AN ABSTRACT OF THE THESIS OF

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Title: PTSD Symptoms among Vietnam, Persian Gulf, and Post-9/11 Veterans: A Rural/Urban Comparison

Abstract approved: ______________________________________________________

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The veteran population, about 18.5 million Americans in 2016 (US Census Bureau, 2018), is particularly at risk for mental health problems. As an example, the suicide rate of veterans is about one and a half times higher than the general population (US Department of Veteran Affairs [DVA], 2018b). Another group at risk for suicide are individuals in rural places (Hedegaard et al., 2018), representing about 20% of all Americans (US Census Bureau, 2016). Further, veterans appear to reside in more densely populated in rural areas, as 24% of all veterans, but only 20% of all Americans, live in rural places (US Census Bureau, 2016; Holder, 2017). Thus, rural veterans could be at an increased risk for mental health problems.

However, the literature about mental health differences, specifically posttraumatic stress disorder (PTSD), among rural and urban veterans is extremely mixed. Some research has shown that rural veterans are more likely to report a mental disorder (Proctor et al., 2011), have higher rates of PTSD (McCarthy et al., 2012), and were more likely to meet screening criteria for PTSD (Whealin et al., 2014). Other studies, however, have found that urban veterans are more likely to have PTSD (Cully et al., 2010; Mott et al.,
2015; Wallace et al., 2006). However, Erickson et al. (2013) found no differences, once controlling for demographics.

There are also discrepancies concerning whether different war cohorts vary in their rates of PTSD. Fontana and Rosenheck (1994) found that Vietnam veterans had higher rates of PTSD when compared with Korean and World II veterans; however, a more recent comparison of war cohorts found that veterans of the most recent conflicts (i.e., Post-9/11) have the highest rates of PTSD, followed by Vietnam veterans, with World War II veterans having the least (IOM, 2013). The reasons for these discrepancies from both rural/urban and cohort comparisons are currently unclear but could result from differences in sample characteristics (e.g., community vs. patient samples, gender, SES, etc.), in cohort differences (e.g., differential combat exposure), or in how PTSD is reported (e.g., prevalence, incidence, positive screening, etc.).

This study has three hypotheses. (1) We hypothesize that rural veterans will have higher levels of PTSD symptoms, controlling for combat exposure and demographics; (2) veterans of the Post-9/11 cohort will have the highest PTSD symptoms; and (3) there will be a rural/urban status by war cohort interaction, with rural veterans of the Post-9/11 cohort having the highest PTSD symptoms. We examined factors that could contribute to these differences, specifically: age, gender, marital status, income, education, and combat exposure.

Participants came from Veterans Aging: Longitudinal studies in Oregon (VALOR) pilot study, (N=237; $M_{age} = 58.16$, $SD = 12.58$; completion rate = 75%) for this thesis. Participants completed a survey online, which measured the following: geographic location (RUCA; Washington State Department of Health, 2016), war cohort
(screening question to participate in the study), combat exposure (CES; King et al., 2006), PTSD (PCL-5; Weathers et al., 2013), and demographics. Analyses of variance (ANOVAs) and analysis of covariance (ANCOVAs) were used to assess group differences and possible influences of demographic covariances, respectively. Parallel analyses were conducted using the entire sample and the combat-exposed subsample. Results from correlations resulted in the inclusion of the following covariates: age, gender, combat exposure, education, and income.

Correlational analyses showed that gender, age, and income were associated with PTSD, with men being higher, and older and higher income individuals having lower levels of PTSD symptoms, while educational attainment had no relationship. Curiously, in the whole sample, being in combat was inversely associated with PTSD, perhaps reflecting a “healthy warrior” effect, while combat severity was positively associated with PTSD in the subsample of combat veterans.

Contrary to our hypotheses, there were no differences in PTSD symptoms due to geographic location, either raw or adjusted, for either sample, probably because there were no demographic differences between the groups; this supported Erickson et al.’s (2013) finding. There was no effect of war cohort in unadjusted analyses, but covarying demographics showed that Vietnam veterans had significantly higher PTSD symptoms than both Persian Gulf and Post-9/11 veterans, contradicting the more recent IOM (2013) study. There were no significant interactions between geographic location and war cohort in PTSD symptoms for either sample, although rural Vietnam Veterans had twice as many PTSD symptoms as urban post-911 veterans.
However, this study uncovered an interesting conundrum, in which age was inversely associated with PTSD symptoms but the older cohort, the Vietnam Veterans, had the highest level of symptoms. Inspection of the distribution of PTSD symptoms by cohort showed that there was a small group of veterans in the oldest cohort which had very high symptom levels. This suggests that, while PTSD symptoms normatively decline with age, there may be a small minority that suffers from very high symptom levels in late life. Future longitudinal research is needed to determine whether this group suffered from life-long PTSD, or if there was a reemergence of PTSD in very late life.

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Maria Kurth, Author
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CHAPTER 1
INTRODUCTION

America is facing an emerging mental health crisis. For example, the suicide rate in 2017 has increased 33% since 1999 (Hedegaard, Curtin, & Warner, 2018). The suicide rate in 2017 in rural places was nearly twice that of urban places, when adjusted for age (Hedegaard et al.). Further, rural Americans, when compared with urban Americans, experienced over a threefold increase in suicide rates from 1999-2017 (56% vs. 16%). Another population at risk in the current suicide epidemic are veterans, whose suicide rate is about one and a half times higher than that of the general population (Department of Veteran Affairs [DVA], 2018b). Some of this suicide differential may be due to post-traumatic stress disorder (PTSD), which can occur after witnessing or experiencing a traumatic event, defined as being threatened by or witnessing death or serious injury (American Psychiatric Association [APA], 2013). Symptoms include intrusive thoughts, avoiding reminders of the event, negative thoughts and feelings, and arousal and reactive symptoms.

Another area that warrants further examination is war cohort differences. Spiro, Settersten, and Aldwin (2016) have suggested that there may be cohort differences in the long-term effects of combat exposure on mental health. Here again, though, the literature is mixed. Some research suggests that veterans of the Post-9/11 conflicts (Operation Iraqi Freedom [OIF] /Operation Enduring Freedom [OEF]/Operation New Dawn [OND]) have higher rates of PTSD than Vietnam veterans (Institute of Medicine [IOM], 2013). PTSD may be the ‘signature wound’ of the Post-9/11 conflicts, as an estimated 13%-20% of the 2.6 million service members had PTSD in 2010 (IOM, 2012). However, others
have found the rate of PTSD to be as high as a 30.9% for veterans of the Vietnam War (Kulka et al., 1990).

Nonetheless, the number of veterans who receive a diagnosis of PTSD is on the rise. Mott, Grubbs, Sansgiry, Fortney, and Cully (2015), comparing VA samples from 2007 and 2010, found that the rate of new PTSD diagnoses increased, while depression and anxiety diagnoses remained constant. Post-9/11 veterans with a positive screen for PTSD were four times more likely to report suicidal ideation (IOM, 2013). Further, the suicide rate 2016 was highest among veterans between the ages of 18-24, although the greatest proportion of suicides was among veterans 55 and older (DVA, 2018b). This highlights the need of veterans not only directly after their service, but also as they age.

Combat exposure can have life-long effects on mental and physical health (Spiro et al., 2016) which may increase with age (APA, 2015). For example, veterans of WWII who reported moderate-heavy combat exposure were 13 times more likely than those without combat exposure to have PTSD (Spiro, Schnurr, & Aldwin, 1994).

However, not every veteran develops PTSD, and not everyone who develops PTSD will suffer lifelong problems (Davison, Kaiser, Spiro, Moye, King, & King, 2016; Sachs-Ericsson, Joiner, Cougle, Stanley, & Sheffler, 2016). Some groups appear more vulnerable than others to the adverse effects of combat with age, such as PTSD (Kang, Aldwin, Choun, & Spiro, 2016), although there are often inconsistent results. Of particular interest are urban and rural differences in PTSD, as well as war cohort differences.

This thesis will address two controversies: whether urban or rural veterans have more symptoms of PTSD, and whether there are cohort differences in PTSD symptoms.
First, we will present the theoretical underpinnings for this thesis. We will then review the literature around these two controversies and examine whether level of combat exposure and other demographic characteristics (age, gender, income, education, and marital status) may account for some of the discrepant findings.
CHAPTER 2
THEORETICAL PERSPECTIVE AND LITERATURE REVIEW

This chapter will be divided into two sections. The first is on the life course perspective and how its key concepts of context (e.g., urban/rural) and historical time and place play a role in the aging of veterans. The second section looks specifically at veteran’s mental health.

THEORETICAL PERSPECTIVE

This thesis will use a theoretical model that draws upon aspects from life course theory (Elder, Shanahan, & Jennings, 2015). According to Elder et al., there are five major principles of the life course: life span development, human agency, timing, linked lives, and historical time and place. This framework acknowledges that individuals develop within various contexts (i.e. historical and social) and, in turn, how these environments shape development. Along with these principles, a major focus of the life course theory is the importance of the sociocultural context for development. This can be described as not only the historical situation of the individual, but also the community and neighborhood in which an individual resides. The two contexts addressed by this thesis concern the rural and the historical contexts of veterans.

The life course framework has been specifically applied to the examination of military service by several scholars. Settersten (2006) notes that much of what we know about aging comes from cohorts born in the early 20th century, many of whom experienced military service. Using the life course perspective allows researchers to make military service the central focus, while examining its impact on trends and outcomes in realms like education, income, and family. As an example, Elder, Gimbel, and Ivie
(1991) found that around 60% of WWII veterans reported that military service had impacted their lives in some way. Many reported that military service was a turning point (an event which results in a long-lasting change for the individual’s development), that resulted in positive change. The authors note that results will mostly likely not be generalizable to veterans of other war cohorts; this pertains to the historical time aspect of life course, in that the time these veterans served varies from veterans of previous or subsequent conflicts.

The life course framework provides a unique examination of military service on various aspects of a veterans’ life, such as mental health. In particular, we are interested how rurality affects veteran’s mental health and how the historical context of different war eras also affects mental health. Thus, contexts provide the individual with certain benefits and/or risks that may impact development and we will review relevant characteristics of these contexts.

**Characteristics of Rural America**

Traditionally, America has been dichotomized into rural and urban areas. However, some have suggested that these two classifications exist on a gradient, composed of large metropolitan areas, suburban areas, smaller communities, and isolated rural communities (Washington State Department of Health, 2016). The expansion of urban places has resulted in bringing rural locations closer, resulting in smaller spatial divides (Lichter & Brown, 2011). Further, the Rural Urban Commuting Area Codes (RUCA; Washington State Department of Health, 2016) classifies not only on residential location alone, but also commuting behavior, suggesting qualitative differences between those who reside and work in rural places and those who reside in rural places but work
in more urbanized locations. The latter group are thought to be “brokers” between urban and rural residents and culture (Lichter & Brown, 2011, p. 568). Nonetheless, many researchers still use the urban/rural dichotomy, which has been viewed by some to be misleading (Isserman, 2005).

US Census Bureau data from 1910 showed that 54.4% of Americans lived in areas that were classified as rural; by 2010, only 19.3% of Americans lived in rural places (US Census Bureau, 2016). Two reasons for this dramatic decline of the rural populations are the out-migration of young adults and in-migration of retirees (Glasgow & Brown, 2012; Lichter & Brown, 2011). Thus, rural residents are older than urban ones; rural residents had a median age of 40.3, while urban residents had a median age of 36.6 in 2012 (Krout & Hash, 2015), and there may be other demographic differences, such as age, that could partially explain the varying rates of PTSD between rural and urban residents.

The 2010 Decennial Census data showed that about 13% of Americans are 65+; this number was higher in nonmetropolitan areas when compared with metropolitan areas (16.2% vs. 12.4%; Nelson, 2014). This same Census Bureau data showed that the Pacific Census Region had the highest concentration of older adults in nonmetropolitan areas, at 17.02% (Nelson, 2014). Further, isolated rural places have about a 50% greater concentration of older adults than the entire country (Nelson, 2014). Some have even said “the more rural an area’s population, the older are its residents” (Glasgow & Brown, 2011, p. 423). Past research has shown that there are age differences in rates of PTSD, which will be discussed in greater detail later.
Census data collected from 2011-2015 has showed additional differences between rural and urban residents on basic demographic characteristics that might affects rates of mental disorders. For example, residents 18 and older in rural places reported higher rates of being married. However, urban adults are more likely than rural residents to live alone, have a bachelor’s degree or higher, and live in poverty (US Census Bureau, 2016). These differences could also help explain differences in PTSD between rural and urban veterans, as age, marital status, income and education have been shown to factor into differences in rates of PTSD, which will be discussed later in the section on veteran’s mental health.

Given these demographic differences between rural and urban Americans (i.e., age, marital status, and education), it is important that context be considered, in accordance with life course theory (Elder et al., 2015). The demographic differences may also contribute to differences in PTSD; this will be discussed in greater detail in the section related to dimensions which influence its prevalence among rural/urban and war cohorts. The focus will now turn towards a specific subgroup within rural America: rural veterans.

**Rural Veterans**

The Department of Veteran Affairs [DVA] identified rural veterans as a population of interest in 2011, due to a variety of reasons as follows (DVA, 2012). Nearly 30% of the entire veteran population resides in rural places, compared to 20% of the US population (US Census Bureau, 2016). Further, they comprised 41% of the population enrolled in VA health care system, suggesting that rural veterans are over-represented (DVA, 2012), although they may have less access to mental health resources.
Of all rural enrollees in the DVA, 30% served in the Post-9/11 conflicts, suggesting that this trend towards veterans residing in rural places is increasing. Further, the DVA (2012) also reported that rural veterans have difficulty with institutional and infrastructural supports. This could possibly lead to worse mental health among rural veterans. However, the literature is extremely mixed. Some studies find that urban veterans have higher rates of PTSD (Cully, Jameson, Phillips, Kunik, & Fortney, 2010; Mott, Grubbs, Sansgiry, Fortney, & Cully, 2015; Wallace, Weeks, Wang, Lee, & Kazis, 2006), while others report that rural veterans have higher rates (McCarthy, Blow, Ignacio, Ilgen, Austin, & Valenstein, 2012; Proctor, Wells, Jones, Boyko, & Smith, 2011; Whealin et al., 2014). Why this discrepancy in the literature exists is currently unknown, and thus, is a focus of this thesis.

In summary, just as rural Americans differ from urban Americans, so too do rural veterans differ from their urban veteran counterparts. Thus, rurality of veterans is an important context for examining the long-terms of military service.

Historical Time and Place: War Cohort Differences

Spiro et al. (2016) argued that the historical context may also affect military service and its long-term consequences. However, they only suggested a few dimensions along which cohorts may vary. Specifying these in greater detail is at the heart of whether there are cohort differences in the consequences of combat exposure. There are a number of differences, including demographic changes, including increases in the number of women and minorities the shift to the all-volunteer force (AVF) in 1973, the change in percentage deployed, mortality and morbidity rates, and readjustment experiences.
**Demographic composition.** More recent conflicts have seen dramatic shifts in the demographics of active duty personal. In 1990, racial/ethnic minorities constituted 25% of active duty military; this increased to 40% in 2014 (Pew Center, 2017). Another major difference of today’s military is the presence of women. For example, the percentage of females in the military increased seven-fold from 1973-2010. Additionally, female officer rates have expanded in a similar way, with a four-fold increase during the same time span (Patten & Parker, 2011). Further, the roles for women have expanded since the Direct Combat Definition was abolished in 2013 (Dempsey & Panetta, 2013). The above changes will eventually translate into more minority and female veterans. Recent estimates show that, in 2013, females accounted for <1% of the veteran population; however, this number is projected to increase to around 16% by 2043 (DVA, 2014). The effect of this demographic shift on veterans’ experiences and mental health in later life is unknown.

**Deployment and combat exposure.** The switch to the AVF has increased the percentage of soldiers deployed. Among a sample of community-dwelling veterans, those who served in the Post-9/11 conflicts were deployed at higher rates than pre-9/11 veterans. However, Post-9/11 veterans vary in comparison to specific pre-9/11 cohorts in their rate of multiple deployments (≥3): Vietnam veterans reported higher rates, while WWII reported lower (Taylor et al., 2011). This has resulted in different rates of combat exposure. For example, 44% of Vietnam veterans, 45% of Persian Gulf veterans, and 92% of veterans of Post-9/11 reported combat exposure during their service (Edwards, 2014).
This pattern suggests that Post-9/11 veterans are deployed at higher rates and report more combat exposure than veterans of previous war cohorts. However, Taylor and colleagues collected data in 2011, 10 year since the start of the Post-9/11 conflicts; nine years later, these same conflicts are still occurring. More recent data collection would provide more accurate insight into deployment rates, and could possibly result in Post-9/11 veterans reporting higher rates of multiple deployments when compared with pre-9/11 conflicts.

**Mortality and morbidity.** Despite the greater percentages of soldiers deployed, the number who died in service (Department of Defense [DOD], 2019a; DVA, 2017a) has decreased dramatically across cohorts. For example, the mortality rate of services members in WWII was two and a half times the rate of the Korean and Vietnam Wars. Dramatically continuing this trend, the rate for the Persian Gulf War was 97% less than that of World War II. For example, in WWII, 405,399 service members died (out of 16.1 million); in the Persian Gulf War, only 383 died (out of 2.3 million; DVA, 2017a).

Even though the number of deaths is lower for those of the current conflicts, the rate of serious injuries is higher among those of post-9/11 than the pre-9/11 conflicts (16% vs. 10%; Taylor et al., 2011); the wounded-to-killed ratio is about 7:1 for the current conflicts and less than 3:1 for Vietnam and previous conflicts. This is a direct result of better medical care, as fewer veterans are dying in combat, but are sustaining higher rates of serious injury. This may be affecting readjustment to civilian life.

**Readjustment to civilian life.** Post-9/11 veterans report higher rates of difficult adjustment into civilian life when compared with pre-9/11 veterans (Taylor et al., 2011). Part of this could be due to higher rates of emotional and psychological hardship of
wartime experiences, resulting in higher levels of distress for post-9/11 veterans when compared with pre-9/11 veterans for both non-combat and combat veterans (Taylor et al.). However, it is also possible that the higher injury rates may also contribute to problems in readjustment.

Summary

Life course theory (Elder et al., 2015) specifies the importance of context and historical time and place in understanding developmental phenomena and is clearly relevant to the experience of veterans during and after their military service. In terms of context, rural residents are vulnerable in a number of ways. They are older and have higher rates of mental health conditions (Carpenter-Song & Snell-Rodd, 2017; Gamm et al., 2010). Not only do they live further away from mental health specialists than their urban peers (Alfers & Heady, 2014), they are also more likely to report negative stigma towards using mental health services (Clement et al., 2017; Stewart, Jameson, & Curtin, 2015).

Further, historical time and place is important in that wars differ with regard to the demographic composition of the troops, warzone conditions, and veteran outcomes after their service. A number of factors differentiate among war cohorts, including degree of combat exposure (Edwards, 2014), the increase in women and minorities in the troops (DVA, 2014; Karmack, 2016; Patten & Parker, 2011), morbidity and mortality rates (DVA, 2017), medical care in war zones, and rates of deployment (Taylor et al., 2011). Although Spiro and colleagues (2016) acknowledge that war cohorts vary in these ways, they do not suggest how these differences contribute to long-term outcomes, such as
PTSD. Another way in which war cohorts differ is in the rate of PTSD experienced by veterans; however, the results are mixed and will be discussed in detail below.

**VETERANS’ MENTAL HEALTH**

The purpose of this section is to examine the mental health of veterans, specifically PTSD, along with characteristics that could contribute to differences in the rates at which veterans experience it. First, the mental health-seeking behaviors of veterans will be examined, followed by PTSD rates among veterans and non-veterans. Next, the two main foci of this thesis will be examined in relation to PTSD: rural/urban status and cohort membership, respectively. Finally, the section will conclude with characteristics of the veteran population, along with how these contribute to rates of PTSD. Note that the terms non-veteran and civilian will be used interchangeably throughout this section, as both are used in the literature and refer to those who have not served in the military.

**Mental Health-Seeking Behaviors among Rural and Urban Veterans**

While there is a growing literature on the mental health status of the populations of interest, it is important to note that stigma around mental health may affect individuals’ willingness to report problems. This is best illustrated by the literature on mental health treatment seeking behavior. In general, rural residents are less likely to seek mental health services and may be more likely to have greater self and public stigma towards seeking psychological help (Stewart et al., 2015).

However, the picture may be more complicated for veterans. Teich, Ali, Lynch, and Mutter (2017) analyzed mental health treatment usage among a nationally representative sample, comparing rural and urban veterans. For both groups, VA
hospitals appear to be the provider of choice for mental health needs (West, Weeks, & Charlton, 2017; see also Whealin et al., 2014). Cully et al. (2010) found that rural veterans in the DVA healthcare system had a significantly longer periods of time between a mental health diagnosis and receiving psychotherapy services. However, once in treatment, there seems to be no differences between rural and urban veteran in completion rates (Baker, Mott, Mondragon, Hundt, Grady, & Teng, 2015). Similarly, Elhai, Baugher, Quevillon, Sauvageot, and Freuh (2004) found no differences among rural and urban DVA patients with a diagnosis of PTSD on the number of mental health clinic visits; this was after the patients were already diagnosed and receiving mental health services. There is also evidence to suggest that, among veterans, there is no differences between the two groups in usage of mental health services (Whealin et al., 2014).

A recent review of mental health care among rural veterans identified problems in this literature. According to Bumgarner et al. (2017), only 45% of identified studies used a specific definition of rural; the most frequently used definition (17%) was the DVA classification which defines urban, rural and highly rural, while 7% used Rural Urban Commuting Area Codes (RUCA; Washington State Department of Health, 2016). The rest used either census codes or idiosyncratic definitions. Second, Bumgarner and colleagues found that 90% of their identified studies focus on ‘all veterans,’ with only 10% focusing on specific war cohorts. Further, veteran studies examining mental health-seeking behaviors often draw from DVA patient databases rather than community-dwelling samples (but see Teich et al., 2017; Whealin et al., 2014).
If there is an urban/rural difference in the rates at which veterans seek help, it appears that there are two possible explanations. The first possibility is the social stigma surrounding mental health issues in rural places (Clement et al., 2017; Stewart et al., 2015), which appears to hinder health-seeking behavior in rural places. The second possibility is the actual differing rates of mental health conditions between rural and urban veterans, as some studies suggest rural veterans have higher rates of PTSD (McCarthy et al. 2012; Proctor et al., 2011; Whealin et al., 2014), while others show urban veterans have higher rates of PTSD (Cully et al., 2010; Mott et al., 2015; Wallace et al., 2006). However, the reasons for differences between help-seeking behavior among rural and urban veterans remains unclear.

**Posttraumatic Stress Disorder among Non-Veterans and Veterans**

**Mental health differences.** Whether or not there are differences between these two groups is an open question, and may vary by cohort or condition. In community-dwelling sample, Boakye and colleagues (2017) found that WWII and Korean veterans reported lower rates than civilians on both depression and current mental distress, in both unconditional analyses and after adjusting for demographics and health behavior habits. However, Vietnam veterans reported higher rates of both current mental distress and depression when compared with their civilian counterparts. In contrast, there were no differences between civilians and the Gulf War veterans in the adjusted analyses. However, both lifetime depression and current mental distress were single-item measures, raising questions of validity.

Trautmann et al. (2017) compared never deployed, deployed, and soldiers with heavy combat experience with civilians in a German sample. In general, both deployed
and non-deployed soldiers had lower rates of anxiety than civilians. However, deployed soldiers who reported high combat exposure were three times more likely to have PTSD than civilians. In similar vein, Jordan and colleagues (1991) compared theater, non-theater, and civilians during the Vietnam War area on current and lifetime prevalence of various psychiatric disorders. Civilians and female non-deployed veterans had better mental health than the theater veterans, when measured as both lifetime and current prevalence of various mental health conditions. War zone stress moderated these findings; high stress theater veterans had higher levels of depression and anxiety disorders (Jordan et al.). Thus, the mental health of veterans may vary by combat status, which will be discussed in further detail in the section about factors that affect PTSD.

**Posttraumatic stress disorder rates.** As a baseline reference, adults in the United States have a PTSD prevalence of 6.4% (Pietrzak, Goldstein, Southwick, & Grant, 2011). A cross-national meta-analysis of general mental health disorders often found urban/rural differences in mental health, but there were no significant differences in the US for any disorder or anxiety disorders (Peen, Beekman, & Dekker, 2010). However, they did not specifically focus on PTSD. In contrast, a more focused study found that PTSD was significantly higher in urban communities than in rural ones (e.g., Erickson, Hedges, Call, & Bair, 2013). Further, the rates of PTSD appear to be higher in veteran than in nonveteran samples; some have found the prevalence of PTSD to be as high as 41.3% among veteran samples (Fulton et al., 2015), as compared with 6.4% in the general population (Pietrzak et al., 2011).
Veteran Posttraumatic Stress Disorder: Rural/Urban Differences

Research examining rural-urban differences in veterans has produced mixed results. Some studies find that urban veterans have higher rates of PTSD (Cully et al., 2010; Mott et al., 2015; Wallace et al., 2006), while others find that rural veterans have higher rates of PTSD (McCarthy et al., 2012; Proctor et al., 2011; Whealin et al., 2012); others have found little difference between rural and urban veterans (Elhai et al., 2004). However, these studies vary widely in their diagnostic criteria of PTSD (i.e., prevalence, incidence, etc.) and sample characteristics (i.e. help seeking v community dwelling samples, war cohort, etc.). These differences will be discussed below to potentially uncover why the literature is mixed in regard to PTSD differences among rural and urban veterans. A visual representation of these differences is provided in Table 2.1.

Within Table 2.1, seven studies are presented which examined rural/urban differences in PTSD, organized by sample type. The first column indicates which group had higher rates of PTSD, followed by a column that shows the rural/urban percentages between the two groups; this was calculated by dividing the rural percentage by the urban percentage of the sample who reported PTSD. The PTSD measurement column reports the tool used for PTSD; there was caseness (new onset of PTSD, which was diagnosed), diagnosis (based upon patient records), and self-reported lifetime and current prevalence.

Three studies found that urban veterans had higher PTSD rates. Using a retrospective design on a DVA national database of 200,000 veterans, Cully et al. (2010) found that, compared to rural veterans, urban veterans had a significantly higher rate of new cases of PTSD among those without a previously related diagnosis. Mott et al. (2015) repeated this study, also using a national DVA data base of more than 500,000
veterans, six years later, and found the same pattern of results. Wallace et al. (2006) examined prevalence among 750,000 users of VA services who filled out a questionnaire in 1999, and found a 10% higher prevalence of PTSD among urban veterans.

Despite the large sample sizes, there are a number of factors that could contribute to these findings. First, the very large samples sizes means that even small differences may be statistically, but not clinically, significant. Second, all three looked at help-seeking veterans, and it may not be generalizable to all veterans. Only 29% of veterans currently use health care benefits, and the rate was lower in the previous two decades (DVA, 2017b). Third, there was no further stratification of veterans, either by war cohort or age. Given that 73.6% of WWII veterans used DVA benefits, compared with 55.4% of Post-9/11 Gulf War veterans (DVA, 2017b), it is possible that Mott et al.’s (2015) and Cully et al.’s (2010) samples were overrepresentative of older veterans, who served in earlier war eras such as Vietnam and Korea and thus, is not generalizable to veterans of more recent cohorts. Thus, there is a strong need for research that uses samples drawn from outside the VA, such as the general public, screening for veteran status (i.e. community-dwelling samples). Further, research should pay attention to both cohort and urban/rural differences.

Three studies found that rural veterans had higher PTSD rates. Whealin et al. (2014) drew from a community-dwelling sample of OEF/OIF/OND deployed veterans residing in Hawaii and found that rural veterans had higher rates of a positive PTSD screen when compared with urban veterans. Also examining veterans of more recent conflicts through, Proctor et al. (2011) examined rates of aggregate mental health conditions among participants from Millennium Cohort Study. Rural veterans had
statistically significant more mental health conditions than urban veterans. McCarthy and colleagues (2012), in a sample of at-risk DVA patients, found that rural veterans had significantly higher rates of PTSD than the urban veterans (McCarthy et al., 2012). The studies finding rural veterans to be higher used more diverse samples. Both Whealin et al. (2014) and Proctor et al. (2011) sampled outside of the VA database, while McCarthy et al. (2012) used a help-seeking DVA population. These two studies that examined community-dwelling samples also examined veterans of cohorts who have served in more recent conflicts (Persian Gulf, OEF/OIF/OND). While McCarthy et al. (2012) did not report cohort information, these were probably mainly Vietnam veterans, given that the average age of the sample (61) in 2004 and 2007.

Other researchers have found few differences between the two groups. Elhai and colleagues (2004) used a DVA sample in which all participants had combat-related PTSD and compared groups on various mental health measures. There were no differences between the groups on depression, paranoia, schizophrenia, or PTSD symptoms related to combat. The one group difference was that rural veterans reported higher dissociative symptoms, suggesting that these veterans were more detached from their experiences of service than the urban veterans. In all, the lack of group differences suggests that rural and urban veterans have similar mental health needs and conditions, which challenges other research suggesting group differences in mental health among rural and urban veterans (Cully et al., 2010; McCarthy et al., 2012; McCarthy et al., 2012; Proctor et al., 2011; Wallace et al., 2006; Whealin et al., 2014). One such factor that could help further identify PTSD differences between rural and urban veterans is their war experiences, such as rate of combat exposure.
**Rural-urban differences in combat exposure.** McCall-Hosenfeld and colleagues (2014) found that war-related trauma was the only significant difference between rural and urban community-dwelling participants was for war-related trauma, which included combat exposure. They found that rural participants were less likely to experience war trauma. However, one part of the war trauma assessment included non-military trauma, such as refugee trauma, and refugees are more populous in metropolitan areas (McCall-Hosenfeld et al., 2014). Results were not reported for combat exposure. Surprisingly, we were unable to locate any studies which specifically contrasted urban/rural differences in combat exposure.

**War Cohort and Posttraumatic Stress Disorder**

The second major research focus of this thesis centers on PTSD differences among war cohorts. As discussed above in the theory section, no two war cohorts are the same in terms of warzone experiences, medical care quality, and rate of deployment (Taylor et al., 2011). These differences are central when examining a large, representative sample of veterans, such as large DVA samples (Cully et al., 2010; McCarthy et al., 2014; Mott et al., 2015; Wallace et al., 2006). Not only acknowledging cohort differences, but explicit examination are central to the life course theory (Elder et al., 2015) and its specific application to military service, as time in history impacts military service outcomes (MacLean & Elder, 2007).

Porter and colleagues (2017) examined PTSD symptoms among veterans and active duty military personnel, using data from a sample that includes veterans and active duty personnel from both the Persian Gulf era and Post-9/11 conflicts. Results found that veterans were more likely than active duty personnel to screen positive for PTSD at
baseline and during subsequent waves of analysis. Given that veterans had higher rates of positive screens for PTSD, they also had more severe symptoms when compared with active duty military participants, but only at baseline (Porter et al., 2017). Further, veterans were less likely to belong to the optimal group (low levels of PTSD symptoms at all time points) and more likely to belong to one of the groups which experienced an increase in PTSD symptoms across time. Although the authors potentially had veterans from both the Persian Gulf and Post-9/11 cohorts, their analyses did not stratify veterans by cohort. This association held even after controlling for demographics, such as age, gender, marital status, and combat exposure.

Among veterans of earlier cohorts, McCranie and Hyer (2000) found that Korean veterans, when compared with WWII veterans, had higher rates of PTSD on both interview and self-report measures of PTSD. Fontana and Rosenheck (1994) found that after controlling for combat exposure, WWII veterans had higher PTSD scores than Vietnam and Korean veterans. When Magruder and Yeager (2009) examined veterans of Vietnam, Persian Gulf, and Post-9/11 veterans, they found that veterans of the Vietnam had the greatest discrepancy between deployed and non-deployed veterans, with a three-fold increase in the rate of PTSD for those who were deployed, as compared with a 50% increase between for the Post-9/11 veterans. However, the authors only included two studies of Post-9/11 veterans. In contrast, and with more recent data, others found that veterans of the Post-9/11 conflicts have the highest rates of PTSD, followed by Vietnam, followed by WWII (IOM, 2013).

**War cohort and combat experience.** Spiro et al. (1994) compared combat exposure and PTSD in WW II and Korean War veterans. For both war cohorts, PTSD
was higher in those who were exposed to combat; the WW II veterans that had moderate-heavy combat exposure were 13.3 times more likely to have PTSD when compare with those who did not experience combat (Spiro et al., 1994). Fontana and Rosenheck (1994) also found that, for veterans of WWII, Korea, and Vietnam, current PTSD prevalence was associated with combat exposure; the beta coefficients for all cohorts for the effects of combat exposure on PTSD were roughly similar, suggesting that the trauma affected mental health similarly. Similar results have been found with Vietnam War (Goldberg et al., 2014) and OEF/OIF veterans (Dursa, Reinhard, Barth, & Schneiderman, 2014).

**Dimensions Relevant to Urban/Rural and Cohort Differences among Veterans**

As mentioned earlier, Spiro et al. (2016) suggested some dimensions along which different war cohorts may vary. Perhaps the most important of these is the amount and type of combat exposure. However, there are some demographic differences which may vary among both urban/rural and war cohorts, including socioeconomic status, marital status, age, and gender; these differences, in turn, could also aide in explaining PTSD rates between the two groups.

**Combat exposure.** The link between combat exposure and PTSD is well-established (Keane et al., 1998). Using an all-male military community-dwelling sample, Sachs-Ericsson, Joiner, Cougle, Stanley, and Sheffler (2016) found that those who reported combat exposure had significantly higher rates of lifetime prevalence of PTSD. At a 10-year follow-up, the combat group still had higher rates of PTSD when compared with the non-combat group. Sachs-Ericsson et al.also found that combat exposure uniquely contributed to PTSD, even when recent life stressors was added into the
regression model. However, combat veterans had about a three-fold reduction in lifetime PTSD prevalence between baseline and the follow-up, suggesting that age is important.

**Socioeconomic status.** SES is a construct which consists of multiple variables. This thesis will focus on two aspects: income and education.

*Income.* In 2016, male veterans reported slightly lower median household income than male nonveterans overall (DVA, 2018a). However, this appears to vary by age group. In their 20’s, veterans have slightly lower median incomes than nonveterans, but then they enjoy an income advantage through the mid-fifties, and then again in later life. In contrast, female veterans had higher incomes than female nonveterans in all age groups. Both female and male veterans had significantly lower rates of poverty than their nonveteran peers at all ages. These poverty statistics reflect measurements which used official poverty thresholds, which do not account for capital gains or noncash benefits.

*Income and PTSD.* Within a community-dwelling sample of adults, those with higher incomes had a lower risk of PTSD (Erickson et al., 2013; Pietrzak et al. 2011). This same appears to be true among veterans (Goldberg et al., 2014). Longitudinal research, however, found that income did not predict PTSD reoccurrence or incidence over a 10-year period (Sachs-Ericcson et al., 2016), suggesting problems in causal directionality; PTSD may create job instability, thus harming income. In this study, income was measured at the household level, suggesting that spousal income may cushion these types of problems.

*Education.* In general, both male and female veterans have greater educational attainment than civilians (DVA, 2018a). Further, female veterans have higher rates of obtaining a bachelor’s degree than male veterans.
However, rural veterans tend to be less educated than their urban counterparts (Whealin et al., 2014). But, this difference may attenuate as veterans increasingly access the GI bill (Proctor et al., 2011). Military service provides the opportunity for veterans to access higher education upon completion of service, which some might not have access to otherwise (Elder et al., 1991). Settersten (2006, p.19) refers to military service as “structural intervention”, as it enables veterans to overcome disadvantaged and troubled upbringings to become members of the middle class.

**Education and PTSD.** In a meta-analysis, Brewin et al. (2000) found that education had only a small effect on PTSD caseness, although Pietrzak and colleagues (2011) found that those with less than a high school education were 30% more likely to have partial PTSD (less symptom endorsement in certain categories) than their post-secondary counterparts. Erickson and colleagues (2013), however, did not find a difference in current PTSD prevalence between those who did and did not complete college. This suggests that some college may have a protective effect.

Among veteran samples, educational attainment might be related with rates of PTSD, although this association may depend on other sample characteristics. Those with less than a high school education were more likely to report full PTSD, but the results often disappear once controlling for demographics and warzone experience (Goldberg et al., 2014; Magruder et al., 2004). Education also did not predict new incidence of PTSD in a longitudinal study (Sachs-Ericcson et al., 2016).

**Marital status.** In general, veterans differ in their marital status from nonveterans (DVA, 2018a). Specifically, male veterans, when compared with nonveterans, were more likely to be married, divorced or separated, or widowed. A similar pattern was
found for female veterans, as they reported slightly higher rates of being married, or
divorced or separated than female nonveterans. However, female civilians have higher
rates of being widowed than female veterans (DVA, 2018a). As the review of the
literature below will demonstrate, this can serve as either a risk or protective factor, in
that marriage is protective, while divorce is a risk factor

Marital status and PTSD. Erickson and colleagues (2013) found that civilians
who were divorced or widowed were more likely to experience PTSD when compared
with those who were married; interestingly, there was no increased risk when single
participants were compared with those who were married. These studies were cross-
sectional, and thus cannot address causal directionality; PTSD could lead to divorce and
vice versa. A similar result was found within a nationally representative sample of
American adults, as those who reported being widowed, separated or divorced having
higher rates of partial and full PTSD (Pietrzak et al., 2011). Again, there was no
difference between those married and the never married.

The relationship between marital status and PTSD is more complex in veteran
samples, partially due to differences in categorization of marital status across studies.
Goldberg et al. (2014) aggregated those who were married, partnered, or widowed vs.
divorced/never married, and found that the latter were more likely to have PTSD. For
veterans of more currently conflicts, marital status might not be associated with PTSD in
the same way as with Vietnam veterans. For example, Fulton and colleagues (2015)
found that, across studies of OEF/OIF veterans, the number of married veterans did not
significantly add to the heterogeneous prevalence rates of PTSD across studies. Haskell
et al. (2010) found that, even after controlling for marital status, female OEF/OEF
veterans were less likely to screen positive for PTSD when compared with males. This suggests that for veterans of more recent conflicts, marriage is not associated with PTSD in a similar fashion when compared with veterans from previous conflicts.

**Age.** Research examining the association between age and PTSD diagnosis or symptom severity in civilian samples have provided consistent results, with younger participants having higher rates of PTSD. Erickson and colleagues (2013) found that younger adults were more likely to have PTSD when compared with those 70 years of age and older. In another community-dwelling sample, Pietrzak et al. (2011) found that partial PTSD was more likely to occur with younger participants compared with those who had no PTSD; this trend was the same for those who had a full PTSD diagnosis.

There is also some indication that the results may be nonlinear. Erickson and colleagues (2013) found a complex age-related trend within a community-dwelling civilian sample. For the urban sample, there was a negative, linear relationship with age, but in the rural samples, the relationship was nonlinear, with middle-aged adults having higher PTSD levels than younger or older individuals, suggesting that studies might consider including nonlinear terms in their equations.

Within a sample of Vietnam War veterans, Goldberg et al. (2014) found significant age differences in the rate of full PTSD diagnoses, with younger participants (< 60) having higher rates when compared with older participants (≥ 64). This association was the same for subthreshold (less symptom indorsement in certain categories) PTSD diagnose; thus, younger veterans reported PTSD symptoms at a higher rate than older veterans of the same war cohort. Further, as a group, Vietnam veterans had lower rates of PTSD when compared with Post-9/11 veterans, again suggesting that
younger veterans have higher rates of PTSD (IOM, 2013), but others reported the risk for PTSD is greater for veterans of Vietnam (Magruder & Yeager, 2009; although there were only two Post-9/11 studies included in this meta-analysis). This inverse age association held within help-seeking sample of veterans from WW II, Korean War, and the Vietnam War; current PTSD prevalence was negatively related with age (Fontana & Rosenheck, 1994). Magruder et al. (2004) also found that younger (<50) and middle-aged (50-64) participants among a DVA sample had higher PTSD symptom severity when compared with older (65+) veterans.

However, others have not found a longitudinal association between age and PTSD within veteran samples. At a 10-year follow-up, Sachs-Ericcson (2016) found that age was not a significant predictor of PTSD; rather, PTSD was associated with factors such as combat exposure and recent life stressors, showing that age may be confounded with other characteristics, like war cohort.

*Age and combat exposure.* Within a civilian sample, McCall-Hosenfeld, Mukherjee, and Lehman (2014) found that older adults were more likely to have experienced war trauma; those aged 60+ were three times more likely to experience war-related trauma when compared with those 29 years of age or younger. However, it is important to note that war trauma not only included combat experience, but also included being a refugee, being an unarmed civilian in war, peacekeeping, and being a civilian in ongoing terror campaigns.

Data from more recent cohorts of veterans showed that combat exposure had a multimodal distribution, with large peaks among the oldest and youngest veterans with a small spike in the middle-aged veterans (Edwards, 2014). For this particular dataset, the
veterans who experienced the most combat exposure had birth years from roughly 1916 – 1922, 1942 – 1952, and 1980 – 1991. Edwards (2014, p. 10) stated that “especially prior to the AVF period, birth cohorts of veterans who were in their late teens and early twenties at the time of major military conflicts were disproportionately exposed to combat.”

**Gender.** Among civilian samples, results suggest that females have higher rates of PTSD (Erickson et al., 2013), for both partial and full PTSD (Pietrzak et al., 2011). Brewin et al. (2000) reported that within non-veteran samples, being female confers a greater risk of having current PTSD prevalence. However, among studies of veterans and military personnel, being female was not a risk factor, noting that “effects of a number of demographic variables, such as female gender . . . are more likely to be homogenous across military studies than across civilian studies” (Brewin et al., 2000, p. 752).

Studies within more recent veteran samples have found less consistent results as to the association between gender and PTSD. Supporting the results of Brewin et al. (2000), Street and colleagues (2013) found that, among community-dwelling Post-9/11 veterans, there was no significant effect of gender on self-reported PTSD symptoms. However, clinical samples (Fulton et al., 2015; Haskell et al., 2010) found males were at greater risk of reporting or screening positive for PTSD, respectively. Thus, civilian women are at higher risk of PTSD, but the same does not appear to be true for women veterans.

**Summary**

The questions of whether there are urban/rural and/or cohort difference in PTSD is complex, due in part differences in demographics, war zone experiences, and a failure
to examine confounding demographics. It is important to note that veterans vary in mental health in relation to civilians, with some indication that veterans may have worse mental health (Hedegaard et al., 2018). Some found that veterans have better mental health than civilians (Boakye et al., 2017; Trautmann et al., 2017) while others found that veterans had better mental health (Jordan et al., 1991), although this is contingent upon war era and degree of combat exposure. Pietrzak and colleagues (2011) reported US adults have a PTSD prevalence of 6.4%; literature has demonstrated that veterans have higher rates of PTSD, with some finding rates as high as 41.3% among veterans (Fulton et al., 2015). Another group which may also require more mental health attention is people who reside in rural places (Hedegaard et al).

One foci of this thesis is rural/urban differences in PTSD among veterans. Rural residents as a whole are less likely to seek mental health treatment and report higher stigma of both self and others who receive these sort of services (Clement et al., 2017; Stewart et al., 2015). Among veterans, however, there seems to be no rural/urban differences in psychotherapy completion (Baker et al. 2015) or use of services (Whealin et al., 2014). Thus, previous research has indicated that veterans may differ from general public trends in their use of mental health services, which could be related to their mental health status. Here, the literature is mixed, with some finding higher rates of PTSD among urban veterans (Cully et al., 2010; Mott et al., 2015; Wallace et al., 2006), and others finding rural veterans to be higher (McCarthy et al., 2012; Proctor et al., 2011; Whealin et al., 2014). However, these differences could be due to the types of samples used, as both studies that used community-dwelling samples (Proctor et al., 2011; Whealin et al., 2014) found PTSD to be higher among rural veterans. All studies which
used a DVA sample found urban residents to be higher in PTSD (Cully et al.; Mott et al.; Wallace et al.), with the exception of McCarthy and colleagues; however, this study examined a high-risk population (suicidal). Given that the suicide rate is higher among rural residents (Hedegaard et al., 2018), this clinical subsample may be different from the general help-seeking DVA population. Another exception was Elhai and colleagues (2004), who found that among veterans diagnosed with PTSD, rural veterans were only higher in dissociation and not PTSD symptom severity.

This suggests that veterans of rural and urban settings are somewhat similar on PTSD severity, once diagnosed. While much of what is known about rural/urban differences in PTSD among veterans has come from DVA samples, this limits the generalizability to the veteran population as a whole, given that only 29% of veterans used DVA healthcare benefits in 2016. Thus, using a community-dwelling sample provides an opportunity to examine mental health among a more representative sample of veterans. Further, these DVA samples might be overrepresentative of older veterans, as they tend to use services provided by the DVA more than younger veterans (DVA, 2017b). Therefore, it is also important to consider possible cohort effects in PTSD.

Examining cohort differences is the second focus of this thesis. Each war era varies from the next, in terms of military demographics, health outcomes (Taylor et al., 2011), and warzone conditions (Edwards, 2014; Spiro et al., 1994), which could contribute to differences in rates of PTSD. The suggestion that veteran outcomes vary by cohort has been suggested by Spiro and colleagues (2016), but further examination will provide greater detail about how these cohorts vary, and in turn, how these differences relate to outcomes. Rates of PTSD among cohorts can vary across studies. Korean
veterans had higher rates of PTSD compared with WWII veterans (McCraine & Hyer, 2000), when others found WWII had higher PTSD than Korean veterans (Fontana & Rosenheck, 1994). Both studies controlled for basic demographics, such as age, suggesting that PTSD does not simply vary as a function of age. Another study, which included veterans of more recent cohorts, found that Post-9/11 veterans have the highest rates of PTSD, followed by Vietnam veterans, then finally by WWII (IOM, 2013); still, others find that Vietnam veterans are at greater risk of developing PTSD (Magruder & Yeager, 2009). Given these discrepant findings, this thesis will further examine cohort differences in PTSD symptoms.

Along with rural/urban and war cohort differences in PTSD, there are other factors that might be related with rates of PTSD. These include: combat exposure, SES, marital status, age, and gender. Veterans who reported combat exposure also reported higher rates of PTSD (Fontana & Rosenheck, 1994; Sachs-Ericcson et al., 2016; Spiro et al., 1994). Those with higher incomes in both civilian (Erickson et al., 2013; Pietrzak et al., 2011) and veteran samples (Goldberg et al., 2014) reported less PTSD. The association between education and PTSD is complex; there were no differences among civilian samples (Erickson et al., 2013; Pietrzak et al., 2011), but marginal (Goldberg et al., 2014) or no effect (Magruder et al., 2004) among veterans. This complex association could be due to different measurement approaches to education across the different studies. Being divorced was associated with higher rates of PTSD among civilians (Erickson et al., 2013; Pietrzak et al., 2011); among veterans of more recent cohorts, marital status was not found to be related to PTSD (Fulton et al., 2014; Haskell et al., 2010). Again, here, as with education, marital status was measured in various ways.
across studies, which could result in discrepant findings. As for age, younger participants have higher rates of PTSD when compared with older adults, in both civilian (Erickson et al., 2013; Pietrzak et al., 2011) and veteran (Fontana & Rosenheck, 1994; Goldberg et al., 2014; Magruder et al., 2004) samples. Gender is another demographic factor that could contribute to varying rates of PTSD and should be taken into account. Among civilian samples, females have higher rates of PTSD (Erickson et al., 2013; Pietrzak et al., 2011). Among veterans, the results are inconsistent, as some reported no gender differences (Street et al., 2013) and some found males to have higher rates (Fulton et al., 2015; Haskell et al., 2010). It is important to note that the above associations with PTSD did not establish causal directionality; therefore, we cannot conclude, if for example, that lower income leads to PTSD, as having PTSD might result in a job that earns lower wages.

Given the above differences in PTSD, as a function of rural/urban status, personal demographics (SES, age, marital status, and age), or war cohort, the purpose of this study will be an attempt to disentangle these relationships. The focus will be three-fold, first examining the differences among rural/urban veterans, and then examining differences between cohorts, while looking at demographic differences and their possible impact between the two groups. Finally, the possible interaction of rural/urban status and war cohort will be examined.

**Present Study**

The present study will examine PTSD symptom severity differences among rural/urban veterans. Past literature has provided mixed results as to which group has higher rates of PTSD. In part, these differences may be due to a failure to account for demographic differences in urban and rural populations. A further confound reflects
whether the samples are help-seeking or community-dwelling veterans, with studies of the latter showing higher rates of PTSD. Thus, this study will examine whether PTSD symptom severity varies across rural and urban veterans, controlling for relevant demographics, in a community-dwelling sample. We hypothesize that community-dwelling rural veterans will have higher PTSD symptoms, controlling for demographics.

The second focus of the present study is PTSD symptom severity differences among war cohorts. As reviewed earlier, the literature on cohort differences is also mixed, again, perhaps due to a failure to examine differences in combat/warzone experience and demographics between cohorts. We hypothesize that veterans of Post-9/11 will have higher rates of PTSD than Persian Gulf or Vietnam veterans, given their younger age and higher rates of combat exposure.

Finally, we will explore the interaction between urban/rural and cohort status. While this is a novel approach in terms of the literature, we would hypothesize that rural veterans from the Post-9/11 cohorts should report the highest PTSD symptoms than the other groups.
Table 2.1

*Rural and Urban Differences in PTSD, by Sample Type*

<table>
<thead>
<tr>
<th>DVA Samples</th>
<th>Rural/urban is higher</th>
<th>Rural/urban percentages</th>
<th>PTSD Measurement</th>
<th>N</th>
<th>$M_{age}$</th>
<th>Year(s) data were collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elhai et al. (2004)</td>
<td>No difference*</td>
<td></td>
<td>Prevalence; diagnosed</td>
<td>100</td>
<td>53.29</td>
<td>--</td>
</tr>
<tr>
<td>McCarthy et al., 2012</td>
<td>Rural</td>
<td>13/12.1 (1.07)</td>
<td>Diagnosed</td>
<td>11,156,334</td>
<td>60.99</td>
<td>2004-2005; 2007-2008</td>
</tr>
<tr>
<td>Mott et al., 2015</td>
<td>Urban</td>
<td>50.6/55.1 (.92)</td>
<td>Incidence; diagnosed</td>
<td>578,741</td>
<td>58.29</td>
<td>2007; 2010</td>
</tr>
<tr>
<td>Wallace et al., 2006</td>
<td>Urban</td>
<td>.9**</td>
<td>Diagnosed</td>
<td>748,216</td>
<td>-</td>
<td>1999</td>
</tr>
</tbody>
</table>

| Community Samples | Rural | 22.2/19.5 (1.14) | lifetime prevalence; self-reported | 10,738 | 34.83 | 2001-2006 |
| Proctor et al., 2011 | Rural | 42.6/30.4 (1.4) | Current prevalence; self-reported | 233 | 36.7 | Nov 2010-Jan 2011 |
| Whealin et al., 2014 | Rural | | | | |

*Note. DVA=Department of Veteran Affairs

* = all participants had PTSD, no difference in symptom severity

** = odds ratio, urban is reference group
CHAPTER 3

METHOD

Procedure

The sample consisted of participants in the Veterans Aging: Longitudinal studies in Oregon (VALOR), which sampled veterans in Oregon, and did not focus just on individuals accessing DVA services (DVA is overrepresentative of older veterans and only 29% of VA enrollees used healthcare benefits in 2016; DVA 2017b). Data were collected via an internet survey. Participants were recruited for this survey through the Oregon Department of Veterans Affairs listserv, as well as the LIFE Registry (Center for Healthy Aging Research subject pool of older Oregonians), the Veterans Resources Blog from the OSU Office of the Dean of Student Life, and social media. Participants were sent an email with a link to an online survey by the participation organization.

To be eligible for this study, participants had to have served during one of three conflict eras: Vietnam, Persian Gulf, or Post-9/11. Quotas were set for the three cohorts: 100 Vietnam veterans, 100 Persian Gulf veterans, and 50 Post-9/11 veterans and 50 of their partners. After completing the survey, participants had the option to receive a $20 gift card or donate $20 to a veteran charity. While we are unable to report on the total number of veterans who received an email, we did calculate the ratio of those individuals who opened the and started they survey (317) by those who completed it (248). The completion rate was 75%. Then 11 questionnaires were deleted due to duplicate cases, resulting in a final sample size of 237 veterans. The study was approved by the Institutional Review Board (IRB Study 8250).
Sample

Table 3.1 presents information on basic demographics for the entire sample (N=237). They were mostly male (65%) and White (85%), although 15% were minorities (largely Hispanic) and over a third consisted (35%) of female veterans. While roughly paralleling the Oregon population (US Census Bureau, 2018), the minority subsample was quite small, \( n = 35 \), and thus care should be taken in generalizing to all minority veterans. Participants ranged in age from 23 – 83 (\( M = 58, SD = 12.58 \)) and about 80% resided in an urban area.

Table 3.2 presents the military characteristics for the entire sample. Half had served in the Army (49.77%); it is important to note that participants were instructed to select more than once branch if applicable. About 40% had served during the Vietnam War era and around 20% served during the Post-9/11 era. In addition, about 71% reported having served in combat.

Measures

**Geographic location.** The Rural-Urban Commuting Area (RUCA; Washington State Department of Health, 2016) system was used to classify rural-urban status. For this study, the primary classification codes were used, which are based on participant zip codes. There are 10 primary codes, ranging from (1) metropolitan (urban) to (10) rural (isolated rural). These codes are based on US Census Bureau definitions of urban clusters, urbanized areas, and commuting relationships. The commuting patterns are based on the American Community Survey results from 2006-2010 (Washington State Department of Health, 2016). Although this classification system allows for examination of places along the rural/urban continuum (e.g. suburban, large rural, isolated rural), the
distribution was such that this was not possible, given the small number who identified as isolated rural (n=4). We then used the US Census Bureau classification of rural and urban geographical areas, which defines rural areas as all areas that are not classified as urban (US Census Bureau, 2018a). Within RUCA, this meant that any place which was not within an urban core (places with 50,000+ people) or in a suburban area (places with over 30% commuting flows to urban cores) was classified as rural. Places classified as rural were either large town (population 10,000-49,999 and commuting flows of over 10% to urban cores) and small town/rural areas (population less than 10,000 and areas with more than one hour drive to nearest city; Washington State Department of Health, 2016).

**War cohort.** In order to participate in the VALOR study, participants were first asked a screening question to assess if they had served in one of the three war cohorts of interest. War eras were defined as follows: Vietnam war era (August 1964-April 1975), Gulf War era (August 1990-August 2001), and OEF/OIF/OND (termed Post-9/11: September 2001 or later).

**Combat exposure.** The combat exposure was first assessed with a screening question asking: *Did you ever serve in combat, warzone, or combat area of responsibility?* If participants answered “yes” to the above prompt, they then filled out the 15-item combat experience subscale from the Deployment Risk and Resilience Inventory (King, King, Vogt, Knight, & Samper, 2006) and were instructed to report only in reference to experiences that occurred during authorized duties. These items are rated on a 5-point Likert-type, with response options ranging from (0) *never* to (4) *daily or almost daily*. Example items include, “I was in a vehicle that was under fire; I personally witnessed soldiers from enemy combatants being seriously wounded or killed; I killed or
“think I killed someone in combat”. A copy of this measure is included in the survey in Appendix A.

Posttraumatic stress disorder. The PTSD Check List (PCL-5) is a 20-item measure developed by Weathers et al. (2013). The items were developed based on the four Diagnostic and Statistical Manual of Mental Disorders (DSM) V criteria; intrusive thoughts, avoiding reminders of the event, negative feelings and thoughts, and reactive and arousal symptoms (APA, 2013). Items were scored on a 5-point Likert-type scale, from (0) not at all to (4) extremely. The directions ask participants to indicate how much they have been bothered by the item in the last month. Examples of PCL-5 items are, “Feeling very upset when something reminded you of the stressful event; Avoiding memories, thoughts, or feelings related to the stressful experience; Loss of interest in activities that you most enjoy; Having strong negative feelings such as fear, horror, anger, guilt, or shame?” A full copy of this measure is included in the survey in Appendix A.

Given the sensitive nature of the questions and in line with IRB regulations, if participants answered the “extremely” option for any question on the PCL-5, a pop-up message appeared on the next page with a two prompt. The first asked if veterans were aware of services available for them. The second prompt listed the phone number for the Portland DVA Health Care System Mental Health Access Line, as well as the DVA Crisis Hotline and website.

Although it appeared that PTSD symptom severity was normally distributed (skewness = 0.92, kurtosis = 0.24), an examination of the histogram suggested almost a bimodal distribution ($M = 20.72, SD = 17.32$). Therefore, a G Ladder function was
computed in Stata (version 15.1; StataCorp, 2017) to assess if data transformation would be necessary. Upon review of the chi-square statistics, the square root transformation was selected, as this had the smallest chi-square value, indicating best fit to the data (smaller chi-square values indicate that the observed data fits the expected data values). Thus, the descriptive statistics and means presented in the results section reflect those of the square root transformed PTSD score.

**Demographics.** Basic demographic information was obtained from the sample, such as: age, gender, income, marital status, and education. Demographic characteristics of the sample are presented in Table 3.1.

*Age* was assessed with a single question, which asked the veteran what year they were born in; age was calculated by subtracting 2018 from the veteran birth year.

*Gender* was taken from a single question which asked if the participant was *male*, *female*, or *other*.

*Marital status* was measured with a question asking about current marital status; options were *married*, *civil commitment*, *cohabitating*, *never married*, *widowed*, or *separated/divorced*. Given that over 90% of the sample was married, marital status was dichotomized as either *married* or *other* for the analyses.

*Income* was captured with an item asking the income category which reflects total household income from all sources, before deductions and taxes, over the last year; responses ranged from *less than $10,000* to *$150,000* and were separated by increments of $10,000 (i.e. $30,000-39,999).

*Education* was assessed with a single question about the highest degree of education that has been completed; options ranged from *less than high school diploma* to
professional or doctorate degree. Given the unequal distribution of this variable, education was dichotomized into less than bachelor’s degree to bachelor’s degree or greater.

Analytic Plan

As noted earlier, we had two different of combat exposure – a dichotomous item and a combat/warzone experience rating. If individuals answered yes to combat exposure, they then filled out the CES, but that dropped 29% of the sample, as only those who indicated combat exposure completed these items. Given that only 20% of the sample was rural, this might have resulted in insufficient power to test our hypotheses. Therefore, we conducted parallel analyses, one with the whole sample using the dichotomous combat exposure variable (yes/no), and the other with only the combat veterans using the combat exposure severity score.

First, we examined demographic differences between the entire sample and combat exposure subsample to understand how these differences affected generalizability. Second, a correlation matrix was constructed for all variables included in the analyses. Given that we are using the entire sample and the combat subsample for analyses, two separate correlation tables are were computed. This provided information as to how the various predictor variables are related with the outcome in the total sample as well as the subsample (Cohen, 2013). The results from this covariance matrix determined which covariates were included in subsequent analyses.

Hypotheses 1 & 2. These hypotheses addressed group differences in PTSD symptoms in geographic location and cohort differences, respectively. Given that these hypotheses address group differences, a factorial analysis of variance (ANOVA) will be
used (Cohen, 2013). Two parallel ANOVAs were conducted for each hypothesis; one for the entire sample and the other for the combat subsample. This resulted in four ANOVAs: rural/urban with the entire sample, rural/urban combat veterans only, cohort entire sample, and cohort combat veterans only.

Analysis of covariance (ANCOVA) was used to examine differences in PTSD symptoms, controlling for possible demographic confounds. This provided adjusted means for PTSD symptom severity across groups, accounting for possible overlap between the independent variable and covariates in PTSD scores (Cohen, 2013). Just as with the above ANOVAs, there were four ANCOVAs: two for rural/urban (entire sample and combat veterans) and two for war cohort (entire sample and combat veterans). All ANOVAs and ANOVAs were conducted using the PROC GLM command (SAS, 2013).

**Hypothesis 3.** The third hypothesis was exploratory and addressed the interaction of geographic location and war cohort membership in PTSD symptoms. To examine this possible interaction, a two-way ANCOVA was computed to examine the association of both rural/urban status and war cohort on PTSD symptoms; this model also included the interaction of rural/urban status and war cohort, along with the possible covariates. As with the above two hypotheses, two separate two-way ANCOVAs were computed; one for the entire sample and another with just the combat veterans.
**Table 3.1**

*Sample Characteristics (N=237)*

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>154 (64.98)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Geographic Location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>180 (78.26)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>202 (85.30)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>226 (95.36)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s degree or higher</td>
<td>122 (51.48)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$75,000-99,999</td>
<td>95 (40.77)</td>
<td>-</td>
</tr>
<tr>
<td>$100,000-149,999</td>
<td>54 (23.18)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>-</td>
<td>58.16 (12.58)</td>
</tr>
</tbody>
</table>
Table 3.2

_Military Characteristics (N=237)_

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
<th>M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PTSD Symptom Severity</strong>*</td>
<td>-</td>
<td>4.08 (2.02)</td>
</tr>
<tr>
<td><strong>Combat Exposure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>167 (70.46)</td>
<td>-</td>
</tr>
<tr>
<td><strong>War Era</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>98 (42.15)</td>
<td>-</td>
</tr>
<tr>
<td>Persian Gulf</td>
<td>86 (34.98)</td>
<td>-</td>
</tr>
<tr>
<td>Post-9/11</td>
<td>53 (22.36)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Service Branch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Army</td>
<td>111 (49.77)</td>
<td>-</td>
</tr>
<tr>
<td>Marine Corps</td>
<td>58 (26.00)</td>
<td>-</td>
</tr>
<tr>
<td>Navy</td>
<td>40 (17.93)</td>
<td>-</td>
</tr>
<tr>
<td>Air Force</td>
<td>13 (5.83)</td>
<td>-</td>
</tr>
<tr>
<td>Coast Guard</td>
<td>9 (4.03)</td>
<td>-</td>
</tr>
<tr>
<td>National Guard</td>
<td>8 (3.59)</td>
<td>-</td>
</tr>
</tbody>
</table>

_Note_. *PTSD symptom severity was square-root transformed

**participants were given the option to select more than one military branch.

Percentages reflect total population (N=237)
CHAPTER 4

RESULTS

This section contains results for the hypotheses indicated in Chapter 3, along with the corresponding tables and figures. First, demographic differences between the non-combat and combat subsample are presented, followed by the results of the correlation matrix for both the entire sample and the combat-exposed samples. Results from these correlations were used to identify which demographic covariates to include in the ANCOVA models for group differences in PTSD. Then, results for the three hypotheses are presented, beginning with rural/urban differences in PTSD symptom severity, followed by war cohort analyses, then finally the results for the rural/urban and war cohort interaction. All tables and figures are presented at the end of this chapter.

Demographic Differences Between Combat and Non-Combat Samples

Table 4.1 presented the demographics for the entire sample, as well the combat/zone subsample. Differences between the groups were tested by $\chi^2$ or $t$-tests, as appropriate. The two groups differed on some characteristics. Compared to the non-combat veterans, combat veterans were more likely to be male, married, and have higher incomes. There were no differences on geographic status, minority status, education, or age.

There were also cohort differences between these groups, with the Persian Gulf veterans having higher percentage of combat veterans (80%) than the Post-9/11 veterans (73.58%) and Vietnam veterans (61.22%). Combat veterans were
also more likely to have served in the Army or Marines Corps, but less likely to have served in the Coast Guard than non-combat veterans.

Perhaps the most interesting finding was that the PTSD symptom levels for the non-combat veterans was significantly higher when compared to the combat veteran group. This might reflect other demographic differences between the groups, or it might be due to the “healthy warrior” effect. Results from the correlations might inform this unexpected result.

**Correlations for the Entire and Combat Subsample**

Tables 4.2 and 4.3 presented the correlations among the study variables for the entire sample and combat subsample, respectively. The dichotomous combat variable was used for the entire sample, while the combat exposure severity variable was used for the combat/warzone sample. For both groups, PTSD was negatively associated with income and gender, suggesting that males and those with lower incomes had higher PTSD symptom severity. Not surprisingly, Vietnam veterans were more likely to be older and veterans of Persian Gulf and Post-9/11 were younger. Persian Gulf and Post-9/11 veterans in general were less likely to report obtaining a bachelor’s degree. Being White was associated with older age, higher incomes, and being female. Females were also less likely to report obtaining a college degree. Lastly, for both groups, being married was associated with higher income.

However, some associations varied between the cohort groups. For the entire sample (Table 4.2), there was no association between combat service and being in the Post-9/11 era. However, being a Persian Gulf veteran was associated
with combat exposure, while Vietnam veteran status was negatively associated with combat exposure. Additionally, combat exposure was related to being male, higher incomes, and being married. For the entire sample, geographic status was not associated with any outcome or predictors. PTSD was negatively correlated with age, in that younger veterans reported higher levels of PTSD symptoms. Surprisingly, income was positively associated with combat exposure, but negatively associated with PTSD. Thus, the correlation between income and combat exposure may account for the negative correlation between combat exposure and PTSD.

Table 4.3 displays the correlations among the variables for the combat/warzone veterans. Higher PTSD symptom reporting among combat veterans was negatively associated with educational attainment and being married (although both associations only approached significance). Higher PTSD symptoms were also associated with minority status and combat exposure severity. Additionally, combat exposure severity was related with low income and minority status. Geographic location was marginally negatively associated with education and Persian Gulf status, indicating that rural veterans appeared to report less educational attainment than their urban counterparts and was home to fewer Persian Gulf veterans.

The results of these correlations determined which covariates were included in the subsequent analyses. Since being married was not associated with PTSD in either the entire or combat subsample, it was not included in further analyses as a possible covariate. The following five variables, given their
significance with PTSD, are included in the following analyses: age, gender, combat exposure/combat exposure severity, college education, and income.

**H1: Rural Veterans Will Have Higher PTSD Symptom Severity**

**Entire sample.** Figure 4.1 and Table 4.4 contain results for the first hypothesis, concerning differences between rural and urban veterans in PTSD symptoms, for the entire sample and the combat subsample, respectively. For the entire sample, there were no differences in the unadjusted means, (estimate = -0.02, SE = 0.32, *ns*), suggesting that PTSD symptoms were comparable between rural (*M* = 4.07, *SD* = 2.18) and urban (*M* = 4.05, *SD* = 1.95) veterans, *F*(1, 228) = 0, *ns*. Once the covariates were added into the model, there were still no significant differences between the rural (*M* = 4.30) and urban (*M* = 3.97) veterans, although the overall model was significant, *F*(6, 222) = 13.21, *p* < .001.

Of the five covariates added into the ANCOVA, geographic location, age, and education were not significant. Of those that were significant, results indicated that male veterans (estimate = 0.67, SE = 0.25, *p* = .01) had higher PTSD symptom severity than females. Those who reported no combat exposure had higher PTSD symptom severity than those who did not serve in combat (estimate = 1.05, SE = 0.26, *p* < .001). Lastly, those who reported lower income had higher PTSD symptom severity (estimate = -0.49, SE = .08, *p* < .001). These results suggest that among the entire sample, PTSD symptom severity did not vary as a function of geographic location, but rather due to gender, combat exposure, and income differences.
**Combat subsample.** Figure 4.2 and Table 4.5 contain results for the rural/urban comparison of the combat exposure subsample. Similar to the entire sample, there was no difference between rural (\( M = 3.86, SD = 2.17 \)) and urban (\( M = 3.64, SD = 2.01 \)) veterans PTSD symptom severity (estimate = 0.21, SE = 0.38, \( ns \)), \( F(1, 161) = 0.32, ns \). After the covariates were added and the adjusted means were obtained, there were still not differences between rural (\( M = 4.06 \)) and urban (\( M = 3.58 \)) veterans PTSD symptoms; however, the overall model was significant, \( F(5, 157) = 7.10, p < .001 \).

Similar to the entire sample, geographic location, age, and education were not significant covariates. Combat exposure severity only approached significance and suggested that those with higher combat exposure also reported higher PTSD symptom severity (estimate = 0.03, SE = 0.01, \( p = .07 \)). As with the entire sample, male veterans had higher PTSD symptoms than female veterans (estimate = 0.99, SE = .34, \( p < .01 \)). The other significant covariance value was for income (estimate = -.39, SE = .10, \( p < .001 \)), suggesting that those who reported lower incomes had higher PTSD symptom severity.

Thus, the hypothesis that rural veterans were higher than urban veterans on PTSD symptom severity was not supported in this sample.

**H2: Post-9/11 veterans will report the highest PTSD symptoms**

**Entire sample.** Figure 4.3 and Table 4.6 display the results for the entire sample and the combat exposed subsample, respectively. For the entire sample, the ANOVA was not significant, \( F(2, 232) = 0.43, p = .65 \), suggesting that PTSD symptom severity was comparable across the Vietnam (\( M = 4.23, SD = 1.90 \)), \( ns \).
Persian Gulf ($M = 3.98$, $SD = 1.93$), and Post-9/11 ($M = 3.99$, $SD = 2.34$) war cohorts.

After accounting for the possible influence of the various demographic covariates, war cohort became a significant predictor of differences in PTSD symptom severity, as was the entire model, $F(7, 225) = 13.28$, $p < .001$. Vietnam veterans reported the highest PTSD symptom severity (adjusted $M = 4.96$), followed by Persian Gulf (adjusted $M = 3.68$) and the Post-9/11 veterans reported the least (adjusted $M = 2.92$). The group comparisons between Vietnam and Persian Gulf veterans (estimate = 1.30, SE = 0.47, $p < .01$) and Vietnam and Post-9/11 veterans (estimate = 2.05, SE = 0.69, $p < .01$) were significant, indicating that Vietnam veterans reported higher PTSD symptom severity than both groups. However, the group difference between Persian Gulf and Post-9/11 veterans was marginal (estimate = 0.75, SE = 0.39, $p = .05$), suggesting that Persian Gulf veterans had higher PTSD symptom severity than Post-9/11 veterans.

The following covariates were significant for the entire sample: gender (estimate = 0.53, SE = 0.25, $p = .03$), no combat exposure (estimate = 0.75, SE = 0.27, $p < .01$), age (estimate = -0.06, SE = 0.02, $p = .01$) and income (estimate = -0.41, SE = 0.08, $p < .001$). These estimates indicate that PTSD symptoms were higher for those who were male, younger, did not experience combat, and had lower incomes. Education were not significant, suggesting that PTSD symptoms did not vary significantly as a function of educational attainment.
Given that the Vietnam veterans had the highest PTSD symptom severity, yet the covariate estimate was negative for age, we examined the distribution of PTSD symptoms among war cohorts. Vietnam veterans had the widest range of PTSD symptoms (range = 0 - 8.94), compared with Persian Gulf (range = 0 - 7.68) and Post-9/11 (range = 0 - 7.94). These distributions and covariate estimate indicated that Vietnam veterans had the highest PTSD, given that there were a few veterans who scored the highest on PTSD, although the overall trend of scores suggested that the younger veterans had higher rates of PTSD symptoms.

**Combat subsample.** Figure 4.4 and Table 4.7 present the results for war cohort differences in PTSD symptoms for the combat/war zone subsample. Consistent with the results of the entire sample PTSD symptom severity was similar across the Vietnam ($M = 3.92, SD = 2$), Persian Gulf ($M = 3.77, SD = 1.97$), and Post-9/11 ($M = 3.34, SD = 2.33$) war cohorts, $F(2, 163) = 0.94, p = .39$.

After adjusting for demographic covariates, the cohort differences became significant once again, $F(7, 157) = 6.65, p < .001$. Comparisons between war cohorts were significant across all group comparisons: Vietnam and Persian Gulf (estimate = 1.90, SE = 0.72, $p = .01$), Vietnam and Post-9/11 (estimate = 3.05, SE = 1.05, $p < .01$), and Persian Gulf and Post-9/11 (estimate = 1.15, SE = 0.51, $p = .02$). These results indicate that between the war cohorts within the combat subsample, the Vietnam veterans had the highest symptom severity (adjusted $M = 5.17$), followed by Persian Gulf (adjusted $M=3.28$), with Post-9/11 veterans reporting the least (adjusted $M = 2.12$). Additionally, the following covariates
were significant: age (estimate = -0.09, SE = 0.03, \( p = .01 \)), gender (estimate = 0.84, SE = 0.34, \( p = .01 \)), and income (estimate = -0.36, SE = 0.10, \( p < .001 \)).

These results suggest that PTSD varied as a function of being younger, being male, and reporting a lower income, along with . Combat exposure severity and education were not significant covariates, indicating that among the combat sample, PTSD symptoms did not vary based upon combat exposure severity or educational attainment.

As with the entire sample, the effect of age was negative, but Vietnam veterans reported the highest PTSD symptom severity. Examination of the range of PTSD scores across cohorts again resulted in Vietnam veterans reporting the highest scores and largest distribution (range = 0 - 9.94) when compared with Persian Gulf (range = 0 - 7.68) and Post-9/11 (range = 0 - 7.94) veterans.

Thus, hypothesis two was also not supported. Post-9/11 veterans reported the lowest PTSD symptoms, once adjusted for covariates.

**H3: Rural Post-9/11s Veterans Will Have the Highest PTSD Symptom Severity**

As the third hypothesis was concerned with both rural/urban status and war cohort membership, only ANCOVAs were used, as estimates for the independent effect of geographic location and war cohort were already presented in the previous two models.

**Entire sample.** Figure 4.4 presents the results for the entire sample. The ANCOVA model was significant, \( F(10, 218) = 9.30, p < .001 \); however, the estimates for geographic location, \( F(1, 218) = 1.35, p = .25 \), and the interaction,
\(F(2, 218) = .99, p = .37\) were not significant. However, war cohort was significant, \(F(2, 218) = 5.23, p = .01\).

Mirroring the results of the war cohort analysis for the entire sample, the comparison between Vietnam and Persian Gulf veterans (estimate = 1.60, SE = 0.53, \(p < .01\)) and Vietnam and Post-9/11 veterans (estimate = 2.22, SE = 0.71, \(p < .01\)). This suggests that Vietnam veterans (\(M = 5.17\) had higher PTSD symptom than Persian Gulf (\(M = 3.57\) and Post-9/11 (\(M = 2.95\) veterans. However, also in line with the previous war cohort analysis, the difference between Persian Gulf and Post-9/11 veterans was not significant (estimate = 0.61, SE = 0.43, \(p = .15\)).

Other covariates that were significant were: age (estimate = -0.06, SE = 0.02, \(p < .01\)), combat exposure (estimate = -0.78, SE = 0.28, \(p < .01\)), and income (estimate = -0.28, SE = 0.08, \(p < .001\)). This indicates that younger, non-combat exposed veterans with lower incomes reported higher PTSD symptom severity. Covariates that were not significant were education; while not statistically significant, results of gender (estimate = 0.47, SE = 0.26, \(p = .07\)) suggest that male veterans had higher PTSD symptom severity than females, although this only reached trend significance.

Given that this was an exploratory hypothesis and the interaction was not significant, we further unpacked the cell means of the six groups (Figure 4.5). For most cohorts, the rural veterans reported slightly higher means than their urban counterparts (Vietnam: \(M_{rural} = 5.50, M_{urban} = 4.84\); Post-9/11: \(M_{rural} = 3.24\), \(M_{urban} = 2.95\).
However, for the Persian Gulf veterans, the urban veterans reported slightly higher PTSD symptoms than their rural counterparts ($M_{rural} = 3.45, M_{urban} = 3.70$). The largest group difference was between the rural Vietnam veterans and the urban Post-9/11 veterans (2.83).

**Combat subsample.** Results for the combat subsample are presented in Table 4.9. Similar to the entire sample, the ANCOVA was significant, $F(10, 152) = 5.08, p < .001$. However, both the rural/urban, $F(1, 152) = 2.86, p = .09$, and the interaction terms, $F(2, 152) = 1.18, p = .31$, were non-significant.

Vietnam veterans ($M = 5.52$) were higher in PTSD than both Persian Gulf ($M = 3.17; \text{estimate} = 2.35, SE = 0.77, p < .01$) and Post-9/11 ($M = 2.14; \text{estimate} = 3.38, SE = 1.06, p < .01$) veterans. However, the difference between Persian Gulf and Post-9/11 veterans ($\text{estimate} = 1.02, SE = 0.55, p = .06$) approached significance, suggesting that the two groups were similar in PTSD symptom severity, but that Persian Gulf veterans endorsed slightly higher symptoms.

Other covariates that were significant in the model were: age (estimate = -.09, SE = 0.03, $p = .01$), gender (estimate = 0.75, SE = 0.34, $p = .03$), and income (estimate = -0.36, SE = 0.10, $p < .001$). This indicates that among the combat subsample, PTSD symptom severity was higher for younger males who reported lower incomes. Covariates that were not significant were combat exposure severity and education, suggesting that PTSD symptom severity did vary as a function of educational attainment or degree of combat exposure.
Even though the interaction between geographic location and war cohort was not significant, we examined the means between all six groups. Similar to the entire sample, rural veterans in the Vietnam ($M_{rural} = 6.06$, $M_{urban} = 4.99$) and Post-9/11 cohort ($M_{rural} = 2.57$, $M_{urban} = 1.71$) reported higher PTSD symptoms than their urban counterparts. For the Persian Gulf veterans, urban veterans reported higher means than rural veterans ($M_{rural} = 3.09$, $M_{urban} = 3.24$). The largest difference was again between the rural Vietnam and urban Post-9/11 cohorts (4.35).

Thus, hypothesis three was also not supported. The effect between geographic location and war cohort together did not account for differences in PTSD symptom severity.
Figure 4.1. Rural/Urban Differences in PTSD Symptom Severity for the Entire Sample (N=237), Raw and Adjusted

Note. adjusted for age, gender (1 = male, 2 = female), combat exposure (0 = no, 1 = yes), education (0 = less than college degree, 1 = college degree or greater), and income
Fig 4.2. Rural/Urban Differences in PTSD Symptom Severity for the Combat Subsample (n=167), Raw and Adjusted

Note. Adjusted for age, gender (1 = male, 2 = female), combat exposure severity, education (0 = less than college degree, 1 = college degree or greater), and income
Figure 4.3 War Cohort Differences in PTSD Symptom Severity for the Entire Sample (N=237), Raw and Adjusted

Note. Adjusted for age, gender (1 = male, 2 = female), combat exposure (0 = no, 1 = yes), education (0 = less than college degree, 1 = college degree or greater), and income. *p<.05, **p<.01
Figure 4.4. Cohort Differences in PTSD Symptom Severity for the Combat Subsample \((n=167)\)

Note. Adjusted for age, gender \((1 = \text{male}, \ 2 = \text{female})\), combat exposure severity, education \((0 = \text{less than college degree}, \ 1 = \text{college degree or greater})\), and income 

\(**p<.01\)
Figure 4.5 Rural/Urban and War Cohort Interaction of PTSD Symptom Severity for the Entire Sample, adjusted (N=237)

Note. Adjusted for age, gender (1 = male, 2 = female), combat exposure (0 = no, 1 = yes), education (0 = less than college degree, 1 = college degree or greater), and income
Figure 4.6 Rural/Urban and War Cohort Interaction of PTSD Symptom Severity for the Combat Subsample, adjusted \( (n=167) \)

*Note.* Adjusted for age, gender (1 = *male*, 2 = *female*), combat exposure severity, education (0 = *less than college degree*, 1 = *college degree or greater*), and income
### Table 4.1

**Demographic Differences Between Combat and Non-Combat Samples**

<table>
<thead>
<tr>
<th></th>
<th>Non-Combat Veterans (n=70)</th>
<th>Combat Veterans (n=167)</th>
<th>( \chi^2 ) or t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%) M (SD)</td>
<td>N (%) M (SD)</td>
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<tr>
<td><strong>Gender</strong></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>37 (53.62) - 116 (69.46) -</td>
<td>5.37*</td>
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<tr>
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<td>Urban</td>
<td>56 (83.58) - 124 (76.07) -</td>
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</tr>
<tr>
<td>Race</td>
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<tr>
<td>Non-Hispanic-White</td>
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<td>Marital Status</td>
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<tr>
<td>Married</td>
<td>62 (89.86) - 163 (97.60)</td>
<td>6.60*</td>
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<tr>
<td>Education</td>
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<td></td>
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<tr>
<td>Bachelor’s degree or higher</td>
<td>36 (52.17) - 85 (50.9) - 0.03</td>
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<tr>
<td>Income</td>
<td></td>
<td></td>
<td>-2.74***</td>
</tr>
<tr>
<td>$75,000-99,999</td>
<td>26 (38.24) - 69 (41.82) -</td>
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<td></td>
</tr>
<tr>
<td>$100,000-149,999</td>
<td>6 (8.82) - 48 (29.09) -</td>
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<td></td>
</tr>
<tr>
<td>Age</td>
<td>-</td>
<td>57.67 (14.12)</td>
<td>57.96 (12.09) -0.16</td>
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<tr>
<td>PTSD Symptom Severity</td>
<td>-</td>
<td>4.95 (1.57)</td>
<td>3.72 (2.07) 4.41***</td>
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<td>War Era</td>
<td></td>
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<td>8.02*</td>
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<tr>
<td>Vietnam</td>
<td>38 (38.78) - 60 (61.22) -</td>
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<tr>
<td>Persian Gulf</td>
<td>17 (20.00) - 68 (80.00) -</td>
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</tr>
<tr>
<td>Post-9/11</td>
<td>14 (26.42) - 39 (73.58) -</td>
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<tr>
<td>Service Branch b</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Army</td>
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<td>8.04**</td>
<td></td>
</tr>
<tr>
<td>Marine Corps</td>
<td>4 (6.25) - 60 (93.75) -</td>
<td>22.36***</td>
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<tr>
<td>Navy</td>
<td>15 (37.50) - 25 (62.50) -</td>
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<td>Air Force</td>
<td>2 (16.67) - 10 (83.33) -</td>
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<tr>
<td>Coast Guard</td>
<td>6 (66.67) - 3 (33.33) -</td>
<td>6.77**</td>
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<tr>
<td>National Guard</td>
<td>3 (33.33) - 6 (66.67) -</td>
<td>0.15</td>
<td></td>
</tr>
</tbody>
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*Note.* a. PTSD symptom severity was square-root transformed  
b. Participants were given the option to select more than one military branch.  
*p<.05, **p<.01, ***p<.001
Table 4.2

Correlations among Study Variables for the Entire Sample (N=237)

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<th></th>
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<th>6</th>
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<th>8</th>
<th>9</th>
<th>10</th>
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Note. Gender (1=male, 2=female), college (0=less than bachelor’s degree, 1=bachelor’s degree or higher), married (0=other, 1=married), minority (0=White, 1=other), geographic status (1=urban, 2=rural), and combat (0=no, 1=yes)
*p<.05, **p<.01, ***p<.001
### Table 4.3

**Correlations among Study Variables for the Combat Subsample (n=167)**

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<td>-.17*</td>
<td>-.32***</td>
<td>.08</td>
<td>.08</td>
<td>-.15†</td>
<td>-.14</td>
<td>.10</td>
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*Note.* Gender (1=male, 2=female), college (0=less than bachelor’s degree, 1=bachelor’s degree or higher), married (0=other, 1=married, minority (0=White, 1=other), geographic status (1=urban, 2=rural), and CES (combat exposure severity) †p<.06, *p<.05, **p<.01, ***p<.001
Table 4.4

*Covariate Estimates for the Geographic Location Differences in PTSD Symptom Severity for the Entire Sample (N=237)*

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
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<th>Model 2</th>
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<th>Post-Hocs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate (SE)</td>
<td>p</td>
<td>Estimate (SE)</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Urban*</td>
<td>-0.02 (0.28)</td>
<td>.95</td>
<td>-0.06 (0.98)</td>
<td>.82</td>
<td>NS</td>
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<tr>
<td>Age</td>
<td>0.00 (0.01)</td>
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<tr>
<td>Male**</td>
<td>0.67 (0.25)</td>
<td>.01</td>
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<td>No Combat***</td>
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<td>-0.22 (0.24)</td>
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<tr>
<td>Income</td>
<td>-0.49 (0.08)</td>
<td>&lt;.001</td>
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</tbody>
</table>

*Note.* Univariate $F(1,228)=0, \ p=0.95$. Multivariate $F(7,221)=16.85, \ p<.001$

*Rural is reference group, ** female is reference group, ***combat exposure is reference group
Table 4.5

*Covariate Estimates for Geographic Location Differences in PTSD Symptom Severity for the Combat Subsample (n=167)*

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
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<th>Model 2</th>
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<th>Post-Hocs</th>
</tr>
</thead>
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<td></td>
<td>Estimate (SE)</td>
<td>p</td>
<td>Estimate (SE)</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Urban*</td>
<td>-0.21 (0.38)</td>
<td>.57</td>
<td>-0.48 (0.35)</td>
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<td>NS</td>
</tr>
<tr>
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<tr>
<td>Male**</td>
<td>0.99 (0.34)</td>
<td>&lt;.01</td>
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<tr>
<td>Combat Exposure Severity</td>
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<tr>
<td>Income</td>
<td>-0.39 (0.10)</td>
<td>&lt;.001</td>
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</tbody>
</table>

*Note.* Univariate $F(1,161) = 0.32, p = .57$. Multivariate $F(6,156) = 6.14, p < .001$

*Rural is reference group  ** Female is reference group*
Table 4.6

Covariate Estimates for War Cohort Differences in PTSD Symptom Severity for the Entire Sample (N=237)

<table>
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<th>Covariate</th>
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<th>Model 2 Estimate (SE)</th>
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</thead>
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<td>0.25 (0.30)</td>
<td>-1.30 (0.47)</td>
<td>Vietnam&gt;Persian Gulf; Vietnam&gt;Post/9/11; Vietnam&gt;Post/9/11</td>
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<tr>
<td>Post-9/11*</td>
<td>0.24 (0.35)</td>
<td>-2.05 (0.70)</td>
<td>Vietnam&gt;Persian Gulf; Vietnam&gt;Post/9/11</td>
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<tr>
<td>Age</td>
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<td>-0.06 (0.02)</td>
<td>.01</td>
</tr>
<tr>
<td>Male*</td>
<td>0.53 (0.25)</td>
<td>0.53 (0.25)</td>
<td>.03</td>
</tr>
<tr>
<td>No Combat***</td>
<td>-0.75 (0.27)</td>
<td>-0.75 (0.27)</td>
<td>.01</td>
</tr>
<tr>
<td>Less than College</td>
<td>-0.21 (0.24)</td>
<td>-0.21 (0.24)</td>
<td>.37</td>
</tr>
<tr>
<td>Income</td>
<td>-0.41 (0.08)</td>
<td>-0.41 (0.08)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note. Univariate $F(2,232) = 0.43, p = .65$. Multivariate $F(7,225) = 13.28, p <.001$

*Vietnam is reference group, ** Female is reference group, ***combat exposure is reference group
Table 4.7

*Covariate Estimates for Cohort Differences in PTSD Symptom Severity for the Combat Subsample (n=167)*

<table>
<thead>
<tr>
<th></th>
<th>Model 1 Estimate (SE)</th>
<th>Model 2 Estimate (SE)</th>
<th>Post-Hocs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persian Gulf</td>
<td>-0.15 (0.37) .68</td>
<td>-1.90 (0.72) .01</td>
<td>Vietnam&gt;Persian Gulf&gt;Post/911</td>
</tr>
<tr>
<td>Post-9/11</td>
<td>-0.58 (0.43) .18</td>
<td>-3.05 (1.05) &lt;.01</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.09 (0.03) .18</td>
<td>-3.05 (1.05) &lt;.01</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.84 (0.34) .01</td>
<td>0.84 (0.34) .01</td>
<td></td>
</tr>
<tr>
<td>Combat Exposure Severity</td>
<td>0.02 (0.02) .26</td>
<td>0.02 (0.02) .26</td>
<td></td>
</tr>
<tr>
<td>Less than College</td>
<td>-0.36 (0.31) .25</td>
<td>-0.36 (0.31) .25</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>-0.36 (0.10) &lt;.001</td>
<td>-0.36 (0.10) &lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Univariate $F(2,163) = 0.94, p = .34$. Multivariate $F(7,157) = 6.65, p < .001$

*Vietnam is reference group, ** Female is reference group*
CHAPTER 5
DISCUSSION

This study had three hypotheses, suggesting that PTSD would vary as a function of geographic location and cohort, especially when controlling for covariates, with rural and Post-9/11 veterans reporting higher symptoms than the other groups. Further, we hypothesized that there would be an interaction between geographic location and cohort, such that rural Post-9/11 veterans would be higher than their counterparts. These hypotheses were only partially supported. First, PTSD symptom severity did not differ by geographic location, even when controlling for covariates, supporting Erickson et al. (2013). The second hypothesis was only partially supported. Cohort differences between the groups did emerge once controlling for covariates, but it was in the opposite direction than predicated – namely, Vietnam veterans were higher in PTSD symptoms than the two younger cohorts were, supporting Magruder and Yaeger (2009). Finally, no significant interaction between geographic location and cohort emerged, although it is noteworthy that rural Vietnam veterans had the highest cell means, twice that of urban post-911 veterans. It is possible that these findings reflect sample biases. Thus, we will address this first before discussing the findings for each hypothesis.

Sample Characteristics

The sample was relatively small (N=237), with only 21% being rural, and it is possible that there was simply not enough power to determine any rural/urban differences. It is also noteworthy, however, that geographic status did not covary with any of the other demographics, suggesting that the urban and rural groups in this sample were quite similar. The sample was also well educated and had fairly high incomes,
suggesting that there might have been a selection bias of some sort. In 2016, male veterans reported a median income of $59,998 however; female veterans reported $56,020 (DVA, 2018a). Close to 30% of male veterans and 37% of female veterans reported a bachelor’s degree or higher. Given that the majority of the current sample reported an income between $75,000-149,999 and over 50% reported a bachelor’s degree or higher, this sample appears to have higher income and more education than the average veteran population (DVA, 2018a).

**Hypothesis 1: Rural Veterans Will Have Higher PTSD Symptom Severity**

The hypothesis that rural veterans would have higher levels of PTSD symptom severity was not supported in either the entire or the combat exposed subsample, for both the raw and adjusted means. Further explanation and examination of the demographic covariates will occur later on.

The result that there was no effect of geographic status on PTSD symptoms, rather that it varied as a function of other demographics is consistent with Erickson and colleagues (2013, p. 407), who stated, “In other words, residents of (urban) communities were more likely to experience PTSD because of the various differences identified in the model. Given that there were no significant correlations between geographic location and other demographic variables, it is not surprising that we also did not find PTSD differences.

Similar to the results of this thesis, Erickson found no effect of educational attainment on PTSD, while finding higher rates of PTSD among younger participants and those who reported lower income. However, Erickson found females to have higher rates of PTSD, opposite of this thesis. However, within military samples, males have higher
rates of PTSD (Fulton et al., 2015; Haskell et al., 2010), while female gender is a risk factor for PTSD among civilian populations (Brewin et al., 2000).

Previous research studies which have found differences in PTSD vary from this study in a variety of ways. The first, and perhaps the most important distinction, is that this sample was community-dwelling veterans; there were not recruited from the VA or any other sort of clinical sample. Most previous comparisons of PTSD differences among rural and urban veterans which used a VA sample found that urban veterans were higher (Cully et al., 2010; Mott et al., 2015; Wallace et al., 2006). These studies had large samples sizes, which can result in detection of an effect, although it might not be clinically meaningful. Additionally, the present study did not diagnosis participants with PTSD, rather symptom severity was examined, which allows for a more in-depth analysis of how PTSD might vary given various demographic factors.

The two exceptions to the VA sample are McCarthy et al. (2012) and Elhai and colleagues (2004). In the case of McCarthy and colleagues, a sample of veterans at risk for suicide was used and resulted in rural veterans having higher rates of PTSD. This is not surprising, given that suicide rates are higher among veterans (DVA, 2018b) and those in rural places (Hedegaard et al., 2018). But this was essentially a clinical sample which, we have seen, can vary in significant ways from community samples. The other exception to this was Elhai et al., which found only one difference between rural and urban veterans enrolled in the VA healthcare network, once diagnosed with PTSD. This difference was that rural veterans reported higher dissociative symptoms, suggesting that rural veterans separated themselves more from their wartime experiences.
In the studies which used community-dwelling samples (Proctor et al., 2011; Whealin et al., 2014), rural veterans were found to have higher rates of PTSD symptoms. However, both studies examined veterans of more recent cohorts, specifically, Persian Gulf and later (Proctor et al., 2011) and exclusively Post-9/11 veterans (Whealin et al., 2014). Had these studies examined veterans of other war cohorts, one might wonder if these rural/urban differences would have emerged; however, in this study which included Vietnam veterans, no differences in PTSD emerged on the basis of geographic location.

**Hypothesis 2: Post-9/11 Veterans Will Have the Highest PTSD Symptom Severity**

The hypothesis that Post-9/11 veterans would have the highest PTSD symptom severity was not supported. The unadjusted analyses for both groups did not show cohort differences in PTSD symptom severity. However, the adjusted analyses for both the entire sample and the combat subsample resulted in significant cohort differences, with Vietnam veterans reporting higher PTSD symptoms than both Persian Gulf and Post-9/11 veterans. In the bivariate analyses, differences in PTSD symptom severity reflected various sources of variance, such as demographics. The multivariate models corrected for this, in as demographics included in the model. However, the comparison between Persian Gulf and Post-9/11 veterans was not significant.

The result of Vietnam veterans having the highest rates of PTSD is comparable to previous studies of cohort differences. Fontana and Rosenheck (1994) reported that Vietnam veterans had higher rates of PTSD than WWII and Korea veterans. However, their results differed slightly from the current results, in that once they controlled for demographics; Vietnam veterans actually had fewer occurrences of PTSD. The authors
concluded that PTSD had an overall effect on veterans due to traumatic exposure, but this effect was comparable across samples.

One possibility for the finding of Vietnam veterans having the highest PTSD symptom severity is the possibility these veterans are in self-reflective stage of their life. For the Vietnam veterans in this study, over 40 years had passed between service and participation in the study. Davison and colleagues (2016) suggest that as combat veterans age, they engage in reminiscence that could possibly result in distress, despite previous success in coping with wartime experiences. This model was based on the earlier late-onset stress symptomatology (LOSS) model, which was situated within an end-point. Briefly, the late-adulthood trauma reengagement (LATR) suggests that aging combat veterans reengage with their trauma and though this process, veterans can give meaning to earlier life events, which can be adaptive. If, for some reason, veterans become “stuck” in this meaning-making process, distress can lead to problems (this model is similar to Erikson’s eight-stage developmental model; specifically, the last stage which is ego integrity vs despair). Davison posits that this process of reminiscence is what sets LATR apart from a simple diagnosis of PTSD.

Another reason Vietnam veterans might have reported the highest PTSD symptom severity is due to poor homecoming reception from service. Perception of low support and negative community attitudes upon homecoming also serves as a long-term risk factor for PTSD. For Vietnam veterans, this perception of negative community attitudes was a risk factor for having PTSD at baseline and a 14-year follow-up (Koenen, Stellman, Stellman, & Sommer, 2003). Further, there is evidence to suggest that homecoming support varies among war cohorts, which is then associated with current
PTSD. Over 40% of Vietnam veterans reported low homecoming support, compared with only 2.1% of veterans of Post-9/11 cohorts (Boscarino et al., 2018). This low homecoming support was a significant predictor of current PTSD and recent suicidality within the last 30 days.

**Hypothesis 3: Rural Post-9/11 Veterans Will Have the Highest PTSD Symptom Severity**

The exploratory hypothesis that rural veterans of the Post-9/11 war cohort would have the highest PTSD symptom severity was not supported. An examination of means across the six groups found that rural Vietnam veterans had the highest PTSD symptom severity across both the entire and combat exposed subsample. Further, rural Vietnam veterans had twice the symptom level of urban Post-9/11 veterans for both the entire sample and the combat subsample, although these differences did not reach statistical significance, perhaps due to a lack of statistical power; this could be due to the Post-9/11 group having fewer members. As noted in the methods section, only 50 Post-9/11 veterans were eligible to participate in VALOR, as part of a sub-study on military couples; thus, the remaining 50 members of the Post-9/11 cohort were partners of these veterans.

Many studies of rural veterans’ mental health do not compare specific war cohorts. Bumgarner and colleagues (2017) reported that, of studies published between 1990 and 2016, only 10% of articles focused on a specific war cohort, while the majority focused on all veterans. The authors also reported that between these same years, the amount of articles published about rural veteran mental health has nearly doubled every five years, highlighting the increased awareness and attention given to this topic.
Demographic Confounds of PTSD

This study is unusual in that it examined possible demographic confounds as it relates to differences in PTSD symptom severity among geographic location and war cohorts. Below is a discussion about how these demographic covariates were related with PTSD symptom severity.

**Combat exposure.** The examination of PTSD symptom severity between the combat and non-combat exposed subsample showed that those in combat had significantly lower symptom level. There are several possibilities as to why this was observed.

The first possibility is related to the association between combat exposure and other demographics. In the overall sample, correlations showed that combat exposure was inversely associated with PTSD symptoms. However, among the combat subsample, combat exposure severity was positively associated with PTSD symptoms. There are several possible explanations for this seeming contradiction. First, in the whole sample, combat exposure was positively associated with income, and income was negatively associated with PTSD symptoms. Therefore, it is possible that, decades after combat exposure, combat veterans were markedly successful. However, in the combat subsample, severity of combat exposure was inversely associated with income, suggesting there might be a non-linear effect, with some combat being associated with greater adaptivity post-service, but higher levels of combat might result in greater lifelong difficulties.
Another possible explanation for this finding is the selectivity of soldiers who are serve in combat. The healthy warrior effect (Larson, Highfill-McRoy, & Booth-Kewley, 2008), suggests that soldiers selected for combat are healthier than those who serve in non-combat roles. For example, mental health problems were less frequent among Marines who served in combat than those who did not, which the Larson et al attribute to detection of mental health conditions pre-deployment. Therefore, only the most mentally fit soldiers are deployed in combat zones, which might result in fewer psychological conditions after military service.

Another explanation as to why combat veterans had lower PTSD is through the appraisal processes veterans engage in regarding their military service. Among male veterans of WWII and Korea eras, Aldwin, Levenson, and Spiro (1994) showed that combat exposure was positively associated with appraisals of desirable effects, which in turn was inversely related to PTSD. Further, Lee and colleagues (2017) found an indirect positive effect of combat exposure on psychological well-being, which was mediated through appraisals of the desirable effects of military service. Thus, combat exposure, and more broadly military service, does not always lead to adverse outcomes in later life, due in part to appraisals of the desirable effects of service (Settersten, Recksiedler, Godlewski, & Elder, 2018).

Age. In line with the earlier discussion related to differences in PTSD related to combat exposure, perhaps income also had an effect over and above that of age for PTSD symptoms.

Examining age and cohort within a cross-sectional study cannot definitively differentiate their effects. However, some interesting patterns emerged in this data set.
Overall, age was negatively correlated with PTSD symptoms within the entire sample and was unrelated to combat exposure. This supports previous research that found younger veterans tend to have higher rates of PTSD (Fontana & Rosenheck, 1994; Goldberg et al., 2014; Magruder et al., 2004). The age difference in PTSD is also found among civilian samples (Erickson et al., 2013; Pietrzak et al., 2011). In the combat sample, however, age was not associated with either combat severity or PTSD symptoms. In the regression analyses, some interesting association emerged. Age was not a significant predictor of PTSD in the geographic location analyses, but did emerge as a significant negative predictor in the cohort analyses. This presented a conundrum – if age was negatively related to PTSD symptoms, then why did the Vietnam Veteran cohort have higher symptoms? We inspected the distribution of PTSD symptoms by cohort and found that the Vietnam cohort had a small group of individuals who had much higher levels of PTSD symptoms than the other two cohorts. This suggests that, in general, PTSD symptoms decrease with age, but for a small group of (presumably highly traumatized) veterans, high levels of PTSD symptoms may persist until very late life.

These confounding results between cohort and age highlights the discrepancy between these two in research (Rosow, 1978). Had the current analyses not included age, results would have concluded that PTSD was similar across the three cohorts. Conversely, had this thesis not examined cohorts and rather focused solely on demographic confounds of PTSD, results would have suggested that the younger veterans had higher PTSD symptoms.

**Gender.** For all analyses, males reported significantly higher levels PTSD symptoms than females. These results contradict those of civilian studies, in which
females had higher rates of PTSD (Brewin et al., 2000; Erickson et al., 2013); this association holds for both full and partial PTSD (Pietrzak et al., 2011).

Previous studies that examine PTSD among military samples had exclusively male samples (Fontana & Rosenheck, 1994; Spiro et al., 1994). One reason for the specific focus of male veterans is that researchers were interested in the effects of combat exposure on veteran mental health. As female roles in combat zones were very limited until the abolishment of the Direct Combat Definition in 2013, women veterans have been neglected in much of the previous research about veteran PTSD.

However, although the sample was mostly male (65%), the finding that females had lower PTSD is still interesting and worthwhile to discuss. More recent analyses of PTSD, with veterans of Post-9/11 eras, also find that men have higher rates of PTSD than female veterans (Fulton et al., 2015; Haskell et al., 2010). Haskell found that while females were less likely to screen positive for PTSD, they were more likely to have a positive screen for depression and military sexual trauma.

Others have found no effect of gender on PTSD (Street et al., 2013). Similar to Haskell et al. (2010), Street found that females were more likely to experience sexual harassment and general harassment; further, they also found females reported less unit support. Similar to our sample, females were less likely to experience combat during their deployment. Further, although females in Street’s sample did not have increased odds of experiencing PTSD, they had greater likelihood of depression.

**Education.** There was no effect of educational attainment on PTSD symptoms in any of the analyses. This result is not surprising, given that previous research examining effects on education on PTSD has found no differences between those who complete or
do not complete college among a nonveteran sample (Erickson et al., 2013). Samples that examine veterans have also found no effect of education on PTSD, after controlling for other demographic variables (Goldberg et al., 2014; Magruder et al., 2004).

In our sample, college completion was associated positively with the Persian Gulf veterans, negatively with the Post-9/11 veterans, and not related to Vietnam veteran status. This suggests that Persian Gulf veterans were likely to hold at least a bachelor’s degree, while the Post-9/11 veterans did not. It could be that the Post-9/11 veterans were still working towards their degree, as the military gives veterans educational benefits (Elder et al., 1991; Settersten, 2006); however, those from less advantaged backgrounds might benefit from these resources more than their more advantaged counterparts. While veterans from rural places have reported lower levels of educational attainment (Whealin et al., 2014), Proctor and colleagues (2011) reported that, after separation from service, rural veterans of more recent conflicts reported education levels that were closer to their urban peers. In our sample, there was no difference in educational attainment among the entire sample, but there was evidence to suggest that among the combat subsample, there was a trend for rural veterans to have higher levels of education.

**Income.** In all analyses, income was inversely associated with PTSD symptoms, indicating that in this sample, PTSD symptoms were higher among those who reported less income. This is consistent with previous research in both civilian (Erickson et al., 2013; Pietrzak et al., 2011) and veteran samples (Goldberg et al., 2014).

However, it is interesting to note that combat exposure was associated with higher incomes, while educational attainment was not. Further, age was associated with higher incomes, but educational attainment was not associated with age. This suggests that
older combat veterans have higher incomes, but this is not related to their education levels. There are a number of explanations to explain the above result.

One explanation is that officers in the military have higher incomes than those who are enlisted (DOD, 2019b). The longer one stays in the military, the more likely it is one can become an officer; however, there are exceptions to this, such as graduates from a military academy (e.g., West Point), all of whom begin as officers. Additionally, experiencing combat exposure might be necessary in order for a soldier to risk in rank.

Lastly, combat veterans in this sample reported significantly higher rates of marriage than those who did not serve in combat (98% vs 90%); this indicates that combat veterans were likely reporting on two income sources, as the income was assessed at the household level. In previous studies that have examined the association between income and PTSD, there has been a negative association between PTSD and individual income (Goldberg et al., 2014; Pietrzak et al., 2011). However, when income was assessed at the household level, income was not associated with PTSD at a 10-year follow-up (Sachs-Ericcson et al., 2016); this suggests that household income might lessen the association between income and PTSD.

Limitations

Like any study, along with the strengths of VALOR, there were also limitations. The first limitation is that VALOR is a cross-sectional, pilot study. PTSD symptoms were measured within the last 30 days, assessed once. The instructions for the PCL-5 are as follows,

*Below is a list of problems and complaints that veterans sometimes have in response to stressful military experiences. Please read each carefully, then circle the*
number to the right that best indicates how much you have been bothered by that problem in the past month.

Thus, participants were not instructed to think back to their military experiences. For some participants in the study, such as the Vietnam veterans, decades have passed since their military experience and they might be reporting on the results of more recent life stressors. Past research has shown an independent effect of recent stressors on PTSD, independent from combat exposure (Saacs-Ericcson et al., 2016); PTSD at baseline was also a risk factor for PTSD 14 years later among a sample of Vietnam veterans (Koenen et al., 2013). Therefore, assessing PTSD at only one point in time did not allow for analysis of factors that might contribute to military service-related PTSD over a span of time. Other variables that were not collected, but might have provided further insight into the association of military service and PTSD are military rank, length of service, and career history during enlistment. While we controlled for basic demographic information, including other military-specific in the models would have provided a more holistic examination and provide information as to if and how factors other than war cohort account for PTSD differences among veterans.

As for geographic location, current place of residence was captured at the point in time when the study was completed. The life course perspective (Elder et al., 2015) asserts that selection into a context is bidirectional: there are characteristics of the individual that are drawn to certain places and there are features of the place that draw certain individuals to it. This is linked with individual perceptions and history of residency, which are interrelated. For example, if someone has just moved from an isolated area to a large city, they would have been classified as urban in this study. That
person might not identify with the urban culture, given they did not grow up in this environment. Further examination into why individuals select their place of residence could provide insight into why there are sometimes differences in mental health status.

The second limitation of this study is the small sample size (N=237). Only 22% of the sample reported residency in a rural place, which limited the power in detecting any sort of difference based on geographic location. More rural participants may have provided enough power for the interaction between geographic location and war cohort to reach significance. Had the sample been more representative of the veteran population overall, close to 30% of our sample would have reported residency in a rural location. This relates to the third limitation of this study.

The third limitation of this study is that it was electronically administered. Given that one purpose of the present study was to examine geographic location differences in PTSD symptom severity, it is possible that urban veterans were more likely to receive an invitation to participate. About a quarter of rural residents reported difficulty accessing the internet in any capacity (Anderson, 2018); further, only 63% of rural residents had broadband internet, while 79% of urban residents reported the same service. However, rural adults are also less likely to have more than one device that allows them internet access (e.g., tablet, laptop, smartphone), and they also spend less time on the internet (Perrin, 2019). Given this, the survey may have reached more residents of rural places had it been administered through another outlet, such as mailing and convenience sampling at veteran locations in rural place.
Future Directions

Given that the military, and in turn, the veteran population are becoming more diverse, research needs to focus on the needs of minority groups of veterans, such as females and those of race/ethnicities other than Non-Hispanic Whites. Within this study, females had lower levels of PTSD, which supports previous research with veterans of the more recent conflicts. This same research has also shown that females have higher rates of military sexual trauma and less social support from their unit (Street et al., 2013), which then resulted in more depression, not PTSD. Studies need to be more conscious of the different experiences female active-duty members face and take these into account when examining the influence of war experiences on later development. Past research has also demonstrated that veterans of minority groups have higher rates of PTSD than White veterans; minority status was found to be a risk factor for PTSD in a meta-analysis related to factors that contribute to PTSD (Xue et al., 2015). The military is more diverse than ever, in terms of enlisted women and minority active duty members, which might require different services once they become veterans.

Future research also needs to examine the long-term impacts of the current Post-9/11 conflicts. Much of what we know about PTSD among veterans draws upon samples that are mostly veterans of Vietnam and earlier war cohorts (Spiro et al., 2016). While studies using these datasets have provided a starting point for how PTSD can influence the aging process for veterans, we also know that veterans of today vary from those of the past (Taylor et al., 2011). Chard, Schumm, Owens, and Cottingham (2010) found that Vietnam and Post-9/11 veterans responded differently to a specific type of PTSD treatment; Post-9/11 veterans had less severe PTSD than Vietnam veterans, after
controlling for pretreatment scores and session attendance. To do this, research would benefit from longitudinal designs, which would allow examination for the long-term impacts of service across a designated period of time; this would allow researchers to observe patterns over the same group of individuals and give insight into the true progression of the impact of military service on veterans.

Another future direction for research is to examine more closely the population of rural veterans on a variety of topics, rather than specifically focusing on mental health outcomes. By understanding who rural veterans are, policies could be created to better serve and cater to the specific needs of this group. Research has shown that female rural veterans expressed concern over the current programs in place (Brooks et al., 2016), indicating that a “one size fits all” approach to serving veterans is not effective. However, these efforts might have to be more sensitive to the needs of local communities and regions, rather than a blanket solution, as some have stated that rural communities have more in common with urban places than with other rural places (Flora, Flora, & Gasteyer, 2016).
CHAPTER 6

CONCLUSION

Prior studies have examined PTSD symptoms differences due to geographic location or war cohort. To our knowledge, this is the first study to examine these two topics together, with an examination across war cohorts. Further, this study examined the associations of possible demographic covariates, which many studies of PTSD symptoms do not include. It was hypothesized that: rural veterans would have higher PTSD symptoms, Post-9/11 veterans would have higher PTSD symptoms, and that rural Post-9/11 veterans would have the highest PTSD symptoms. Additionally, we examined the influence of possible demographic covariates on the above associations.

By using the life course perspective (Elder et al., 2015), both the historical and physical context were considered. Many studies which examine if PTSD varies as a function of age and conclude that differences in PTSD are due to being younger or older (most research suggests an inverse association between age and PTSD). However, cohort is also an important concept to measure when examining veterans, as historical context can factor into long-term outcomes of service. While highly correlated, there is complexity between age and cohort, in that differences might be due to social factors, and not simply a pattern that can be generalized to people born outside of a particular set of birth years. The life course approach also considers the importance to immediate contextual settings. Many studies of PTSD use nationally representative samples; while this allows for generalizability, there are also differences among geographic settings. By not considering differences due to geographical region or urbanity, clinicians might
assume a ‘one size fits all’ approach; we need to consider the variability across contexts, both geographical and historical.

Second, since cohort differences were observed in this study, in what other ways do war cohorts vary? Besides age, the cohorts varied on the following demographic variables: combat exposure and education. Vietnam veterans were less likely to serve in combat than Persian Gulf and Post-9/11 veterans in this study. Persian Gulf veterans were more likely to have at least a college degree, while Post-9/11 veterans were less likely to have a college degree. There are many ways in which cohorts can vary, including: medical treatment, fighting conditions (such as location and types of weapons used), and enlistment status (voluntary vs draft). Another dimension along which cohorts vary is in demographic composition, including the number of women.

Much of what we know about long-term term impacts of war service on the aging process comes from male combat veterans. There have been policy changes, such as the switch to the AVF and abolishment of the Direct Combat Definition that has resulted in a very different military than before. As more women join the military, it is necessary that we understand how, and if, there are gender differences in how war experiences impact veterans. This sample is 35% female, thus highlighting the need for such research and policy implications. Future research needs to focus and identify the needs of female veterans, in order to best serve these women as they return from war and age.

Another group that will benefit from further examination are rural Vietnam veterans. In this study, they were the most distressed, as they endorsed the highest levels of PTSD symptoms (about double that of urban Post-9/11 veterans). This finding highlights the importance of examining both geographic location and war cohort in the
same study. Had the focus solely been on age, we might have concluded that younger veterans reported higher symptoms, and thus, would have completely missed this group of Vietnam veterans who scored the highest. Second, had the focus been exclusively on war cohort, the results would have suggested that Vietnam veterans collectively endorsed higher levels of PTSD. While this is the case, further examination showed that those in rural places endorsed higher symptoms than those in urban places (although these differences were not significant, possibly due to issues of power). Thus, although preliminary, this thesis can set the stage for future research considerations, and well as policy applications.
References


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APPENDIX A

VALOR SURVEY
SECTION A: PLEASE TELL US A LITTLE ABOUT YOURSELF

1. What is today's date?   __/__/______  (MM/DD/YY)

2. What is your date of birth?  __/__/______  (MM/DD/YY)

3. What is your gender?
   □ Male    □ Female    □ Other

4. What is the highest degree or level of school you have completed?
   □ Less than high school diploma    □ Bachelor's degree (e.g., BA, BS)
   □ High school diploma / GED    □ Master's degree (e.g., MA, MS, MBA)
   □ Some college credit, but no degree    □ Professional or Doctorate degree
   □ Associate's degree (e.g., AA, AS)

5. Are you Spanish, Hispanic, or Latino?
   □ No    □ Yes

6. What is your race?  (Mark all that apply)
   □ White    □ Asian
   □ Black / African-American    □ Pacific Islander
   □ American Indian / Alaska Native    □ Other

7. What is your current marital status?
   □ Married    □ Never married
   □ Civil commitment    □ Widowed
   □ Cohabitating    □ Separated/divorced

8. Have you ever been divorced?
   □ Never    □ Yes, once    □ Yes, more than once

9. Including yourself, how many people currently live in your household?
   1  2  3  4  5  6  7  8  9+  □  □  □  □  □  □  □  □  □

10. Do you have a religious affiliation?
    □ None    □ Catholic    □ Protestant    □ Non-denominational    □ Buddhist    □ Muslim    □ Other

11. How often do you go to religious services?  (Choose one answer)
    □ Never    □ 1-2x/year    □ monthly    □ 1-2 x/month    □ Weekly    □ Daily
12. Within your religious or spiritual tradition, how often do you pray or meditate? (Choose one answer)
   □ Never    □ 1-2x/year    □ monthly    □ 1-2 x/month    □ Weekly    □ Daily

SECTION B: MILITARY SERVICE

1. In which branch of the service did you serve? (Mark all that apply)
   □ Army           □ National Guard
   □ Navy           □ Merchant Marines
   □ Air Force      □ NOAA
   □ Marine Corps   □ Public Health Service
   □ Coast Guard    □ None (Skip to Section C on p. 6.)

2. Please indicate whether your service was:
   □ Active Duty    □ Reserves only    □ Not applicable (not in the military)

3. When did you serve? (Mark all that apply)
   □ I am still serving
   □ September 2001 or later
   □ August 1990 to August 2001 (includes Gulf War)
   □ May 1975 to July 1990
   □ August 1964 to April 1975 (Vietnam era)
   □ February 1955 to July 1964
   □ July 1950 to January 1955 (Korean War)
   □ January 1947 to June 1950
   □ December 1941 to December 1946 (WWII)
   □ November 1941 or earlier

4. Where were you stationed? (Mark all that apply)
   □ Africa
   □ Asia / South Pacific
   □ Basin
   □ Caribbean
   □ South / Central America
   □ Mexico
   □ Canada
   □ Northern / Central Europe
   □ Southern Europe / Mediterranean Basin
   □ Eastern Europe
   □ Middle East
   □ United States
   □ Other

5. Overall, how did you feel about belonging to your unit(s)?
   Please rate your feelings on a scale of 1 to 7.
   1  2  3  4  5  6  7
   Generally Disliked Extremely Proud
6. How did you get along with your service members?
Please rate your feelings on a scale of 1 to 7.

1 2 3 4 5 6 7
1 Disliked
Everyone

7. How well did you adjust to life in the armed services?
Please rate your feelings on a scale of 1 to 7.

1 2 3 4 5 6 7
1 Hated
Everything

8. In general, how proud would you say you are of your military service?
Please rate your feelings on a scale of 1 to 7.

1 2 3 4 5 6 7
1 Not very proud
Extremely proud

9. Was there anything that you did in the military that you're not particularly proud of, or regret?
Please indicate how much you agree on a scale of 1 to 7.

1 2 3 4 5 6 7
No, things or
Yes, many
regret

10. During your military service, were you ever exposed to environmental hazards such as Agent Orange, chemical warfare agents, ionizing radiation, or other potentially toxic substances?

☐ Definitely yes  ☐ Probably yes  ☐ Probably no  ☐ Definitely no
☐ Don’t know

11. Have you been deployed? (Check all that apply)

☐ No
☐ Yes, Vietnam War
☐ Yes, 1990-91 Gulf War
☐ Yes, OIF/OEF/OND
☐ Yes, other _________________________
12. Did you ever serve in a combat, warzone, or combat area of responsibility?

☐ No *(Skip to Section C, p. 6)* ☐ Yes

13. Were you ever a prisoner of war? ☐ No ☐ Yes

If YES,
13a. Where were you a POW?

____________________________________

13b. What dates were you a POW? _____/_____/_______ to _____/_____/_______

(MM/DD/YY) (MM/DD/YY)

14. COMBAT EXPERIENCE

The statements below are about your combat experiences during deployment. Please read each statement and describe how often you were exposed to each event over the course of the entire time you were deployed. You should respond to these questions only in reference to experiences that occurred as part of your authorized duties.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>A few times over entire deployment</th>
<th>A few times each month</th>
<th>A few times each week</th>
<th>Daily or almost daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I went on combat patrols or missions.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. I or members of my unit encountered land or water mines, IEDs, and/or booby traps.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. I or members of my unit received hostile incoming fire from small arms artillery, rockets,</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>PTSD SYMPTOMS AMONG VETERANS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>d. I or members of my unit received “friendly” incoming fire from small arms artillery, rockets, mortars, or bombs.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>e. I was in a vehicle that was under fire.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>f. I or members of my unit were attacked by terrorists, civilians, or non-traditional combatants.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>g. I was part of a land or naval artillery unit that fired on the enemy.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>h. I was part of an assault on entrenched or fortified positions.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>i. I took part in an invasion that involved naval and/or land forces.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>j. My unit engaged in battle in which it suffered casualties.</strong></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
15. DESIRABLE & UNDESIRABLE EFFECTS OF MILITARY SERVICE

Life experiences often have some mixture of the desirable and undesirable. The following are experiences that some individuals feel resulted from their military service. From the two lists of desirable and undesirable experiences, please indicate to what extent you experienced each one.

<table>
<thead>
<tr>
<th>Desirable Experiences</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lifelong friends</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. A broader perspective on things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. Learned to cope with adversity</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>k. I personally witnessed someone</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>from my unit or an ally unit being</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>seriously wounded or killed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l. I personally witnessed soldiers</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>from enemy combatants being</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>seriously wounded or killed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m. I was wounded or injured in combat.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>n. I fired my weapon at the enemy.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>o. I killed or think I killed someone</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>in combat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
d. Greater self-discipline, dependability & 0 & 1 & 2 & 3  

e. Became more independent & 0 & 1 & 2 & 3  
f. Improved life chances through education & 0 & 1 & 2 & 3  
g. Value life more & 0 & 1 & 2 & 3  
h. Positive feelings about self & 0 & 1 & 2 & 3  
i. Became proud to be an American & 0 & 1 & 2 & 3  
j. Clearer direction and purpose in life & 0 & 1 & 2 & 3  
k. Better job skills and options & 0 & 1 & 2 & 3  
l. Rewarding memories & 0 & 1 & 2 & 3  
m. Learned cooperation, teamwork & 0 & 1 & 2 & 3  
n. Appreciate peace more & 0 & 1 & 2 & 3  

<table>
<thead>
<tr>
<th>Undesirable Experiences</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
</table>
| a. Economic problems for me or my wife & 0 & 1 & 2 & 3  
| b. Disrupted my life & 0 & 1 & 2 & 3  
| c. Lonely for my wife, children & 0 & 1 & 2 & 3  
| d. Delayed career, put me behind age mates & 0 & 1 & 2 & 3  
| e. Combat anxieties, apprehensions & 0 & 1 & 2 & 3  
| f. Hurt my marriage & 0 & 1 & 2 & 3  
| g. Waste of time, boredom & 0 & 1 & 2 & 3  
| h. Misery, discomfort & 0 & 1 & 2 & 3  
| i. Loss of friends & 0 & 1 & 2 & 3  
| j. Lost my good health & 0 & 1 & 2 & 3  
| k. Separation from loved ones & 0 & 1 & 2 & 3  
| l. Drinking problem & 0 & 1 & 2 & 3  
| m. Bad memories or nightmares & 0 & 1 & 2 & 3  
| n. Death and destruction & 0 & 1 & 2 & 3  

### 17. Thinking back to your discharge, what feelings did you have at the time?

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. People at home just didn't understand what I had been through in the armed forces.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Having been away for a while, I felt left out of everything that was going on at home.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Readjusting to civilian life was more difficult than most people imagine.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. People at home made me feel proud to have served my country in the armed forces.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. In general, my feelings about my military service after being discharged were very positive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
SECTION C. HEALTH

1. In general, would you say your health is:
   □ Poor   □ Fair   □ Good   □ Very good   □ Excellent

2. How tall are you? __________________ ft/inches

3. How much do you weigh? ________________ lbs

2. Do you use tobacco products (e.g., cigarettes, e-cigarettes, smokeless)?
   □ No (Skip to Q3)   □ Yes

   If Yes,
   2a. How many cigarettes do you smoke per day now?
       □ Less than 1/2 pack (fewer than 6)
       □ 1/2 pack (6 - 15)
       □ 1 pack (16 - 25)
       □ 2 packs (26 - 50)
       □ More than 2 packs

   2b. Over the entire time you smoked, on average, how many cigarettes did you smoke per day?
       □ Less than 1/2 pack (fewer than 6)
       □ 1/2 pack (6 - 15)
       □ 1 pack (16 - 25)
       □ 2 packs (26 - 50)
       □ More than 2 packs

3. Do you drink alcohol?
   □ Yes, I currently drink alcohol
   □ No, but I used to drink alcohol
   □ No, I have never drank alcohol (Skip to Q5.)

4. In a typical month, what is/was the average number of drinks of alcohol (beer, wine and/or liquor) you may have had in one day? By a drink we mean half an ounce of absolute alcohol (e.g. a 12 ounce can or glass of beer or cooler, a 5 ounce glass of wine, or a drink containing 1 shot of liquor).
   □ Less than 1   □ 5 - 6 drinks
   □ 1 drink   □ 7 - 9 drinks
   □ 2 drinks   □ 10 - 14 drinks
   □ 3 drinks   □ 15 or more drinks
   □ 4 drinks
5. In a typical month, how often do you use marijuana?
   □ Never, I do not use at all  □ Once a day
   □ Once or twice  □ More than once a day
   □ Once a week

6. How many hours do you usually sleep each day (24 hour period)?
   □ 5 or less  □ 6  □ 7  □ 8  □ 9  □ 10 or more

7. Have you had any of these sleep problems at least half the days of the past year? (Check all that apply.)
   □ Trouble falling asleep when you first go to bed
   □ Waking up during the night and not easily going back to sleep
   □ Waking up in the morning earlier than planned or desired
   □ Feeling unsatisfied or not rested by your night’s sleep
   □ Feeling excessively sleepy during the day (does not include regular naps)

8. Do you have difficulty remembering?
   □ No difficulty  □ Some difficulty  □ A lot of difficulty

9. Do you have difficulty finding solutions to problems in day-to-day life?
   □ No difficulty  □ Some difficulty  □ A lot of difficulty

10. During the past 12 months, have you had a problem with your ability to smell, such as not being able to smell things or things not smelling the way they are supposed to?
    □ No  □ Yes  □ Don’t know

11. Have you noticed any difference in your ability to smell now as compared to when you were 25 years old?
    □ No  □ Yes  □ Don’t know

12. Do some smells bother you although they do not bother other people?
    □ No  □ Yes  □ Don’t know

13. Below is a list of problems and complaints that veterans sometimes have in response to stressful military experiences. Please read each carefully, then circle the number to the right that best indicates how much you have been bothered by that problem in the past month.

<table>
<thead>
<tr>
<th>In the past month, how much were you bothered by:</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Repeated, disturbing, and unwanted memories of the stressful experience?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Repeated, disturbing dreams of the stressful experience?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suddenly feeling or acting as if the stressful experience was actually happening again (as if you were actually back there reliving it)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Feeling very upset when something reminded you of the stressful experience?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoiding memories, thoughts, or feelings related to the stressful experience?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trouble remembering important parts of the stressful experience?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss of interest in activities that you most enjoy?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blaming yourself or someone else for the stressful experience or what happened after it?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Having strong negative feelings such as fear, horror, anger, guilt, or shame?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feeling distant or cut off from other people?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
o. Irritable behavior, angry outbursts, or acting aggressively? | 0 | 1 | 2 | 3 | 4
---|---|---|---|---|---
p. Taking too many risks or doing things that could cause you harm? | 0 | 1 | 2 | 3 | 4
---|---|---|---|---|---
q. Being “superalert” or watchful or on guard? | 0 | 1 | 2 | 3 | 4
---|---|---|---|---|---
r. Feeling jumpy or easily startled? | 0 | 1 | 2 | 3 | 4
---|---|---|---|---|---
s. Having difficulty concentrating? | 0 | 1 | 2 | 3 | 4
---|---|---|---|---|---
t. Trouble falling or staying asleep? | 0 | 1 | 2 | 3 | 4

14. In the past 30 days, how much difficulty did you have in:

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extremely or cannot do</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Standing for long periods such as 30 minutes?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Taking care of your household responsibilities?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Learning a new task, for example, learning how to get to a new place?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. How much of a problem did you have joining in community activities (for example, festivities, religious or other activities) in the same way as anyone else can?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. How much have you been emotionally affected by your health problems?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>f. Concentrating on doing something for ten minutes?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>g. Walking a long distance such as a mile?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>h. Washing your whole body?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>i. Getting dressed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>j. Dealing with people you do not know?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>k. Maintaining a friendship?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>l. Your day-to-day work?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
15. Was/were there particular health problem(s) that caused these difficulties (e.g., war injury, arthritis, diabetes, anxiety, PTSD)? If yes, please list these below.

________________________

16. During the PAST 30 days, how much did pain interfere with your normal work (including both work outside the home and housework)?

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

17. In a typical month, how frequently do you take opioids or other psychotropic medications to deal with your pain or other symptoms?

☐ Never, I do not use at all ☐ Once a day
☐ Once or twice ☐ More than once a day
☐ Once a week

18. Please indicate whether or not you have been diagnosed with problems any of the following health areas. (Check all that apply)

☐ Heart/Circulatory ☐ Digestion
☐ Muscular/Skeletal ☐ Liver Problems
☐ Nervous System ☐ Diabetes
☐ Mental Health Disorder ☐ Asthma
☐ Hearing/Vision ☐ Sleep Apnea
☐ Cancer ☐ COPD
☐ Chronic infectious disease ☐ Other

19. In the past year, about how much of your health care did you get at a VA facility (e.g., doctor’s visits, hospitalizations, urgent care visits, or counseling)?

☐ None ☐ 1-25% ☐ 26-50% ☐ 51-75% ☐ 76-99% ☐ 100%

20. In the past year, how many times were you a patient in a hospital overnight or longer?

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1 - 3</th>
<th>4 - 6</th>
<th>7 - 9</th>
<th>10 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA healthcare facility</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Non-VA healthcare facility</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

21. Is there a particular clinic, hospital, or other place that you usually go if you are sick or need advice about your health? If there is more than one place, would you go to one of these places first or most often when you are sick?  ☐ No ☐ Yes
21. How long does it usually take you to get to your usual source of care?

☐ Less than 15 minutes  ☐ 15 to 30 minutes  ☐ 30 minutes to 1 hour
☐ 1 hour to 1.5 hours  ☐ 1.5 hours to 2 hours  ☐ More than 2 hours

22. How difficult is it to contact a medical person at your usual source of care during regular business hours over the telephone about a health problem?

☐ Not at all difficult  ☐ Not too difficult  ☐ Somewhat difficult  ☐ Very difficult

23. How difficult is it to contact a medical person at your usual source of care after their regular business hours in case of urgent medical needs?

☐ Not at all difficult  ☐ Not too difficult  ☐ Somewhat difficult  ☐ Very difficult
SECTION D. FAMILY RELATIONSHIPS

1. If you are currently married or living with a romantic partner, please answer the following questions. Select the number that indicates how satisfied you are with your relationship. *(If not currently married or partnered, skip to Q. 3.)*

<table>
<thead>
<tr>
<th>Extremely Dissatisfied</th>
<th>Very Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Mixed</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
<th>Extremely Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

a. How satisfied are you with your relationship?

b. How satisfied are you with your spouse/partner?

c. How satisfied are you with your relationship with your spouse/partner?

2. Now, rate how much you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>During our normal conversations in the past week, I have…</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Talked with my spouse/partner about important feelings I had.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Told my partner private or personal things about me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Been very open with my partner.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Freely disclosed my opinions to my partner.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
3. Please indicate how much you agree or disagree with the following statements about your family.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>My family really tries to help me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b.</td>
<td>I get the emotional help and support I need from my family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c.</td>
<td>I can talk about my problems with my family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d.</td>
<td>My family is willing to help me make decisions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

17. How often have you talked to your family and friends about your military experience?

<table>
<thead>
<tr>
<th></th>
<th>Not Applicable</th>
<th>Never</th>
<th>Used to but stopped</th>
<th>Occasionally</th>
<th>Frequently</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Parents</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b.</td>
<td>Spouse</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c.</td>
<td>Children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d.</td>
<td>Friends with military experience</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e.</td>
<td>Friends without military experience</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
SECTION E. HOUSEHOLD FINANCES

1. Which income category represents the total income of your household from all sources (before taxes and deductions) during the last 12 months?

- Less than $10,000
- $10,000 - $19,999
- $20,000 - $29,999
- $30,000 - $39,999
- $40,000 - $49,999
- $50,000 - $59,999
- $60,000 - $74,999
- $75,000 - $99,999
- $100,000 - $149,999
- $150,000 or more
- Prefer not to answer

2. Please indicate whether your family received income (past 12 months) in any of the categories listed below. Please include income from all members of this family who live at your address and who are 15 years of age or older.

<table>
<thead>
<tr>
<th>Type of Income</th>
<th>No</th>
<th>Yes</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Wage, salary, commissions, bonuses, or tips from all jobs</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b. Self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c. Interest, dividends, rental income, royalty income, or income from estates and trusts</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d. Social Security or Railroad Retirement</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e. Supplemental Security Income (SSI)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>f. Any public assistance or welfare payments from the state or local welfare office</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>g. Retirement, survivor, or disability pensions</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>h. Veterans’ (VA) service-connected disability compensation payments</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>i. All other VA payments (e.g., VA education payments)</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>j. Any other sources of income received regularly such as unemployment compensation, child support or alimony</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

3. How difficult is it for (you/your family) to meet monthly payments on (your /your family’s) bills?

- Not at all difficult
- Not very difficult
- Somewhat difficult
- Very difficult
- Completely difficult
4. How well does this statement describe you or your situation?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all</th>
<th>Very little</th>
<th>Somewhat</th>
<th>Very well</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Because of my money situation, I feel like I will never have the things I want in life.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. I am just getting by financially.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. I am concerned that the money I have or will save won’t last.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. How often do these statements apply to you?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I have money left over at the end of the month.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. My finances control my life.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

6. If you were to lose all sources of income today, how long could you and your family maintain on your savings and other accumulated assets?

_______ number of months

7. How confident are you that you and your family could come up with $2,000 if an unexpected need arose within the next month?

☐ I am certain I could come up with the full $2,000
☐ I could probably come up with $2,000
☐ I could probably not come up with $2,000
☐ I am certain I could not come up with $2,000
☐ Don’t know
☐ Prefer not to say

8. We are interested in whether vets from urban and rural counties have different experiences. Please write in your zip code:

Zip code (1)____________________________
SECTION F. VA DISABILITY AND OTHER BENEFITS

1. Have you ever applied for VA disability compensation benefits?
   ☐ No ☐ Yes

2. Do you have a VA service-connected disability rating?
   ☐ No ☐ Yes ☐ Don’t know

2a. IF YES, please mark the box that reflects your service-connected disability rating?
   ☐ Less than 10 percent ☐ 50 to 69 percent
   ☐ 10 to 29 percent ☐ 70 percent or higher
   ☐ 30 to 49 percent ☐ I Don’t know

2b. Are you currently receiving monthly disability payments from VA?
   ☐ No ☐ Yes

3. During the past year, how important was the disability payment benefit you received from VA in helping you meet your financial needs?
   ☐ Not at all important ☐ Slightly important ☐ Moderately important
   ☐ Very important ☐ Extremely important ☐ Don’t know

4. Which of the following benefit types have you used? (Check all that apply)
   ☐ Education ☐ Vocational rehabilitee and employment
   ☐ Home loan guarantee ☐ Life insurance
SECTION G. PARTICIPANT OBSERVATIONS

Could you please tell us in your own words what was the best thing about your military service?

THANK YOU SO MUCH FOR FILLING OUT THIS SURVEY!! To compensate you for your time and effort, we would like to send you a $20 gift card. To do so, we would need your name and contact information. (*This information will be kept separately from the information on the survey to maintain confidentiality.*) Alternatively, if you would prefer not to provide your contact information, we could donate the $20 to a veterans organization.

☐ I would like to receive my gift card.
  ☐ Name:________________________________________________
  ☐ Address:_______________________________________________
  ☐ (Street)                City                    zip
  ☐ Email_________________________________________________

☐ Please donate my $20 to a veterans’ organization.

OPPORTUNITIES FOR ADDITIONAL STUDIES

We are very interested in how military service affects the aging process. Would you be willing to participate in some of these studies? All studies will compensate you for your time and effort.

1. Veterans Aging: Longitudinal studies in Oregon (VALOR). We’re hoping to develop a long-term study which would examine, among other things, cohort differences in aging – how do different wars impact aging? This would involve filling out questionnaires and the opportunity to participate in specialized biomedical studies.

☐ Yes    ☐ Maybe    ☐ No, not at all interested

2. We are also interested in the experiences of military spouses and partners of OEF/OIF/OND veterans, particularly in how the military influenced their educational, career, and family experiences. Do you think your spouse or partner would be willing to participate in an online survey? S/he would be compensated for their time and effort.

☐ Yes    ☐ Maybe    ☐ No, not at all interested
3. We are interested in how military service impacts cognitive and neural functions, such as attention, memory, and mental flexibility. The testing will involve filling out paper surveys and taking cognitive tests (on paper, orally, via computer and iPad).

3a. Would you be willing to participate in approximately 2 hours of cognitive testing?

☐ Yes    ☐ Maybe    ☐ No, not at all interested

3b. Would you also be willing to undergo some cognitive testing in an MRI scanner in Portland or Eugene?

☐ Yes    ☐ Maybe    ☐ No, not at all interested

4. We are also interested in how military service impacts sensory functions, especially the sense of smell. Problems with smell can relate to poor nutrition, leading to problems in aging. Would you be willing to have your sense of smell tested? This would also take about two hours.

☐ Yes    ☐ Maybe    ☐ No, not at all interested

5. If you are or might be interested in any of the above, may we contact you? This information will be kept separately from the answers you provided on the survey.

Name: ______________________________________

Phone number: _______________________________

Email address: ______________________________