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The Effects of Combat Exposure on Post-Deployment Coping Deficits in OEF/OIF/OND Veterans

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THE EFFECTS OF COMBAT EXPOSURE ON POST-DEPLOYMENT

COPING DEFICITS IN OEF/OIF/OND VETERANS

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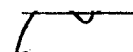
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A Dissertation Submitted to the Faculty
of Old Dominion University in Partial Fulfillment of the
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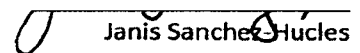
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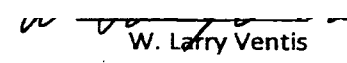
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ABSTRACT

THE EFFECTS OF COMBAT EXPOSURE ON POST-DEPLOYMENT COPING DEFICITS IN OEF/OIF/OND VETERANS

Alex Dryden

The Virginia Consortium Program in Clinical Psychology, 2012

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As members of the United States Military return stateside from the combat zones in Iraq and Afghanistan, an increasing number of veterans exposed to combat are reporting symptoms of posttraumatic stress disorder (PTSD) as well as other significant detrimental impacts on their ability to cope with the stressful situations they experienced in the combat arena. The purpose of the current study is to ascertain the presence of posttraumatic stress disorder in veterans returning from Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), and Operation New Dawn (OND), the potential impairment in their abilities to cope with the combat-related stress. The comparison groups included 1,824 veterans who participated in the Mental Illness Research, Education and Clinical Centers (MIRECC) research project, and were recruited from Veterans Administration Centers in Durham, North Carolina, Salisbury, North Carolina, Richmond, Virginia, Hampton, Virginia and Salem, Virginia. The research study included 1,824 participants, of which 1451 were male and 373 were female. The study included 822 Caucasians, 896 African Americans, 41 Hispanic Americans, 24 Asian Americans, and 8 Native Americans. Each of the participants completed measures related to mental, emotional, social and occupational functioning, and provided information regarding personal and familial history, prior exposure to traumatic experiences and levels of combat experiences in theater. Analyses indicated that symptoms of PTSD and trauma are positively correlated with intensity of exposure to combat experiences, and that symptoms of trauma and exposure to combat were both related to impaired coping abilities, alcohol misuse and substance use. Analyses indicated that combat exposure and coping abilities predicted PTSD, specifically symptom severity related to PTSD, and that

exposure to combat leads to increased prevalence and severity of symptoms of PTSD, independent of coping skills and social support. Veterans reporting higher levels of combat exposure demonstrated a higher prevalence of PTSD and predicted a negative impact on their coping abilities. Results indicated that experiences of trauma before, during and after deployment contributed to the development of PTSD symptoms. Gender and race differences, as well as the effects of education and the limitations of the present study and its implications for future research are discussed.

This dissertation is dedicated to my parents, Raymond and Tish Dryden, who never let me go out and play until I got my homework finished. You taught me to believe that I could achieve the seemingly impossible if I believed in myself. It looks like that really paid off, Mom and Dad!

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CHAPTER I

INTRODUCTION

Posttraumatic stress disorder (PTSD) is a type of anxiety disorder that has been receiving increasing public attention in recent years, as its prevalence rates continue to climb, and the associated health risks increase (Kulka et al., 1990b; Ozer, Best, Lipsey, and Weiss, 2008; Weiss et al., 1992). The Global War on Terror (GWOT) that began after the events of September, 11, 2001, saw U.S. military personnel, active and reserve duty called to action (Hoyt, 2006). Worldwide since World War II, it has been reported that over 20 million deaths can be attributed to over 127 wars (de Girolamo, 1993). As a human experience, war is not a new phenomena. Its effects are far reaching, and can have a potentially significant impact on those experiencing it first hand on the battlefield.

The wars in Afghanistan and Iraq have been reported to be horrific and life threatening, with an estimated 6,000 troops having lost their lives as of 2010 (DoD, 2011). With the number of troops returning from campaigns in Iraq and Afghanistan steadily increasing, a noticeable increase in the prevalence of PTSD is also being demonstrated in the number of military personnel reporting experiencing symptoms of PTSD (Hoge, Auchterlonie, and Milliken, 2006; Hoge et al., 2004). Military personnel who have been exposed to high combat situations are expected to exhibit such symptomatology (Strachan, Gros, Ruggiero, Lejuez and Aciermo, 2011). However, a new trend is beginning to emerge: persons reporting low combat exposure are presenting with increasing incidences of combat related stress as well as symptoms of PTSD (Hoge, Auchterlonie, and Miliken, 2006). Some researchers posit that an explanation for this phenomenon may be explained by gender differences, as women typically experience less direct combat exposure, yet have presented with symptoms of PTSD (Street, Vogt, and Dutra, 2009). Military psychologists and medical personnel have begun looking into the causes of this phenomenon in order to determine how gender and other factors such as race may be impacting veterans with low combat exposure that develop symptoms of PTSD (Kulka et al., 1990b; Vogt et

al., 2011). Specifically, researchers have begun to examine whether various types of coping mechanisms, both adaptive and maladaptive, as well as potential risk and protective factors can be used to predict symptoms of PTSD in troops exposed to high combat versus low combat situations (Renshaw, 2011; Rodrigues and Renshaw, 2010).

CHAPTER II

LITERATURE REVIEW

Key Constructs

PTSD involves the exposure to a traumatic event, which involves “actual or threatened death or serious injury” leaving the individual feeling fearful, helpless and in a state of panic or horror (American Psychiatric Association, 2000). Persons with PTSD may experience a psychobiological reaction that involves intrusive thoughts related to the trauma (Litz and Keane, 1989; Resick and Schnicke, 1992), and often report experiencing recurrent disturbing dreams and feelings (Vogt et al., 2011). PTSD also includes symptoms such as increased arousal, hypervigilance and an exaggerated startle response, avoidance of situations that remind one of the traumatic experience, and a numbing of intense emotions (American Psychiatric Association, 2000; Litz and Keane, 1989; Marx and Sloane, 2005; Morina, 2007; Resick and Schnicke, 1992; Solomon and Mikulincer, 2007). These symptoms have the potential to interfere with daily living across multiple domains of functioning, including in the home, at work and in the community. Moreover, individuals presenting with these symptoms experience a negative impact in both their interpersonal relationships and social functioning (American Psychiatric Association, 2000).

Research on PTSD prevalence suggests that at least two thirds of adults in the United States have experience with at least one traumatic event over the course of their lives (Resnick, Kilpatrick, and Dansky, 1993). It has also been suggested that experience with multiple traumatic events is not uncommon (Kessler, et al., 1995). Studies of persons diagnosed with PTSD have indicated negative physical and mental health consequences resulting from exposure to traumatic experiences (Resnick, et al., 1997). Persons diagnosed with depression and/or anxiety comorbid with PTSD have reported more negative impact on their physical and mental health (Clum et al., 2000). For example, Rauch, et al. (2010), found that veterans with PTSD and comorbid depression had a significant negative impact on their reported health satisfaction.

For persons who develop PTSD, the course of the disorder begins with a traumatic

incident that impacts an individual's ability to cope, which subsequently develops into a traumatic reaction, and is characterized by the symptoms described previously (Everly, Jr., 1999). It is particularly important to note that the traumatic incident is perceived as frightening by the average person, and involves life events which are potentially life threatening and are out of the control of the individual (Flannery, 1999; Flannery, Everly, and Eyler, 2000). , The traumatic or critical incident is distinct from the trauma itself (Flannery and Everly, 2000). The crisis or trauma is the reaction or the toll it takes on the person(s) bearing witness to, or actually experiencing the event, and can also be the result of exposure to critical incidents, whether they are short term or long term in duration (Caplan, 1961; Caplan, 1964; Everly and Mitchell, 1999). The experience of trauma is very idiosyncratic and can be experienced differently for individuals based on a wide variety of factors, including available psychological resources, early trauma history, cognitive ability level, religious/spiritual beliefs, or a variety of other biopsychosocial factors (Drescher and Foy, 1995; King, King, Gudanowski and Foy, 1996; Zaidi and Foy, 1994). Examples of traumatic experiences include sexual, physical, or emotional abuse, car accidents, natural disasters, terrorism, traumatic loss, involvement in combat, or exposure to violent crime (Everly and Lating, 1995; Everly, 2000; Gil and Caspi, 2006; Gleser, Green, and Winget, 1981; Green, Lindy, Grace et al., 1990; Kilpatrick et al., 1985; Mayou, Ehlers, and Bryant, 2002; McFarlane, 1988; Nadelson, Notman, Zackson, and Gornick, 1982; Shore, Tatum and Volmer, 1986b; Smith, North, McCool, and Shea, 1990; Steinglass and Gerrity, 1990; Subica, Claypool and Wylie, 2012; Winfield, George, Swartz, and Blazer, 1990).

Many people become exposed to critical incidents throughout their lifetime, however only a certain percentage of those people actually develop PTSD (Brewin, Andrews, and Valentine, 2000; Yehuda, 1999; Yehuda and McFarlane, 1995). It has been estimated that over the lifespan, 5% of men and 10% of women in the United States have exposure to traumatic experiences leading to the development of PTSD (Kinder, et al., 2008), and more than one third of people who develop PTSD at some point in their lives fail to recover completely (Kessler,

Sonnega, Bromet, Hughes, and Nelson, 1995). In the general population, PTSD is estimated to be prevalent among 8% of United States citizens (Kessler, Sonnega, Bromet, Hughes, and Nelson, 1995).

Common symptoms of PTSD can include depression, anxiety, intense guilt and self-loathing (National Institute of Mental Health, 2002). Other symptoms of PTSD can include disturbances in emotional experience and expression, as well as social impairment, interpersonal relationship problems, tendencies towards social isolation, feelings of alienation, aggressive tendencies towards others and self-injurious behavior (Brewin and Holmes, 2003). In some occasions, persons with PTSD experience alexithymia, or a difficulty recognizing and labeling their emotions (Taylor, Bagby, and Parker, 1997; Krystal and Krystal, 1988). Trauma survivors may also experience memory loss and related confusion, a fragmentation of personality, intrusive memories, flashbacks, and impairment in sleep (Litz and Keane, 1989; Resick and Schnicke, 1992). In effect, people can become “stuck” in the trauma, appearing psychologically frozen in time (van der Kolk, McFarlane, and Weisaeth, 2006). Another characteristic of the PTSD symptomatology is that those diagnosed tend to frequently relive or re-experience various aspects of the traumatic events. As a result, individuals tend to avoid experiences that remind them of the incident (Herman, 1997).

Traumatic Experiences with Military Combat Veterans

Military personnel are at a higher risk for exposure to traumatic experiences (Hoge, 2006, and Hoge, et al., 2004). For those Americans serving in the military, exposure to combat stress in war zones is associated more strongly with the severity of PTSD symptoms (Fontana and Rosenheck, 1994, Helzer, Robins and McEnvoy, 1987, and Shore, Tatum and Vollmer, 1986a). The phenomenon of combat exposure commonly includes experiences such as direct exposure to combat situations and firefights. Research in recent years has demonstrated the importance of a multidimensional definition of combat exposure which also includes exposure to violence and

exposure to persons who have been injured, have life threatening wounds, or have expired (Egendorf, Kadushin, Laufer, Rothbart, and Sloan, 1981; Laufer, Gallops, and Frey-Wouters, 1984). Many veterans who have experienced combat-related trauma exhibit difficulty with symbolically processing information after a trauma, which is a common factor in PTSD (van der Kolk, and Fislser, 1995). Dohrenwend, et al. (2006) reported that 18.7% of Vietnam veterans developed combat-related PTSD, and that eleven to twelve years after the war 9.1% were still experiencing the debilitating effects of PTSD. According to a national survey, an estimated 31% of men and 26% of female Vietnam veterans attributed the development of PTSD to traumatic incidents experienced during their service in the military (Kulka, et al., 1990). In contrast, Gulf War veterans from Operation Desert Storm diagnosed with PTSD account for only approximately 1%, perhaps due to the different nature of that war (Barrett, et al., 2002). It is estimated that among returning military service personnel, not physically injured in combat, 12.6% of those who served in Iraq and 6.2% of those who served in Afghanistan will develop PTSD (Smith, et al., 2008). With regards to those who experienced physical combat injury, the prevalence rates of PTSD more than doubles at 32% (Hoge, 2006, and Hoge, et al., 2004).

The first Gulf War and Operations Iraqi Freedom, Enduring Freedom and New Dawn have produced rather striking differences with regards to effects of combat exposure on military veterans. Research has noted the difference in prevalence rates of PTSD from the first Gulf War to Operations Enduring Freedom and Iraqi Freedom, with the Gulf War prevalence rate close to 10.1% ten years after the war (Kang et al., 2003), with 12.9% specifically among U.S. Army soldiers, 12.2% of Marine Corps soldiers in Iraq during OIF, and 6.2% among U.S. Army soldiers in Afghanistan (Hoge et al., 2004). Reservists and National Guard soldiers also demonstrated a significant difference in prevalence rates of PTSD, with an increase from 2.0% during the Gulf War (Black et al., 2004; Schwartz et al., 1997) to 12.7% in Operation Iraqi Freedom (Milliken, Auchterlonie, and Hoge, 2007). It has been suggested that 18% of veterans returning from Iraq

and 11% of those returning from Afghanistan are at a high risk of PTSD due to their combat exposure (Hoge, et al., 2004). Once in combat zones, these military personnel were potentially exposed to traumatic situations, and have returned experiencing symptoms of anxiety, depression and PTSD. This prompted the creation of the term “combat stress reaction,” by the Department of Defense in 1999 (Figley and Nash, 2007).

Factors influencing this impairment in functioning may include that, different from the wars in Vietnam and the Persian Gulf, deployments during OIF and OEF have been for longer durations and military personnel had less time before redeployment (Tanielian and Jaycox, 2008). Additionally, more National Guard and Reservists, many of whom are older and more established in their civilian lives, as well as a higher proportion of female service personnel than ever before, are being deployed and experiencing high combat situations (Schnurr et al., 2009). Active duty and National Guard/Reservist military service members are subjected to numerous and constant threats to their personal safety and integrity, while expending efforts to cognitively manage questions of personal stability and control, as well as environmental predictability, which can negatively impact their stress-resilience (Hoyt, G., 2006).

Further complicating the issue of combat related stress and trauma is that a proportion of the United States armed services personnel serving in the campaigns in both Iraq and Afghanistan have been exposed to traumatic experiences prior to deployment. One study reported that 9.3% of OEF/OIF veterans demonstrated either depression, generalized anxiety disorder or PTSD prior to their deployment to the combat arena (Hoge, Castro, Messer, McGurk, Cotting, and Koffman (2004). Trauma experiences prior to military service, for example physical and sexual abuse in childhood, appear to predispose a person to developing combat trauma / PTSD as well as an increasing severity of military PTSD related symptomatology (Bremner, et al., 1993, King, King, and Foy, 1996, Smith, et al., 1999). This poses the question of coping strategies, and whether military personnel who have been exposed to traumatic situations prior to their most recent deployments are more or less negatively affected by their experiences in Iraq and Afghanistan.

Parsing out which symptoms are related to the most recent traumatic experiences related to trauma is difficult to study empirically.

Symptoms of PTSD and trauma are not only experienced by military service personnel who are more directly exposed to combat situations. It has been found that combat veterans who have not been diagnosed with PTSD still demonstrate the potential to exhibit symptoms of the disorder (Hoge, Auchterlonie, and Miliken, 2006). To address this finding, the Navy, Marines and Air Force jointly changed the term “combat stress reaction” to “combat-operational stress reaction” (COSR) to more adequately address the numerous physical, mental and emotional signs of exposure to combat stress situations (Brusher, 2007). This change in terminology reflects the idea that many military personnel experience stress reactions during peacetime operations in a similar fashion to military personnel in active combat situations (Figley and Nash, 2007). Clinicians are able to distinguish between military personnel that have been exposed to higher levels of combat, and those who have been exposed to lower levels through the use of a variety of measures as the Combat Exposure Scale (Keane, Fairbank, Caddell, Zimering, Taylor, and Mora, 1989) and the Traumatic Life Exposure Questionnaire (Goodman, Corcoran, Turner, Yuan, and Green, 1998) These measures provide a wealth of information regarding a person’s combat exposure, as well as their own perceptions regarding the experience.

Many of the mental health problems experienced by combat veterans are traumatic and can even be disabling (Dohrenwend, et al., 2006). Combat experiences can include situations which are life-threatening, involve horrific loss and moral injury, while also promoting high levels of fear (Nash, 2007). Gray, et al. (2011) describe moral injury as a “syndrome of shame, self-handicapping, anger, and demoralization that occurs when deeply held beliefs and expectations about moral and ethical conduct are transgressed.” Among active duty and National Guard service members, with regards to functional impairment, the development of PTSD was evidenced between 5.6% to 11.3%, with depression ranging from 5.0% to 8.5%, while 14% of all

soldiers reported functional impairment related to both PTSD and depression, ranging between 8.5% and 14% (Thomas et al., 2010). Recent studies have found that due to their experiences in combat and resulting psychiatric symptomatology, OIF/OEF veterans are experiencing increasing risk of unemployment (Resnick and Rosenheck, 2008; Walker, 2008), an 85% greater risk of becoming homeless (O'Connell, Kaspro and Rosenheck, 2008), and divorce/marital instability (Milliken, Auchterlonie, and Hoge, 2007; Mulhall, 2009; Peebles-Kleiger and Kleiger, 1994).

Importance of the Study

Due to the fact that PTSD has empirically demonstrated a negative and damaging impact on a person's mental health and available psychological resources, it is common for individuals diagnosed with PTSD to have poor and / or limited coping skills. Residual stress from exposure to traumatic circumstances creates impairment in daily functioning and increased risk for potentially dangerous, risk taking behavior (Foy, Sipprelle, Rueger and Carroll, 1984, and Goy and Card, 1987). For example, individuals diagnosed with PTSD are at an increased risk for substance abuse and addiction (National Institute of Mental Health, 2002). Such addiction problems are often associated with a breakdown in a person's ability to cope with any number of stressful stimuli. It was during the Civil War that the first documented cases of substance abuse problems directly related to military service were documented, often associated with self-medicating, as soldiers were utilizing medications that were commonly prescribed for the relief of pain (Dean, 1997). As in times past, current veterans may engage in substance use to self-medicate to alleviate pain and other physical and mental symptoms associated with trauma (Nampiarampil, 2008). Another maladaptive coping strategy that can be closely related to PTSD among veterans is intimate partner physical and psychological violence (Coker, et al., 2002, Taft, Murphy, King, Dedyne, and Musser, 2005). A recent study found that the rate of intimate partner physical violence among veterans is as much as three times higher than what is represented among the civilian population (Marshall, Panuzio, and Taft, 2005). Moreover, veterans diagnosed with PTSD exhibited higher levels of relationship dissatisfaction and intimate

partner aggression as compared to veterans without a diagnosis of PTSD (Marshall, Panuzio, and Taft, 2005). Veterans involved in combat in Iraq also demonstrated a higher prevalence rate of completed suicide, potentially attributed to greater combat exposure, as it has been noted that the rate of PTSD increases with more exposure to firefights (Litz, 2005).

Purpose of the Study

The purpose of this study is to ascertain the presence of PTSD in veterans returning from Operation Iraqi Freedom, Operation Enduring Freedom, and Operation New Dawn, and to study the relationship between PTSD symptom severity, severity of combat exposure, and post-deployment coping abilities.

Hypothesis 1. It is hypothesized that PTSD symptoms from the Davidson Trauma Scale (DTS), will be positively correlated with severity of combat exposure based on scores from the Combat Exposure Scale (CES), and exposure to traumatic experiences from scores on the Traumatic Life Experiences Questionnaire (TLEQ), which are representative of traumatic experiences during military service.

Hypothesis 2. Severity of PTSD symptoms as reflected in scores on the DTS, will be positively related to post-deployment scores on measures of alcohol use (AUDIT), substance use (DAST) and depression (BDI), and will be negatively correlated with coping abilities (CDRISC) and social support (MOS).

Hypothesis 3. It is hypothesized that the relationship between the severity of PTSD symptoms (DTS) and the level of combat exposure (CES) will be moderated by coping skills (CDRISC) and current level of social support (MOS).

Hypothesis 4. It is hypothesized that severity of PTSD symptoms (DTS) will be related to self-reported trauma experienced (TLEQ) before, during, and after military service.

Hypothesis 5. It is hypothesized that severity of PTSD symptoms (DTS) will correlate with alcohol use (AUDIT), substance use (DAST), and depression (BDI), after the effects of severity of combat experiences are partialled out.

Hypothesis 6. It is hypothesized that gender and racial differences will be observed for the dependent measures of alcohol ingestion (AUDIT), drug abuse (DAST), depression (BDI), coping skills (CDRISC), social skills (MOS), combat exposure (CES) and work status, when levels of the veterans' education is included as a covariate.

CHAPTER III

METHODOLOGY

Participants

The participants included in this study (N = 1824) are military veterans who served in Operation Iraqi Freedom, Operation Enduring Freedom, and Operation New Dawn, and who participated in the Mental Illness Research, Education and Clinical Centers (MIRECC) research project. Participants were recruited from Veterans Administration Centers in Durham, North Carolina, Salisbury, North Carolina, Richmond, Virginia, Hampton, Virginia and Salem, Virginia. With regards to racial demographics, the current study included Caucasians (N = 822), African Americans (N = 896), Hispanic (N = 41), Asian (N = 24), Native Americans (N = 8). Each of the participants completed measures related to mental, emotional, social and occupational functioning, as well as providing information regarding personal demographics, family history, prior exposure to traumatic experiences and levels of combat experiences in theater. The data utilized in this research study were archival, and specific identifying information was de-identified prior to data analysis to protect the confidentiality of research participants.

Measures

Demographics form. The MIRECC database includes forms which gather a large amount of demographic information. Included on these forms is information related to current living circumstances, which include present location and with whom the veteran currently lives, mental health and substance abuse problems of the veteran and their family members, as well as relevant military service related information. Demographic information is also provided, examples of which include gender, marital status, race and ethnicity, working status, level of education, relevant current and historical medical information, and legal history.

The Alcohol Use Disorder Identification Test (AUDIT). The AUDIT is an instrument that assesses behaviors relevant to alcohol consumption (Bradley, Bush, et al., 2004). The AUDIT

includes 10 multiple choice items, and is based on a five point scale rated from 0-4. The test items involve rating the frequency and quantity of alcohol consumed on average on a “typical day,” symptoms of binge drinking and problematic behaviors related to alcohol consumption (Gerwitz, DeGarmo, Polusney, Khaylis and Erbes, 2010). Higher scores on the AUDIT indicate a greater likelihood of alcohol problems.

Beck Depression Inventory-II (BDI-II). The BDI-II is a commonly used instrument for the measurement of depression and depression symptoms. It is comprised of 21 test items which assess the intensity of clinical depression. Test items present four statements based on severity of depressive symptoms (Storch, Roberti, et al., 2004). The BDI has demonstrated high internal reliability as well as test-retest reliability, (Beck, Steer and Brown, 1996) and concurrent validity (Beck, Steer and Brown, 1996).

Combat Exposure Scale (CES). The CES is an instrument that measures the degree of exposure to traumatic combat related events (Keane, et al., 1989, and Nye and Bell, 2007). The CES consists of 7 items which assess exposure to violence, threat of severe injury or death, wounding, wounding or death of others, leadership failures, abusive violence, and Prisoner of War (POW) captivity (Lund, Foy, et al., 1984). The CES demonstrates good test-retest reliability as well as internal stability ($\alpha=.85$) (Keane, et al., 1989).

Connor Davidson-Resiliency Scale (CD-RISC). The CD-RISC is an instrument designed to measure resilience with regards to available personal coping resources, and was developed with persons experiencing PTSD (Davidson et al., 2005). The measure includes 25 multiple choice test items involving personal strengths and coping skills (Connor and Davidson, 2003). The CD-RISC demonstrates good convergent validity, internal consistency and test-retest reliability (Davidson, et al., 2005).

Davidson Trauma Scale (DTS). The DTS is an instrument that measures PTSD symptoms, and has been validated with the OIF/OEF veteran population (Calhoun et al., 2010). It includes 17 test items that produce a score indicative of the frequency and severity of PTSD (Davidson, 2004). Studies have demonstrated good reliability and validity for the DTS (Davidson, et al., 1997).

The Drug Abuse Screening Test (DAST). The DAST is an instrument that measures symptoms and problematic behaviors related to substance use and abuse (Gavin, Ross and Skinner, 1989). It was developed to be a brief clinical screen, and contains 20 dichotomous yes/no questions and demonstrates a good internal consistency reliability of .92 (Skinner, 1982).

Medical Outcome Student Social Support Survey (MOS): The MOS is an instrument that measures perceptions of available social support in relation to stressful life events, within the past 12 months (Kornblith, et al., 2001). It includes 20 items and contains 4 subscales of perceived support including emotional/informational, tangible, affectionate and positive social interactions (Sherbourne and Stewart, 1991). Each of the items is rated using a 5 point Likert scale from “none of the time” to “all of the time.” The 4 subscales in the MOS demonstrate reliability with alphas $>.091$, are stable over time, and exhibit internal consistency reliability estimates that are greater than .50 (Sherbourne and Stewart, 1991).

Traumatic Life Exposure Questionnaire (TLEQ). The TLEQ is an instrument that utilizes a multiple-item list of life events that can be perceived as potentially traumatic (Goodman, Corcoran, Turner, Yuan, and Green, 1998). It includes 22 events described in behavioral terms, with an additional category for “other events,” with examples provided (Pierce, Burke, Stoller, Neurfeld, and Brooner, 2009). The TLEQ also elicits information regarding the frequency with which a person experienced such events (from “never” to a specific number of times), and utilizes follow up questions that determine if fear, helplessness or horror was experienced as a result of

exposure to the traumatic incident (Kubany, Haynes et al., 2000). The TLEQ has demonstrated good reliability and content validity, with convergent validity of 85% approximately one week later (Kubany, et al., 2000).

CHAPTER IV

RESULTS

Hypothesis 1. A Pearson correlational analysis was conducted to determine the relationship between exposure to combat (CES) and symptoms of (DTS) trauma. The Davidson Trauma Scale (DTS) was significantly related to the Combat Exposure Scale (CES) $r(1805) = .482, p < .05$, indicating that as individuals are exposed to more combat, their level of trauma symptoms increase.

Hypothesis 2. Pearson correlations were run between the CES and DTS, and indicators of post deployment coping including the CDRISC, DAST, AUDIT, BDI and the MOS, (See Table 1). Trauma symptoms as measured by the DTS were correlated with poor coping skills (CD-RISC, $r(1808) = -.55, p < .000$), increased drug abuse (DAST, $r(1806) = .23, p < .000$), increased depression (BDI, $r(1807) = .81, p < .000$) and increased alcohol use (AUDIT, $r(1803) = .272, p < .000$). Combat exposure was also associated with poor coping skills (CD-RISC, $r(1823) = -.208, p < .000$), increased drug abuse (DAST, $r(1821) = .118, p < .000$), increased depression (BDI, $r(1822) = .37, p < .000$), and increased alcohol use (AUDIT, $r(1818) = .248, p < .000$).

Hypothesis 3. In order to examine whether coping abilities (CD-RISC) and satisfaction with social support (MOS) moderate the relationship between combat exposure (CES) and the development of PTSD symptoms (DTS), a moderated regression analysis was conducted. Results indicated that when controlling for the CDRISC, the CES predicted an increase in trauma symptoms (Adjusted $r^2 = .223; \beta = .378, p < .01$). The adjusted R^2 (.47, $p < .001$) increased when CES, CDRISC and MOS were entered into the equation, with only CES (Beta .357, $p < .001$) and CDRISC (Beta $-.51, p < .001$) as predictors of PTSD symptom severity. An additional regression analysis included the MOS by CES (MOSxCES) and CDRISC by CES (CDRISCxCES) interaction terms. The adjusted R^2 for this equation was not different from equation two (R^2 change p value N.S.) with CES (Beta .507, $p < .001$) and CDRISC (Beta $-.485, p < .001$) as significant predictors of DTS scores.

Table 1

Correlational Analysis for Coping Variables

	CES	DAST	AUDIT	CD-RISC	MOS	BDI	DTS
CES	-	.118**	.248**	-.208**	.018	.370**	.482**
DAST	.118**	-	.321**	-.192**	-.010	.268**	.230**
AUDIT	.248**	.321**	-	-.203**	-.024	.260**	.272**
CDRISC	-.208**	-.192**	-.203**	-	-.002	-.675**	-.554**
MOS	.018	-.010	-.024	-.002	-	-.053	-.035
BDI	.370**	.268**	.260**	-.675**	-.053	-	.811**
DTS	.482**	.230**	.272**	-.554**	-.035	.811**	-

** p <.01

Hypothesis 3. In order to examine whether coping abilities (CD-RISC) and satisfaction with social support (MOS) moderate the relationship between combat exposure (CES) and the development of PTSD symptoms (DTS), a moderated regression analysis was conducted. Results indicated that when controlling for the CDRISC, the CES predicted an increase in trauma symptoms (Adjusted r square .223; β =.378, $p <.01$). The adjusted R square (.47, $p <.001$) increased when CES, CDRISC and MOS were entered into the equation, with only CES (Beta .357, $p <.001$) and CDRISC (Beta -.51, $p <.001$) as predictors of PTSD symptom severity. An

additional regression analysis included the MOS by CES (MOSxCES) and CDRISC by CES (CDRISCxCES) interaction terms. The adjusted R square for this equation was not different from equation two (R square change p value N.S.) with CES (Beta .507, $p < .001$) and CDRISC (Beta -.485, $p < .001$) as significant predictors of DTS scores.

Hypothesis 4. To determine if the severity of PTSD symptoms (DTS) were related to self-reported traumas (TLEQ) before, during and after military service. A regression equation was run with the DTS (PTSD symptoms) as the dependent variable and trauma experiences veterans reported prior to, during, and after military service (TLEQ) as the independent variables. Results of the equation were significant (Adjusted $R^2 = .29$, $F(3, 283062.002) = 244.233$, $p < .001$) (See Table 2). Specifically, the analysis indicated that veterans' exposure to traumatic experiences prior to military service ($\beta = .021$, $p < .001$, VIF= 1.298), during military service ($\beta = .473$, $p < .001$, VIF= 1.315), and after military service ($\beta = .115$, $p < .001$, VIF= 1.236). all significantly contributed to the severity of their PTSD symptoms.

Table 2

Regression Analysis of Combat Exposure (CES) and PTSD Criterion Before, During and After Military Service (TLEQ) by Trauma Symptoms (DTS)

	Standardized Beta Coefficients	t	VIF
TLEQ Before Military	.021**	.928	1.298

Table 2 (Continued)

Regression Analysis of Combat Exposure (CES) and PTSD Criterion Before, During and After Military Service (TLEQ) by Trauma Symptoms (DTS)

	Standardized Beta Coefficients	t	VIF
TLEQ During Military	.473**	20.769	1.315
TLEQ After Military	.115**	5.228	1.236

** p <.001

Hypothesis 5. A correlational analysis was run to determine if the severity of a veteran's PTSD symptoms (DTS) with levels of alcohol use (AUDIT), substance use (DAST), and depression (BDI) would be significant, after the effects of the severity of combat experiences (CES) were partialled out. Results of the partial correlation indicated significant correlations between veterans' PTSD symptoms (DTS) and alcohol abuse (AUDIT), drug use (DAST), and depression (BDI) when the effects of severity of combat experiences (CES) were partialled out (See Tables 3,4).

Hypothesis 6. Analyses were conducted utilizing veterans' gender (Males N = 776; Females N = 195) and race as independent variables. Race was grouped according to subjects who self-identified as Caucasian (N = 822) and those who identified as African-American (N = 896) on the research questionnaires. Other racial groups according to self-description, including

Hispanic (N=41), Native American (N=35), Asian (N=24), and Pacific Islanders (N=8) were not adequately represented in the overall sample (see Appendix A).

Table 3

*Correlation of Severity of PTSD Symptoms (DTS) by AUDIT, DAST, and BDI, with CES
Partialled Out*

	DTS	DAST	AUDIT	BDI
DTS	1	.203**	.179**	.777*
DAST	.203**	1	.302**	.248**
AUDIT	.179**	.302**	1	.187**
BDI	.777*	.248**	.187**	1

** p < .001

Between subjects analyses indicated that the covariate education was significant ($p < .05$ or higher) and contributed to the main effects for gender and race groups on the following dependent variables: drug abuse (DAST) $F = 4.49$, $\eta^2 = .005$; coping (CD-RISC) $F = 9.78$, $\eta^2 = .010$; depression (BDI) $F = 11.59$, $\eta^2 = .012$; , and working status $F = 22.32$, $\eta^2 = .023$ (See Table 5). Between subject comparisons for gender groups were significant ($p < .05$) for alcohol use (AUDIT) $F = 12.32$, $\eta^2 = .013$; depression (BDI) $F = 6.97$, $\eta^2 = .007$; coping (CD-RISC) F

= 4.80, $\eta^2 = .005$; combat exposure (CES) $F = 44.28$, $\eta^2 = .044$; and working status $F = 11.78$, $\eta^2 = .012$. Significant main effects for racial group differences were observed on alcohol use (AUDIT) $F = 5.30$, $\eta^2 = .005$; depression (BDI) $F = 4.12$, $\eta^2 = .004$; and combat exposure (CES) $F = 13.08$, $\eta^2 = .013$. For the effects of the interaction between gender and race, significant main effects were observed on combat exposure (CES) $F = 4.00$, $\eta^2 = .004$; and working status $F = 5.93$, $\eta^2 = .006$.

Table 4

Regression Analysis of Severity of PTSD symptoms (DTS) and Post Deployment Coping Measures, Beck Depression Inventory (BDI), Alcohol Use Disorder Identification Test (AUDIT) and Drug Abuse Screening Test (DAST)

	Standardized Beta Coefficients	t	VIF
BDI	.795**	54.816	1.118**
AUDIT	.066**	4.501	1.155

** $p < .001$

Table 5

MANCOVA Effects for Covariate Level of Education and Between Subjects Effects for Gender and Race Groups

Source		Df	<i>F</i>	Significance	Partial Eta Squared
Between Subjects Effects					
Covariate - Education					
	BDI	1	11.59	.001	.001
	CD-RISC	1	9.78	.002	.010
	DAST	1	4.49	.034	.005
	Working Status	1	22.32	.000	.023
Gender					
	AUDIT	1	12.32	.000	.013
	BDI	1	6.97	.008	.007
	CD-RISC	1	4.80	.029	.005
	CES	1	44.28	.000	.044
	Working Status	1	11.78	.001	.012
Race					
	AUDIT	1	5.30	.022	.005
	BDI	1	4.12	.043	.004
	CES	1	13.08	.000	.013
Gender x Race					
	CES	1	4.00	.046	.004

Table 5 (Continued)

MANCOVA Effects for Covariate Level of Education and Between Subjects Effects for Gender and Race Groups

Source		Df	F	Significance	Partial Eta Squared
Gender x Race					
	Working Status	1	5.93	.015	.006

A multivariate analysis of covariance (MANCOVA) was conducted with gender and race as independent or fixed factors and drug abuse, depression, work status, social support, combat exposure during deployment, coping and alcohol use as dependent variables. Levels of education was included as a covariate. Multivariate tests indicated significant effects for gender (Wilks Lambda $F = 14.047$, $p < .001$) and race (Wilks Lambda $F = 2.615$, $p < .05$), for the covariate education (Wilks Lambda $F = 4.421$, $p < .05$), and approaching significance for the interaction of race and gender (Wilks Lambda $F = 1.934$, $p < .062$). Levene's test of equality of error variances indicated significant differences between gender groups on the AUDIT ($F = 8.262$, $p < .001$) and CES ($F = 18.112$, $p < .001$).

T-test comparisons between gender groups, with homogeneity of variance not assumed indicated significant gender group differences on the AUDIT ($t = 9.19$, $df = 803.19$, $p < .001$), CES ($t = 12.813$, $df = 767.48$, $p < .001$) and the CD-RISC ($t = 1.029$, $df = 536.11$, $p < .03$). T-test comparison between race groups, with homogeneity of variance not assumed indicated significant race group differences on the AUDIT ($t = -5.539$, $df = 1644.27$, $p < .014$), the BDI ($t = -2.331$, df

= 1666.72, $p < .021$), and the CES ($t = -9.678$, $df = 1594.14$, $p < .000$). Gender and race group means on all dependent variables are presented in Table 6.

Table 6

Descriptive Statistics for Gender and Race by Dependent Variables

	AUDIT	BDI	CD-RISC	CES	DAST	MOS	Work Status
Male							
N	776	776	776	776	776	776	776
Mean	5.09	14.21	73.60	13.14	1.24	74.85	1.23
SD	5.804	12.76	17.61	11.00	2.28	24.95	.93
Female							
N	195	195	195	195	195	195	195
Mean	3.30	16.28	71.22	7.03	1.08	72.27	1.06
SD	4.51	13.27	20.26	8.21	1.90	25.94	.92
African American							
N	493	493	493	493	493	493	493
Mean	3.96	13.54	73.39	9.61	1.14	74.38	1.19
SD	5.18	12.41	18.99	9.68	1.99	25.94	.93
Caucasian							
N	478	478	478	478	478	478	478
Mean	5.52	15.73	72.86	14.28	1.28	74.29	1.21
SD	5.93	13.27	17.33	11.34	2.41	24.23	.92

CHAPTER V

DISCUSSION

In Afghanistan, combat operations began in 2001, and in Iraq, ground operations began in 2003 and officially ended in 2010, making this war the longest timeframe of continuous combat operation for an all-volunteer U.S. military force experiencing multiple combat deployments in American history (Department of Defense, 2009; Naynack-Beebe and Yoder, 2011). It has been estimated that over 2 million U.S. troops have served tours in Operation Iraqi Freedom and Operation Enduring Freedom since the Global War on Terror (GWOT) began in 2001, and are demonstrating rates of PTSD from 5-17% and rates of depression from 2-10% (Hoge et al., 2004; Institute of Medicine, 2010; Seal, Bertenthal, Miner, Sen and Marmar, 2007; Tanielian and Jaycox, 2008).

As suggested by the first hypothesis, the findings from the current study demonstrate that symptoms of PTSD and trauma are positively correlated with intensity of exposure to combat experiences. This is consistent with reports from the Post-Deployment Health Assessments, in which 17% of active duty military and 17.1% of reservist service personnel demonstrated post-deployment mental health problems (Hoge, et al., 2006). Other research indicated that among OIF/OEF veterans, PTSD is one of the most common psychiatric disorders affecting approximately 1 in 6 veterans (Tanielian and Jaycox, 2008). After being evaluated 3 - 6 months later, in a Post-Deployment Health Reassessment survey, the level of significant mental health risk for active duty military personnel was 20.3%, and the risk for reservist service personnel was at 42.4% (Milikin, Auchterlonie, and Hoge, 2006). According to the Department of Defense Task Force on Mental Health (2007), among those deployed, 38% of soldiers, 31% of Marines, and 49% of National Guard service personnel demonstrated post-deployment psychological symptoms.

Additional analyses indicated that symptoms of trauma and exposure to combat were both related to impaired coping abilities, alcohol misuse and substance use. Factors influencing

this impairment in functioning may include the fact that, different from the wars in Vietnam and the Persian Gulf, deployments during OIF and OEF were for longer durations and veterans experienced less time before redeployment (Tanielian and Jaycox, 2008). Additionally, more National Guard and Reservists, many of whom are older and more established in their civilian lives, as well as a higher proportion of female service personnel than ever before, are being deployed and experiencing high combat situations (Schnurr et al., 2009). Both active duty and National Guard/Reservist military service members are subjected to numerous and constant threats to their personal safety and integrity, while expending efforts to cognitively manage questions of personal stability and control, as well as environmental predictability, which can negatively impact their stress-resilience (Hoyt, G., 2006). One factor worth mentioning regarding this study, is that current measures of coping, in addition to the other instruments involved in the MIRECC database, were administered after return home from deployment to the OEF/OIF/OND arena, and thus, these data are unable to inform whether coping abilities can serve as a preventive mechanism prior to and during combat deployment.

Much attention is being given to the subject of veterans experiencing combat stress and the subsequent effects on their coping abilities, yet different researchers seem to define coping in different terms, and approach treatment with different methods (Blake, Cook and Keane, 1992; Sharkansky et al., 2000; Suvak, Vogt, Savarese, King, and King, 2002). Lazarus (1993) viewed coping as a fluid construct that changes over time, as the individual adjusts to the stress of the traumatic experience(s), and encouraged other researchers to examine coping in terms of adaptive and maladaptive constructs independent of expected outcome. Some of the research on coping has been described as problem focused coping (PFC), which is more proactive and solution focused, and emotion focused coping (EFC), which involves the use of avoidance and focusing on behaviors after a stressful experience (Schwarzer and Schwarzer, 1996; Folkman and Lazarus, 1985; Lazarus and Folkman, 1991; Moos and Schaefer, 1993). Among OEF/OIF combat veterans post-deployment, EFC was highly related to high levels of combat exposure and the subsequent

development of PTSD symptoms, whereas during low levels of combat exposure EFC was not associated with PTSD symptom severity (Rodrigues and Renshaw, 2010). Rodrigues and Renshaw (2010) further postulated that different levels of trauma are more successfully managed by different types of coping, whereas different levels and severities of traumatic experiences may be associated with outcomes in different ways.

The intensity of combat and length of deployments OEF/OIF have contributed to comorbid physiological and psychological problems, in addition to substance abuse problems in veterans after they return home from deployment (Larson, Wooten, Adams and Merrick, 2012). Alcohol use among military service personnel has been reported as a significant problem (Kehle et al., 2012), with estimations of 15% of OEF/OIF combat exposed veterans reporting problems managing alcohol consumption post-deployment. (Jacobson et al., 2008), problems which are related to impairment in quality of life and daily functioning (Kehle et al., 2011). Problematic alcohol consumption has been correlated with the intensity of combat exposure among National Guard and Reserve service personnel (Jacobson et al., 2008). Another study found that high incidences of combat exposure that involved threat of death or injury, as well as witnessing atrocities were related to problematic alcohol use (Wilk et al., 2010).

Additional analyses indicated that, combat exposure and coping abilities predicted PTSD, specifically symptom severity related to PTSD, a finding which is echoed by much of the current research. The results of the current study suggest that exposure to combat situations leads to the increased prevalence and severity of symptoms of PTSD, independent of current coping skills and social support, and independent of current coping skills and levels of social support. These data predict that veterans reporting higher levels of combat exposure demonstrate a higher prevalence of PTSD and also predict a negative impact on their coping abilities. The findings of these analyses failed to demonstrate support for perceptions of social support impacting the development of PTSD in combat exposed veterans.

According to research investigations, veterans exposed to combat situations are reported to be 2 to 3 times higher to develop PTSD than those with less significant combat exposure (Smith et al., 2008; LeardMann, Smith, Smith, Wells and Ryan, 2009). The development of PTSD symptoms may also be connected to the emotional response of the individual at the time of the stressful experience (Gold et al., 2005). Experiences involving combat exposure for OEF/OIF veterans that were associated with the development of PTSD are distinct and not as prevalent in the general population, as they involve direct threats to life and safety of themselves or the veterans with whom they served (Maguen, et al., 2010; Philips, et al., 2010; Rona et al., 2009, Renshaw, 2011). In a recent study, Pietrzak, Whealin, Stotzer, Goldstein and Southwick (2011) found that specific factors of combat experiences in OEF/OIF veterans were differently related to the potential development of PTSD as well as symptom severity. This study did not examine specific combat experiences, but future studies are sure to continue the trend of examining how specific aspects of combat affect the development of PTSD in different ways.

Mott, Graham and Teng (2011) found that development of PTSD, as well as other DSM-IV TR related Axis I psychiatric disorders, except for substance abuse related disorders, was connected with levels of perceived threat by veterans during deployment, and that increased levels of perceived threat were closely related with an increased chance of developing PTSD (Kolkow, Spira, Morse, and Ginger, 2007). Research has found a strong correlation between the severity of PTSD symptoms developing post-deployment and level of combat exposure, perceived threat during deployment, and experiences following combat experiences (Renshaw, 2011). More so than combat exposure, these researchers found that combat pre-deployment preparation and the deployment environment predicted the level of perceived threat while on deployment (Mott, Graham, and Teng, 2011). Other research has supported their contentions that combat exposure may not as strongly predict PTSD as well as the combination of levels of perceived threat and warfare exposure (King, King, Gudanowski and Vreven, 1995; Vogt and Tanner, 2007). Researchers suggest examining factors of unit support and combat training

experiences as predictors of perceived threat, as these factors have already demonstrated a link with the development of PTSD (Pietrzak, et al., 2009; Wolfe, Brown, and Kelly, 1993). Although the MIRECC database does not include measures related to unit support, this could be a protective factor in shielding OIF/OEF veterans from traumatic stress (Brailey, Vasterling, Proctor, Constans and Friedman, 2007), and is an aspect of combat related PTSD that is worth closer inspection.

Although the current study did not find significant results with the use of the MOS to moderate the relationship between combat exposure and symptoms of PTSD among combat veterans, much research is currently being conducted examining factors of social support. A study by Goldmann, et al. (2012) found that post-deployment social support was one of the main contributing factors that potentially prevented the development of PTSD. The researchers built on previous studies which discussed social support as strengthening an individual's coping abilities and how they subjectively evaluate and react in potentially stressful situations, which they reported acted as a buffer against psychological and emotional results of traumatic experiences (Cohen and Syme, 1985; Dagland, Bjork, and Tambs, 1995; Kawachi and Berkman, 2001; Thoits, 1986). Recent findings indicate that social support for veterans post deployment is negatively associated with symptoms of PTSD, depression and suicidal ideation (Pietrzak et al., 2009a; Pietrzak, 2010a,b), which is contrary to the findings of the current study. One potential explanation for this is that the MOS gathered post-deployment may be affected by a bias in retrospective memory, as in some cases memory can be negatively impacted by persons experiencing prolonged periods of high combat exposure (Gilbertson et al., 2001; Uddo, Vasterling, Brailey, and Sutker, 1993) as well as traumatic brain injuries often comorbid with PTSD (Campbell et al., 2009; Trudeau et al., 1998), another factor which was not examined in the current study.

King et al. (1998) found that social support mediated the relationship between combat exposure and PTSD. The Department of Defense has recognized the importance of social support,

specifically service members' healthy interpersonal relationships, and has endorsed programs such as Strong Bonds (www.strongbonds.org) to enhance perceived support. Dynamics of support within family relationships have been demonstrated to be connected with the potential development of PTSD (Goff, et al., 2006). More specifically, situations involving veterans with high levels of family stress negatively impact PTSD treatment outcomes (Tarrier, et al., 1999). To this end, treatment focused on increasing family stability to reduce family stress, beginning specifically with the marital dyad, can utilize a couples based treatment called Structural Approach Therapy (Sautter et al., 2010), which has been modified for specific use with OEF/OIF veterans and is presently being researched for efficacy in a study funded by the Department of Veterans Affairs (Sautter, et al., 2011). Similar research has also focused on utilization of treatment modalities including Cognitive Behavioral Conjoint Therapy, which has been described as a beneficial treatment modality that has been studied and recommended for couples, where one partner is affected by PTSD (Monson, et al., 2008). Cognitive Behavioral Conjoint Therapy used with military personnel with PTSD and their loved ones works to educate the family on the potential effects to trauma, to reduce the impact of PTSD and to strengthen their sense of social support and relationship, with reported positive results (Fredman, et al., 2011).

In another analysis, the results of the current study indicated that experiences of Criterion A related PTSD experienced by veterans before, during and after deployment contributed to the development of symptoms of PTSD. A factor that received relatively little attention in this study involves pre-deployment factors and their connection to the severity of PTSD symptoms among OEF/OIF/OND veterans. Research that compared combat veterans from different wars demonstrated that unlike soldiers in Vietnam, veterans who served in OEF/OIF were comprised of volunteers, which researchers indicate merits the study of the role of complex and unique pre-deployment factors for these veterans' experiences in the combat arena (Vogt et al., 2011). Renshaw (2011) recommends the use of pre-deployment trainings and preparation to moderate associated risk factors of PTSD post-deployment, and that adequate preparation may reduce the

perception of threat in the combat arena. His research found that during combat exposure, high levels of pre-deployment training received more adequately mentally prepared a soldier such that perceptions of were more congruent with the actual situation, whereas a condition of low preparedness was correlated with high perceptions of threat. Due to the connection of combat exposure with perceived threat and the development of PTSD (Goldmann, et al., 2012; Green, Grace, Lindy, Gleser, and Leonard, 1990; King, King, Gudanowski, and Vreven, 1995; King et al., 2008; Vogt and Tanner, 2007), pre-deployment preparedness may mitigate the development of PTSD in the combat arena (Renshaw, 2011). Examining pre-deployment factors may yield useful data with regards to combat exposure and development of PTSD, and suggest that future research might benefit from focusing more on this area.

In the current study, Criterion A PTSD symptoms were utilized in the examination of trauma symptoms, whereas another study questioned the use of using Criterion A qualifiers in the diagnosis of PTSD (Cameron, Palm, and Follette, 2010). Cameron, Palm, and Follette, (2010) endorsed closer inspection of the individual's perceptions of the traumatic experiences, their unique internal psychological processes, and the subsequent distressing reactions leading to the development and maintenance of PTSD symptomology. These researchers found that there were no significant differences in the symptom severity of PTSD between individuals who did and did not experience a Criterion A event. Cameron, Palm, and Follete (2010) further postulated that a potential reason for this phenomenon may involve the notion that different traumatic events may follow a different progression for different individuals.

In an additional analysis, PTSD, alcohol use, substance abuse and depression were all related irrespective of levels of combat exposure. Studies have demonstrated that alcohol and other substance abusing behavior can be comorbid with PTSD, traumatic brain injury and depression (Larson, Wooten, Adams and Merrick, 2012). In one study, OEF/OIF veterans completing post-deployment surveys, of those who demonstrated clinical signs of PTSD and depression, almost 50% exhibited criteria for aggressiveness and alcohol abuse (Thomas et al.,

2010). This demonstrates a notable connection between mental health, alcohol abuse and aggressive behavior. Thus, as theorized in the self-medication hypothesis, combat veterans with PTSD may be engaging in self-medicating behaviors, through the consumption of alcohol, to manage psychiatric distress (Stewart, 1996).

A connection between substance use and PTSD has been found to be present among the different diagnostic clusters (Saladin et al., 1995), particularly in avoidance symptoms among post-deployed combat veterans, of which 13% met criteria for an alcohol use disorder according to one study (Kehle et al., 2012). The results of another study found that among Reserve members and National Guard service personnel, symptoms of PTSD predicted problems related to the consumption of alcohol (Jacobson et al., 2008). Another factor in substance use and abuse can involve multiple deployments, wherein the onset of substance use may be delayed but with stronger cumulative effects (Larson, Wooten, Adams and Merrick, 2012). Spera et al. (2010) found that among active duty Air Force personnel, as the frequency of deployments increased, problematic alcohol consumption also increased by 14%, and for every additional year spent deployed in OEF/OIF, there existed a 23% increased risk of problematic drinking. Regarding depression, OEF/OIF veterans have presented with co-morbid PTSD and depression ranging from 6-24% with negative consequences on physical and mental health (Grieger et al., 2006; Lapierre, Schwegler, and LaBauve, 2007; Campbell, Felker, Liu, Yano, Kirchner, Chan, et al., 2007). Both depression and PTSD contribute uniquely to a veteran's health status (Pittman et al., 2012). Thus, research included the current study demonstrate the strong relationship with development of maladaptive coping skills such as alcohol and substance use and abuse, and mental health consequences such as the development of depression and PTSD. This provides support for the use of pre, peri, and post-deployment assessment measures to examine potential risk of developing the aforementioned maladies and to implement effective, evidence based strategies specifically designed to address such consequences of combat exposure.

Regarding the final analysis of this study, while considering years of education, group differences were observed based on race and gender with the post-deployment coping indicators of substance abuse, coping, depression, and working status. Thus, the veteran's level of education had a significant effect on many of their coping abilities such that higher levels of education decrease the risk for dysfunctional coping. Gender differences were observed related to depression, combat exposure, coping, working status and alcohol use. In the current study, while gender differences were observed in five of the coping measures, they were not observed on others, which is consistent with the findings of some research, and yet inconsistent with other studies. Thus the current study suggests that when considering the level of education and combat exposure of female veterans, the most significant differences between them and their male counterparts is represented by their patterns of alcohol use, coping abilities, employment status, and the consideration exposure to combat and depression, which warrant closer inspection in future studies.

Since the end of the Vietnam War, women and racial minorities have become increasingly represented as the largest growing segments of the U.S. military (Schlenger and Fairbank, 1996). With regards to gender, although the number of women joining the armed forces in increasing to having represented an estimated 14.3% of active duty military in 2007 (Joint Economics Committee, 2007), and are experiencing higher instances of combat exposure (Vogt et al., 2011), much of the research on OEF/OIF veterans with PTSD has been with men, and the paucity of research efforts to study the effects of gender, combat exposure and the development of PTSD indicate a need for future study (Schnurr et al., 2009). Although women are officially banned from military positions that involve direct ground combat, they are increasingly serving in positions that place them in situations with a greater risk for combat exposure (Street, Vogt, and Dutra, 2009). Previous studies have indicated that men demonstrate more significant effects of PTSD on their quality of life (Zatzick, Marmar et al., 1997; Zatzick, Weiss et al., 1997) whereas other studies have demonstrated no significant difference for gender

effects (Magruder et al., 2004; Schnurr and Lunney, 2008). In a recent study, Vogt et al. (2011) suggested that women and men experience a similar perception of threat due to combat related stressors, and that effects of combat exposure on their mental health is similar to men, as is their level of resilience. For example, similar to some of the findings in this study, effects of gender have indicated that female OEF/OIF veterans may be more likely to endorse symptoms of PTSD and depression, but present less with substance use problems (Luxton, Skopp, and Maguen, 2010; Tanielian and Jaycox, 2008).

Other factors facing females exposed to combat situations involve research that indicates that female veterans who served in OEF/OIF are at an increased risk of divorce than male veterans (Mulhall, 2009). Studies examining the effects of combat on female veterans have factors contributing to the severity of PTSD symptomatology and higher rates of anxiety and depression were a lack of social support and traumatic stress life events (Benda, 2005; Campbell et al., 2007; Lapierre, Schwegler, and LaBauve, 2007; Nayback-Beebe and Yoder, 2011; Schnurr, et al., 2004; Vogt, Pless, King, and King, 2005).

Regarding psychopathology, 8% to 10% of retired and active duty female military service personnel are estimated to exhibit PTSD (Scharnberg, 2005), while 15% to 25% exhibit depressive symptomatology (Frayne et al., 2004; Wells et al., 2010), while anxiety is present in 12.7% (Bray et al., 2006).

As with gender, there is relatively little research that has been published to date regarding the effects of combat exposure with minority populations in OEF/OIF. Racial group differences in post-deployment coping indicators were observed in relation to alcohol use/misuse, depression and combat exposure in the current research study. This is consistent with the findings of past research such as the National Vietnam Veterans Readjustment Study, where it was determined that African American and Hispanic veterans were found to have been exposed to a greater frequency of combat stressors (Beals et al., 2002; Green et al., 1990; Kulka, et al., 1990), as well as subsequent higher rates of PTSD that were specifically found among African-American and

Hispanic veterans in postdeployment situations (Kulka, et al., 1990; Schlenger and Fairbank, 1996; Ruef, Litz, and Schlenger, 2000). In a study by Ruef et al. (2000), Hispanic Vietnam veterans demonstrated higher levels of PTSD than African American Vietnam veterans, which researchers attributed to pre-existing stress related to pre-exposure characteristics such as poverty, racism, urban violence, and sociocultural differences which were dissimilar in Caucasian respondents (Schlenger and Fairbank, 1996).

According to the National Vietnam Veterans Readjustment Study (Kulka et al., 1990b), out of the 3.2 million United States veterans who served in Vietnam, African American men represented approximately 11% (350,000) and Hispanic men represented approximately 5% (170,000) of the total number of troops who served. African Americans veterans participating in the study demonstrated prevalence rates of PTSD of 20.6% and Hispanic veterans with prevalence rates of 27.9%, as opposed to the prevalence rate in Caucasian/other men of 13.7% (Schlenger et al., 1992). Additionally, African American and Hispanic Vietnam veterans reported adjustment problems more frequently than other race groups (Kulka, et al., 1990a), with little difference of life adjustment between the African American Vietnam veterans and Vietnam era veterans (Schlenger and Fairbank, 1996). Schlenger and Fairbank (1996) suggested that African American and Hispanic American Vietnam veterans experienced higher levels of PTSD post-deployment, as well as higher instances of life adjustment problems with lower rates of life satisfaction than Caucasian/other Vietnam veterans.

Another study, comparing African American and Caucasian Vietnam veterans, demonstrated higher levels of combat related stress among the African American veterans, which the authors explained as the higher levels of stressors unique to that war related to racism (Green, Grace, Lindy, and Leonard, 1990). Other research found that among African American and Caucasian veterans with combat related PTSD, no significant difference was present related to the presence or severity of PTSD, anxiety, depression or other psychopathological symptomatology (Monnier, Elhai, Frueh, Sauvageot and Macgruder, 2002), replicating findings of previous

research (Frueh et al., 1996; Frueh et al., 1997; Frueh, et al., 1998; Frueh, Monnier, Hamner, Elhai and Knapp, 2004; Trent et al., 2000). Frueh, Monnier, Hamner, Elhai and Knapp (2004) examined differences among treatment seeking African-American and Caucasian combat veterans who presented with PTSD and found little evidence for significant differences between the presence and severity of psychopathology. Although many of these research endeavors were conducted with Vietnam veterans, the results of the current study echo the results of these previous studies. Research suggests that in situations involving combat exposure, based on lifetime experiences of racism and inequality prior to deployment, minority soldiers may find themselves risking their lives for their country and government from which they feel alienated and disenfranchised which may ultimately contributed to their subsequent response to combat experiences and may influence the subsequent development of PTSD (Parson, 1985).

Consistent with the current study, Rosenheck and Fontana (1996) found that African American Vietnam veterans demonstrated higher levels of alcohol and substance abuse problems after returning from the combat arena. Another study found less general psychiatric service use by African Americans, while demonstrating a higher instance of substance abuse related treatment programs, with relatively no service use for treatment of PTSD related symptomology (Rosenheck and Fontana, 1996). With regards to mental health treatment, African-American veterans have been noted to under- utilize mental health services provided by PTSD treatment programs in Veterans Administration centers (Rosenheck, 1994), and it has been strongly suggested that mental health services be provided that take into consideration, and are sensitive of the racial status of the veterans that do present for treatment (Allen, 1996; Jones, Brazel, Peskind, Moreli, and Raskind, 2000). Kudler and Straits-Tröster (2009) recommend education programs to provide programs for veterans that are “trauma-informed and culturally competent,” to address the unique needs of all OEF/OIF veterans. Consistent with the assessment and diagnostic research, some research focused on treatment outcomes of veterans in VA PTSD treatment programs, and no significant differences were noted between African-American and Caucasian

veterans regarding treatment outcomes (Rosenheck and Fontana, 1996; Fontana and Cottrol, 1995; Rosenheck and Fontana, 2002).

Limitations of this Research Study

Due to the significant differences in racial and ethnic group representation, the current study focused on the implications for Caucasian and African American veterans. Future studies that more closely examine the characteristics of non-Caucasian and non-African American participants could yield data more relevant to other racial and ethnic groups, and may further demonstrate trends in the data that warrant closer inspection. Also, it is important to examine the effects of race on the coping abilities of veterans of different ethnicities, including Hispanic, Asian, Native American and Pacific Islanders, all of which are represented in the MIRECC database, but are represented in fairly low numbers. The possibility exists that this could be a function of race, as treatment seeking individuals from different races may be less likely to pursue treatment or participate in research projects. Therefore, the development of resiliency training programs and effective treatment interventions that are sensitive to the dimensions of culture and race may demonstrate a more positive impact on the treatment of combat related PTSD with veterans from racial and ethnic minorities.

An additional consideration is that these data need to be standardized and uniform to prevent any confusion and to maintain the validity of the data. For example, one of the participating MIRECC centers collected race and ethnicity data with regards to Latino/Hispanic Americans in a different manner than others, differentiating between Hispanic non-Caucasian and Hispanic non-African American, whereas other centers categorized all persons of Hispanic origin, despite the aforementioned qualifiers, as Latino and Latina. Uniformity in the data would be necessary to gain a more clear understanding of the effects of race and ethnicity for Hispanic participants related to coping abilities and combat exposure.

Another potential limitation of the current study involves rank, years in service and branch of military service. Although this information is included in the MIRECC database, it was

not chosen as a variable to be studied in the current analysis. Further inspection of such data related to rank of the veterans involved may also yield additional information relevant to the experiences of veterans in the combat arena, as well as whether a veteran's rank is in any way related to the development of PTSD, their ability to cope with combat related stress, and how they impact the resiliency of veterans. Regarding branch of service, the present study included service personnel from the Army, Navy, Air Force, Marines, Coast Guard, Reserves and National Guard. This data was not utilized due to missing data and inconsistent coding of data related to branch of service. Further study with regards to these variables could further be examined with regards to variables such as gender and race.

One area not specifically addressed by this study involved the experiences of National Guard and Reservist service personnel, who have been noted to be at greater risk for negative outcomes related to PTSD (Browne et al., 2007; Rundell, 2006). National Guard service members experience similar combat situations as active duty military but receive less preparedness training pre-deployment (Gold, 2004). It has been postulated that this population of military service personnel may have more difficulty readjusting to civilian life (Renshaw et al., 2009) as well as accessing mental health services from VA service centers and installation based support (APA Presidential Task Force on Military Deployment Services for Youth, Families, and Service Members, 2007). Like their active duty counterparts, National Guard/Reservist veterans demonstrated higher incidences of mental health related issues after returning home from deployment (Milliken, Auchterlonie, and Hoge, 2007).

Another limitation of the current study, and consideration for future research, is the fact that during OEF/OIF, many veterans served multiple deployments, a factor which was not considered in the data presented with the veterans who participated in the MIRECC program. Multiple deployments may in fact impact the PTSD symptomatology, as the level of severity, and incidences of combat exposure could be more prolonged and intense, and when reporting information relevant to combat exposure during deployment, the veterans may have difficulty

focusing their attention on most recent deployments and may in fact present data that represents an aggregate of their deployment experiences over time (Goldmann, et al., 2012). In 2007, over one third of the deployed military personnel had served more than one deployment in the OEF/OIF arena, while many more had reported serving three to five deployments (The President's Commission on Care for America's Returning Wounded Warriors, July, 2007). Due to many contributing factors, such as less time between deployments, those who had served more than one deployment presented with more severe psychological symptoms, a decrease in morale, an increase in acute stress, mental health related problems, and marital discord (Straits-Tröster et al., 2011; and MHAT, VI, 2009). Such information demonstrates the importance of additional research on veterans experiencing multiple deployments.

With regards to coping abilities, in future research, it would be useful to include variables of spiritual beliefs or religious orientation. The rigors of war expose military service personnel to situations which involve the threat of death, injury, as well as other horrors of war. As many people turn to faith and spiritual beliefs in times of great stress, examining the veteran's involvement in religious activities or organizations and practices of faith could be interesting to explore, in an attempt to understand their relationship with a veteran's coping abilities. Some research has been conducted with respect to how combat exposure is related to the development of PTSD, as well as moral injury and loss of spirituality, however, more research is needed to examine trends in the data and to develop successful, evidence based treatment approaches that can work to prevent or address issues related to this subject (Drescher and Foy, 1995; Fontana and Rosenheck, 2004; Drescher, et al., 2011). More thorough understanding of the impact of spiritual beliefs on a veteran's coping abilities before deployment, such as through the use of a pre-deployment coping measure, may have implications for their coping abilities in theater as well as after their return from deployment.

Suicidal behavior is also relevant information that could be useful in future studies, but was not included in the current study. Although data related to suicide is captured by the breadth

of data included in the MIRECC database, in an attempt to keep the analyses in this study focused, it was not addressed in the current study. According to the Department of Defense (2007), among U.S. military personnel, suicide is the second leading cause of death, with the death rates ranging from 9 to 15 deaths per 100,000 (Ritchie, Keppler, and Rothberg, 2003). Research from Pietrzak, Russo, Ling and Southwick (2011b) demonstrated that 1 in 5 of the treatment seeking veteran participants demonstrated suicidal ideation. Compared to the general population, male military veterans are twice as likely to complete suicide as male non-military veterans (Kaplan, Huguet, McFarland, and Newson, 2007). Recent research findings indicate that active duty military service males exposed to combat and other deployment related activities present an increased risk of suicide than that of males in the general population (Kang and Bullman, 2008, Kaplan et al., 2007), especially those OEF/OIF veterans diagnosed with psychiatric disorders (Guerra et al., 2010, Jakupcak, et al. 2009; Pietrzak, R., 2010a; Tanielian and Jaycox, 2008). It is theorized that combat exposure may cause veterans to become habituated to situations involving fear of painful experiences and death, placing them at greater risk for suicidal behavior, when combined with other factors such as social isolation and perceived lack of support (Bryan, Cukrowicz, West and Morrow, 2010).

Successful prevention and treatment of PTSD is a goal shared by many clinicians working with OEF/OIF veterans. In 2010, the Department of Veterans Affairs mandated that VA medical facilities must implement evidence based treatments, such as exposure-based therapies, for veterans suffering from symptoms of PTSD (Department of Veterans Affairs, Veterans Health Administration, 2010). The U.S. Department of Veterans Affairs, as well as the Department of Defense, have made concerted efforts in the research, as well as assessment and successful treatment of PTSD among returning OEF/OIF veterans to assist in their reintegration back into society post-deployment, to improve life satisfaction and ultimately to prevent disability and other adverse effects of the disorder (www.oefoif.va.org).

Research with exposure based therapies has demonstrated that treatment with persons with PTSD must consider the role of depression, which in past studies has demonstrated a moderating factor in the development and course of PTSD and may impair the veteran's responsiveness to treatment (Scott and Stradling, 1997; Shaley, et al., 1998). Treatments that involve the use of behavioral activation in concert with exposure therapies may increase the effectiveness of the exposure therapy for PTSD symptoms impacting daily functioning (Strachan, et al., 2011), however it may not be as effective for treating comorbid depressive symptomatology (Jakupcak, et al., 2006).

Cognitive behavioral treatment strategies that have demonstrated positive results with survivors of traumatic experiences include exposure based treatments like prolonged exposure and cognitive- processing therapy (Foa, Keane, Friedman, and Cohen, 2009) which can be modified for use with combat related PTSD (Gray, et al., 2011). Cukor et al. (2009) found that treatment modalities that are technologically based, such as exposure therapies combined with virtual reality techniques, have the potential to be beneficial in treatment of military related PTSD. Tuerk et al., (2010) also found evidence that technology based interventions can improve veterans' access to services for PTSD and can bypass barriers that commonly interfere with treatment regimens. One study discussed the benefits of combining virtual reality techniques with behavioral training, making a case for future study in this treatment modality (Tworzus, Szymanska, and Ilnicki, 2010).

Another exposure based approach utilized a process called Adaptive Disclosure (AD) which is a manualized therapy created specifically for active duty military service personnel (Steenkamp, et al., 2011) that has been used with combat veterans with problems related to moral injury and traumatic loss, and which demonstrated reductions in PTSD and depression (Gray, et al., 2011). Research by Pietrzak, Rotem, and Southwick (2011) suggested that the use of cognitive processing therapy (Monson et al., 2006; Macdonald et al., 2011) to modify maladaptive coping strategies and avoidant coping behaviors may be helpful when working with

OEF/OIF veterans to reduce PTSD symptoms related to combat experiences. They further posited that by working through and reducing the PTSD symptoms, OEF/OIF would have more cognitive resources to adopt more adaptive coping strategies. It has been suggested that attention should be given to targeting maladaptive strategies in particular avoidance and social avoidance in psychotherapy interventions with veterans with PTSD (Pietrzak, Rotem, and Southwick, 2011a). As such, interventions that promote and reinforce the veteran's belief that they have the ability and skill to handle stressful situations can help to reduce the avoidant tendencies and strength and intensity of symptoms of PTSD (Bandura, 1989; Benight and Bandura, 2004).

Treatments which enhance positive outcomes also include the Army's Battlemind training as they enhance a veteran's ability to manage combat stress (Adler, Bliese, McGurk, Hoge and Castro, 2009). Some researchers believe providing assessment and intervention services pre-deployment and during deployment involve the use of such programs as Combat and Operational Stress Control, which serves to assess soldiers before deployment, to minimize the effects of combat on a soldier's mental and physical wellbeing, and to secure the completion of mission parameters in theater (Brusher, 2007).

One approach to managing the development of PTSD from combat exposure involves implementation of mental health programs during deployment, such as Combat Stress Control (CSC) units involving a 2 to 5 day inpatient program designed specifically for restoration of functioning (Bacon and Staudenmeier, 2003; Brusher, 2007) which is endorsed by the Department of Defense (United States Army, 2006) . Potter, Baker, Sanders, and Peterson (2009) endorse augmenting the CSC program model with prolonged exposure treatment to potentially improve the effectiveness and long lasting effects of the program.

Although much of the research and literature on the effects of combat exposure focus on the development of PTSD and the negative consequences that result, there also is data to support the idea that the effects of being in war can have a positive transformative effect, as veterans learn positive coping strategies by making meaning of their experiences in what is called benefit

finding (Linley and Joseph, 2004). Some researchers use the term “posttraumatic growth” to describe the phenomenon of positive growth or change resulting from coping with traumatic stress and finding a way to grow from the experience, in spite of the difficulties experienced (Larner and Blow, 2011; Tedeschi and Calhoun, 2004). It has been theorized that benefit finding is part of a positive adaptation to stress (Affleck and Tennen, 1996), and may be a positive coping strategy that can assist managing stress from traumatic episodes (Helgeson et al., 2006) in veteran’s post-deployment (Schok et al., 2007). In a recent study, Wood et al. (2011) found that benefit finding had a moderating effect on the symptoms of PTSD, as when benefit finding was high, there was a reduction in the rate for which PTSD symptoms increase after combat exposure. The current study did not address posttraumatic growth, however this is a very relevant area of future study, as returning veterans attempt to make sense and meaning of their experiences in Operations Iraqi Freedom, Enduring Freedom and New Dawn.

Conclusions

With the number of returning military personnel, both active and reserve, returning from deployment and assuming their previous duties and responsibilities, mental health professionals, as well as the Department of Veteran Affairs, Department of Defense, and the general public will require updated relevant information regarding the potential effects of combat exposure on veterans. The current literature suggests the need for education and awareness of these issues, in addition to effective intervention strategies to assist the returning veterans successfully reintegrate into mainstream society (Drescher and Foy, 1995; Drescher, et al., 2011; Fontana and Rosenheck, 2004; Foa, Keane, Friedman, and Cohen, 2009; Pietrzak, Rotem, and Southwick, 2011; Strachan et al., 2011; Steenkamp et al., 2011).

Combat exposure is related to symptoms of PTSD in post-deployment veterans. The findings of this study appear to suggest a connection between combat exposure and potential detrimental effects on the veteran’s ability to cope effectively upon their return from the OEF/OIF/OND combat arena. Ultimately, the results of this study suggest further research on

combat exposure as a predictor of impairment in coping abilities is needed to more adequately understand its effects on returning veterans. The data discussed from the current study represents only a small proportion of research on the effects of exposure to combat on veterans of OEF/OIF/OND. The MIRECC database holds the potential to explore and examine the experiences of these brave men and women with regards to multiple variables. Much research is, and will continue to be extrapolated on from this study and serves to broaden the understanding of the effects of war on those exposed to it in efforts to develop preventative risk assessment procedures as well as successful intervention strategies to assisted those veterans and their families affected by combat stress and PTSD.

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APPENDIX A

Descriptive Statistics for Race and Gender

	N	Mean	Standard Deviation
Gender	1824	.20	.403
Male	1451	.80	.4031
Female	373	.20	.4034
Race			
African American/ Caucasian	1716	.47	.499
African American	896	.49	.500
Caucasian	822	.45	.498
Asian American	24	.01	.114
Hispanic/Latino/a	41	.02	.148
Native American	35	.02	.137
Pacific Islander	8	.00	.066

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