joint publication 1-02*. [Electronic Version]. Retrieved from http://www.dtic.mil/doctrine/dod_dictionary/?zoom_Query=Rank&zoom_sort=0&zoom.

Department of Defense (2008a).Department of Defense Publication Library [Electronic Version]. Retrieved from http://www.dtic.mil/whs/directives/.

Department of Defense (2008b). Update: Deployment health assessments, U.S. Armed Forces, January 2003-December 2007. *Medical Surveillance Monthly Report, 15* (1), 15-20. [Electronic Version]. Retrieved from http://amsa.army.mil/msmr.htm/.

Department of Defense/Veterans Affairs (2008). Posttraumatic stress disorder treatment guidelines [Electronic Version]. Retrieved from http://www.oqp.med.va.gov/cpg/PTSD/PTSD_Base.htm

Department of the Navy (2008a). Department of the Navy Publication Library [Electronic Version]. Retrieved from http://doni.daps.dla.mil/allinstructions.aspx/.

Department of the Navy (2008b). Navy environmental health center website [Electronic Version]. Retrieved from https://www-nehc.med.navy.mil/edha/.

Department of the Navy (2015a). Navy Enlisted Manpower and Personnel Classifications and Occupational Standards, Vol. II [Electronic Version]. Retrieved from http://www.public.navy.mil/bupers-npc/reference/nec/Pages/default.aspx.

Department of the Navy (2015b). Manual of Navy Officer Manpower and Personnel Classifications [Electronic Version]. Retrieved from http://www.public.navy.mil/bupers-npc/reference/nec/NECOSVolII/Pages/default.aspx.

Deployment Health Clinical Center (2008). Deployment health clinical center website [Electronic Version]. Retrieved from http://www.pdhealth.mil/.

Deuster, P. A., & Silverman, M. N. (2013). Physical fitness: A pathway to health and resilience. U.S. Army Medical Department Journal, 24-35. Retrieved from http://www.cs.amedd.army.mil/amedd_journal.aspx

Dickstein, B. D., McLean, C. P., Mintz, J., Conoscenti, L. M., Steenkamp, M. M., Benson, T. A., Isler, W. C., ... (2010). Unit cohesion and PTSD symptom severity in air force medical personnel. *Military Medicine, 175* (7), 482-486. http://dx.doi.org/10.7205/MILMED-D-09-00178

Dutra, L., Grubbs, K., Greene, C., Trego, L., McCartin, T., Kloezeman, K., ... (2011). Women at war: Implications for mental health. Journal Of Trauma & Dissociation: The Official Journal Of The International Society For The Study Of Dissociation (ISSD), 12(1), 25-37. doi: 10.1080/15299732.2010.496141

Efkildes, A. (2008). Metacognition: Defining its facets and levels of functioning in relation to self-regulation and coregulation. *European Psychologist, 13*, 277–287. http://dx.doi.org/10.1027/1016-9040.13.4.277

Ehlers, A., & Clark, D.M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319 - 345. http://dx.doi.org/10.1016/S0005-7967(99)00123-0

Ehring, T., Ehlers, A., & Glucksman, E. (2008). Do cognitive models help in predicting the severity of posttraumatic stress disorder, phobia, and depression after motor vehicle accidents? A prospective longitudinal study. *Journal Of Consulting And Clinical Psychology*, *76*(2), 219-230. http://psycnet.apa.org/doi/10.1037/0022-006X.76.2.219

Eikenberry, K. W. (2013). Reassessing the all-volunteer force. Washington Quarterly, 36(1), 7-24. doi: 10.1080/0163660X.2013.751647

Erbes, C.R., Meis, L.A., Polusny, M.A., & Compton, J.S. (2011). Couple adjustment and posttraumatic stress disorder symptoms in National Guard veterans of the Iraq war. *Journal of Family Psychology*, *25*(4), 479-487. http://psycnet.apa.org/doi/10.1037/a0024007

Fischer, H. *United States Military Casualty Statistics: Operation Iraqi Freedom and Operation Enduring Freedom*. Washington D.C.: Congressional Research Service, 2009. Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA498363

Fletcher, D. & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist, 18* (1), 12-23. http://dx.doi.org/10.1027/1016-9040/a000124

Foa, E. B. (2011). Prolonged exposure therapy: past, present, and future. *Depression & Anxiety, 28*(12), 1043-1047. doi: 10.1002/da.20907

Foa, E., Keane, T., & Friedman, M. (2000).Guidelines for treatment of PTSD. *Journal of Traumatic Stress, 13*, 539 - 588. doi: 10.1023/A:1007802031411

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*, 20–35. http://psycnet.apa.org/doi/10.1037/0033-2909.99.1.20

Frankl, V. (1960).*The doctor and the soul.* New York: Knopf.

Friedman M.J. (2004). Acknowledging the psychiatric cost of war. *New England Journal of Medicine, 351* (1), 75 – 77. doi: 10.1056/NEJMe048129

Friedman, M. J. (2014). PTSD history and overview: A brief history of the PTSD diagnosis. [Electronic Version]. Retrieved from http://www.ptsd.va.gov/professional/pages/ptsd-overview.asp.

Garcia, H. A., Finley, E. P., Ketchum, N., Jakupcak, M., Dassori, A., & Reyes, S. C. (2014). A survey of perceived barriers and attitudes toward mental health care among OEF/OIF veterans at VA outpatient mental health clinics. *Military Medicine*, *179*(3), 273-278. http://dx.doi.org/10.7205/MILMED-D-13-00076

Giardina, T. M., (2007). Augmenting the force. *FDCH Congressional Testimony*, Retrieved from Military & Government Collection database.

Gibbons, S. W., Hickling, E. J., & Watts, D. D. (2012). Combat stressors and post-traumatic stress in deployed military healthcare professionals: an integrative review. *Journal of Advanced Nursing*, *68*(1), 3-21. doi: 10.1111/j.1365-2648.2011.05708.x

Google (2008). Google Internet Web Search Engine [Electronic Version]. Retrieved from www.google.com/.

Garmezy, N. (1991). Resiliency and vulnerability to adverse developmental outcomes associated with poverty. *American Behavioral Scientist, 34*(4). 416–430.

Hamilton, J. (2007). *The Navy.* ABDO Publishing Company, Minneapolis, MD.

Hassija, C. M., Jakupcak, M., Maguen, S.,& Shipherd, J. C. (2012). The influence of combat and interpersonal trauma on PTSD, depression, and alcohol misuse in U.S. Gulf War and OEF/OIF women veterans. *Journal of Traumatic Stress, 25* (2), 216-219. doi: 10.1002/jts.21686

Hawke, L. D., & Provencher, M. D. (2011). Schema theory and schema therapy in mood and anxiety disorders: A review. *Journal of Cognitive Psychotherapy*, *25*(4), 257-276. http://dx.doi.org/10.1891/0889-8391.25.4.257

Heidegger, M. (1986). *Being and time.* New York: HarperCollins.

Hoge, C. W., Auchterlonie, J. L., & Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq and Afghanistan. *Journal of the American Medical Association, 295* (9), 1023-1032. doi:10.1001/jama.295.9.1023.

Hoglund, M. W., &Schwartz, R. M. (2014). Mental health in deployed and nondeployed veteran men and women in comparison with their civilian counterparts. *Military Medicine*, *179*(1), 19-25. http://dx.doi.org/10.7205/MILMED-D-13-00235

Holland, W. J. Jr.(Ed.). (2000). The Navy. Washington, DC: Naval Historical Foundation.

Holowka, D. W., Wolf, E. J., Marx, B. P., Foley, K. M., Kaloupek, D. G., & Keane, T. M. (2012). Associations among personality, combat exposure and wartime atrocities. *Psychology of Violence*, *2*(3), 260-272. http://psycnet.apa.org/doi/10.1037/a0026903

Hutchinson, M., & Hurley, J. (2013). Exploring leadership capability and emotional intelligence as moderators of workplace bullying. *Journal of Nursing Management, 21*(3), 553-562. doi: 10.1111/j.1365-2834.2012.01372.x

Johnston, S. L., &Dipp, R. D. (2009). Support of marines and sailors returning from combat: a comparison of two different mental health models. *Military Medicine, 174*(5), 455-459. http://dx.doi.org/10.7205/MILMED-D-04-0107

Kardum, I., Hudek-Knežević, J., & Krapić, N. (2012). The structure of hardiness, its measurement invariance across gender and relationships with personality traits and mental health outcomes. *PsihologijskeTeme / Psychological Topics*, *21*(3), 487-507.

Kehle, S. M., Reddy, M. K., Ferrier-Auerbach, A. G., Erbes, C. R., Arbisi, P. A., & Polusny, M. A. (2011). Psychiatric diagnoses, comorbidity, and functioning in

national guard troops deployed to Iraq. *Journal of Psychiatric Research, 45* (1), 126-132. http://dx.doi.org/10.1016/j.jpsychires.2010.05.013

Kintzle, S., Yarvis, J. S., &Bride, B. E. (2013). Secondary traumatic stress in military primary and mental health care providers. *Military Medicine, 178*(12), 1310-1315. http://dx.doi.org/10.7205/MILMED-D-13-00087

Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology, 37,* 1–11. http://psycnet.apa.org/doi/10.1037/0022-3514.37.1.1

Kobau, R., Seligman, M. P., Peterson, C., Diener, E., Zack, M. M., Chapman, D.,& Thompson, W. (2011). Mental health promotion in public health: perspectives and strategies from positive psychology. *American Journal of Public Health, 101*(8), e1-e9. doi: 10.2105/AJPH.2010.300083

Kroenke, K., Spitzer, R.L., & Williams, J.B. (2003). The Patient Health Questionnaire–2: Validity of a two-item depression screener. *Medical Care,* 41 (11), 1284–1292.

Lane, M. E., Hourani, L. L., Bray, R. M., & Williams, J. (2012). Prevalence of perceived stress and mental health indicators among reserve-component and active-duty military personnel. *American Journal of Public Health, 102*(6), 1213-1220. doi: 10.2105/AJPH.2011.300280

Lapierre, C.B., Schwegler, A.F., LaBauve, B.J. (2007). Posttraumatic stress and depression symptoms in soldiers returning from combat operations in Iraq and Afghanistan. *Journal of Trauma and Stress, 20* (6), 933-943. doi: 10.1002/jts.20278

Lasiuk, G., & Hegadoren, K. (2006). Posttraumatic stress disorder, part I: Historical development of the concept. *Perspectives in Psychiatric Care, 42,* 13-20. doi: 10.1111/j.1744-6163.2006.00045.x

Lenhardt, J., Howard, J., Taft, C., Kaloupek, D., & Keane, T. (2012). Examining aggression in male Vietnam veterans who receive VA services: the role of traumatic events and combat exposure. *Journal of Traumatic Stress*, *25*(4), 461-464. doi: 10.1002/jts.21717

Levine, S. Z., Laufer, A., Stein, E., Hamama-Raz, Y., & Solomon, Z. (2009). Examining the relationship between resilience and posttraumatic growth. *Journal of Traumatic Stress*, *22*(4), 282-286. doi: 10.1002/jts.20409

Luke, I. T. (2013). Not just "warfare lite". *Naval War College Review*, *66*(2), 10-26.

Luthar, S. S., Cicchetti, D., and Becker, B. (2000). The construct of resilience: implications for interventions and social policies," *Child Development*, *71* (3), 543–562.

Maclin, V. L. (2012). Jasmine's changes through schema focused therapy. *Journal of Psychology & Christianity*, *31*(1), 78-83.

Maddi, S. R., Matthews, M. D., Kelly, D. R., Villarreal, B., & White, M. (2012). The role of hardiness and grit in predicting performance and retention of USMA cadets. *Military Psychology*, *24*(1), 19-28. http://dx.doi.org/10.1080/08995605.2012.639672

Maddi, S. R., Harvey, R. H., Khoshaba, D. M., Lu, J. L., Persico, M., & Brow, M. (2006). The Personality construct of hardiness, III: relationships with repression,

innovativeness, authoritarianism, and performance. *Journal of Personality*, *74*(2), 575-598. doi: 10.1111/j.1467-6494.2006.00385.x

Maddi, S.R. (2007). Relevance of hardiness assessment and training to the military context. *Military Psychology*, *19*(1).61–70. http://dx.doi.org/10.1080/08995600701323301

Meis, L. A., Barry, R. A., Kehle, S. M., Erbes, C. R., & Polusny, M. A. (2010). Relationship adjustment, PTSD symptoms, and treatment utilization among coupled national guard soldiers deployed to Iraq. *Journal of Family Psychology, 24* (5), 560-567. http://dx.doi.org/10.1037/a0020925

Meredith, L.M., Sherbourne, C.D., Gaillot, S., Hansell, L., Ritschard, H.V., Parker, A.M... (Eds.). (2011). *Promoting psychological resilience in the U.S. military.* (RAND Corporation Monograph 996), Santa Monica, CA: Rand Corporation. Retrieved July 10, 2013 from www.rand.org.

Millett, A. R. & Maslowski, P. (1994).*For the Common Defense: A Military History of the United States of America*. New York: New York Free Press.

Milliken, C. S., Auchterlonie, J. L., & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *Journal of the American Medical Association, 298* (18), 2141-2148. Retrieved from www.jama.com

Morel, K. R.(2008). Development of a validity scale for combat-related posttraumatic stress disorder: Evidence from simulated malingerers and actual disability

claimants. *The Journal of Forensic Psychiatry & Psychology, 19* (1), 52-63. doi: 10.1080/14789940701594645

Nasky, K.M., Hines, N.N., & Simmer, E. (2009). The USS Cole bombing: Analysis of pre-existing factors as predictors for development of post-traumatic stress or depressive disorders. *Military Medicine, 174* (7), 689-694. http://dx.doi.org/10.7205/MILMED-D-04-3608

National Center for Posttraumatic Stress Disorder (2008). Empirical Evidence Regarding Behavioral Treatments for PTSD. [Electronic Version]. Retrieved from http://www.ncptsd.va.gov/ncmain/ncdocs/fact_shts/fs_empiricalinfo_treatment_dis.html?opm=1&rr=rr129&srt=d&echorr=true

Naval Center Combat and Operational Stress Control. (2011). Resilience: The bounce back factor. [Electronic Version]. Retrieved from http://www.med.navy.mil/sites/nmcsd/nccosc/serviceMembersV2/buildResilience/resilienceTheBounceBackFactor/Pages/default.aspx.

Nidiffer, F., & Leach, S. (2010). To hell and back: evolution of combat-related post traumatic stress disorder. *Developments In Mental Health Law*, *29*(1), 1-22.

Novaco, R.W., Cook, T.M. and Sarason, I.G. (1983). Military recruit training: An arena for stress-coping skills. In *Stress Reduction and Prevention*, Meichenbaum D, and Jaremko, M.E. (Eds.), Plenum Press: New York, NY.

Nucifora, F., Langlieb, A.M. Siegal, E. Everly, G.S. &Kaminsky, M. (2007). Building resistance, resilience, and recovery in the wake of school and workplace violence.

Disaster Medicine and Public Health Preparedness, 1(S1), 33-37. http://dx.doi.org/10.1097/DMP.0b013e31814b98ae

O'Bryant, J. M. Waterhouse, and the Library of Congress. *U.S. Forces in Iraq*. Washington, D.C.: Congressional Research Service, 2006.

Office of Naval Information (2009). RhumbLines, September 16, 2009. [Electronic Version]. Retrieved from http://www.navy.mil/navco/pages/rhumb_lines.html.

Office of Naval Information (2010). RhumbLines, October 4, 2010. [Electronic Version]. Retrieved from http://www.navy.mil/navco/pages/rhumb_lines.html.

Office of National Security (2010). National Security Strategy [Electronic Version]. Retrieved from http://www.whitehouse.gov/issues/foreign-policy.

Ong, A. D., Zautra, A. J., & Reid, M. (2010). Psychological resilience predicts decreases in pain catastrophizing through positive emotions. *Psychology and Aging, 25*(3), 516-523. http://psycnet.apa.org/doi/10.1037/a0019384

Palmer, C. (2008). A theory of risk and resilience factors in military families. *Military Psychology*,*20*(3), 205–217. http://psycnet.apa.org/doi/10.1080/08995600802118858

Pietrzak, E., Pullman, S., Cotea, C., & Nasveld, P. (2013). Effects of deployment on health behaviours in military forces: A review of longitudinal studies. *Journal of Military & Veterans' Health*, *21*(1), 14-23.

Pollack, L. M., Boyer, C. B., Betsinger, K., & Shafer, M. (2009).Predictors of one-year attrition in female marine corps recruits. *Military Medicine, 174*(4), 382-391. http://dx.doi.org/10.7205/MILMED-D-02-5308

Powers, M. B., Halpern, J. M., Ferenschak, M. P., Gillihan, S. J., & Foa, E. B. (2010). A meta-analytic review of prolonged exposure for posttraumatic stress disorder. *Clinical Psychology Review*, *30*, 635–646. http://dx.doi.org/10.1016/j.cpr.2010.04.007

Prins, A., Ouimette, P., Kimerling, K., Cameron, R.P., Hugelshofer, D.S., Shaw-Hegwer, … (2004). The primary care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry,9* (1), 9-14.

Renshaw, K. D. (2010). Deployment experiences and postdeployment PTSD symptoms in National Guard/Reserve service members serving in Operations Enduring Freedom and Iraqi Freedom. *Journal Of Traumatic Stress*, *23*(6), 815-818. doi: 10.1002/jts.20575

Richardson, G. E. (2002). The metatheory of resilience and resiliency. *Journal of Clinical Psychology, 58*, 307–321. doi: 10.1002/jclp.10020

Riddle, J. R., Smith, T. C., Smith, B., Corbeil, T. E., Engel, C. C., Wells, T. S., … (2007). Millennium Cohort: The 2001-2003 baseline prevalence of mental disorders in the U. S. military. *Journal of Clinical Epidemiology*, *60*, 192-201. http://dx.doi.org/10.1016/j.jclinepi.2006.04.008

Riggio, R. E. (2013). *Introduction to Industrial/Organizational Psychology* (6th ed.). Upper Saddle River, NJ: Pearson.

Robinson, A. M. (2008). Mental health services for the military and their families. *FDCH Congressional Testimony.* Retrieved from Military & Government Collection database

Rodriguez-Llanes, J., Vos, F., & Guha-Sapir, D. (2013). Measuring psychological resilience to disasters: are evidence-based indicators an achievable goal? Environmental Health: A Global Access Science Source, 12(1), 2-20. doi: 10.1186/1476-069X-12-115

Rubel, R. C. (2013). National policy and the post-systemic Navy. *Naval War College Review*, *66*(4), 10-29.

Sammons, M. T. (2005). Psychology in the public sector: Addressing the psychological effects of combat in the U. S. Navy. *American Psychologist, 60* (8), 899-909. http://psycnet.apa.org/doi/10.1037/0003-066X.60.8.899

Santiago, P.N. Wilk, J.E., Milliken, C.S. Castro, C. A., Engel, C.C., Hoge, C.W. (2010). Screening for alcohol misuse and alcohol-related behaviors among combat veterans. *Psychiatric Services, 61,* 575-581. http://dx.doi.org/10.1176/ps.2010.61.6.575

Shiner, B., Drake, R. E., Watts, B. V., Desai, R. A., & Schnurr, P. P. (2012). Access to VA services for returning veterans with PTSD. *Military Medicine*, *177*(7), 814-822. http://dx.doi.org/10.7205/MILMED-D-12-00009

Schnurr, P., & Lunney, C. (2008). Exploration of gender differences in how quality of life relates to posttraumatic stress disorder in male and female veterans. *Journal of Rehabilitation Research & Development, 3,* 383-394. doi: 10/1682.JRRD. 2007.06.0099

Seal, K. H., Maguen, S., Cohen, B., Gima, K. S., Metzler, T. J., Ren, L…(2010). VA mental health services utilization in Iraq and Afghanistan veterans in the first year

of receiving new mental health diagnoses. *Journal Of Traumatic Stress*, *23*(1), 5-16. doi: 10.1002/jts.20493

Secretary of Defense (2008). Office of Assistant Secretary of Defense for Health Affairs Publication Website [Electronic Version]. Retrieved from http://www.ha.osd.mil/policies/.

Sharkey, J., & Rennix, C. (2011). Assessment of changes in mental health conditions among sailors and marines during postdeployment phase. *Military Medicine*, *176*(8), 915-921. http://dx.doi.org/10.7205/MILMED-D-10-00366

Sharpless, B. A., & Barber, J. P. (2011). A clinician's guide to PTSD treatments for returning veterans. *Professional Psychology: Research and Practice*, *42*(1), 8-15.

Shen, Y., Arkes, J., & Pilgrim, J. (2009). The effects of deployment intensity on Post-Traumatic Stress Disorder: 2002-2006.*Military Medicine, 174* (3).217-223. http://psycnet.apa.org/doi/10.1037/a0022351

Shen, Y & Arkes, J. (2009). *Effects of OEF/OIF deployment intensity on PTSD diagnoses among still active population: Analysis of enlisted and officer populations 2001-2006.* (Department of the Navy Technical Report NPS-GSBPP 09-034). Monterey, CA: United States Navy. Retrieved December 30, 2010 from http://edocs.nps.edu/npspubs/scholarly/TR/2009/NPS-GSBPP-09-034.pdf.

Shen, Y., Arkes, J., Kwan, B., Tan, L., & Williams, T. V. (2010). Effects of Iraq/Afghanistan deployments on PTSD diagnoses for still active personnel in all four services. *Military Medicine*, *175*(10), 763-769. http://dx.doi.org/10.7205/MILMED-D-10-00086

Sherrieb, K., Norris, F., & Galea, S. (2010). Measuring capacities for community resilience. *Social Indicators Research*, *99*(2), 227-247. doi: 10.1007/s11205-010-9576-9

Simmons, A. (2007). Speculation as to why women get PTSD more often than men. *Women & Therapy*, 30, 85-98. doi: 10.1300/J015v30n01_05

Simmons, C. A. (2010). Gender differences in the appraisal of violent crime experiences: A qualitative study. *Victims & Offenders*, *5*(4), 371-387. doi: 10.1080/15564886.2010.509664

Smith, T.C., Ryan, M.A., Wingard, S., Sallis, J.F., & Kritz-Silverstein, D. (2008). New onset and persistent symptoms of posttraumatic stress disorder self-reported after deployment and combat exposures: prospective population-based US military cohort study. *British Medical Journal*, *336*, 366-371. http://dx.doi.org/10.1136/bmj.39430.638241.AE

Southwick, S.M., Morgan, C.A., Darnell, A., Bremner, D., Nicolaou, A. L., & Nagy, L.M. (1995). Trauma related symptoms in veterans of Operation Desert Storm: A 2-year follow up. *American Journal of Psychiatry*, *152*, 1150-1155. http://dx.doi.org/10.1176/ajp.152.8.1150

Street, A., Gradus, J., Giasson, H., Vogt, D., & Resick, P. (2013). Gender differences among veterans deployed in support of the wars in Afghanistan and Iraq. *Journal of General Internal Medicine*, *28 Suppl*, 556-562. doi: 10.1007/s11606-013-2333-4

Sundin, J., Fear, N.T., Iversen, A., Rona, R.J., Wessely, S. (2010). PTSD after deployment to Iraq: conflicting rates, conflicting claims. *Psychological Medicine, 40*, 367-382. http://dx.doi.org/10.1017/S0033291709990791

Survey System. (2010). Sample Size Calculator.[Electronic Version]. Retrieved from http://www.surveysystem.com/sscalc.htm

Taft, C. T., Schumm, J. A., Panuzio, J., & Proctor, S. P. (2008). An examination of family adjustment among Operation Desert Storm veterans. *Journal of Consulting and Clinical Psychology*, *76*(4), 648-656. http://psycnet.apa.org/doi/10.1037/a0012576

Tanielian, T. & Jaycox, L. H. (Eds.). (2008). *Invisible wounds of war: psychological and cognitive injuries, their consequences, and services to assist recovery*. (RAND Corporation Monograph 720), Santa Monica, CA: RAND Corporation. Retrieved from www.rand.org.

Taylor, M. A. (2014). Prevalence and mental health correlates of sleep disruption among military members serving in a combat zone. *Military Medicine*, *197*(7), 744-751. http://dx.doi.org/10.7205/MILMED-D-13-00551

Tedeschi, R. (2011). Posttraumatic growth in combat veterans. *Journal of Clinical Psychology In Medical Settings*, *18*(2), 137-144. doi: 10.1007/s10880-011-9255-2

Thomas, J.L., Wilk, J.E., Riviere, L.A., McGurk, D., Castro, C.A., Hoge, C.W. (2010). Prevalence of mental health problems and functional impairment among active component and national guard soldiers 3 and 12 months following combat in Iraq.

Archives of General Psychiatry, 67, 614-623. doi: 10.1001/archgenpsychiatry.2010.54

Tolin, D., & Foa, E. (2006). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin, 6*, 959-992. http://psycnet.apa.org/doi/10.1037/0033-2909.132.6.959

Tusaie, K., and Dyer, J. (2004). Resilience: A historical review of the construct. *Holistic Nurse Practice, 18* (1), 3–8.

Veteran's Affairs. (2003). VA/DOD clinical practice guideline for the management interventions module summary of post traumatic stress. [Electronic Version]. Retrieved from http://www.qmo.amedd.army.mil

Veterans Affairs (2008[1]). National Center for Posttraumatic Stress Disorder Website [Electronic Version]. Retrieved from http://www.ncptsd.va.gov/ncmain/publications/.

Veterans Affairs (2008[2]).Iraq War Clinician Guide.[Electronic Version].Retrieved from http://www.ncptsd.va.gov/ncmain/ncdocs/manuals/nc_manual_iwcguide.html

Vogt, D. S., Samper, R. E., King, D. W., King, L. A., & Martin, J. A. (2008). Deployment stressors and posttraumatic stress symptomatology: Comparing active duty and National Guard/Reserve personnel from Gulf War I. *Journal of Traumatic Stress*, *21*(1), 66-74. doi: 10.1002/jts.20306

Walden University (2008). Walden University Library [Electronic Version]. Retrieved from http://library.waldenu.edu/.

Watson, P. J., Brymer, M. J., & Bonanno, G. A. (2011). Postdisaster psychological intervention since 9/11. *American Psychologist, 66*(6), 482-494. http://psycnet.apa.org/doi/10.1037/a0024806

Weatherill, R., Vogt, D., Taft, C., King, L., King, D., & Shipherd, J. (2011). Training experiences as mediators of the association between gender-role egalitarianism and women's adjustment to marine recruit training. *Sex Roles, 64*(5/6), 348-359. doi: 10.1007/s11199-010-9921-0

Wells, T., Leardmann, C., Fortuna, S., Smith, B., Smith, T., Ryan, M… (2010). A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. *American Journal of Public Health, 100*, 90-99. doi: 10.2105/AJPH.2008.155432

Wiebe, D. J. (1991). Hardiness and stress moderation: A test of proposed mechanisms. *Journal of Personality and Social Psychology, 60*, 89–99. http://psycnet.apa.org/doi/10.1037/0022-3514.60.1.89

Winnie W. S. Mak, I. S. W. Ng, and Wong, C.C.Y. (2011). Resilience: Enhancing well-being through the positive cognitive triad. *Journal of Counseling Psychology, 58* (4), 610–617. http://psycnet.apa.org/doi/10.1037/a0025195

Wood, M. D., Britt, T. W., Thomas, J. L., Klocko, R. P., & Bliese, P. D. (2011). Buffering effects of benefit finding in a war environment. *Military Psychology 23*(2), 202-219. http://psycnet.apa.org/doi/10.1080/08995605.2010.521732

Wood, M. D., Britt, T. W., Wright, K. M., Thomas, J. L., & Bliese, P. D. (2012). Benefit finding at war: a matter of time. *Journal of Traumatic Stress*, *25*(3), 307-314. doi: 10.1002/jts.21701

Appendix A: PDHRA DD Form 2900 Data Elements/PTSD Crosswalk (June 2005) and Physical Readiness Assessment/Resilience Data

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Social Security Number	Nine digit response	1	0	Not weighted.	Social Security Number will be removed and replaced with a standard identifier for statistical purposes only.
Today's Date	Eight digit response	1	0	Not weighted.	This is a date response of dd/mm/yyyy. It will be used in a calculation for **Feature E** of PTSD diagnostic criteria.
Service Branch	Air Force, Army, Navy, Marine Corps, Coast Guard, Civilian Employee, Other	7	1	Navy = 1, All others = 0	Data will be captured and recorded as needed. The only category utilized for all research questions will be Navy = 1. All other Service Branch information will not be considered as it is outside the scope of this research.
Status Prior to Deployment	Active Duty, Selected Reserves - Reserve Unit, Selected Reserves - Reserve-AGR, Selected Reserves - Reserve-IMA, Selected Reserves - National Guard-Unit, Selected Reserves - National Guard-AGR, Ready Reserves - IRR, Ready Reserves - ING, Civilian Government Employee, Other	10	1 or 2	Active Duty = 1. Selected Reserves - Reserve - Unit = 2, All others = 0	Data will be captured and recorded as needed. The only category utilized for all research questions will be Active Duty = 1 and Selected Reserves - Reserve - Unit = 2. All other Status Prior to Deployment information will not be considered as it is outside the scope of this research.
Location of Operation	Iraq, Afghanistan, Kuwait, Qatar, Bosnia/Kosovo, SW Asia - other, Africa, South America, North America, Australia, Europe, On a ship, Other	13	1 or 2	Iraq = 1, Afghanistan = 2, All others = 0.	Data will be captured and recorded as needed. The only category utilized for all research questions will be Iraq = 1 and Afghanistan = 2. All other Location of Operation information will not be considered as it is outside the scope of this research.
Total Deployments in Past 5 Years (OIF)	OIF 1, 2, 3, 4, 5 or more.	5	1 or 2 (or more)	OIF 1 = 1, OIF 2 = 2, OIF 3 = 3, OIF 4 = 4, OIF 5 < = 5	Data will be captured and recorded as needed. The only category utilized for research question 3.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Total Deployments in Past 5 Years (OEF)	OEF 1, 2, 3, 4, 5 or more.	5	1 or 2 (or more)	OEF 1 = 1, OEF 2 = 2, OEF 3 = 3, OEF 4 = 4, OEF 5 < = 5	Data will be captured and recorded as needed. The only category utilized for research question3.
Date of departure from theater (mm/yyyy) - Today's date (dd/mm/yyyy) >= 1 month and 1 day	The data range for this research is between September 1, 2002 and December 31, 2010. Data is captured on this form as DD/MM/YYYY for today's date and MM/YYYY for date arrived in theater and date departed in theater for the June 2005 form.	0	0	Date departed from theater 09/2002 - 12/2010. Today's date 01/09/2002 through 12/30/2010 for June 2005 form.	**Feature E.** Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
Question #2. Compared to before your most recent deployment, how would you rate your health in general now? ["Somewhat worse now than before I deployed or "Much worse now than before I deployed."]	Much better now than before I deployed, Somewhat better now than before I deployed, About the same as before I deployed, Somewhat worse now than before I deployed, Much worse now than before I deployed.	5	1	Much better… weighted as 0, Somewhat better… weighted as 0, About the same… weighted as 0, Somewhat worse… weighted as 1, Much worse… weighted as 1.	**Feature E.** Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
Question #5. During your deployment, were you wounded, injured assaulted, or otherwise physically hurt? [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature A.** Exposure to traumatic event in which both are present. (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person's response involved intense fear, helplessness, or horror.
Question #5a. IF YES, are you still having problems related to this wound, assault, or injury? [Yes/No/Unsure]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature A.** Exposure to traumatic event in which both are present. (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person's response involved intense fear, helplessness, or horror.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Question #6. Other than wounds or injuries, do you currently have a health concern or condition that you feel is related to your deployment? [Yes/No/Unsure]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature A.** Exposure to traumatic event in which both are present. (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person's response involved intense fear, helplessness, or horror.
Question #6a. IF YES, please mark the item(s) that best describes your deployment-related condition or concern: [Problems sleeping or still feeling tired after sleeping, Difficulty remembering, Increased irritability]	Chronic cough, Runny nose, Fever, Weakness, Headaches, Swollen stiff joints, Back pain, Muscle aches, Numbness, Skin disease, Ringing of the ears, Redness of eyes, Dimming of vision, Chest pain, Dizziness, Difficulty breathing, Diarrhea, Problems sleeping, Difficulty remembering, Increased irritability, Taking more risks, Other.	22	2 (if 9.c. is 1) or 3 (if 9.c. is 0)	Problems sleeping, Difficulty Remembering, and Increased irritability weighted as 1 respectively. The remaining responses are weighted as 0.	**Feature D.** Persistent symptoms of increased arousal (not persistent before the trauma), as indicated by two (or more) of the following: (1) Difficulty falling or staying asleep, (2) Irritability or outbursts of anger, (3) Difficulty concentrating.
Question #8. Since return from your deployment, have you had serious conflicts with your spouse, family members, close friends, or at work that continue to cause you worry or concern? [Yes/No]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature F.** The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
Question #9. Have you had any experience that was so frightening, horrible, or upsetting that, IN THE PAST MONTH, you…					
a. Have had nightmares about it or thought about it when you did not want to [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature B.1 and 2.** Traumatic event is re-experienced in one (or more) of the following ways: (1) Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions; and (2) Recurrent distressing dreams of the event.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
b. Tried hard not to think about it or went out of your way to avoid situations that remind you of it [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature C.1. and 2.** Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following: (1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma; (2) Efforts to avoid activities, places, or people that arouse recollections of the trauma.
c. Were constantly on guard, watchful, or easily startled [Yes/No]	Yes/No	2	1 (if 6.a. is 0) or 0 (if 6.a. is 1)	No weighted as 0 and Yes weighted as 1.	**Feature D.4.** Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following: (4) Hypervigilance; (5) Exaggerated startle response.
d. Felt numb or detached from others, activities, or your surroundings [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature C.5.** Persistent avoidance of stimuli… (5) Feeling of detachment or estrangement from others.
Question #11.a. Over the PAST MONTH, have you been bothered by the following problems? Little interest or pleasure in doing things. [Few or several days, More than half the days, Nearly every day]	Not at all, Few or several days, More than half the days, Nearly every day.	4	1	Not at all weighted as 0, Few or several weighted as 1, More than half weighted as 1, Nearly every day weighted as 1.	**Feature C.4.** Persistent avoidance of stimuli… (4) Marked diminished interest or participation in significant activities.
Question #12. If you checked off any problems or concerns on this questionnaire, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? [Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult]	Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult.	4	1	Not difficult weighted as 0, Somewhat difficult weighted as 1, Very difficult weighted as 1, Extremely difficult weighted as 1.	**Feature F.** The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
		96	***13***	***13***	For PTSD diagnostic criteria to be met, 13 total points must be achieved from Questions #2 through 12.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Independent and Dependent Variable name "PTSDSYMP"	1 or 0	2	1 = PTSD symptom criteria present, 0=PTSD symptom criteria not present		Dichotomous variable created based on responses from questions #2 through #12. Once PTSD criteria are met, weighted responses are captured and a new variable of PTSDSYMP is created. This dependent variable will be used for research questions 1 and 2. This independent variable will be used for research questions 3 and 4.
Independent Variable name "STATUS"	Active Duty, Selected Reserves - Reserve Unit, Selected Reserves - Reserve-AGR, Selected Reserves - Reserve-IMA, Selected Reserves - National Guard-Unit, Selected Reserves - National Guard-AGR, Ready Reserves - IRR, Ready Reserves - ING, Civilian Government Employee, Other	10	Active Duty = 1. Selected Reserves - Reserve - Unit = 2		Dichotomous variable created based on responses from Status Prior to Deployment. Only two responses will be recorded (Active Duty = 1 and Selected Reserve - Reserve - Unit =2. Once the status is determined, weighted responses are captured and a new variable of STATUS is created. This variable will be used for research questions 1, 3, and 4.
Independent Variable name "TOURHIST"	OIF, OEF, BOTH	3	OIF = Tour in OIF, OEF – Tour in OEF, BOTH – Tour in OIF and OEF.		3-level categorical variable created based on responses from Total Deployments in Past 5 Years. A response of OIF = any responses within the range of OIF 1, 2, 3, 4, 5 or more; a response of OEF = any responses within the range of OEF 1, 2, 3, 4, 5 or more, and a response of BOTH = any combination of responses in OIF and OEF. This variable will be used for research question 2.
Dependent Variable name "TOTALDEPL"	OEF 1, 2, 3, 4, 5 or more; OIF 1, 2, 3, 4, 5 or more..	10-Jan			Calculated metric dependent variable created based on responses from Total Deployments in Past 5 Years. This variable will be used for research question 3.
Physical Fitness Assessment 6 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Physical Fitness Assessment 12 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 18 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 24 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 30 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 36 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Independent Variable name "PFAAVERAGE"	Calculated average.	1	Resilience absent = 0-2.99, Resilience present = 3 - 5.	0-2.99 average scores do not meet criteria for resilience, 3.00-5.00 average scores do meet criteria for resilience.	Data will be captured and recorded as needed. Metric variable created based on the average of Physical Fitness Assessment scores for six cycles post individual augmentee tour. Once the average is obtained, a new variable of PFAAVERAGE will be created. This variable will be used for research question 4.

Note: Question 9 was adapted from the PC-PTSD questionnaire and Question 11 was adapted from the PHQ-2 questionnaire. The validity of its usage to detect PTSD symptomology can be found in Shen, Arkes, and Pilgrim (2009) and Kronke, Spitzer, and Williams (2003) respectively.

Appendix B: PDHRA DD Form 2900 Data Elements/PTSD Crosswalk (January 2008) and Physical Readiness Assessment/Resilience Data

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Social Security Number	Nine digit response	1	0	Not weighted.	Social Security Number will be removed and replaced with a standard identifier for statistical purposes only.
Today's Date	Nine digit response	1	0	Not weighted.	This is a date response of dd/mmm/yyyy. It will be used in a calculation for **Feature E** of PTSD diagnostic criteria.
Service Branch	Air Force, Army, Navy, Marine Corps, Coast Guard, Civilian Employee, Other	7	1	Navy = 1, All others = 0	Data will be captured and recorded as needed. The only category utilized for all research questions will be Navy = 1. All other Service Branch information will not be considered as it is outside the scope of this research.
Status Prior to Deployment	Active Duty, Selected Reserves - Reserve Unit, Selected Reserves - Reserve-AGR, Selected Reserves - Reserve-IMA, Selected Reserves - National Guard-Unit, Selected Reserves - National Guard-AGR, Ready Reserves - IRR, Ready Reserves - ING, Civilian Government Employee, Other	10	1 or 2	Active Duty = 1. Selected Reserves - Reserve - Unit = 2, All others = 0	Data will be captured and recorded as needed. The only category utilized for all research questions will be Active Duty = 1 and Selected Reserves - Reserve - Unit = 2. All other Status Prior to Deployment information will not be considered as it is outside the scope of this research.
Location of Operation	Country 1 and Months, Country 2 and Months, Country 3 and Months, Country 4 and Months, Country 5 and Months,	10	1 or 2	Iraq = 1, Afghanistan = 2, All others = 0.	Data will be captured and recorded as needed. The only category utilized for all research questions will be Iraq = 1 and Afghanistan = 2. All other Country data and all month data will not be considered as it is outside the scope of this research.
Total Deployments in Past 5 Years (OIF)	OIF 1, 2, 3, 4, 5 or more.	5	1 or 2 (or more)	OIF 1 = 1, OIF 2 = 2, OIF 3 = 3, OIF 4 = 4, OIF 5 < = 5	Data will be captured and recorded as needed. The only category utilized for research question 3.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Total Deployments in Past 5 Years (OEF)	OEF 1, 2, 3, 4, 5 or more.	5	1 or 2 (or more)	OEF 1 = 1, OEF 2 = 2, OEF 3 = 3, OEF 4 = 4, OEF 5 < = 5	Data will be captured and recorded as needed. The only category utilized for research question 3.
Date of departure from theater (dd/mmm/yyyy) - Today's date (dd/mmm/yyyy) >= 1 month and 1 day	The data range for this research is between September 1, 2002 and December 31, 2010. Data is captured on the January 2008 form as DD/MMM/YYYY for today's date, date arrived in theater, and date departed from theater.	0	0	Date departed from theater 01/09/2002 - 31/12/2010. Today's date 01/09/2002 through 12/30/2010 for January 2008 form.	**Feature E.** Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
Question #2. Compared to before your most recent deployment, how would you rate your health in general now? ["Somewhat worse now than before I deployed or "Much worse now than before I deployed."]	Much better now than before I deployed, Somewhat better now than before I deployed, About the same as before I deployed, Somewhat worse now than before I deployed, Much worse now than before I deployed.	5	1	Much better… weighted as 0, Somewhat better… weighted as 0, About the same… weighted as 0, Somewhat worse… weighted as 1, Much worse… weighted as 1.	**Feature E.** Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.
Question #4. During the past 4 weeks, how difficult have emotional problems (such as feeling depressed or anxious) made it for you to do your work, take care of things at home, or get along with other people? [Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult]	Not difficult at all, Somewhat difficult, Very difficult, Extremely difficult	4	1	Not difficult at all weighted as 0, Somewhat difficult weighted as 0, Very difficult weighted as 1, Extremely difficult weighted as 1.	**Feature F.** The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
Question #7. During your deployment, were you wounded, injured assaulted, or otherwise physically hurt? [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature A.** Exposure to traumatic event in which both are present. (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person's response involved intense fear, helplessness, or horror.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Question #7a. IF YES, are you still having problems related to this wound, assault, or injury? [Yes/No/Unsure]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature A.** Exposure to traumatic event in which both are present. (1) The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person's response involved intense fear, helplessness, or horror.
Question #8. Other than wounds or injuries, do you currently have a health concern or condition that you feel is related to your deployment? [Yes/No/Unsure]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature D.** Persistent symptoms of increased arousal (not persistent before the trauma), as indicated by two (or more) of the following: (1) Difficulty falling or staying asleep, (2) Irritability or outbursts of anger, (3) Difficulty concentrating.
Question #8a. IF YES, please mark the item(s) that best describes your deployment-related condition or concern: [Problems sleeping or still feeling tired after sleeping, Difficulty remembering, Increased irritability]	Fever, Cough, Trouble breathing, Bad headaches, Generally feeling weak, muscle aches, Swollen joints, Back pain, Numbness, Trouble hearing, Ringing in the ears, Watery eyes, Diming of vision, Chest pain, Dizzy, Diarrhea, Problems sleeping, Trouble concentrating, Forgetful, Hard to make up your mind, Increased irritability, Taking more risks, Skin disease, Other.	24	2 (if 12.c. is 1) or 3 (if 12.c. is 0)	Problems sleeping, Difficulty Remembering, and Increased irritability weighted as 1 respectively. The remaining responses are weighted as 0.	**Feature D.** Persistent symptoms of increased arousal (not persistent before the trauma), as indicated by two (or more) of the following: (1) Difficulty falling or staying asleep, (2) Irritability or outbursts of anger, (3) Difficulty concentrating.
Question #11. Since return from your deployment, have you had serious conflicts with your spouse, family members, close friends, or at work that continue to cause you worry or concern? [Yes/No/Unsure]	Yes/No/Unsure	3	1	No weighted as 0, Unsure weighted as 0, Yes weighted as 1.	**Feature F.** The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Question #12. Have you had any experience that was so frightening, horrible, or upsetting that, IN THE PAST MONTH, you…					
a. Have had nightmares about it or thought about it when you did not want to [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature B.1 and 2.** Traumatic event is re-experienced in one (or more) of the following ways: (1) Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions; and (2) Recurrent distressing dreams of the event.
b. Tried hard not to think about it or went out of your way to avoid situations that remind you of it [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature C.1. and 2.** Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following: (1) Efforts to avoid thoughts, feelings, or conversations associated with the trauma; (2) Efforts to avoid activities, places, or people that arouse recollections of the trauma.
c. Were constantly on guard, watchful, or easily startled [Yes/No]	Yes/No	2	1 (if 8.a. is 0) or 0 (if 8.a. is 1)	No weighted as 0 and Yes weighted as 1.	**Feature D.4.** Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following: (4) Hypervigilance; (5) Exaggerated startle response.
d. Felt numb or detached from others, activities, or your surroundings [Yes/No]	Yes/No	2	1	No weighted as 0 and Yes weighted as 1.	**Feature C.5.** Persistent avoidance of stimuli… (5) Feeling of detachment or estrangement from others.
Question #14.a. Over the PAST MONTH, have you been bothered by the following problems? Little interest or pleasure in doing things. [Few or several days, More than half the days, Nearly every day]	Not at all, Few or several days, More than half the days, Nearly every day.	4	1	Not at all weighted as 0, Few or several weighted as 1, More than half weighted as 1, Nearly every day weighted as 1.	**Feature C.4.** Persistent avoidance of stimuli… (4) Marked diminished interest or participation in significant activities.
		95	***13***	***13***	For PTSD diagnostic criteria to be met, 13 total points must be achieved from Questions #2 through 14a.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Independent and Dependent Variable name "PTSDSYMP"	1 or 0	2	1 = PTSD symptom criteria present, 0=PTSD symptom criteria not present		Dichotomous variable created based on responses from questions #2 through #12. Once PTSD criteria are met, weighted responses are captured and a new variable of PTSDSYMP is created. This dependent variable will be used for research questions 1 and 2. This independent variable will be used for research questions 3 and 4.
Independent Variable name "STATUS"	Active Duty, Selected Reserves - Reserve Unit, Selected Reserves - Reserve-AGR, Selected Reserves - Reserve-IMA, Selected Reserves - National Guard-Unit, Selected Reserves - National Guard-AGR, Ready Reserves - IRR, Ready Reserves - ING, Civilian Government Employee, Other	10	Active Duty = 1. Selected Reserves - Reserve - Unit = 2, All others will be coded 0.		Dichotomous variable created based on responses from Status Prior to Deployment. Only two responses will be recorded (Active Duty = 1 and Selected Reserve - Reserve - Unit =2. Once the status is determined, weighted responses are captured and a new variable of STATUS is created. This variable will be used for research questions 1, 3, and 4.
Independent Variable name "TOURHIST"	OIF, OEF, BOTH	3	OIF = Tour in OIF, OEF – Tour in OEF, BOTH – Tour in OIF and OEF.		3-level categorical variable created based on responses from Total Deployments in Past 5 Years. A response of OIF = any responses within the range of OIF 1, 2, 3, 4, 5 or more; a response of OEF = any responses within the range of OEF 1, 2, 3, 4, 5 or more, and a response of BOTH = any combination of responses in OIF and OEF. This variable will be used for research question 2.
Dependent Variable name "TOTALDEPL"	OEF 1, 2, 3, 4, 5 or more; OIF 1, 2, 3, 4, 5 or more.	10-Jan			Calculated metric dependent variable created based on responses from Total Deployments in Past 5 Years. This variable will be used for research question 3.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Physical Fitness Assessment 6 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 12 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 18 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding..		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 24 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 30 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.
Physical Fitness Assessment 36 months post individual augmentee tour	Scores are Failure, Satisfactory, Good, Excellent, or Outstanding.	5	0=Failure, 1=Satisfactory, 2=Good, 3=Excellent, 4=Outstanding.		Data will be captured and recorded as needed. The only category needed and utilized for research question 4. All Physical Fitness Assessment scores will be summed and averaged for six cycles post individual augmentee tour.

Statement Number/Variable Name	Variable Responses	Total Variable Responses	Weighted Responses Needed	Weight/ Calculation	Remarks, Research Questions, DSM-IV-TR Feature Element, Hypothesis, and/or Analysis
Independent Variable name "PFAAVERAGE"	Calculated average.	1	Resilience absent = 0-2.99, Resilience present = 3 - 5.	0-2.99 average scores do not meet criteria for resilience, 3.00-5.00 average scores do meet criteria for resilience.	Data will be captured and recorded as needed. Metric variable created based on the average of Physical Fitness Assessment scores for six cycles post individual augmentee tour. Once the average is obtained, a new variable of PFAAVERAGE will be created. This variable will be used for research question 4.

Note: Question 12 was adapted from the PC-PTSD questionnaire and Question 14 was adapted from the PHQ-2 questionnaire. The validity of its usage to detect PTSD symptomology can be found in Shen, Arkes, and Pilgrim (2009) and Kronke, Spitzer, and Williams (2003)

Appendix C: Department of the Navy Data Usage Agreement

DATA USE AGREEMENT

This Data Use Agreement ("Agreement"), effective as of September 13, 2014 ("Effective Date"), is entered into by and between Thomas J. Palmer, BS, MS, PhD(ABD) ("Data Recipient") and Navy/Marine Corps Public Health Center ("Data Provider"). The purpose of this Agreement is to provide Data Recipient with access to a Limited Data Set ("LDS") for use in research **in accord with laws and regulations of the governing bodies associated with the Data Provider, Data Recipient, and Data Recipient's educational program.** In the case of a discrepancy among laws, the agreement shall follow whichever law is more strict.

1. Definitions. Due to the study's affiliation with Laureate, a USA-based company, unless otherwise specified in this Agreement, all capitalized terms used in this Agreement not otherwise defined have the meaning established for purposes of the USA "HIPAA Regulations" and/or "FERPA Regulations" codified in the United States Code of Federal Regulations, as amended from time to time.

2. Preparation of the LDS. Data Provider shall prepare and furnish to Data Recipient a LDS in accord with any applicable laws and regulations of the governing bodies associated with the Data Provider, Data Recipient, and Data Recipient's educational program.

3. Data Fields in the LDS. **No direct identifiers such as names may be included in the Limited Data Set (LDS).** In preparing the LDS, Data Provider shall include the **data fields specified as follows**, which are the minimum necessary to accomplish the research: Post Deployment Health Reassessment (DD Form 2900 – June 2005) Unique Identifier (removal of SSN used to link PDHRA and PRIMS data), Today's Date, Service Branch, Status Prior To Deployment, Location Of Operation, Total Deployments In Past 5 Years (OIF), Total Deployments In Past 5 Years (OEF), Date Of Departure From Theater, Questions #2, 5, 5a, 6, 6a, 8, 9a, 9b, 9c, 9d, 11a, 12; Post Deployment Health Reassessment (DD Form 2900 – July 2008) Unique Identifier (removal of SSN used to link PDHRA and PRIMS data), Today's Date, Service Branch, Status Prior To Deployment, Location Of Operation, Total Deployments In Past 5 Years (OIF), Total Deployments In Past 5 Years (OEF), Date Departure From Theater, Questions #2, 4, 7, 7a, 8, 8a, 11, 12, 12a, 12b, 12c, 12d, 14a; Physical Health Readiness Information Management System Physical Fitness Assessment scores 6-36 months post IA tour.

4. Responsibilities of Data Recipient. Data Recipient agrees to:

   a. Use or disclose the LDS only as permitted by this Agreement or as required by law;

   b. Use appropriate safeguards to prevent use or disclosure of the LDS other than as permitted by this Agreement or required by law;

c. Report to Data Provider any use or disclosure of the LDS of which it becomes aware that is not permitted by this Agreement or required by law;

d. Require any of its subcontractors or agents that receive or have access to the LDS to agree to the same restrictions and conditions on the use and/or disclosure of the LDS that apply to Data Recipient under this Agreement; and

e. Not use the information in the LDS to identify or contact the individuals who are data subjects.

5. Permitted Uses and Disclosures of the LDS. Data Recipient may use and/or disclose the LDS **for its Research activities only.**

6. Term and Termination.

a. Term. The term of this Agreement shall commence as of the Effective Date and shall continue for so long as Data Recipient retains the LDS, unless sooner terminated as set forth in this Agreement.

b. Termination by Data Recipient. Data Recipient may terminate this agreement at any time by notifying the Data Provider and returning or destroying the LDS.

c. Termination by Data Provider. Data Provider may terminate this agreement at any time by providing thirty (30) days prior written notice to Data Recipient.

d. For Breach. Data Provider shall provide written notice to Data Recipient within ten (10) days of any determination that Data Recipient has breached a material term of this Agreement. Data Provider shall afford Data Recipient an opportunity to cure said alleged material breach upon mutually agreeable terms. Failure to agree on mutually agreeable terms for cure within thirty (30) days shall be grounds for the immediate termination of this Agreement by Data Provider.

e. Effect of Termination. Sections 1, 4, 5, 6(e) and 7 of this Agreement shall survive any termination of this Agreement under subsections c or d.

7. Miscellaneous.

a. Change in Law. The parties agree to negotiate in good faith to amend this Agreement to comport with changes in federal law that materially alter either or both parties' obligations under this Agreement. Provided however, that if the parties are unable to agree to mutually acceptable amendment(s) by the compliance date of the change in applicable law or regulations, either Party may terminate this Agreement as provided in section 6.

b. Construction of Terms. The terms of this Agreement shall be construed to give effect to applicable federal interpretative guidance regarding the HIPAA Regulations.

c. No Third Party Beneficiaries. Nothing in this Agreement shall confer upon any person other than the parties and their respective successors or assigns, any rights, remedies, obligations, or liabilities whatsoever.

d. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

e. Headings. The headings and other captions in this Agreement are for convenience and reference only and shall not be used in interpreting, construing or enforcing any of the provisions of this Agreement.

IN WITNESS WHEREOF, each of the undersigned has caused this Agreement to be duly executed in its name and on its behalf.

DATA PROVIDER

Signed: _____ 28NOV14

Print Name: Christopher P. Rennix, ScD, MS, CIH

Print Title: Director, NMCHPC EpiData Center

DATA RECIPIENT

Signed: _____

Print Name: Thomas J. Palmer

Print Title: Researcher, Walden University

Table 1.

*Presence of PTSD Symptomology * Component Prior To Deployment Crosstabulation*

			Component Prior To Deployment		Total
			Active Duty Component	Reserve Component	
Presence of PTSD Symptomology	PTSD Symptomology Not Present	Count	278	273	551
		% within Presence of PTSD Symptomology	50.5%	49.5%	100.0%
		% within Component Prior To Deployment	97.5%	95.8%	96.7%
		% of Total	48.8%	47.9%	96.7%
	PTSD Symptomology Present	Count	7	12	19
		% within Presence of PTSD Symptomology	36.8%	63.2%	100.0%
		% within Component Prior To Deployment	2.5%	4.2%	3.3%
		% of Total	1.2%	2.1%	3.3%
Total		Count	285	285	570
		% within Presence of PTSD Symptomology	50.0%	50.0%	100.0%
		% within Component Prior To Deployment	100.0%	100.0%	100.0%
		% of Total	50.0%	50.0%	100.0%

Table 2.

*Presence of PTSD Symptomology * Component Prior To Deployment Chi-Square Test*

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.361[a]	1	.243		
Continuity Correction[b]	.871	1	.351		
Likelihood Ratio	1.377	1	.241		
Fisher's Exact Test				.351	.176
N of Valid Cases	570				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.50.

b. Computed only for a 2x2 table

Table 3.

*Presence of PTSD Symptomology * Tour History Crosstabulation*

			Tour History			Total
			Both OIF and OEF	Operation Enduring Freedom	Operation Iraqi Freedom	
Presence of PTSD Symptomology	PTSD Symptomology Not Present	Count	179	187	185	551
		% within Presence of PTSD Symptomology	32.5%	33.9%	33.6%	100.0%
		% within Tour History	94.2%	98.4%	97.4%	96.7%
		% of Total	31.4%	32.8%	32.5%	96.7%
	PTSD Symptomology Present	Count	11	3	5	19
		% within Presence of PTSD Symptomology	57.9%	15.8%	26.3%	100.0%
		% within Tour History	5.8%	1.6%	2.6%	3.3%
		% of Total	1.9%	0.5%	0.9%	3.3%
Total		Count	190	190	190	570
		% within Presence of PTSD Symptomology	33.3%	33.3%	33.3%	100.0%
		% within Tour History	100.0%	100.0%	100.0%	100.0%
		% of Total	33.3%	33.3%	33.3%	100.0%

Table 4

*Presence of PTSD Symptomology * Tour History*
Chi-Square Test

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.662[a]	2	.059
Likelihood Ratio	5.488	2	.064
N of Valid Cases	570		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.33.

Table 5.

PTSD Symptomology and ComponentDescriptive Statistics

Dependent Variable: Total Number of Deployments

Presence of PTSD Symptomology	Component Prior To Deployment	Mean	Std. Deviation	N
PTSD Symptomology Not Present	Active Duty Component	1.69	.940	278
	Reserve Component	1.52	.753	273
	Total	1.61	.856	551
PTSD Symptomology Present	Active Duty Component	2.00	1.414	7
	Reserve Component	2.25	1.138	12
	Total	2.16	1.214	19
Total	Active Duty Component	1.70	.952	285
	Reserve Component	1.55	.784	285
	Total	1.63	.875	570

Table 6.

PTSD Symptomology, Status, and Total Deployments Tests of Between-Subjects Effects

Dependent Variable: Total Number of Deployments

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9.795[a]	3	3.265	4.345	.005	.023
Intercept	238.902	1	238.902	317.895	.000	.360
PTSDSYMP	4.562	1	4.562	6.070	.014	.011
STATUS	.027	1	.027	.036	.849	.000
PTSDSYMP * STATUS	.757	1	.757	1.008	.316	.002
Error	425.356	566	.752			
Total	1946.000	570				
Corrected Total	435.151	569				

a. R Squared = .023 (Adjusted R Squared = .017)

Table 7.

PTSD Symptomology and Number of Deployments Univariate Tests

Dependent Variable: Total Number of Deployments

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	**4.562**	**1**	**4.562**	**6.070**	**.014**	**.011**
Error	**425.356**	**566**	**.752**			

The F tests the effect of Presence of PTSD Symptomology. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Table 8

PTSD Symptomology and Total Deployments Pairwise Comparisons

Dependent Variable: Total Number of Deployments

(I) Presence of PTSD Symptomology	(J) Presence of PTSD Symptomology	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
PTSD Symptomology Not Present	PTSD Symptomology Present	-.516*	.209	.014	-.927	-.105
PTSD Symptomology Present	PTSD Symptomology Not Present	.516*	.209	.014	.105	.927

Based on estimated marginal means

*. The mean difference is significant at the

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 9.

Component and Total Deployments Pairwise Comparisons

Dependent Variable: Total Number of Deployments

(I) Component Prior To Deployment	(J) Component Prior To Deployment	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Active Duty Component	Reserve Component	-.040	.209	.849	-.451	.372
Reserve Component	Active Duty Component	.040	.209	.849	-.372	.451

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 10.

Component and Presence of Individual Resilience Descriptive Statistics

Dependent Variable: Presence of Individual Resilience

Presence of PTSD Symptomology	Component Prior To Deployment	Mean	Std. Deviation	N
PTSD Symptomology Not Present	Active Duty Component	2.30	.684	266
	Reserve Component	2.18	.763	233
	Total	2.25	.724	499
PTSD Symptomology Present	Active Duty Component	2.31	.410	7
	Reserve Component	1.94	.371	5
	Total	2.16	.423	12
Total	Active Duty Component	2.30	.678	273
	Reserve Component	2.17	.757	238
	Total	2.24	.718	511

Table 11.

PTSD Symptomology, Status, and Individual Resilience Tests of Between-Subjects Effects

Dependent Variable: Presence of Individual Resilience

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2.457[a]	3	.819	1.593	.190	.009
Intercept	217.534	1	217.534	423.119	.000	.455
PTSDSYMP	.149	1	.149	.289	.591	.001
STATUS	.712	1	.712	1.385	.240	.003
PTSDSYMP * STATUS	.176	1	.176	.343	.558	.001
Error	260.659	507	.514			
Total	2835.000	511				
Corrected Total	263.116	510				

a. R Squared = .009 (Adjusted R Squared = .003)

Table 12.

PTSD Symptomology and Individual Resilience Pairwise Comparisons

Dependent Variable: Presence of Individual Resilience

(I) Presence of PTSD Symptomology	(J) Presence of PTSD Symptomology	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
PTSD Symptomology Not Present	PTSD Symptomology Present	.114	.212	.591	-.303	.531
PTSD Symptomology Present	PTSD Symptomology Not Present	-.114	.212	.591	-.531	.303

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 13.

Component and Individual Resilience Pairwise Comparisons

Dependent Variable: Presence of Individual Resilience

(I) Component Prior To Deployment	(J) Component Prior To Deployment	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Active Duty Component	Reserve Component	.250	.212	.240	-.167	.667
Reserve Component	Active Duty Component	-.250	.212	.240	-.667	.167

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 14.

Diagnostic criteria for 309.81 Posttraumatic Stress Disorder

Feature		Description	
A.	Exposure to traumatic event in which both are present	(1)	The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others
		(2)	The person's response involved intense fear, helplessness, or horror
B.	Traumatic event is reexperienced in one (or more) of the following ways	(1)	Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions
		(2)	Recurrent distressing dreams of the event
		(3)	Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated.)
		(4)	Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
		(5)	Physiological reactivity on exposure to internal or external cures that symbolize or resemble an aspect of the traumatic event
C.	Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following	(1)	Efforts to avoid thoughts, feelings, or conversations associated with the trauma
		(2)	Efforts to avoid activities, places, or people that arouse recollections of the trauma
		(3)	Inability to recall an important aspect of the trauma
		(4)	Markedly diminished interest or participation in significant activities
		(5)	Feeling of detachment or estrangement from others
		(6)	Restricted range of affect (e.g. unable to have loving feelings)
		(7)	Sense of a foreshortened future (e.g. does not expect to have a career, marriage, children, or a normal life span)
D.	Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following	(1)	Difficulty falling or staying asleep
		(2)	Irritability of outbursts of anger
		(3)	Difficulty concentrating
		(4)	Hypervigilance
		(5)	Exaggerated startle response
E.	Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month		
F.	The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning		

Note: Acute Specification exists if duration of symptoms is less than 3 months, Chronic Specification exists if duration of symptoms is 3 months or more, and With Delayed Onset exists if onset of symptoms is at least 6 months after the stressor.
*Source:*DSM-IV-TR (APA, 2000)

Figure 1. Decision matrix for PTSD(DD form 2900)(June 2005)

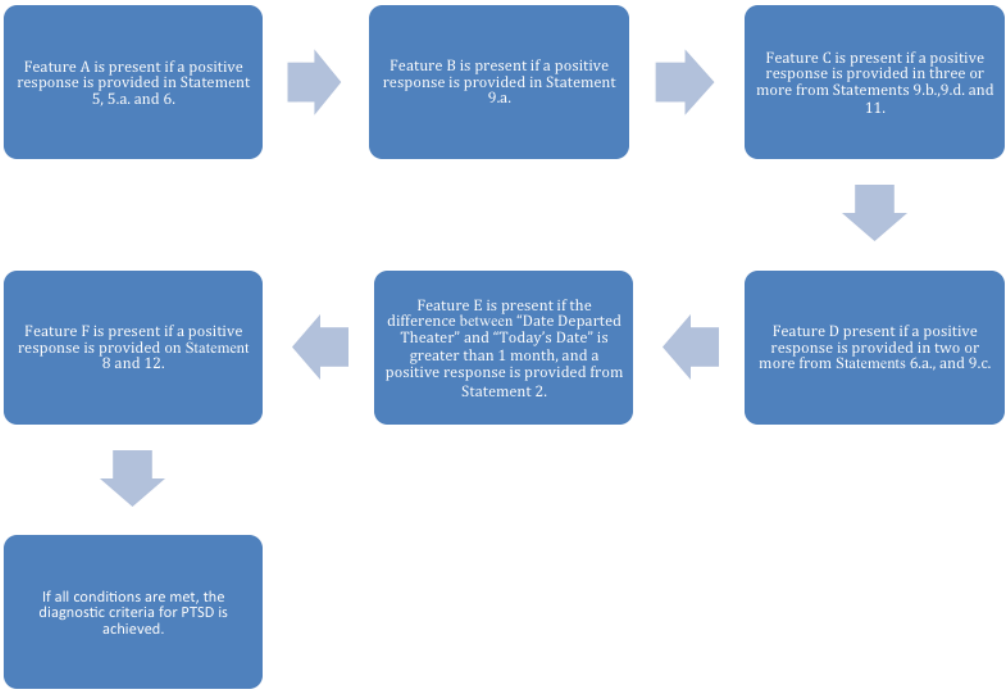

Figure 2. Decision matrix for PTSD(DD form 2900)(January 2008)