A QUANTITATIVE ANALYSIS OF SUSCEPTIBILITY RISK FACTORS ASSOCIATED WITH POSTTRAUMATIC STRESS: RESULTS FROM THE ARMY STUDY TO ASSESS RISK AND RESILIENCE

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ABSTRACT

A QUANTITATIVE ANALYSIS OF SUSCEPTIBILITY RISK FACTORS ASSOCIATED WITH POSTTRAUMATIC STRESS IN SERVICE MEMBERS: RESULTS FROM THE ARMY STUDY TO ASSESS RISK AND RESILIENCE

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This body of research is focused on susceptibility risk factors associated with Post Traumatic Stress Disorder (PTSD), including History of Child Abuse, Attribution Style, Moral Injury, Biological and Familial Risk Factors, Intelligence, Gender, and Social Support (Unit Cohesion and Family Support). The objective of this study is to investigate PTSD risk factors the literature has identified. The goal of this research is to highlight risk factors for PTSD and increase the efficiency of the clinical interview process during the assessment phase of a clinical intake and treatment. The data comes from The Army Study to Assess Risk and Resilience in Servicemembers (STARRS) which includes the All-Army Study (ASS), and New Soldier Study (NSS), a de-identified cross-sectional survey of active-duty soldiers exclusive of those in Basic Combat Training or deployed to a combat theater. The de-identified research data comes from a 5-year study on risk and resiliency factors impacting our service members a total of $N = 21,449$. The overall model for this proposed analysist is based on the Diathesis Stress Model, also known as the vulnerability-stress model. The Diathesis Stress model made it possible to generate and study new hypotheses about the role of risk factors in causing mental health illness. A multiple regression model will be utilized to assess whether PTSD symptomology could be predicted by the following variables: history of child abuse, Attribution style, Moral Injury, Biological and Familial Risk Factors, Intelligence, Gender, and Social Support (Unit Cohesion and Family

Support.) This dissertation will be available when complete in open access at AURA, https://aura.antioch.edu/ and OhioLINK ETD Center, https://etd.ohiolink.edu.

Keywords: PTSD, Risk Factors, Army STARRS, Susceptibility, Child Abuse, Moral Injury, Biological Risk, Unit Cohesion, Resiliency, Combat, Multiple Regression Analysis, Quantitative, Iraq, Afghanistan, Military

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This publication is based on public use data from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). The data are available from the. Inter-University Consortium for Political and Social Research (ICPSR) at the University of Michigan (http://doi.org/10.3886/ICPSR35197-v1). The U.S. National Institute of Mental Health (grant number U01MH087981) funded Army STARRS. The contents of this dissertation are solely the responsibility of the authors and do not necessarily represent the views of the Army STARRS investigators, funders, the U.S. Department of the Army, or the U.S. Department of Defense. For additional information on the Army STARRS project, please visit the Army STARRS website (https://starrs-ls.org/#/).

Table of Contents

List of Tables

List of Figures

CHAPTER I: INTRODUCTION

Overview

All living beings are at risk of exposure to traumatic events. People are exposed to war, natural disasters, death of loved ones, physical assaults, and other types of traumatic events. The belief about the ability to control what happens to you forms the basis of understanding about how people live, and subsequently how they view and process adverse events (Swain, 1972). Clinical psychology research shows that some individuals change their behavior more than others in the event of a new experience (Watts, 1975). Richardson et al. (2010) found an aversive event that cannot be controlled or predicted often causes more disturbances to an organism. For instance, a natural disaster may cause a wide range of negative psychological results among both adults and children who survive. Some may experience suicidal behavior, anxiety, PTSD, and other experiences, while others are not affected. Some people may have a strong emotional response while others are able to bounce back quickly and reduce the effect. Currently, it may be difficult to predict whether a person exposed to a traumatic event would develop Post Traumatic Stress Disorder (PTSD). This proposed dissertation research study first surveys the current literature on PTSD susceptibility and other related known contributing factors. Then the research portion of this project will attempt to broaden existing knowledge of susceptibility and other contributing risk characteristics to aide in identifying and advancing treatment for PTSD vulnerability and treatment.

PTSD is a psychological disorder that occurs among people who have been through an extremely traumatic and stressful life event (Richardson et al., 2010). Studies show that in general trauma alone does not determine the development of PTSD among individuals because

the majority of those who survive extreme trauma do not develop this disorder (Kilmer & Gil-Rivas, 2010; M. Walker, 1999; Yehuda et al., 2015).

Recent estimates indicate a lifetime prevalence rate of PTSD in adults in the United States (U.S.) to be approximately 6.8% (Kessler et al., 2004). Comparatively, the prevalence rate of PTSD across countries varies in the European population from approximately 0.56% to 6.67% (Burri & Mearcker, 2014). Although the prevalence rate for PTSD is high for U.S. citizens, it is even higher for military veterans. In fact, current era veterans from Operation Iraqi Freedom/Operation Enduring Freedom have a lifetime PTSD prevalence rate of 13.8%, double the prevalence rate in the U.S. (Kessler et al., 2004; Tanielian et al., 2008). Other studies have found this prevalence rate to be even higher, with research on Vietnam era veterans showing a lifetime prevalence rate of 30.9% for men and 26.9% for woman, more than four times the prevalence rate in the U.S. (Hamner, 1992). To make matters worse, further studies have found that PTSD has significant negative social, familial, and economic impacts that puts veterans more at risk for other co-occurring issues such as suicidal ideation and depression (Kimhi et al., 2010; Vogt et al., 2008).

The literature on risk and protective factors has highlighted several topics that have been researched and investigated, such as: pre-traumatic development, overall coping skills, Central Nervous System (CNS) response, culture, and gender. Regarding gender, for example, several studies indicate that females are more vulnerable to PTSD after a traumatic event (Breslau & Anthony, 2007; Breslau & Davis et al., 1997; Maretta, 2018; Stein, J. Walker, & Forde, 2000). One reason for this may be that women in general are more likely to be victims of complex sexual trauma than men, which has a higher susceptibility risk to PTSD than other types of traumas (Bromet et al., 1998).

One important, common risk factor for PTSD is having a history of child abuse, which appears to not only increase the risk for individuals to experience adult trauma, but also increases the risk for developing PTSD in response to this exposure (Daniels et al., 2013). Comorbid correlations exist among several susceptibility factors, including learned helplessness, locus of control (LOC), child abuse, trauma and adult trauma exposures, and genetic predisposition that contribute to PTSD susceptibility.

Understanding the vulnerability factors prior to diagnosis could help with the direction of therapy and the ability of the clinician to gain insight into how the individuals process trauma. The value to soldiers and veterans is not only in identifying a PTSD diagnosis, but also understanding the underlying risk factors that may exacerbate and/or aggravate PTSD symptoms.

Statement of the Problem

Posttraumatic stress disorder is not limited to a particular age, gender, race, or social group: it can develop in anyone. Two hard-hit populations that are exposed to Potential Traumatic Events (PTE) in the U.S. are children and U.S. military veterans. Children are vulnerable to developing PTSD with studies in the U.S. showing more than 60% of the children experience a (PTE) before their 16th birthday (Copeland et al., 2007). Another reason why understanding risk factors for PTSD is because the number of suicide rates among veterans is 22 per day, which is an astonishing rate equaling one suicide every 65 minutes (Department of Veterans Affairs, 2012). It is important to look at the sequelae of trauma for veterans to acknowledge accumulative impact of PTE goes well into adulthood.

To reduce these numbers and to help the victims, it is important to develop a clinical understanding of the risk factors that are highly linked to the development of PTSD among vulnerable groups such as armed forces veterans. The understanding of causative factors may be

essential in directing the appropriate approach to therapy and to understand the individual ability to process the trauma.

Regarding Military related PTSD according to Lehrner & Yehuda (2014), "war fighters steeped in the military culture that values toughness, discipline, and willpower" (p. 6) may not be keen to self-report their PTSD symptoms, which could lead to rejection by their *battle buddies* and/or families. It is easy to understand given that the United States military discharges service members for PTSD as an unfit condition for continued service under section 4.129 (Army Review Board Agency, 2015). Soldiers who love their career are forced to choose between getting the services they need while in the service and risking potential discharge: "[a] condition that appears to significantly interfere with the performance of duties appropriate to a service member's office, grade, rank or rating will be considered for [discharge/retirement]" (Army Review Board Agency, 2015, p. 5).

The need for clinician awareness of susceptibility factors is often overlooked. The core of the problem is recognition of PTSD susceptibility and the factors related to it, instead of the cursory symptom review. This research will also discuss in depth the need for a proper assessment. Currently, the Clinicians-Administered PTSD Scale for the Diagnostic Statistical Manual of Mental Disorders, 5th Edition (otherwise known as the CAPS-5) is thought to be the "gold standard in PTSD assessment" (Department of Veterans Affairs, 2015, p. 1).

The problem with the CAPS-5 assessment is that it relies on the accuracy of the client to self-report his or her symptoms. In this regard, the proposed research is attempting to address the problem of assessment of contributing risk factors associated with PTSD among service members with the aim of helping identify those with known risk factors to assist in an appropriate therapeutic intervention (e.g., combat veterans).

Theoretical Perspective

This study will follow a dimensional perspective of where vulnerability to PTSD pathology is seen to be on a continuum from vulnerability/risk to protective factors against PTSD. Sinclair & Wallston (1999) have defined vulnerability as the cognitive processes that make an individual more fragile to stress. Regarding vulnerability and risk, both are used interchangeably to address the overall susceptibility to PTSD. Schwarz (2018) defined resilience as "traditionally understood as a prevention of disasters or a capacity for individuals or systems to manage and rebound from a disruption, the concept has migrated from the natural and physical sciences into the social sciences" (p. 228). In other words, it is the mental ability to cope with a crisis and rebound back to pre-crisis status. Resiliency and protective factors are often thought of as interchangeable terms in positive psychology. When someone is high on the vulnerability/risk end of the continuum, they are more susceptible to experiencing long lasting impacts of the trauma. On the other end of this continuum, are individuals who are resilient to trauma and can bounce back to a state before the crisis or trauma occurred.

Individual reaction to a PTE is random and could lead to PTSD. Thus, it is critical to distinguish between the PTE and the emotional response. Research indicates that after a traumatic event, PTSD has the potential to develop from complex interaction of various factors, which includes risk or vulnerability factors that are the catalyze for the possibility of developing PTSD (Freidman, 2011).

Overall, research has found that PTSD is likely triggered by a combination of vulnerability or resiliency and stressful circumstances. In this light, cumulative lifetime stresses are important factors in PTSD development (Foy et al., 1996).

Research Objective

The study objective is to assess currently known contributing factors associated with PTSD in U.S. servicemembers.

Specific Objectives

This research will:

1. Assess the impact of child abuse history on potential future susceptibility (e.g., military servicemembers) to a PTSD diagnosis,
2. Evaluate the ways in which moral injury impacts the processing of trauma, and subsequently, posttraumatic growth, and
3. Analyze the ways in which biological (such as genetic vulnerabilities) and familial factors (such as generational trauma, environmental factors) increase the risk for a PTSD diagnosis.

Research Questions

1. Are servicemembers who endorse a history of child abuse more likely to endorse symptoms associated with PTSD?
2. Are servicemembers who experience a moral injury more likely to endorse symptoms associated with PTSD?
3. Is a servicemembers biological and familial history a risk factor for endorsing symptoms associated with PTSD?
4. Is a servicemembers education attainment a risk factor for endorsing symptoms associated with PTSD?
5. Is the age of a servicemember a risk factor for endorsing symptoms associated with PTSD?

Significance

The economic, social, and psychological impact of PTSD for individuals, communities, and the country makes examining risk factors critical. A number of trauma victims in the U.S. could potentially acquire PTSD. These are people who have traumatic experiences, such as rape, domestic violence, and other types of assaults. In addition, people who survive acts of terrorism and natural disasters, and children who have been abused sexually, physically, or through neglect have a high potential of developing PTSD. Veterans of the armed forces that have traumatic experiences such as active combat also have a high risk of developing PTSD. Trauma alone, however, is not sufficient cause for PTSD development. Individual characteristics can predispose individuals to develop PTSD after a traumatic event, which include gender, age, childhood abuse, family factors (such as epigenetics), previous life events and traumas, and childhood problems among others. In addition, the individual and background risk factors that predispose one to PTSD often overlap with risk factors for other psychiatric disorders, leading to comorbidity.

Severity of trauma has been used as the primary predictor for development of PTSD for a long time. Understanding the contributing risk factors that are associated with PTSD development is critical to ensure that an appropriate clinical approach is developed for individual cases based on their risk factors. This research is based on the correlation of PTSD and the known risk factors. Soldiers with risk factors who have been exposed to trauma can benefit from psychological triage to help reduce PTSS.

Limitations and Delimitations

The research is going to rely on de-identified data as part of the investigative process provided under the “User Agreement” of the Inter-University Consortium of Political and Social Research (ICPSR, 2021).

Definitions and Discussion of Key Terms

Child Abuse

The following definition is a federal guideline for states, which falls under the Child Abuse Prevention and Treatment Act (CAPTA): "Any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse or exploitation" (Child Welfare Bureau, 2019; Department of Human Health Services, 2010). Having a universal definition of abuse at a federal level is useful to remove ambiguity from State to State.

Cumulative Lifetime Stress

Samuels-Dennis (2010) defines cumulative lifetime stress as "the phenomena whereby exposure to one set of trauma or adversity gives rise to other negative and detrimental experiences, the effects of which surface and recede or function in combination to impact health" (p. 95).

Pre-Traumatic Risk Factors

According to Parslow et al. (2006) who carried out an analysis of a community-based study of 2,085 young adults, pre-trauma factors increased the likelihood of PTSD concern. Attributes existing prior to the traumatic event that can impact the susceptibility to PTSD are gender, education, pre-trauma psychopathology, prior exposure to trauma, and social support after historical trauma (Ozer et al., 2003; Parslow et al., 2006). The definition of pre-trauma varies in the literature, and no agreed upon definition exists on what constitutes risk factors before the occurrence of the trauma exposure. DiGangi et al. (2013) identified six categories that might be subsumed under the term pre-trauma risk factors: (a) cognitive abilities, (b) coping and response styles, (c) personality factors, (d) psychopathology, (e) psychophysiological factors, and (f) social ecological factors (e.g., family of origin, social support, poverty). Since the

definition of pre-trauma varies amongst researchers, it is important to explore the varied considerations when discussing potential categories to explore when conceptualizing trauma risk.

Pre-trauma risk factors are the characteristics of a person that may play a role in the processing and recovery of trauma exposure. However, DiGangi et al. (2013) makes no attempt to quantify the association between pre-trauma risk factors and the impact of prior traumas as a risk factor contributing to subsequent trauma.

Posttraumatic Stress Disorder (PTSD)

A considerable amount of literature has been published on PTSD (e.g., Kessler & Sonnega et al., 1995; Stein & Jang et al., 2002; Stein & Kessler et al., 2015; Xian et al., 2000; Yehuda, 1999; Yehuda & Hoge et al., 2015; Yehuda & McFarlane et al., 1998). However, the inception of PTSD in the DSM-III created much controversy (DiGanji et al., 2013). Whereas virtually all other psychiatric disorders were largely non-etiological, PTSD required a specific type of event to precede the development of a clinical syndrome to meet PTSD clinical criteria. So important was this precipitating event that when PTSD was initially conceptualized, PTSD was thought of as monocausal (American Psychiatric Association [APA], 1980; DiGanji et al., 2013). The limitation of this conceptualization was realized as researchers found that trauma was common, and PTSD was the exception, not the rule (Breslau & Kessler et al., 1998; Bromet et al., 1998; North et al., 2009). This showed a need to be explicit about symptom criteria. According to the American Psychiatric Association (2013), PTSD is characterized by a set of four symptom group criteria (Intrusion, Avoidance, Negative Cognition and Mood, and Hyperarousal) to meet diagnosis per the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; see Appendix A for PTSD criteria from the DSM-5).

As stated previously, unlike other diagnoses, Criteria A for a PTSD diagnosis requires previous trauma exposure. The DSM-5 gives examples of experiences that would qualify under

the trauma exposure criteria: “Direct experience of immediate serious physical danger. Witnessing trauma to others. Indirect exposure via violent or accidental trauma experienced by a close family member or close friend. Repeated or extreme exposure to aversive details of trauma” (APA, 2013, p.1).

Peri-Traumatic Factors

Despite its common usage in the field of psychology, peri-trauma is used in different disciplines to mean different things. Peri-trauma is often used in psychology to mean “[a response] to an environmental stressor or potentially traumatic event” (Hood et al., 2020, p. 396). The sequalae of a traumatic event can lead someone to have a broad range of emotions that are subjective to their own cognitive process and have a physiological response. Additionally, Hood et al. (2020) noted that peri-traumatic emotions often include fear, anger, sadness, guilt, and shame.

The meaning of the term “peri-trauma” has not been consistent. Marsac et al. (2014) proposed a new model taking advantage of the bio-psycho-social framework while focusing on peri-trauma processes of dire medical events. This definition is broad and is a more comprehensive description of a response to a traumatic event. This definition also allows for the subjective emotional aspect of a traumatic event and incorporates the physical trauma. This broader definition includes:

> Injuries and sudden illnesses (excluding chronic illnesses). Medical trauma or medical emergencies are also a peri-traumatic period that typically includes physical trauma (i.e., discomfort and/or pain due to injury, illness, or medical treatment), interaction with medical providers, and medical interventions. (Marsac et al., 2014, p. 399)

CHAPTER II: LITERATURE REVIEW

Many factors play into the susceptibility to a PTSD diagnosis. There is a relationship among learned helplessness, Locus of Control (LOC), child abuse trauma, adult trauma exposures, genetics, and the susceptibility of PTSD. For example, the research shows one common risk factor for PTSD is having a history of child sexual abuse, which puts individuals at risk for adult PTSS due to diminished overall perception of control (e.g., Bolstad & Zinbarg, 1997; Daniels et al., 2013), it also contributes to the development of PTSD as response to trauma exposure.

Understanding the vulnerability factors prior to diagnosis may help with the direction of therapy and simply to gain insight into the way in which an individual processes trauma. The value is not only in the diagnosis but identifying the underlying triggers that help support the symptoms.

The objective of this study is to investigate the risk factors for PTSD which have been identified in the literature in order to see which factors are strongly correlated with PTSD among U.S. servicemembers. The final goal will be to create an assessment tool or protocol to guide clinicians with their assessment protocols by putting an emphasis on historical, biological, and environmental risk factors identified and verified through this analysis.

Theoretical Basis of the Proposed Research

A systematic understanding of how risk factors impact trauma victims has been lacking. It was believed that the traumatic event itself took diagnostic precedence over risk factors (APA, 1980). Not only was this belief widely accepted, but it was also believed that PTSD was a moral or character flaw within the individual experiencing such symptoms. Veterans returning from World War I were labeled with “Combat Neurosis” (Shuman, 1995). This sentiment continued

within the first diagnostic and statistical manual by the American Psychiatric Association (1952) by introducing "Gross Stress Reaction"—the predecessor to the PTSD diagnosis criteria. This approach focused on the reaction of the victim and *victim blaming* rather than conceptualizing the risk factors and inherent predisposition prevalent in the medical field practice (Kendler, 2020).

A considerable amount of literature has been published on The Diathesis-Stress Model dating back to the 1950s (e.g., Alarcon et al., 1997; Kendler, 2020; McKeever & Huff, 2003). These studies have found a direct link between environmental influences and vulnerability risk factors that play a critical role as a catalyst for the onset of PTSD. The Diathesis Stress Model is a conceptualization to understand the underpinning of risk factors into three different stress pathways. The first stress pathway, *residual stress*, is a term that can be traced back to Figley (1978), which refers to the severity of the trauma experienced, and past historical trauma. The second pathway is *ecological diatheses*, which attempts to account for environmental stressors that may impact the individual. Lastly, the third in the triad is *biological diathesis*, which has been a historical working conceptualization in the medical field to explain how epigenetics and prolonged trauma exposure "alters brain volume, neuronal architecture, and hormonal makeup" (McKeever & Huff, 2003, p. 243).

The Diathesis Stress Model, which is also known as the *vulnerability stress model*, attempts to explain a trajectory of a disorder by accounting for contributing risk factors to the particular disorder. However, as Kendler (2020) noted, each individual has a breaking point or the point he or she develops a disorder. The following is a literature review of the vulnerability risk factors associated with PTSD.

Attribution Style

Martin Seligman coined the term "learned helplessness" in 1965 while studying classical conditioning. He learned animals that have been shocked/abused long enough will not try to get out of their abusive situation. The theory of learned helplessness in animals applies to human behavior. A recent article by Forgeard et al. (2011) suggests that learned helplessness can help us better understand sequelae of depression and subsequently bring understanding to a patient with PTSD. Given the understanding of learned helplessness, it is reasonable to understand how a depressed veteran with PTSD could succumb to his or her misery or addiction, not seek help, and tragically commit suicide.

> In their detailed survey investigation into trauma, McKeever et al. (2006) showed that, Trauma clinicians have observed that individuals with personal learned helplessness similarly tend to believe that any successful resolution of post-trauma events, especially unpleasant or stressful ones, is determined by forces outside of themselves, such as fate, luck, and powerful people. (p.124)

This concept of is referred to as an external locus of control (LOC). This implication is alarming because it is simply stating that soldiers who have learned helplessness are more susceptible to PTSD due to their external LOC. Since they believe that they themselves do not have the power within to make a change in their life, they are relying on some external force to fix their problem.

Rotter (1996) characterized a theory of generalized perception of control as the effects of reward and punishment on behavior and the ways in which a person perceived their behavior as independent of reward and punishment (Rotter, 1996, p. 1). The research suggested that generalized perception of control may be more important in the study of PTSD than actual control, as well as coping with the effects of the traumatic events.

LOC is a theory of personality that Julian Rotter developed in 1966 at Ohio State University. Rotter (1966) distinguished people who see themselves as the source of their success (internal LOC) versus people who believe that their fate is sealed in destiny or believe in luck as the primary factor in their success (external LOC). Individuals with a high internal LOC tend to feel more responsible for the success or failure in their life. For example, a person with an internal locus orientation would attribute their success directly to their efforts and hard work.

Child Abuse as a Risk Factor for PTSD

In a study conducted by Bolstad and Zinbarg (1997), it was shown that children who have experienced sexual abuse are more likely to have a diminished generalized perception of control, which is a factor in susceptibility to PTSD. Both child sexual abuse and adult PTSD survivors may suffer from diminished generalized perception of control. However, this link could merely be a delayed onset of PTSD symptoms from the same childhood sexual abuse. Bolstad and Zinbarg (1997) suggested that early trauma might cause increased susceptibility in an individual to *"mental illness and adjustment problems*" (p. 525). Studies have shown that the longer a child goes without treatment, the more arduous the treatment process is for the child following sexual trauma. This theory suggested the compounding effect of the actual child abuse and/or another trauma event was only half of the mental injury. The possible sequelae of events in a sexual trauma could have led to depression, suicidal ideations, and possibly a PTSD diagnosis.

Berger et al. (1988) noted that many individuals who are questioned about physically abusive experiences fail to label themselves as abused. This is another variable to consider when conducting a clinical assessment and overall bio-psycho-social history interview. The term "child abuse" is subjective. How does one define such a broad term? What are the standards by which a person may judge whether child abuse has occurred? Berger et al. (1988) and her colleagues

established “The Assessing Environments III” questionnaire used to obtain data regarding specific childhood punishment experiences. This consists of 10 demographic questions and 155 true-false items that assess an individual's childhood history, including the frequency of physical punishment.

Zaidi and Foy (1994) suggest that the sequelae of having a history of child abuse and combat exposure may not be independent factors and should be examined as one contributing factor. Another aspect of child abuse history is *intergenerational* trauma and the ways in which relationships with parents affect relationships with children. In this way, “abuse breeds abuse” (M. Walker, 1999, p. 284), in other words, this describes what is known as the cycle of abuse (Hunter & Kilstrom, 1979; Oliver & Taylor, 1971; Sudia, 1976). This suggests that if a veteran has a history of child abuse and PTSD, their children may be more susceptible to maltreatment. Having a comprehensive treatment plan that would benefit the veteran and those individuals in close proximity to him or her would likely benefit the veteran to a greater extent than simply having a strategy to deal with the veteran alone (Zaidi & Foy, 1994). Additionally, this approach of serving the family must also be coupled with psychoeducation so the family may better understand the veteran and associated symptoms with PTSD.

Recently, Perales et al. (2012) highlighted the relationship between childhood trauma and the suicide rate in a sample of U.S. Army soldiers with a history of childhood trauma. The method to qualify someone for the study was a self-report system using the U.S. Department of Defense Service Examination Record to determine who has a history of childhood trauma. “Personal trauma was defined as experiencing physical, sexual, or emotional abuse during childhood” (California Penal Code, 2015; Perales et al., 2012, p. 1035). Perales et al. (2012) showed how the self-report questionnaire data used for research from the U.S. Department of

Defense Service Examination Record. Furthermore,

> The data used were available only for cases of suicide attempt and suicide death and not for a control group of soldiers without suicidal behavior; thus, we were unable to conduct statistical tests for association between childhood trauma and suicidal behavior. (Perales et al., 2012, p. 1038)

In addition, this study appeared to lack data regarding veteran and enlisted suicide rates. Another concern is that veterans and enlisted are being treated as two separate numbers when presumably the suicidal ideation or completed suicide comes from the same service time experience or stressors. The arbitrary departure from the military does not wipe the slate clean with trauma. Therefore, there must be a reasonable window to include newly released veterans in these types of studies to take into account suicidality that was service aggravated during the time the veteran was serving in the capacity of his or her military assigned duties.

Moral Injury

Another aspect of combat that is increasingly important to conceptualize is the impact of Moral Injury. According to Worthington and Langberg (2012), being a combat servicemember could potentially create opportunities for self-condemnation. Moral injury could include letting your battle buddy down in a combat scenario or having an internal religious conflict with some action you did or failed to do. This could be culturally based or based on religious values.

> They may violate their own deeply held moral beliefs, witness the unethical behaviors of others, or question the justness of their own country's involvement in war. As a result, they suffer internal conflict between their morally questionable actions and internal beliefs. (Worthington & Langberg, 2012, p. 274)

The term self-condemnation is described by Worthington and Langberg (2012) as a

challenge to your faith due to a complex trauma perpetrated by you, witnessed by you, or person-to-person combat that triggers severe mental and physical problems. These authors discuss how a different approach must be taken when you identify that a person's problems stem from his or her religious convictions. Ontologically speaking, Worthington and Langberg (2012) are presenting the theory of soul repair. The data on self-forgiveness is lacking with combat veterans but it is gaining traction with civilians and has been used in alcohol and drug treatment centers (Scherer et al., 2011).

Moral injury could be detrimental even if the person experiencing moral injury was not a part of the atrocity or trauma. The military gives this issue a different component which is the military culture of obey and follow orders, and the fact that service members all represent one unifying goal. For example, The Department of the Army (2007) Field Manual 3-21.20 describes the mission of the infantry as,

> The primary mission of the Infantry battalion is to close with the enemy by means of fire and maneuver. Its purpose is to destroy or capture him, to repel his assaults by fire, close combat, and counterattack, or all of these. (p. 1-1).

You do not have to be in the infantry to be affected by their mission. According to Worthington and Langberg (2012), you can be a spectator to what is going on and if you feel you are somehow supporting or in essence you have acquiesced to the situation; the potential for moral injury is likely to occur if what you found to be troubling conflicted with your deeply held values (Leoffler, 2013; Worthington & Langberg, 2012). The authors state, "They may experience challenges to their conception of God and question the goodness or power of God. They may also lose the belief that humans are redeemable" (Worthington & Langberg, 2012, p. 275).

Furthermore, their research suggests that in order to move forward with moral injury you must repair your faith with your God. For example, it might involve confession and telling the truth if you are Christian and if you are not affiliated with any faith but still perceive moral injury, it could be a crime against nature or criminal law, which might require a penance in line with your morality (Worthington & Langberg, 2012). Moral injury theory has its limitations. This article has assumptions that a person has to be moral to be morally injured, and the literature heavily references God as one of the possible sources to which a person needs to do penance. The authors discuss the failure to live up to your own standards and the need to having to look towards the future in order to make amends with God (Worthington & Langberg, 2012, p. 275). The variable that is not discussed is the separation of duty and personal objections. The military does not work on the opinions and beliefs of many. The military has codes of conduct and falls under the Uniform Code of Military Justice (UCMJ). The lower ranking soldier on the front lines does not have privilege to act on his or her moral compass if the military orders are lawful. The thought behind this is that the lower ranking soldier lacks experience to fully grasp the totality of the situation. However, the issue that Worthington and Langberg (2012) suggest is that military members have a warrior ethos, and self-forgiveness goes against that warrior mentality. The complexity of self-forgiveness comes when the soldier begins to question his or her authority to forgive an action he or she was compelled to do in the line of duty. For example, if a Commanding Officer or Non-Commissioned Officer gives a servicemember a lawful order and someone gets injured or killed in the act of obeying the lawful order, who is ultimately accountable? The moral question of personal accountability comes into question when soldiers acknowledge their role in the mission or combat operation. Worthington and Langberg (2012) suggest, “Self-forgiveness does not fit the warrior ethos. We [Worthington & Langberg] suggest

that this might be dealt with by characterizing self-condemnation as a fitness issue and self-forgiveness as a way of increasing military fitness" (p. 285).

Biological and Familial Risk Factors

A growing body of literature supports the importance of biological influences in PTSD. As previously discussed, a key aspect to assess PTSD is pre-trauma risk factors, which include ecological factors such as family of origin. To determine the effects of an individual's biology and PTSD susceptibility, Bomyea et al. (2012) looked at hereditary factors associated with PTSD, which suggested hereditary factors accounted for a 30% risk of developing PTSD. Researchers agree that genetic vulnerabilities in stress-response pathways exist prior to the traumatic event and in some ways these genetic vulnerabilities may influence PTSD development (Bomyea et al., 2012; Daniels et al., 2013). A recent systemic literature review by Daniels et al. (2013) suggested the "neurotoxic impact of childhood trauma might inhibit white matter myelination, especially during certain sensitive periods of development" (Daniels et al., 2013, p. 207). The research notes that white matter connectivity issues have been reported in adults with PTSD and clients who have reported trauma. Their research, however, suggests that it is unclear whether structural damages are due to PTSD or trauma, as the neurotoxicity hypothesis suggests, or whether it is simply a vulnerability factor for PTSD. This research is particularly interesting because they note that white matter connectivity is a common factor in trauma resulting possibly from traumatic brain injury (TBI)-related head trauma, psychological trauma, or the effects of PTSD. This is a very important finding given the prevalence of PTSD and TBI with military servicemembers/veterans (Bryan & Clemans, 2013).

A key aspect of susceptibility risk factors is the role of the Sympathetic Nervous System (SNS) as it relates to trauma. The SNS is a subdivision of the Autonomic Nervous System

(ANS). The function of the SNS is to prepare the body for a threatening situation also known as the fight or flight response. Another function of the SNS is to slow the bodies less important functions just as digestion during emergencies. These processes are not under direct conscious control, they occur automatically without conscious thought (Veith & Murburg, 1994).

According to Ostrowski and Delahanty (2014), "Prior research on emotional memory formation consistently underscored the role of arousal in facilitating emotional memory formation; sympathetic arousal during an event leads to better memory retention, and blocking arousal is associated with poor memory" (p. 196). Furthermore, Pitman (1989) hypothesized an exaggerated SNS response during or after a traumatic event could lead to over-consolidation of traumatic memories manifesting themselves in rumination, intrusive thoughts, or flashbacks of the particular event characteristic to PTSD.

An alternative hypothesis regarding a SNS response is habituation, a form of non-associative learning in which the response is decreased after repeated presentation and, therefore, reducing the fight or flight response due to repeated exposure. Yehuda and McFarlane et al. (1998) concluded that low levels of cortisol during or around the trauma may fail to contain SNS activity leading to the inappropriate memory consolidating characteristic of PTSD.

There is a growing body of literature that recognizes the importance of familial, biological and genetic factors associated with the susceptibility to PTSD. Yehuda (1999) concluded that the major etiologic agent in PTSD was assumed to be the traumatic event itself, regardless of any pre-traumatic considerations. Her research article pointed out that the Diagnostic and Statistical Manual of Mental Disorders-I (DSM-1) and the DSM-II only referenced acute symptomatic stress relating to "categories of gross stress reaction and transient situational disturbance" (Yehuda, 1999, p. 35). According to Yehuda (1999), it was believed

before the DSM-III was published that the failure of many trauma survivors to recover from the effects of the exposed trauma was partly due to a weakness in part of the survivor.

The issue of epigenetics in the field of psychology has received considerable critical attention. Recently, the literature has grown up around the theme of generational trauma and the ways in which it impacts the individual. A study by Yehuda (1999), found that children of Holocaust survivors are more likely to develop PTSD than those people whose parents did not have Holocaust experience. This study made the genetic and biological connection with PTSD. The study also implies a psychological footprint of trauma that is trans-generational even when the current generation had no first-hand experience in the trauma or event (Rosenheck, 1986; Yehuda, 1999). A comprehensive review of epigenetics and PTSD risk factors has received significant analysis and discussion.

However, a major problem with genetic factors and PTSD is the lack of studies on this seminal issue. Yehuda and Hoge et al. (2015) presented a significant analysis and discussion on the subject and found that,

> [Pending] progress in Genome Wide Association Studies (GWAS), genetic variants confidently associated with PTSD *have yet to be identified [emphasis added]* … however, one study found polymorphisms in FKBP5 [FK506 binding protein 5] were shown to have a significant association with severity of child abuse in the prediction of adult PTSD symptoms. (p. 6)

Much of the current literature on epigenetics pays particular attention to twin studies regarding PTSD. By diagnostic definition, PTSD requires trauma exposure (APA, 2013), which implies a possible causal effect on the development of PTSD. As previously noted, the literature points to evidence regarding a genetic vulnerability for PTSD at 30% (Bomyea et al., 2012).

However, several studies examined twins, veterans, and adults and found the range to be more like 30%–46% of the variance in PTSD is attributed to genetic factors (e.g., Sartor et al., 2012; Scherrer et al., 2008; Stein & Jang et al., 2002; True et al., 1993; Xian et al., 2000). The main challenge faced by many researchers is based on the diathesis stress model, which involves the gene by environment (G x E) interplay. According to Wolf et al. (2014),

> [A] harmful environment interacts with a genetic predisposition towards pathology and increases the risk for the pathology. Thus, the basic concept underlying G x E is that risk for a given trait or disorder is not static, but instead is dependent on the synergy between basic biological and environmental risk factors. (p. 1500)

A mechanism may exist in which specific genes are turned on or off based on the G x E interaction (Bagot & Meaney, 2010).

Perhaps the most serious disadvantage of this theory is lack of specificity with regard to what types of environmental pathogens have a direct impact in gene expression that turns on or off. Hammen et al. (2000) proposed a similar hypothesis that suggests a compounding effect and impact of one negative environment interacting with another negative environment (E x E). For example, having experienced child abuse and subsequent exposure to a "combat theater" may make a person more susceptible to the development of a constellation of symptoms associated with PTSD. The predisposition to a PTSD diagnosis is increased with childhood trauma, which is supported by Breslau , Chilcoat, Kessler, and Davis (1999) and McLaughlin et al. (2010).

One of the more significant findings in epigenetics and environmental risk factors is the direct impact of combat as an environmental pathogen and as a mediator that increases susceptibility. The compounding effect of accumulative lifetime stress is another significant finding. One question that has yet to be studied, however, is whether habituation has a positive or

negative role in accumulative lifetime stress in regards to gene expression (e.g., E x E). The existing body of research on psychobiological evidence suggests that *exposure therapy* utilizes the theory of habituation whereby, the patient is gradually exposed to the stimulus to elicit a gradual response. The goal is to elicit a new association with the stimulus therefore, greatly reducing the fear to the original stimulus (Groves & Thompson, 1970; Yehuda et al., 2015). For example, the more you are exposed to the stimuli; the response progressively declines over time and exposure. Lissek and Van Meurs (2015) argue "the failure of this type of habituation is proposed as a central contributor to the hyper-arousal cluster of PTSD symptoms (e.g., hyper-vigilance, exaggerated startle, and difficulty concentrating)" (p. 600). A full discussion of habituation and gene expression with regards to PTSD lies beyond the scope of this study. However, the link between accumulative lifetime stress and PTSD seems to be the bridge between the two theories.

Intelligence

There is evidence that intelligence plays a crucial role in regulating the severity of PTSD symptomology and treatment outcomes. The research of Marx et al. (2021), noted that intelligence may be an important determinant in the ability to comply with and comprehend treatment for PTSD. A considerable amount of literature has been published on the impact of intelligence and PTSD as it related to treatment. These studies have shown that individuals with a higher level of intelligence receive a greater benefit from psychotherapy interventions (M. Smith & Glass, 1979). The research also noted a link in an individual's intelligence and effective problem-solving strategies to cope with symptoms associated with a traumatic experience.

Research by Bomyea et al. (2012) also implies that the studies done on intelligence do not account for environmental factors that contribute to coping strategies. Essentially, regardless

of what coping strategies or intelligence a person may have, outside factors such as family dysfunction, financial stress, or relationship issues can and often do have an effect on a person's overall recovery and wellbeing. This study also highlights the importance of self-appraisal. They found individuals with a positive self-appraisal are more likely cope with a traumatic event whereas a person with a negative self-appraisal may have a negative or exaggerated response to the trauma, thereby increasing anxiety concerning the event. On the other hand, Yehuda (1999) maintains some individuals may not be impacted terribly from a traumatic event due to a perceived "mastery over the event simply by the fact of his or her survival" (p. 35), which suggests survival from a traumatic environment or event may be an important factor on susceptibility and resiliency. The state of mind prior to an exposure to a traumatic event is a protective factor.

Gender

A considerable amount of literature has been published on gender as a risk factor for PTSD. These studies indicated roughly 70% of adult women have experienced a traumatic event in the U.S., and the general population regardless of gender experience one traumatic event in their lifetime (Kessler & Sonnega et al., 1995; Resnick et al., 1993). A study from Canada sought to determine the reasons why women are more susceptible than men to PTSD by a ratio of 3:5 (Stein, J. Walker, & Forde, 2000; Yehuda, 1999). Their research concluded that the rate may be more prevalent in women than in men due to the type of trauma women are exposed to such as: sexual traumatization, muggings, physical abuse, domestic abuse, and women are more likely to be re-victimized, therefore increasing the compounding exposure to multiple traumatic events (Tolin & Foa, 2006).

One of the objectives of the Tolin and Foa's (2006) study was to compare types of traumas that affect women more than men. However, the primary focus of their research was to look at how gender influences vulnerability to PTSD. The data did not conclude that women experience more varied types of trauma; therefore, their susceptibility ratio is higher. In fact, the data suggested that men experienced more varied types of trauma but are less susceptible to the development of PTSD. By contrast, women are more susceptible to PTSD by nearly twofold than men according to epidemiological studies (Breslau & Anthony, 2007; Breslau, Chilcoat, Kessler, and Peterson et al., 1999).

These findings would have been more useful if they had addressed the reason men are less susceptible than women to develop PTSD. The limitation in gender comparisons as it relates to PTSD development fails to account for specific resiliency or protective factors directly attributed to a person's gender. The literature did, however, account for the specific types of traumas that are more attributed to women versus men. Additionally, the articles lack clarification if gender is based on biology or self-identified gender and how self-identification impacts resiliency or susceptibility to symptomology development associated with a PTSD diagnosis.

Social Support (Unit Cohesion and Family/Partner Support)

Another factor that contributes to onset of PTSD is postwar social support/family. According to Green et al. (1990), a good homecoming with social support greatly reduces likelihood of a PTSD diagnosis (p. 732). The theory purported by Green et al. (1990) is that a soldier in this case would be more than likely to share and possibly seek therapy for any military related traumas he or she may experience. A person who lacks social support and does not get a welcome home would be more likely to isolate himself or herself and possibly ruminate about

his or her troubling experiences, creating dysfunctional thought processes. The generalizability of much published research on this issue is problematic. Consensus among social scientists holds that negative life events, and interpersonal stress or loss of important relationships contribute to suicide risk (e.g., Mann et al., 2002; Maris et al., 2000). In a large longitudinal study, Feskanich et al. (2002) investigated home stress and suicide risk factors. He concluded that severe home stress increased suicide risk fourfold. Gradus et al. (2015) conclude family stress and family support may be important predictors of post deployment suicidal ideation in the veteran community. Others (Barrett & Barber, 2007; Interian et al., 2014; T. Smith et al., 2008) have highlighted the connection between complex family factors that have an association with PTSD and depression. The role of mental health symptomology in association with familial factors are a critical variable in overall PTSD assessment when understanding PTSD in the context of the ways in which the family system contributes to the symptomology.

CHAPTER III: METHODOLOGY

Methodology

This study will also attempt to estimate a relationship between the independent variables such as risk factors previously identified in the literature and the dependent variables of PTSD symptoms and subsequent diagnosis (McKeen, 2002).

Using a multiple regression analysis (MRA) will allow the research to predict behavior of a dependent variable (PTSD) based on the independent variables (such as risk factors associated with PTSD; Carnell, 2021). Using an MRA will help determine if a statistically significant ($p \leq .05$) association between the independent variables and the dependent variable. The use of a MRA will allow this researcher to look at the strength of the relationship between PTSD and several risk factors previously identified in the literature review.

Highlighting the statistical relationship between the dependent variable (PTSD) and the selected independent variables allows researchers to further understand the relationship with the multiple independent variables and the dependent variable. “The variances allow researchers to understand the dependent variable's changes based on the fit with the selected model” (Carnell, 2021, p.96). Applying MRA to this study will allow the researcher to look at how risk factors previously highlighted in the literature review impact susceptibility to PTSD after a Potentially Traumatic Event (PTE).

Therefore, this research is going to be conducted using de-identified data from The Army Study to Assess Risk and Resilience in Servicemembers (STARRS) All Army Study (ASS), and New Soldier Study (NSS), and given the framework of the previous study, this design will be quantitative. This research will conduct a secondary analysis of the data, which will be provided by the Inter-university Consortium for Political and Social Research (ICPSR) under the Terms of

Use Agreement for Investigators (ICPSR, 2021).

Participants

The data used in this proposed research study are from The Army Study to Assess Risk and Resilience in Servicemembers (STARRS) All Army Study (ASS) that was performed in April to December from 2011 to 2013:

> The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) is a multicomponent epidemiological and neurobiological study designed to generate actionable evidence-based recommendations to reduce Army suicides and increase knowledge about risk and resilience factors for suicidality and its psychopathological correlates. (Ursano et al., 2014, p. 2)

The purpose of the original The Army STARRS study was conducted to identify factors that help protect a soldier's mental health and factors that put a soldier's mental health at risk (Ursano et al., 2014).

The researchers in the Army STARRS study looked at examining patterns of risk-resilience factors and suicidal behaviors (Kessler and Cole et al., 2013). The AAS assessments consisted of stratified (by army command location) probability samples of units or subunits. These assessed units were selected with probabilities proportional to authorized unit strength, excluding units of fewer than 30 soldiers (less than 2% of army personnel; Kessler and Cole et al., 2013)

"All personnel in selected units were ordered to attend an informed consent presentation. At this presentation, researchers explained the study's purpose, confidentiality, and voluntary participation before requesting written informed consent" (Kessler and Coleet al., 2013. p. 271). Consent included filling out a self-administered records questionnaire and participation in future data collections. Weekly samples of 200–300 soldiers were selected at each installation to attend

a study overview and informed consent presentation for the study. Army STARRS staff worked closely with Army coordinators to guarantee these samples were representative of all new soldiers in each weekly cohort.

> These recruitment, consent, and data protection procedures were approved by the Human Subjects Committees of the Uniformed Services University of the Health Sciences for the Henry M. Jackson Foundation (the primary grantee), the Institute for Social Research at the University of Michigan (the organization collecting the data), and all other collaborating organizations. (Kessler and Colpe et al., 2013. p. 270)

Overall, 21,449 U.S. Army Soldiers consented to participate in the Army STARRS AAS and self-reported questionnaire (Kessler & Colpe et al., 2013). The surveys were completed from May 2011 through March 2013.

Inclusion and Exclusion Criteria

The participants in the study were recruited by the Inter-university Consortium for Political and Social Research (ICPSR) from active duty and activated National Guard and Reserve members of the United States Army. An exclusionary criterion is civilian status.

Mode of Data Collection

The ICPSR collected these data on two separate series of dates:

1. May 2011–March 2013, All Army Study (AAS)
2. April 2011–November 2012, New Soldier Study (NSS)

The ICPSR incorporated survey data using the following tools: Computer-Assisted Self Interview (CASI), Paper and Paper Interview (PAPI), an on-site questionnaire, and by web-based survey (Ursano et al., 2014).

Measures

STARRS is an exhaustive study to assess risk and resiliency among the military

personnel (Ursano et al., 2014). The five component measures of the study by the ICPSR are the Historical Administrative Data Study, New Soldier Study (NSS), All Army Study (AAS), Solder Health Outcome Study, and Special Studies. The ICPSR only has available the AAS and NSS under a restricted-use data agreement and under the Virtual Data Enclave (VDE). For the purpose of this research, only the data from the AAS and the NSS will be used.

All Army Study Questionnaire (AAS)

The ICPSR described the AAS as an assessment to assess "soldiers" psychological and physical health, events encountered during training, combat, and non-combat operations, and life and work experiences across all phases of Army service. The AAS data includes information on soldiers' psychological resilience, mental health, and risk for self-harm" (Ursano et al., 2014, p. 5) The AAS is a standard survey that was developed or adapted from several sources by the STARRS study. The following is a list and description of the sources used for the AAS:

1. Joint Mental Health Advisory Team 7 (J-MHAT 7) Operation Enduring Freedom 2010 Afghanistan. Consist[s] of three components:
    a. "Assess behavioral health in land combat forces by surveying Service Members in the Army and Marine maneuver units.
    b. Examine the delivery of mental health in Operation Enduring Freedom (OEF)
    c. Provide Recommendations for sustainment and improvement to command staff" (DOD, 2010, p.1).
2. Patient Health Questionnaire (PHQ): the PHQ is a self-administered instrument for common mental health disorders (Spitzer, Kroenke, & Williams, 1999).
3. Sheehan Disability Scale (SDS). The scale was developed to assess functional impairment in three domains:

a. School and Professional Life

b. Social Impairments

c. Family Life (Sheehan et al., 1996)

4. Brief Insomnia Questionnaire (BIQ): a fully structured assessment developed to diagnose insomnia according to hierarchy-free Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-RT; Hajak et al., 2011; Kessler & Coulouvrat et al., 2010; Roth et al., 2011).

5. Graded Chronic Pain Scale (CPG) is a questionnaire for grading pain. The CPG: "was established before the publication of the World Health Organization's International Classification of Functioning Disability and Health (ICF). The ICF was established to give doctors a standard with which to work when comparing pain and health" (Dixon et al., 2007, p. 249).

6. Pain Catastrophizing Scale: this is a 13-item self-report measure to assess catastrophic thinking related to pain in adults with or without chronic pain (Cano et al., 2005; Leung, 2012; Sullivan et al., 1995).

7. World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) also known as The World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI). WHO WMH-CIDI is a comprehensive, structured interview designed to be used lay interviewers for the assessment of mental disorders according to the definitions and criteria of ICD-10 and DSM-IV. It is intended for use in epidemiological, cross-cultural and clinical studies as well as for research purposes (Kessler & Ustun, 2004; Wittchen, 1994).

8. Adult ADHD Self Report Scale (ASRS): this assessment is a self-report screener for adult attention/deficit hyperactivity disorder. The assessment was developed in conjunction with the WHO CIDI (Adler et al., 2006; Kessler, Adler, & Ames et al., 2005; Kessler, Adler, & Gruber et al., 2007).
9. Composite International Diagnostic Interview Screening Scale (CIDI-SC):
    a. The [There are] 41 sections in the WMH-CIDI. These are not in their order of assessment. The first section is an introductory screening and lifetime review section. […] There are also 22 diagnostic sections that assess mood disorders (two sections), anxiety disorders (seven sections) substance-use disorders (two sections), childhood disorders (four sections), and other disorders (seven sections). Four additional sections assess various kinds of functioning and physical comorbidity. (Kessler & Ustun, 2004, p. 95)
10. Columbia Suicide Severity Rating Scale (CSSRS): the most evidence based-supported tool of its kind to help identify suicidality. It is available in 114 different languages (Interian et al., 2018; Posner et al., 2007).
11. Hurricane Katrina Community Advisory Group (Baseline Survey):
    a. Hurricane Katrina was the most destructive and costliest natural disaster to occur in the United States. Nearly 5 million people lived in the path of Katrina. An additional 1.3 million lived in the New Orleans metropolitan area at the time of the hurricane. Although not in the direct path of Katrina, New Orleans was devastated by a massive flood that occurred as a result. Government policy makers need to

> understand the problems faced by these more than 6 million people as they try to reconstruct their lives. This can best be done by monitoring, over time, a group of people who represent those affected by Katrina. The Hurricane Katrina Community Advisory Group is designed to do just that. (Harvard Medical School, 2006, p. 1)

12. Hurricane Katrina Community Advisory Group 12-month follow up: "This survey asks some of the same questions that were asked at the first interview, e.g., about current emotional, physical, psychological health so that we can compare people's ratings now to how they rated these things a year prior" (Harvard Medical School, 2007, p. 1).
13. Deployment Risk and Resilience Inventory (DRRI): this assessment is designed to assess key psychological risk and resilience factors for military personnel and veterans deployed to war zones or other hazardous environments (King et al., 2006; Vogt et al., 2008).
14. Posttraumatic Stress Checklist (PCL): the PCL is a self-report measure of 17 items of the DSM-IV symptoms of PTSD. The screener has three functions:
    a. Screening individuals for PTSD
    b. Diagnosing PTSD
    c. Monitoring symptoms changes for during and after treatment (Bliese et al., 2008; Wilkins et al., 2011).
15. Life Events Questionnaire (LEC): "The LEC is "a measure of exposure to potentially traumatic events, was developed at the National Center for Posttraumatic Stress Disorder (PTSD) concurrently with the Clinician

Administered PTSD Scale (CAPS) to facilitate the diagnosis of PTSD" (Brugha & Cragg, 1990; Gray et al., 2004, p. 330).

16. 2008 Department of Defense Survey of Health-Related Behaviors among Active-Duty Military Personnel. The study has three broad aims for active-duty personnel:
    a. Continue to assess the nature, extent, and consequences of substance and abuse.
    b. Examine stress, mental health, and deployment issues and challenges of active-duty personnel; and
    c. Assess progress (Department of Defense, 2009).
17. National Comorbidity Survey Replication (NCS-R): the National Comorbidity Survey Replication is a new nationally representative survey of the prevalence and correlates of mental disorders in the U.S. (Hudson et al., 2007; Kessler & Berglund et al., 2004; Kessler & Merikangas, 2004).
18. Land Combat Study (LCS): this study was intended to gather data to measure aggregated and specific combat exposures and the associations among factors such as combat exposure and PTSD, Depression, and Substance Abuse (Hoge & Castro et al., 2004).
19. Mental Health Advisory Team IV (MHAT VI) Operations Enduring Freedom 07-09. The purpose of the team has three components:
    a. Assess behavioral health in land combat forces by surveying servicemembers in Army and Marine maneuver units,
    b. Examine the delivery of behavioral healthcare in Operation Enduring

Freedom (OEF), and

c. Provide recommendation for sustainment and improvement to command (Army Medicine, 2007).

20. Dyadic Adjustment Scale (DAS): the dyadic adjustment scale is a measure intended to see an individual's perception of his or her relationship with an intimate partner (Spanier, 1976; J. Walker et al., 1992).

21. Family History Screen:

    a. The Family History Screen (FHS) collects information on 15 psychiatric disorders and suicidal behavior in informants and their first-degree relatives. Since each question is posed only once about all family members as a group, the administrative time is 5 to 20 minutes, depending on family size and illness. (Weissman et al., 2000, p. 675)

22. Structured Clinical Interview for DSM-IV-TR Axis II Personality Disorders. This instrument is designed to be administered by a clinician or trained mental health professional for the purpose of making a diagnosis (Germans et al., 2010; Spitzer & Williams et al., 1992).

(see Appendix B for the All Army Study (AAS) Questionnaire)

New Soldier Study (NSS) Data

The second assessment has a distinct purpose: data were "drawn from new soldiers who have just entered the Army. The data contain information on soldier health, personal characteristics, and prior experiences" (Ursano et al., 2014, p. 5). The NSS are baseline data for assessing men and women who choose to enter the military as they begin their Army careers.

> To capture this information, soldiers were asked, in their first hours of initial entry training, to consider volunteering for Army STARRS. Data collection took place at three training installations and began in February 2011. By the time the data collection phase ended in November 2012, more than 55,000 soldiers had volunteered for the study. (National Institute of Mental Health, 2021, p. 1)

The NSS is a standard survey that was developed or adapted from several sources by the STARRS study. The following is a list and description of the sources used for the NSS:

1. United States Army Recruiting Command (USAREC) Survey of New Army Recruits 2006. According to Yeung and Gifford (2011), the survey seeks to determine enlistment decisions. The study aims to determine what recruits are most interested in, such as military lifestyle, seeking opinions and details on job functions, duty stations, and benefits.
2. UPPS Impulsive Behavior Scale. UPPS was originally created by Whiteside and Lynam (2001) to create consensus on impulsivity traits using existing impulsivity measures. The following is a list of the traits found in the scales:
    a. Negative Urgency: tendency to act rashly under extreme negative emotions.
    b. Lack of Premeditation: tendency to act without thinking.
    c. Lack of Perseverance: inability to remain focused on a task.
    d. Sensation Seeking: tendency to seek out novel and thrilling activities (Magid & Colder, 2007).
3. Goldberg 100 Unipolar Markers. This is an assessment of personality structures

also known as The Big Five: surgency (or extraversion), agreeableness, conscientiousness (or dependability), emotional stability, and culture (Goldberg, 1990, 1992; Mlačić & Goldberg, 2007).

4. Marlowe-Crowne Social Desirability Scale. This scale measures social desirability bias, which is considered one of the most common biases affecting survey research (Crowne & Marlow, 1960; Katkin, 1964; Loo & Thorpe, 2000).
5. Widiger Five Factor Model Rating Form is a Likert self-report survey measuring between 1–5 for 30 personality traits (Min et al., 2021; Mullins-Sweatt et al., 2006).
6. Scale for Traits that Increase Risk for Bipolar II Disorder. This scale is based on genetic research on neuropsychiatric syndromes. Progress in research lead to the concept of *cognitive test specification*, which developed cognitive ontologies at the Consortium of Neuropsychiatric Phenomics (Acerated & Gillberg, 1990; Bilder, Sabb, & Cannon et al., 2009; Bilder, Sabb, & Parker et al., 2009).
7. Life Orientation Test (LOT) was developed to assess individual differences in generalized optimism versus pessimism (Scheier et al., 1994).
8. Guilt Inventory. The Guilt Inventory contains subscales measuring trait guilt, state guilt, and moral standards (Dorahy & Shemaker, 1997; W. Jones & Kugler, 1993; W. Jones et al., 2000; Kugler & W. Jones, 1992).
9. Acquired Capability for Suicide Scale. This is a self-report instrument to assess fearlessness to death and perceived tolerance to physical pain (Bender et al., 2011; Joiner et al., 2009; Ribeiro et al., 2014; Van Orden et al., 2008).

10. Chapman Scales. The Chapman Scales are a series of four domains to assess psychotic symptoms:
    a. Physical
    b. Physical Anhedonia
    c. Perceptual Aberration
    d. Magical Ideation (Chapman et al., 1976)
11. Profile of Mood States (POMS). POMS is a widespread instrument to measure mood. It is mainly used in clinical psychology, psychotherapy, medicine, and sports science (Pollock et al., 1979).
12. Positive Affect and Negative Affect Scale (PANAS). This assessment is widely used to assess Positive Affect (PA) and Negative Affect (NA). It is widely used to measure mood and emotion (Heubeck & Wilkinson, 2019; Watson et al., 1988).
13. Karolinska Sleepiness Scale (KSS). This assessment is to evaluate subjective sleepiness (Akerstedt & Gillberg, 1990; Gillberg et al., 1994).

The following is a list of assessments that have been previously described in the All Army Study that are also used in the New Soldier Study:

1. Patient Health Questionnaire (PHQ): *see AAS for description.*
2. Brief Insomnia Questionnaire (BIQ): *see AAS for description.*
3. World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) also known as The World Health Organization World Mental Health Composite International Diagnostic Interview (WHO WMH-CIDI): *see ASS for description.*
4. Graded Chronic Pain Scale*: see AAS for description.*

5. Adult ADHD Self Report Scale (ASRS)*: see AAS for description.*
6. Composite International Diagnostic Interview Screening Scale (CIDI-SC): *see AAS for description.*
7. National Comorbidity Survey Replication (NCS-R)*: see AAS for description.*
8. Deployment Risk and Resilience Inventory (DRRI): *see AAS for description*.
9. Posttraumatic Stress Checklist (PCL)*: see AAS for description.*
10. Joint Mental Health Advisory Team 7 (J-MHAT 7) Operation Enduring Freedom 2010 Afghanistan*: see AAS for description.*
11. Life Events Questionnaire (LEC)*: see AAS for description.*
12. 2008 Department of Defense Survey of Health-Related Behaviors among Active Duty Military Personnel*: see AAS for description.*
13. Hurricane Katrina Community Advisory Group (Baseline Survey)*: see AAS for description.*
14. Land Combat Study (LCS)*: see AAS for description.*
15. Structured Clinical Interview for DSM-IV-TR Axis II Personality Disorders*: see AAS for description.*

(see Appendix C for the New Soldier Study (NSS) Questionnaire)

Restrictions

The ICPSR (distributor) has restrictions in place for data access and use,

The Army Study to Assess Risk and Resilience in Servicemembers (STARRS) is restricted from general dissemination; a Confidential Data Use Agreement must be established prior to access. Researchers interested in gaining access to the data can submit their applications via ICPSR's online Restricted Contracting System. (ICPSR,

2021, p.1)

The data will be accessed at Antioch University of Santa Barbara on their restricted servers for access use to protect from potential unauthorized access inline with the User Agreement provided by the ICPSR.

Confidentiality

The confidentiality agreement for this study is listed in Appendix D.

Ethical Assurances

In all research studies *nonmaleficence* or "do no harm" becomes a paramount requirement for the Institutional Review Board (IRB). Risk factors associated with PTSD have been widely researched and studied. The All Army Study was commissioned by the U.S. Army to investigate risk and resiliency factors impacting suicide. This study will use the de-identified data, which will be provided by the ICPSR under the User Agreement. The STARRS and the ICPSR have implemented protections to safeguard the identity of participants and data to include:

1. Written consent to participate in original study-STARRS (Kessler & Cole et al., 2013).
2. Detailed review of datasets to assess disclosure, limited assess, training staff to mitigate disclosure (ICPSR, 2021).
3. Removal of direct and indirect identifiers to prevent being able to identify individuals or groups of individuals. Furthermore, the ICPSR may recode those data sets to "reduce disclosure risk" (ICPSR, 2021).
4. As a secondary means to protect the data in *secondary analysis,* the ICPSR

requires investigators/researchers undergo an IRB to further bolster the security and integrity of the of original study and the raw data (ICPRS, 2021).

Analysis: Tools and Statistical Methodology

Under the User Agreement, the data will be accessible in Statistical Package for Social Sciences (SPSS) format. According to Muijs (2012), SPSS is the most widely used statistical software in the social sciences. Through the use of this software a multiple regression analysis (MRA) will be used to determine whether a statistically significant ($p \leq .05$) association exist between the predictor variables (the risk factors) and the outcome (PTSD). The use of a MRA will allow this researcher to look at the strength of the relationship between PTSD and several risk factors previously identified in the literature review while controlling for the effect of each of the other risk factors and control variables (such as demographic variables). Additionally, it would allow determining if the risk factors (predictor variables) have a statistically significant ($p \leq .05$) interaction with each other. In addition, applying MRA to this study will also allow the researcher to look at how risk factors previously highlighted in the literature that impact susceptibility to PTSD after a Potentially Traumatic Event (PTE).

CHAPTER IV: RESULTS

This study examined the relationship between Moral Injury, Education, Gender, Age, Social and Unit Cohesion, and Cumulative Lifetime Stress with PTSD. The results of the data will be presented in two different sections: Descriptive Statistics and Inferential Statistics. The section titled Descriptive Statistics will describe the characteristic of the data set and a summary of the data to include demographic information. The Inferential Statistic section will allow conclusions about the population by examining the sample. Inferential statistics relies on the principles of evidence and utilizes sample statistics as a basis of drawing broader conclusions. Inferential statistics relies largely on the accuracy of the sample data and how it represents the larger population. Additionally, the Inferential Statistics section will allow the hypotheses to be tested and determine the level of confidence or significance in the results. Participants were allowed to skip questions on the survey therefore not all demographic data may be available.

Descriptive Statistics

This study took advantage of utilizing de-identified data from the "All Army Study to Assess Risk and Resilience in Servicemembers (STARRS)." The STARRS research was funded by several government partners: the United States Department of the Army, the United States Department of Health and Human Services, the National Institute of Health, and the National Institute of Mental Health. That study relied on two different questionnaires, the New Soldier Study (NSS) and the All Army Study (AAS). For the purpose of this research the data components of the AAS were used, which assessed soldiers' psychological and physical health, events and encounters during training, combat experiences, and non-combat operations. The AAS data includes data on soldiers' psychological resilience, mental health, and risk for self-harm.

Data

The STARRS data is restricted from general dissemination and required a Confidential Data Use Agreement prior to access of the data. The STARRS study mode of data collection was the computer-assisted self-interview (CASI), paper and pencil interview (PAPI), on-site questionnaire, and web-based survey. The data reported in this section will reflect the data collected by the AAS including demographics, age, gender, education, and combat experiences. The AAS is a cross-sectional probability sample survey of the global active-duty Army population conducted over a roughly two-year period spanning 2011 to early 2013 (Kessler & Hearing et al., 2013). The combined AAS sample was designed so the survey sample would contain sufficient representation of all units from all major Army Commands, and all geographic locations in the Continental United States (CONUS) and Outside the Continental United States (OCONUS) to include Afghanistan and in all stages of deployment cycle. The sample included Active-Duty soldiers and activated National Guard and Reserve members of the United States Army.

Survey Sample Disposition

The AAS was integrated from three distinct data collections: Soldiers in the CONUS, Soldiers OCONUS, and soldiers participating in the AAS in-theater component, interviewed in Kuwait while in transit to and from Afghanistan. Based on the count of *present for duty* for the AAS CONUS and OCONUS sample units, a total of 47,744 were expected to report for the AAS briefing. Based on the total sample who attended the briefing a total of 38,837 consented to complete the survey. Of the 38,837 who consented to the survey, a total of 34,813 completed the survey, of whom only 21,449 consented to have their personal administrative data linked to their de-identified survey responses. Survey collection mode was 44.3% Computer assisted (a total of 9,646) and 55.7% of the data was collected via Paper and Pencil (a total of 11,953), which

together represent the total sum of 21,449 participants. The locations of the consenting soldiers were 7.2% (or 1,539) soldiers OCONUS, 73.5% (or 15,767) of the sample was in CONUS, and the In-Theater percentage was 19.3% (or 4,143), totaling 21,449 of total cases.

Table 1

Demographics of the All Army Study (AAS)

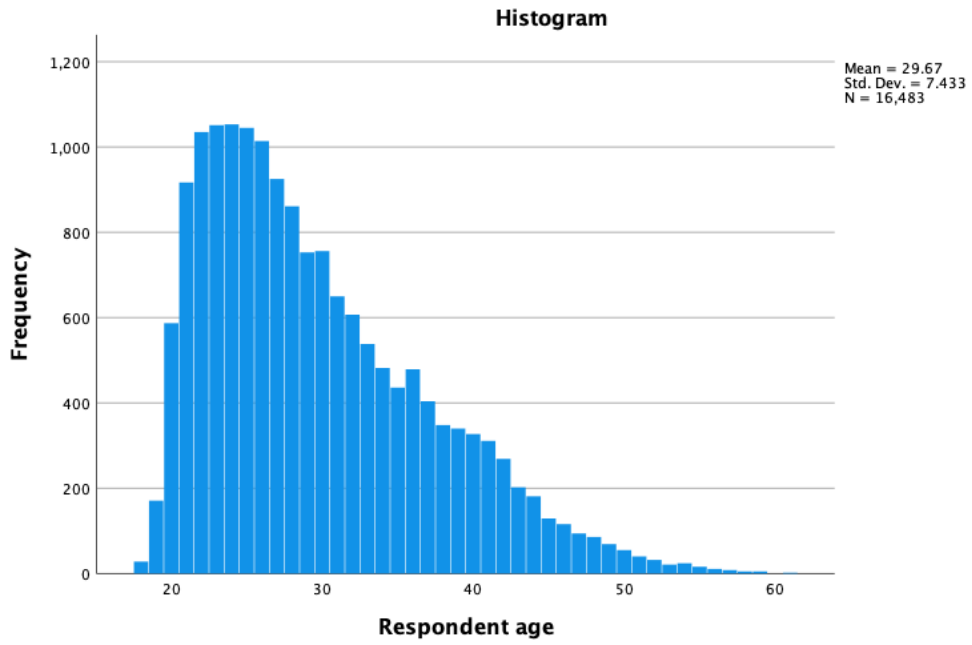
Variable	Frequency	Percentage	Mean	SD
Age (*n* = 21,331 valid cases out of *n* = 21,449)			28.66	7.42
18–30	14,243	66.4%		
31–40	5,235	24.5%		
41–50	1,673	7.8%		
51-61	180	.8%		
**Missing Data*	112	.5%		
Gender (*n* = 21,294 valid cases out of *n* = 21,449)				
Female	2,504	11.7%		
Male	18,790	87.6%		
**Missing Data*	155	.7%		
Nationality and/or Ethnicity (*n* = 21,057 valid cases out of *n* = 21,449)				
American Indian or Alaska Native	613	2.9%		
Asian or Asian American	884	4.1%		
Black or African American	3,568	16.6%		
Native Hawai'ian or other Pacific Islander	288	1.3%		
White or Caucasian	14,909	69.5%		
Race-Other	1,799	8.4%		
Education (*n* = 21,261 valid cases out of *n* = 21,449)				
GED or equivalent	1,315	6.1%		
High school diploma	6,716	31.3%		
Some post high school education	5,904	27.5%		
Post high school technical school certificate or degree	1,336	6.2%		
2-year college associate degree	2,174	10.1%		
4-year college degree (B.A, B.S. or equivalent)	2,766	12.9%		
Graduate or Professional Study	1,050	4.9%		
*Missing Data	188	.9%		

Age

Of the total *n* = 21,449 participants, there were only *n* = 21,331 valid cases with ages ranging between 18 to 61, with an average age of 28.66 and a Mode of 23-years-old.

Figure 1

Age Histogram

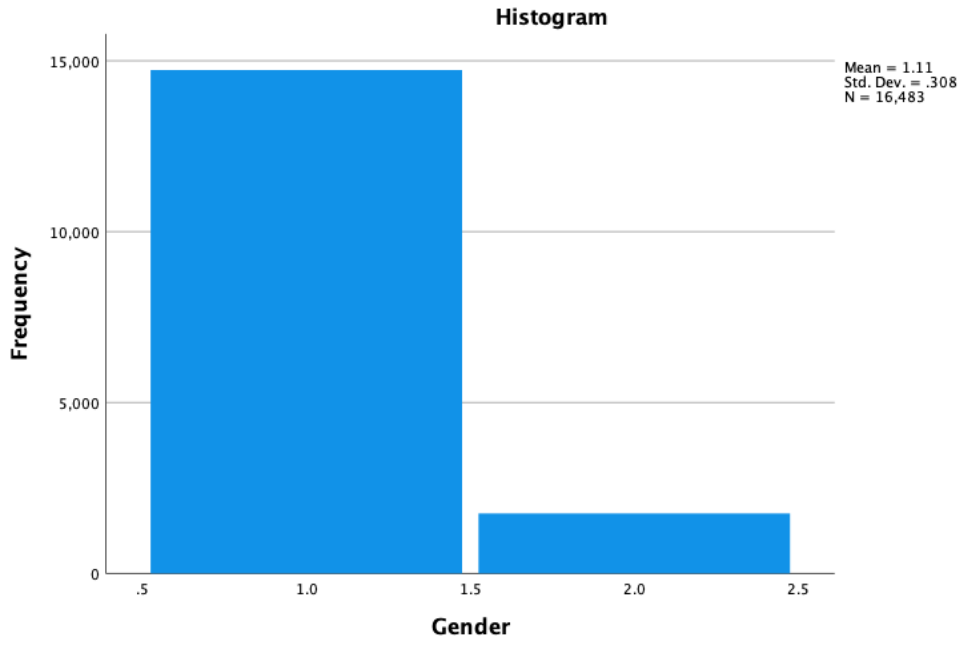


Gender

Of the number sampled (*n* = 21,449), only 21,294 were considered valid. The assessment was binary in nature for Female or Male. The total number of females who self-identified was *n* = 2,504, approximately 11.7% of the valid sample. The male participants totaled *n* = 18,790, approximately 87.6% of the valid sample. The missing data was approximately .7% of 21,449.

Figure 2

Gender Histogram



Nationality and/or Ethnic Background

Participants were asked to select the ethnic background that applied to them and were given five options to choose from: American Indian or Alaska Native, Asian or Asian American, Black or African American, Native Hawai'ian or other Pacific Islander, White or Caucasian, and Other. Of the total 21,449 participants in the AAS, only 21,057 were valid cases. The number of participants who identified as American Indian or Alaska Native was n = 613, representing 2.9% of the total sample. Of the 21,057, only n = 884 identified as Asian or Asian American, representing 4.1% of the total valid sample. The participants who identified as Black or African American was n = 3,568, representing a total of 16.6% of the valid sample. The smallest ethnic sample is Native Hawai'ian or other Pacific Islander at 1.3% of the total sample (n = 288). The

largest ethnic group of the sample is White or Caucasian at 69.5%, or 14,909 of the total sample. Lastly, 8.4% of the sample identified as Other-Race at 1,799 of the total sample.

Particularly interesting of the AAS, they asked participants to identify if they are Spanish/Hispanic/Latino/a/x. Of the total sample n = 21,449 only 21,062 were considered valid. A total of n = 3,210, or 15.0% of participants, identified as Spanish/Hispanic/Latino/a/x. Additionally, of the n = 3,210, a total of 1,502 identified as "Spanish origin-Mexican," a total of 7.0%. Participants that identified as, "Spanish origin-Puerto Rican" is n = 785, or 3.7% of the valid sample. Furthermore, participants that were asked if their ethnicity is "Spanish origin-Cuban" was n = 94 of the total valid sample n = 21,062, or .4% of the sample. Lastly, participants that identified their ethnicity as "Spanish Origin-Other" is n = 996, or 4.6% of the valid sample. The missing data within the "Spanish origin" section was reported as n = 387 or 1.8% for all sections.

Education

The total valid participants were n = 21,261. Participants that endorsed to have a General Education Development (GED) or equivalent is n = 1,315, or 6.1%. The largest endorsement came from participants who endorsed to only have a "High School Diploma" (n = 6,716, or 31.3%). The second largest sample size was participants who have "Some post high school education, but no degree or certificate" at n = 5,904, or 27.5% of the sample. Participants were also asked to identify if they had a "Post High school Technical School Certificate or Degree" at n = 1,336, or 6.2%. Participants also selected having a "2-year college associate degree" at n = 2,174, or 10.1% of the total sample. Additionally, a total of n = 2,766 also identified having a "4-year college degree" (B.A., B.S., or equivalent), or 12.9% of the total sample. Lastly, a total of n = 1,050 participants endorsed having or participated in "Graduate or Professional Study," or 4.9% of the valid sample. A total of n = 188 or .9% of data was missing from the sample size.

Figure 3

Education Histogram

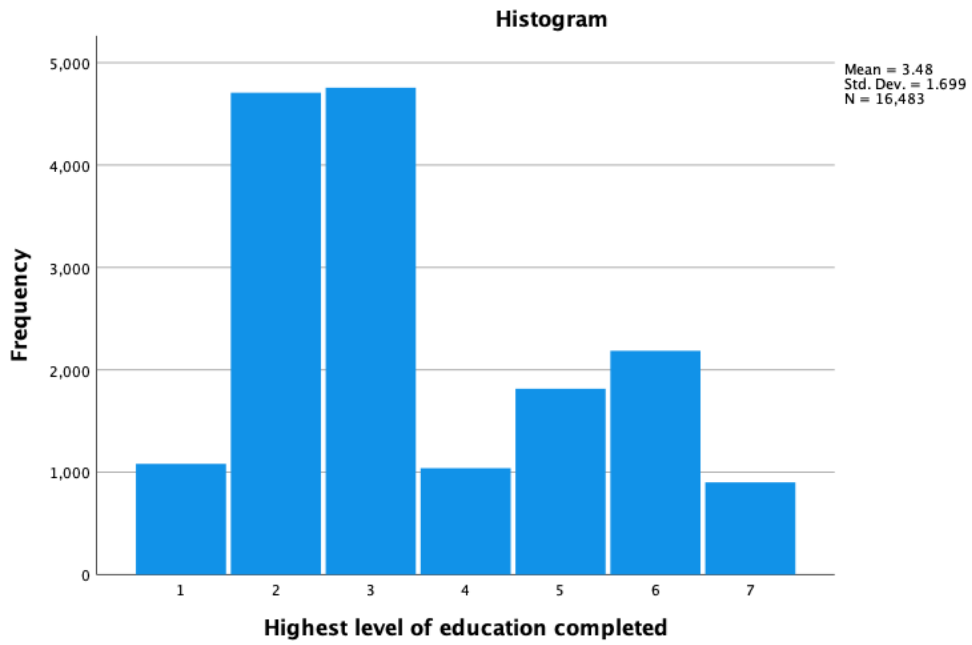


Table 2

Highest Level of Education Completed

Education Level Completed	Frequency	Percentage
1. GED or Equivalent	n: 1,315	6.1%
2. High School Diploma	n: 6,716	31.3%
3. Post High School Education, but no Diploma or Certificate	n: 5,904	27.5%
4. Post High School Technical school with Degree/Diploma	n: 1,336	6.2%
5. 2-year College Degree	n: 2,174	10.1%
6. 4-year College Degree	n: 2,766	12.9%

7. Graduate or Professional Study	n: 188	0.9%

Inferential Statistics

With inferential statistics, this research will attempt to reach conclusions that extend past the immediate data alone. Inferential statistics will be used to assess relationship between variables and draw conclusions within the greater population. Figures and tables are included for reference to the results as needed.

Research Questions

1. Are servicemembers who endorse Moral Injury more likely to endorse symptoms associated with PTSD?
2. Is a servicemember's education attainment a risk factor for endorsing symptoms associated with PTSD?
3. Is a servicemember's gender a risk factor for endorsing symptoms associated with PTSD?
4. Is the age of a servicemember a risk factor for endorsing symptoms associated with PTSD?
5. Is Social & Unit Cohesion a risk factor for endorsing symptoms associated with PTSD?
6. Is cumulative lifetime stress in servicemembers associated with endorsing symptoms associated with PTSD?

Research Hypothesis

1. Are servicemembers who endorse a Moral Injury more likely to endorse symptoms associated with PTSD?

a. It is hypothesized that servicemembers who endorse a Moral Injury are significantly more likely to endorse symptoms associated with PTSD.

2. Is a servicemembers education a risk factor for endorsing symptoms associated with PTSD?

    a. It is hypothesized that if a servicemember has a lower education attainment, he or she is more likely to endorse symptoms associated with PTSD.

    b. It is hypothesized that if a service member endorses high educational attainment, they are less likely to endorse symptoms of PTSD.

3. Is a servicemember's gender a risk factor for endorsing symptoms associated with PTSD?

    a. It is hypothesized that if a servicemember is female she is more likely to endorse symptoms associated with PTSD.

4. Is a servicemember's age a risk factor for endorsing symptoms associated with PTSD?

    a. It is hypothesized that the younger servicemembers are more likely to report symptoms associated with PTSD.

5. Is a lack of Social/Family and Unit Support a risk factor for endorsing symptoms associated with PTSD?

    a. It is hypothesized that not having Social and Unity Cohesion is a risk factor for endorsing symptoms associated with PTSD.

6. Is Cumulative Lifetime stress a risk factor for endorsing symptoms associated with PTSD?

a. It is hypothesized that endorsing Cumulative Lifetime stress is a risk factor for endorsing symptoms associated with PTSD.

Variables

Dependent Variable: Post-Traumatic Stress Disorder

A total of 16 variables were selected from the AAS to target symptoms associated with PTSD. Next, a factor scaled analysis was completed to create a factor scale score for each participant which represents their PTSD, which could then be utilized as the outcome variable for the regression model. The sixteen different variables that were included in the factor analysis of PTSD symptomatology included the following:

1. How often in the past 30 days did you have each of the following problems? Irritability. Likert scale: 1) all or almost all the time, 2) most of the time, 3) some of the time, 4) a little of the time, 5) none of the time.
2. How often in the past 30 days did you have each of the following problems? Sleep problems (getting to sleep, staying asleep, waking too early, sleeping too much). Likert scale: 1) all or almost all the time, 2) most of the time, 3) some of the time, 4) a little of the time, 5) none of the time.
3. How often in the past 30 days did you have each of the following health problems? Feeling restless, tense, wound up, or on edge. Likert scale: 1) all or almost all the time, 2) most of the time, 3) some of the time, 4) a little of the time, 5) none of the time.
4. After an extremely stressful experience, did you ever in your life have reactions like frequent upsetting memories or dreams, feeling jumpy, being emotionally distant or depressed, and trouble sleeping or concentrating for one month or

longer? About how old were you the very first time this happened? Likert scale ranging from 1–5.

5. After an extremely stressful experience, did you ever in your life have reactions like frequent upsetting memories or dreams, feeling jumpy, being emotionally distant or depressed, and trouble sleeping or concentrating for one month or longer? About how many years in your life did you have this problem at least some of the time? Likert scale ranging from 1–5.
6. The next questions are about feelings of irritability and anger. How often in the past 30 days did you feel irritated, annoyed, or grouchy? Likert scale: 1) all or almost all the time, 2) most of the time, 3) some of the time, 4) a little of the time, 5) none of the time.
7. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You had repeated, disturbing memories, thoughts, or images of a stressful experience. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
8. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You avoided thinking about or talking about a stressful experience or avoided having feelings about it. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.

9. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You avoided activities or situations because they reminded you of a stressful experience. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
10. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You had physical reactions (like heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
11. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You had difficulty concentrating. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
12. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? Your disturbing memories or thoughts about a stressful experience interfered with the

quality of your life. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.

13. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You felt jumpy or were easily startled. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
14. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? The reactions in this list interfered with your work or personal life. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
15. Highly stressful experiences like the ones you reported in questions P1 and P2 can cause a number of reactions. How often did you have each of the following reactions to any of your highly stressful experiences in the past 30 days? You experienced serious psychological distress because of the reactions in this list. Likert scale: 1) Once a week or less, 2) 2–3 times a week, 3) 4–5 times a week, 4) 6 or more times a week, 5) Never.
16. After an extremely stressful experience, did you ever in your life have reactions like frequent upsetting memories or dreams, feeling jumpy, being emotionally distant or depressed, and trouble sleeping or concentrating for one month or longer? Answer: 1) yes, 2) no.

Table 3

Correlation Matrix PTSD Scaled Factor (SF) Score

Correlation Matrix

		Past 30 day reaction-experience serious psychological distress	Past 30 days health problems-irritability	Past 30 days health problems-sleep problems	Past 30 days health problems-feeling restless/tense/wound-up/on edge	Age first emotional problems-PTSD	Ever emotional problems/2 weeks or longer-PTSD	Years emotional problems-PTSD	Past 30 days-feel irritated/annoyed/grouchy	Past 30 day reaction-repeated, disturbing memories/thoughts/images	Past 30 day reaction-avoided thinking/talking about stressful experience	Past 30 day reaction-avoided activities/situation reminded you of your stressful experiences	Past 30 day reaction-physical reaction when reminded of stressful experience	Past 30 day reaction-had difficulty concentrating	Past 30 day reaction-thoughts/memories interfered with quality of life	Past 30 day reaction-felt jumpy/easily startled	Past 30 day reaction-reactions made it difficult to do work/get along w/people
Correlation	Past 30 day reaction-experience serious psychological distress	1.000	.229	.206	.255	.006	.	-.042	.239	.329	.352	.447	.424	.380	.580	.326	.615
	Past 30 days health problems-irritability	.229	1.000	.481	.587	.024	.	-.060	.637	.154	.137	.180	.214	.168	.213	.164	.220
	Past 30 days health problems-sleep problems	.206	.481	1.000	.496	.040	.	-.045	.361	.142	.133	.176	.212	.174	.190	.165	.193
	Past 30 days health problems-feeling restless/tense/wound-up/on edge	.255	.587	.496	1.000	.033	.	-.039	.493	.174	.155	.216	.255	.201	.249	.200	.244
	Age first emotional problems-PTSD	.006	.024	.040	.033	1.000	.	.352	.000	.061	.008	.012	.042	.002	.022	.064	.024
	Ever emotional problems/2 weeks or longer-PTSD	.	.	.	.	.	1.000	.	.	.	.	.	.	.	.	.	.
	Years emotional problems-PTSD	-.042	-.060	-.045	-.039	.352	.	1.000	-.059	-.022	-.035	-.047	-.026	-.025	-.036	-.012	-.051
	Past 30 days-feel irritated/annoyed/grouchy	.239	.637	.361	.493	.000	.	-.059	1.000	.161	.163	.210	.211	.174	.232	.166	.259
	Past 30 day reaction-repeated, disturbing memories/thoughts/images	.329	.154	.142	.174	.061	.	-.022	.161	1.000	.505	.421	.484	.419	.441	.430	.350
	Past 30 day reaction-avoided thinking/talking about stressful experience	.352	.137	.133	.155	.008	.	-.035	.163	.505	1.000	.496	.432	.403	.425	.383	.368
	Past 30 day reaction-avoided activities/situation reminded you of your stressful experiences	.447	.180	.176	.216	.012	.	-.047	.210	.421	.496	1.000	.442	.388	.520	.348	.467
	Past 30 day reaction-physical reaction when reminded of stressful experience	.424	.214	.212	.255	.042	.	-.026	.211	.484	.432	.442	1.000	.400	.438	.431	.417
	Past 30 day reaction-had difficulty concentrating	.380	.168	.174	.201	.002	.	-.025	.174	.419	.403	.388	.400	1.000	.453	.441	.420
	Past 30 day reaction-thoughts/memories interfered with quality of life	.580	.213	.190	.249	.022	.	-.036	.232	.441	.425	.520	.438	.453	1.000	.379	.614
	Past 30 day reaction-felt jumpy/easily startled	.326	.164	.165	.200	.064	.	-.012	.166	.430	.383	.348	.431	.441	.379	1.000	.341
	Past 30 day reaction-reactions made it difficult to do work/get along w/people	.615	.220	.193	.244	.024	.	-.051	.259	.350	.368	.467	.417	.420	.614	.341	1.000

Table 4

PTSD SF KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.916
Bartlett's Test of Sphericity	Approx. Chi-Square	30761.494
	Df	120
	Sig.	< .001

Note: KMO sample being ≤ .5 is considered significant. The KMO measure of .916 in the PTSD sampling variables is considered adequate. A KMO test is a statistical measure to determine how suited the data is for factor analysis.

Bartlett's Test Below .05 is suggest a substantial correlation. The Bartlett's Test of Sphericity of < .001 suggest the factor analysis to be acceptable. The Bartlett test statistic is designed to test for equality of variances across groups against the alternative that variances are unequal for at least two groups.

Moral Injury

In order to assess participants' level of moral injury, a factor analysis was conducted on seven variables selected from the AAS to target symptoms associated with moral injury. The factor analysis produced a singular factor scale score that represents a participant's Moral Injury. The variables used for the Moral Injury factor analysis include the following:

1. How many times did you ever have each of these experiences during that deployment? Get exposed to the sights, sounds, or smells of severely wounded or dying people or see dead bodies. Likert scale: 0) 0, 1) 1, 2) 2–4, 3) 5–9, 4) 10 or more.

2. How many total months over your entire Army career have you...received combat zone tax exclusion? Likert scale: 0) 0, 1) 1–3, 2) 2–4, 3) 7–12, 4) 13–18, 5) 19–24, 6) 25–36, 7) 37–48, 8) 49–60, 9) 61 or more.
3. How many times did you ever have each of these experiences during any previous deployment (that is, before your most recent deployment)? Fire rounds at the enemy or take enemy fire (either direct or indirect fire) Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
4. How many times did you ever have each of these experiences during any previous deployment (that is, before your most recent deployment)? Have member(s) of your unit who were seriously wounded or killed. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
5. How many times did you ever have each of these experiences during any previous deployment (that is, before your most recent deployment)? Have direct responsibility for the death of an enemy combatant. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
6. How many times did you ever have each of these experiences during any previous deployment (that is, before your most recent deployment)? Have direct responsibility for the death of a non-combatant. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
7. How many times did you ever have each of these experiences during any previous deployment (that is, before your most recent deployment)? Have direct responsibility for the death of U.S. or ally personnel. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.

Table 5

Moral Injury Correlation Matrix Scaled SF

Correlation Matrix[a]

		Recent deploy stress–exposed to severely wound/dying people/dead bodies	Total months deployed–combat zone tax exclusion	Any deploy stress–fire rounds at enemy or take enemy fire	Recent deploy stress–unit member seriously wounded/killed	Recent deploy stress–responsible for enemy combatant death	Recent deploy stress–responsible for non–combatant death	Recent deploy stress–responsible for ally death
Correlation	Recent deploy stress–exposed to severely wound/dying people/dead bodies	1.000	.029	.247	.500	.435	.232	.109
	Total months deployed–combat zone tax exclusion	.029	1.000	.163	.037	.019	.003	-.011
	Any deploy stress–fire rounds at enemy or take enemy fire	.247	.163	1.000	.241	.233	.072	.033
	Recent deploy stress–unit member seriously wounded/killed	.500	.037	.241	1.000	.372	.235	.131
	Recent deploy stress–responsible for enemy combatant death	.435	.019	.233	.372	1.000	.409	.211
	Recent deploy stress–responsible for non–combatant death	.232	.003	.072	.235	.409	1.000	.513
	Recent deploy stress–responsible for ally death	.109	-.011	.033	.131	.211	.513	1.000
Sig. (1–tailed)	Recent deploy stress–exposed to severely wound/dying people/dead bodies		.060	<.001	<.001	<.001	<.001	<.001
	Total months deployed–combat zone tax exclusion	.060		.000	.000	.006	.332	.080
	Any deploy stress–fire rounds at enemy or take enemy fire	.000	.000		.000	.000	.000	.039
	Recent deploy stress–unit member seriously wounded/killed	.000	.000	.000		.000	.000	.000
	Recent deploy stress–responsible for enemy combatant death	.000	.006	.000	.000		.000	.000
	Recent deploy stress–responsible for non–combatant death	.000	.332	.000	.000	.000		.000
	Recent deploy stress–responsible for ally death	.000	.080	.039	.000	.000	.000	

a. Determinant = .312

Table 6

Moral Injury SF KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.691
Bartlett's Test of Sphericity	Approx. Chi-Square	3195.722
	Df	21
	Sig.	< .001

Note: KMO sample being ≤ .5 is considered significant. The KMO measure of .691 in the Moral Injury sampling variables is considered adequate.

Bartlett's Test Below .05 suggests a substantial correlation. The p-value of Bartlett's Test of Sphericity of < .001 suggest the factor analysis to be acceptable. The Bartlett test statistic is

designed to test for equality of variances across groups against the alternative that variances are unequal for at least two groups.

Education

Education was used as a control variable in the AAS questioner to ensure that the observed results were not caused by a participant's education. The participants' level of education was captured with the following question: What is the highest level of education you completed? Likert scale: 1) GED or equivalent, 2) high school diploma, 3) some post high school education, but no certificate or degree, 4) post high school technical school certificate or degree, 5) 2-year college Associate Degree, 6) 4-year college degree (BA, BS, or equivalent), 7) Graduate or professional study.

Gender

Gender was used as a control variable in the AAS questionnaire to ensure that the observed results were not because of a participant's gender. The regression models will account for both male and female respondents using the following variable: are you male or female? Answer: 1) Male, 2) Female.

Respondent Age

Age was also used as a control variable in the analysis to ensure that the observed results in the analysis were not due to the age of the participant. This was assessed with the following question: How old are you? The answer was a numerical value ranging between 18 and 61-years-old.

Social Support & Unit Cohesion

A factor analysis was conducted on five variables selected from the AAS that are associated with Social Support and Unit Cohesion. The variables that were selected to represent Social Support and Unit Cohesion include the following:

1. Think of all your deployments in answering the questions. How many times did you ever have each of these experiences during any of your deployments? You were hazed or bullied by one or more members of your unit. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
2. What is your marital status? Likert scale: 1) Married, 2) Never Married, 3) Divorced, 4) Separated, 5) Widowed.
3. Which of these responses best describes how happy you are, all things considered, in your relationship? The average response "happy" is the score of most couples. Likert scale: 1) Perfect, 2) Extremely happy, 3) Very happy, 4) Happy, 5) A little unhappy, 6) Fairly happy, 7) Extremely unhappy.
4. The next questions are about your relationship with this person. How often do you discuss or have you considered divorce, separation, or terminating your relationship? Likert scale: 1) All the time, 2) Most of the time, 3) More often than not, 4) Occasionally, 5) Rarely, 6) Never.
5. How often do you confide in your partner? Likert scale: 1) All the time, 2) Most of the time, 3) More often than not, 4) Occasionally, 5) Rarely, 6) Never.

Table 7

Social Support Correlation Matrix Scaled Factor Score

		Deploy stress-bullied by members of unit	Ending relationship discussions	Confide in partner
Correlation	Deploy stress-bullied by members of unit	1.000	-.030	.011
	Ending relationship discussions	-.030	1.000	-.451
	Confide in partner	.011	-.451	1.000
Sig. (1-tailed)	Deploy stress-bullied by members of unit		<.001	.118
	Ending relationship discussions	.001		.000
	Confide in partner	.118	.000	

[a.] Determinant = .796

Table 8

Social Support and Unit Cohesion KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	1708.796
	Df	3
	Sig.	< .001

Note: KMO sample being ≤ .5 is considered significant. The KMO measure of .500 in the Social Support and Unit Cohesion sampling variables is considered adequate. A KMO test is a statistical measure to determine how suited the data is for factor analysis. Bartlett's Test Below > .05 is suggest a substantial correlation. The Bartlett's Test of Sphericity of < .001 suggest the factor analysis to be acceptable. The Bartlett test statistic is designed to test for equality of variances across groups against the alternative that variances are unequal for at least two groups.

Table 9

Social Support Correlation Matrix Scaled Factor Score

		Ending relationship discussions	Confide in partner	Marital status	Relationship happiness
Correlation	Ending relationship discussions	1.000	-.451	-.032	-.592
	Confide in partner	-.451	1.000	.028	.525
	Marital status	-.032	.028	1.000	.013
	Relationship happiness	-.592	.525	.013	1.000
Sig. (1-tailed)	Ending relationship discussions		<.001	<.001	<.001
	Confide in partner	.000		.001	.000
	Marital status	.000	.001		.042
	Relationship happiness	.000	.000	.042	

[a.] Determinant = .450

Table 10

Social Support Unit Cohesion SF KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.680
Bartlett's Test of Sphericity	Approx. Chi-Square	9384.084
	Df	6
	Sig.	<.001

Note: KMO sample being < .5 is considered significant. The KMO measure of .680 in the Social Support and Unit Cohesion sampling variables is considered adequate. A KMO test is a statistical measure to determine how suited the data is for factor analysis.

Having the p-value of the Bartlett's Test below .05 ($p < .05$) suggests a substantial correlation. The p-value for the Bartlett's Test of Sphericity of < .001 suggest the factor analysis to be acceptable. The Bartlett test statistic is designed to test for equality of variances across groups against the alternative that variances are unequal for at least two groups.

Cumulative Lifetime Stress

Lastly, in order to capture the Cumulative Lifetime Stress of participants, a factor analysis was conducted on three variables selected from the AAS to target symptoms associated with Cumulative Lifetime Stress. These variables included the following:

1. The next questions are about highly stressful experiences that might have happened to you at any time in your life. Do not count experiences that you already reported in P1. How many times did you experience each of the following? Serious physical assault (e.g., mugging) Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
2. The next questions are about highly stressful experiences that might have happened to you at any time in your life. Do not count experiences that you already reported in P1. How many times did you experience each of the following? Sexual assault or rape. Likert scale 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.
3. How many times did you experience each of the following? Serious assault happened to a close friend or relative. Likert scale: 0) 0, 1) 1 time, 2) 2–4 times, 3) 5–9 times, 4) 10 or more times.

Table 11

Cumulative Lifetime Stress Scaled Factor Score

Correlation Matrix[a]

		Lifetime stressful experiences–number times–serious physical assault	Lifetime stressful experiences–number times–serious sexual assault/rape	Lifetime stressful experiences–number times–serious assault of friend/relative
Correlation	Lifetime stressful experiences–number times–serious physical assault	1.000	.200	.446
	Lifetime stressful experiences–number times–serious sexual assault/rape	.200	1.000	.183
	Lifetime stressful experiences–number times–serious assault of friend/relative	.446	.183	1.000
Sig. (1–tailed)	Lifetime stressful experiences–number times–serious physical assault		<.001	<.001
	Lifetime stressful experiences–number times–serious sexual assault/rape	.000		.000
	Lifetime stressful experiences–number times–serious assault of friend/relative	.000	.000	

a. Determinant = .760

Table 12

Cumulative Lifetime Stress SF KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.565
Bartlett's Test of Sphericity	Approx. Chi-Square	4794.098
	Df	3
	Sig.	< .001

Note: KMO sample being < .5 is considered significant. The KMO measure of .565 in the Social Support and Unit Cohesion sampling variables is considered adequate. A KMO test is a statistical measure to determine how suited the data is for factor analysis.

Having the p-value of the Bartlett's Test Below .05 ($p < .05$) suggests a substantial correlation. The Bartlett's Test of Sphericity of < .001 suggest the factor analysis to be acceptable. The Bartlett test statistic is designed to test for equality of variances across groups against the alternative that variances are unequal for at least two groups.

Model Building Process

The goal of the study was to examine the relationship between predictor variables, control variables, and the outcome variable of PTSD. This was accomplished through a series of correlations and linear regression analyses using various combinations of variables. The significant findings are represented in Table 13.

Table 13

Correlation Analysis

Correlations

		PTSD FS	Total months deployed–combat zone tax exclusion	Highest level of education completed	Gender	Respondent age	Social Support SF	Lifetime Stress SF	Moral Injury SF
PTSD FS	Pearson Correlation	1	-.047**	.026**	-.037**	-.011	-.064**	-.126**	-.060**
	Sig. (2-tailed)		<.001	<.001	<.001	.109	<.001	<.001	<.001
	N	21449	16777	21259	21292	21329	21449	21449	21449
Total months deployed–combat zone tax exclusion	Pearson Correlation	-.047**	1	.097**	-.111**	.357**	.013	.021**	.092**
	Sig. (2-tailed)	<.001		<.001	<.001	<.001	.082	.008	<.001
	N	16777	16777	16640	16666	16689	16777	16777	16777
Highest level of education completed	Pearson Correlation	.026**	.097**	1	.091**	.432**	-.046**	-.020**	.002
	Sig. (2-tailed)	<.001	<.001		<.001	<.001	<.001	.004	.735
	N	21259	16640	21259	21142	21155	21259	21259	21259
Gender	Pearson Correlation	-.037**	-.111**	.091**	1	-.020**	.036**	.101**	-.047**
	Sig. (2-tailed)	<.001	<.001	<.001		.004	<.001	<.001	<.001
	N	21292	16666	21142	21292	21198	21292	21292	21292
Respondent age	Pearson Correlation	-.011	.357**	.432**	-.020**	1	.002	.002	.003
	Sig. (2-tailed)	.109	<.001	<.001	.004		.749	.813	.646
	N	21329	16689	21155	21198	21329	21329	21329	21329
Social Support SF	Pearson Correlation	-.064**	.013	-.046**	.036**	.002	1	.074**	-.004
	Sig. (2-tailed)	<.001	.082	<.001	<.001	.749		<.001	.592
	N	21449	16777	21259	21292	21329	21449	21449	21449
Lifetime Stress SF	Pearson Correlation	-.126**	.021**	-.020**	.101**	.002	.074**	1	.033**
	Sig. (2-tailed)	<.001	.008	.004	<.001	.813	<.001		<.001
	N	21449	16777	21259	21292	21329	21449	21449	21449
Moral Injury SF	Pearson Correlation	-.060**	.092**	.002	-.047**	.003	-.004	.033**	1
	Sig. (2-tailed)	<.001	<.001	.735	<.001	.646	.592	<.001	
	N	21449	16777	21259	21292	21329	21449	21449	21449

**. Correlation is significant at the 0.01 level (2-tailed).

Model 1

The first model predicted PTSD with the Total Months Deployed to a Combat Zone with Tax Exclusion. The results $r = .047$ indicate a *small positive association* with Total Months Deployed to a Combat Zone with a Tax Exclusion and PTSD. Results: $R^2 = .002$, $F(1, 16775) = 36.440$, $p < .001$. The more months a soldier reported to be deployed, the higher the likelihood they would endorse symptoms associated with PTSD.

Model 2

The second model predicted PTSD with the Highest Level of Education Completed. The results indicate $r = .026$ a *small association* with reported education level and PTSD. Results: $R^2 = .001$, $F(1, 21257) = 13.875$, $p < .001$.

Model 3

The third model predicted that Gender would have an impact on PTSD reported symptoms. The results indicate r=.037 a *small positive association* with reported gender and PTSD. Results: $R^2 = .001$, $F(1, 21290) = 28.898$, $p < .001$.

Model 4

The fourth model predicted the relationship between Social Support and Unit Cohesion SF and PTSD reported symptoms. The results indicate $r = .064$ a *moderate positive association* between Social Support and Unit Cohesion SF and PTSD reported symptoms. Results: $R^2 = .004$, $F(1, 21447) = 87.238$, $p < .001$.

Model 5

The fifth model predicted the relationship with Cumulative Lifetime Stress SF and PTSD reported symptoms. The results indicate $r = .126$ a *moderate positive association* with Cumulative Lifetime Stress and reported PTSD symptoms. Results: $R^2 = .016$, $F(1, 21447) = 348.344$, $p < .001$.

Model 6

The sixth model predicted the relationship with Moral Injury SF and PTSD reported symptoms. The results indicate $r = .06$ a *small positive association* with reported PTSD symptoms. Results: $R^2 = .004$ $F(1, 21{,}447) = 78.157$, $p < .001$.

Model 7

The seventh model predicted the compounding effect of two variables. This model predicted PTSD using Gender and Highest Level of Education Completed. The results indicate R = .047 a *small positive association* with reported PTSD symptoms. Results: R^2 = .002, F(2, 21,139) = 22.911, p < .001.

Model 8

The eighth model predicted PTSD using the compounding effect of three variables: Age, Gender, and Highest Level of Education Completed. The results indicate r = .054 a *small positive association* with reported PTSD symptoms. Results: R^2 = .003, F(3, 20,174) = 20.296, p < .001.

Model 9

The ninth model predicted PTSD with the compounding effect of the following three variables Female Respondent (i.e., gender), Age, and Highest Level of Education Completed with PTSD. The results indicate r = .054 a *moderate positive association* with reported PTSD symptoms. Results: R^2 = .003, F(3, 21,048) = 20.296, p < .001.

Model 10

This model predicted PTSD with the compounding effect of the following four variables: Social Support SF, Age, Female Respondent (i.e., gender), and Highest Level of Education Completed. The results indicate R = .083 a *moderate positive association* with reported PTSD symptoms. Results: R^2 = .007, F(4, 21,051) = 36.132, p < .001.

Model 11

The model predicted PTSD with the compounding effect of the following five variables: Cumulative Lifetime Stress SF, Age, Social Support SF, Female Respondent, and Highest Level

of Education Completed. The results indicate $R = .144$ a *moderate positive association* with reported PTSD symptoms. Results: $R^2 = .021$, $F(5, 21{,}046) = 89.683$, $p < .001$.

Model 12

The model predicted PTSD with the compounding effect of the following six variables: Moral Injury SF, Cumulative Lifetime Stress SF, Age, Social Support SF, Female Respondent, and Highest Level of Education Completed. The results indicate $R = .156$ a *moderate positive association* with reported PTSD symptoms. Results: $R^2 = .024$, $F(6, 21{,}045) = 86.980$, $p < .001$.

Model Building Summary

As seen in the models above. The model building process attempted to examine the linear and multiple regression models to predict the outcome variable of reported Posttraumatic Stress Symptoms (see table 13). All models were found to be statistically significant. Model #1 was a control model and found that Total Months Deployed to a Combat Zone with Tax Exclusion could predict a small the outcome of PTSD. Model #2 a secondary control variable Highest Level of Education Completed was a ***small*** predictor of the outcome PTSD. The control variable Model #3 was found to be a *small* predictor to the outcome variable (PTSD). Model #4 demonstrated that the Cumulative Lifetime Stress SF was found to be a *moderate positive* predictor to the outcome variables of PTSD. Model #6 showed the Moral Injury SF was also found to be a *small* predictor to the outcome variable of PTSD.

Model #7 attempted to look at the compounding effect of two variables on the predictability of the outcome variable of PTSD. Model #7 looked at the impact of Gender and Highest Level of Education completed predicted a *small* predictor to PTSD. Model #8 and Model #9 looked at the compounding effect of two control variables (Male/Female and Highest Level of Education Completed) and Age as a predictor to PTSD. Model #8 and Model #9

predictability could scantly predict the outcome variable even when accounting for different gender.

Model #10 examined the compounding effect of four variables (Social Support SF, Age, Female Respondent, and Highest Level of Education Completed) able to predict the outcome variable. Model #11 had a *moderate* predictability to the outcome variable PTSD. Model #11 examined the relationship between PTSD and five variables (Cumulative Lifetime Stress SF, Age, Social Support SF, Female Respondent, Highest Level of Education Completed), finding that they had a *moderate* with the outcome variable of PTSD.

Lastly, Model #12 found that six variables (Moral Injury SF, Cumulative Lifetime Stress SF, Age, Social Support SF, Female Respondent, and Highest Level of Education Completed) had a *moderate positive* to predict the outcome variable of PTSD.

Inferential Statistics Summary

Looking at the results of Model #1 through #12 all models were found to be *statistically highly significant* as $p < 0.001$ (less than one in a thousand chance of being by change). The changes observed in the linear and multiple regression models where in the coefficient of determination, or R^2. The linear regression control models had descriptively lower predictability. The linear regression models of Social Support SF, Cumulative Lifetime Stress SF, and Moral Injury were found to have a moderate positive association as predicted.

The commonality of Model #7 through Model #9 used controlled variables of Age, Highest Level of Education Completed, and both Male and Female Gender variables, and found a consistent smaller predictability of PTSD. Model #10 through Model #12 took advantage of multiple independent variables. The incremental building of independent variables was made to assess the increased predictability to the outcome variable. A lack of Social Support SF,

Cumulative Lifetime Stress SF, and Moral Injury SF were found to have a predictability of moderate.

Result Chapter Summary

This chapter examined the relationship between PTSD and Moral Injury, Education attainment level, Gender, Age, Social and Unit Support, and Cumulative Lifetime Stress. The de-identified data provided by the Army Study to Assess Risk and Resilience (STARRS) provided information on n = 21,449 participants in the All Army Study (AAS) Component. This made it possible to make predictions about risk factors associated with PTSD. The research questions were answered utilizing simple regressions and multiple regression models. Key findings include that Age, Gender, and Education to be a weak to moderate predictor of PTSD. The scale factor scores of Moral Injury, Cumulative Lifetime Stress, and Social Support and Unit Cohesion were found to have good predictability for PTSD.

CHAPTER V: DISCUSSION

Goal of this dissertation is to investigate susceptibility risk factors associated with Post Traumatic Stress. The secondary goal is to increase the efficiency in the clinical interview process during the clinical assessment phase utilizing the Diathesis Stress Model to explain the trajectory of a disorder based on predispositional vulnerability caused by life experiences.

This researched looked at psychological susceptibility as an inherent quality or experience that would make someone more prone to an outcome. Risk, on the other hand, refers to a likelihood or probability of experiencing a negative outcome from a particular event or harm. It involves an assessment of loss, harm, or sustained damage that arises from previous exposure to known hazards or danger. The risk would be quantifiable in nature and would allow for risk management and an assessment of probabilities.

This study took a quantitative approach to investigate the compounding effect of known risk factors for PTSD and participants who endorsed PTSD symptoms. The data showed a small to moderate link between the identified known risk factors and PTSD symptoms. This chapter summarizes the key findings, highlights relevant results, reviews additional questions that need to be answered, future research the role of a vulnerability or likelihood of being affected by a factor or condition.

Hypothesis and Significance

It has been widely accepted that potentially traumatic events could lead to an increased risk of a PTSD diagnosis. Some of these risk factors are very common for military deployments in Iraq and Afghanistan. Some of the servicemembers process what they experience in combat within the context of their lived experience. As a result, early childhood adversity such as child abuse, previous exposure to potentially traumatic events, low education attainment, younger age,

and even military rank have shown to increase PTSD risk (Brewin et al., 2000; Iverson et al., 2008; Riddle et al., 2007). Additionally, decreased family and unit support have been associated with an increased risk for PTSD (Brewin et al., 2000).

The first hypothesis, which looked at the relationship between moral injury and reported PTSD symptoms, indicated a moderate positive association with a $p < .001$. This level of significance supports the notion that the findings are robust and not a product of chance. The second and third hypothesis examined the relationship between both Gender and Highest Level of Education Completed and reported PTSD symptoms. These results also indicated associations, with p-values of < .001, indicating true relationships. Age resulted in a small relationship with PTSD, with a $p < .001$. Having a lack of Family and Social Support was found to be a moderate and positive with a $p < .001$ indicating there is a less than a .01% change the results occurred by change. Lastly, the results related to the sixth hypothesis demonstrated that Cumulative Lifetime Stress had a moderate positive association with PTSD ($p < .001$, which suggests strong evidence for the presence of a relationship).

A more detailed model building examined the compounding effect of multiple variables to look at the relationship with the outcome variable PTSD. Model 11 and 12 indicated a positive probability of the compounding effect of the dependent variables on the outcome variable. This is consistent with the Diathesis Stress Model of the Gene x Environment interplay and Environment x Environment interplay, which proposes the environmental pathogens as a mediator that increases susceptibility.

Implications of Key Findings

As previously reported, the hypothesis in the research found to have statistically significant relationship with the outcome variable. However, the variables such as Gender, Age, and Education were found to have a smaller relationship with the outcome variable. The research on gender is inconclusive and the correlations have a small relationship with PTSD. Consistent with the literature, the findings are scant. The research also noted a role between intelligence/education in regulating the severity of PTSD symptoms expression and treatment outcomes. The data indicated a small relationship between higher education and endorsement of PTSD symptoms.

An examination of Unit Cohesion and Family Support as a risk factor was found to have a moderate positive relationship with servicemembers who have endorsed PTSD symptoms. Having Social Support is a protective factor to help identity soldiers who may or may not be aware of symptoms associated with PTSD to encourage them to seek therapy to address problematic thinking based on their PTE's before they meet criteria for PTSD. The military has recognized post deployment support could increase resiliency in servicemembers by providing emotional sustenance such as making an individual feel proud of their service by awarding military medals/ribbons if earned post deployment and with tangible assistance like resources (e.g., personal aid and attendance, medical care, marital counseling and or psychological services).

Limitations

This study examined the susceptibility risk factors associated with Post Traumatic Stress Disorder (PTSD). The study reviewed several variables known in the literature to be associated with PTSD. This study shows small to moderate connections between the identified variables

and symptoms associated with PTSD reported by servicemembers. One of the limitations in this study is not being able to assess Attribution Style and Child Abuse. The Army Study to Assess Risk and Resilience in Servicemembers (STARRS) is based on two distinctive questionnaires the All Army Study (AAS), and New Soldier Study (NSS). The raw data provided for secondary analysis by the Inter-University Consortium for Political and Social Research (ICPSR) under the Terms of Use Agreement for Investigators provided two distinctive data sets that could not be merged and compared with the outcome variable that was only in the All Army Study (AAS). The data set in the New Soldier Study (NSS) which also included Historical Administrative Data, provided a history of Child Abuse. The STAARS did not assess for Attribution Style and therefore would not have been able to assess against the outcome variable. Participants were also recruited within the military, and the study sample excluded civilians. Future research may want to consider medically discharged servicemembers, retired servicemembers, and servicemembers who were discharged under Other than Honorable Conditions, to assess which variables are associated with a PTSD diagnosis. Despite these limitations, this research method addressed the contributing risk factors to PTSD. Lastly, this research relied on the accuracy of self-report raw data which is susceptible to self-report bias and inaccuracy.

Recommendations

The findings in this dissertation could be used as a conceptual understanding of The Diathesis Stress model to gain further insight regarding the compounding effect of one environmental pathogen on another. Clinicians could generate a hypothesis based on their reported history, unit cohesion, familial support, education, moral injury, gender, and even age. As previously stated, understanding the causative factors of PTSD is essential for clinicians to determine the direction of therapy and to gather insight in the assessment phase of treatment.

Serving the military population demands cultural competence and awareness of the warrior's ethos, "war fighters steeped in the military culture that values toughness, discipline, and willpower" (Lehrner & Yehuda, 2014, p. 6). Clinicians should understand risk factors associated with PTSD in servicemembers and understand that the "gold standard in PTSD assessment" (Department of Veterans Affairs, 2015, p. 1) relies on the accuracy of self-report. Therein lies the difficulty in the assessment process with servicemember whose culture values self-reliance and mental toughness. As such, it is essential for clinicians and military leaders to understand environmental pathogens and historical susceptibility with their servicemembers. Therefore, it is important that military leaders continue to support unit cohesion and family friendly support groups for military spouses to support the servicemember's family system. Supporting the support system ultimately helps the servicemember. Ultimately, it is the moral responsibility of military leaders to find ways to minimize prolonged exposure to PTE and support ways to increase unit cohesion and family support system.

Future Research

One of the limitations of this study is also an opportunity for future research. Childhood Abuse could not be assessed based on the two distinctive questionnaires in the All Army Study and the New Soldier Study, which could not be merged. It is recommended that future research address the compounding impact of child abuse and reported generational child abuse. M. Walker (1999) stated succinctly, "abuse breeds abuse," and children with generational trauma could be more susceptible to maltreatment (Hunter & Kilstrom, 1979; Oliver & Taylor, 1971; Sudia, 1976). Future research would benefit from understanding the role of attribution style on trauma and the mitigating role on environmental pathogens and compounding risk factors.

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APPENDIX A: DIAGNOSTIC CRITERIA: F43.10

Posttraumatic Stress Disorder in Individuals Older Than 6 Years

Note: The following criteria apply to adults, adolescents, and children older than 6 years. For children 6 years and younger, see corresponding criteria below.

A. Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:
    1. Directly experiencing the traumatic event(s).
    2. Witnessing, in person, the event(s) as it occurred to others.
    3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
    4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse).
       Note: Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:
    1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s).
       Note: In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
    2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event(s).
       Note: In children, there may be frightening dreams without recognizable content.
    3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.)
       Note: In children, trauma-specific reenactment may occur in play.
    4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
    5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:
    1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
    1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia and not to other factors such as head injury, alcohol or drugs).
    2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad," "No one can be trusted," "The world is completely dangerous," "My whole nervous system is permanently ruined").
    3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
    4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
    5. Markedly diminished interest or participation in significant activities.
    6. Feelings of detachment or estrangement from others.
    7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).
E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
    1. Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.
    2. Reckless or self-destructive behavior.
    3. Hypervigilance.
    4. Exaggerated startle response.
    5. Problems with concentration.
    6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).
F. Duration of the disturbance (Criteria B, C, D, and E) is more than 1 month.
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

Specify whether:

With dissociative symptoms: The individual's symptoms meet the criteria for posttraumatic stress disorder, and in addition, in response to the stressor, the individual experiences persistent or recurrent symptoms of either of the following:

1. **Depersonalization:** Persistent or recurrent experiences of feeling detached from, and as if one were an outside observer of, one's mental processes or body (e.g., feeling as though one were in a dream; feeling a sense of unreality of self or body or of time moving slowly).
2. **Derealization:** Persistent or recurrent experiences of unreality of surroundings (e.g., the world around the individual is experienced as unreal, dreamlike, distant, or distorted).

Note: To use this subtype, the dissociative symptoms must not be attributable to the physiological effects of a substance (e.g., blackouts, behavior during alcohol intoxication) or another medical condition (e.g., complex partial seizures).

Specify if:

With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (although the onset and expression of some symptoms may be immediate).

APPENDIX B: ALL AMERICAN STUDY (AAS)

Army Study to Assess Risk and Resilience in Servicemembers (STARRS)

All Army Study (AAS) Data Collection Instruments- ICPRSR 35197

Citation Reference:

Ursano, Robert J., Murray B. Stein, Ronald C. Kessler, and Steven G. Heeringa. Army Study to Assess Risk and Resilience in Servicemembers (STARRS). ICPSR35197-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2015-07-01. http://doi.org/10.3886/ICPSR35197.v1

SECTION ORDER:

SECTION A: TELL US ABOUT YOURSELF
SECTION B: YOUR HEALTH
SECTION C: INJURIES
SECTION D: HISTORY OF EMOTIONAL PROBLEMS

SECTION E: TOBACCO, ALCOHOL, AND DRUGS
SECTION F: ATTENTION AND CONCENTRATION
SECTION G: DEPRESSION
SECTION H: HIGH MOOD
SECTION J: ANXIETY

SECTION K: IRRITABILITY AND ANGER
SECTION L: PANIC
SECTION M: ANGER ATTACKS
SECTION N: SELF HARM

SECTION O: DEPLOYMENT EXPERIENCES
SECTION P: STRESSFUL EXPERIENCES
SECTION Q: TREATMENT
SECTION R: UNIT EXPERIENCES

SECTION S: OWNERSHIP OF WEAPONS
SECTION T: SOCIAL NETWORKS
SECTION U: SPIRITUALITY
SECTION V: HOW YOU SEE YOURSELF
SECTION W: YOUR CHILDHOOD

Note: All questions without a footnote were developed or adapted from standard survey questions by the Army STARRS team.

APPENDIX C: NEW SOLDIER STUDY

Army Study to Assess Risk and Resilience in Servicemembers (STARRS)

New Soldier Study (NSS) Data Collection Instruments-

ICPSR 35197

Citation Reference:

Ursano, Robert J., Murray B. Stein, Ronald C. Kessler, and Steven G. Heeringa. Army Study to Assess Risk and Resilience in Servicemembers (STARRS). ICPSR35197-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2018-12-03. http://doi.org/10.3886/ICPSR35197.v2

PART B SECTION ORDER

SECTION A: INJURIES

SECTION B: TOBACCO, ALCOHOL, DRUGS

SECTION C: SELF-HARM

SECTION D: FAMILY HISTORY

SECTION DD: HISTORY OF EMOTIONAL PROBLEMS

SECTION E: SOCIAL NETWORKS

SECTION F: CHILDHOOD

SECTION G: HOW YOU SEE YOURSELF POMS6KSS

NEUROCOG 15 MINUTES.

Note: All questions without a footnote were developed or adapted from standard survey questions by the Army STARRS team.

APPENDIX D: CONFIDENTIALITY USER AGGREEMENT

Agreement for the Use of Confidential Data from the Army Study to Assess Risk and Resilience in Servicemembers at the Inter-university Consortium for Political and Social Research

1. Definitions

"Investigator" is the person primarily responsible for analysis and other use of Confidential Data obtained through this Agreement.

"Research Staff" are the persons authorized by the Investigator's institution, excluding the Investigator, who will have access to Confidential Data obtained through this Agreement. Research Staff include project staff or students conducting dissertation or thesis research.

"Institution" is the university or research institution at which the Investigator will conduct research using Confidential Data obtained through this Agreement.

"Representative of the Institution" is a person authorized to enter into contractual agreements on behalf of Investigator's Institution.

"Confidential Data" consist of data or any objects derived from it with information that is linkable to a specific individual either directly or indirectly, and for which the individual (whether a person or organization) has the expectation that the information will not be released in a manner allowing public identification of the individual or causing some harm to the individual.

"Private Person" means any individual (including an individual acting in his official capacity) and any private (i.e., non-government) partnership, corporation, association, organization, or entity (or any combination thereof), including family, household, school, neighborhood, health service, or institution.

"ICPSR" is the Inter-university Consortium for Political and Social Research.

"Army STARRS" is the Army Study to Assess Risk and Resilience in Servicemembers.

"ICPSR Data Access Request System" ("IDARS") is the web-based system for restricted-use data agreements at ICPSR.

"Virtual Data Enclave" ("VDE") is the virtual computing environment in which Army STARRS Confidential Data are provided to authorized Investigators. The VDE can only be accessed from approved computer location(s) and IP address(es) at the Investigator's Institution.

"Deductive Disclosure" is the discerning of an individual's identity or confidential information through the use of known characteristics of that individual. Disclosure risk is present if an unacceptably narrow estimation of an individual's confidential information is possible or if determining the exact attributes of the individual is possible with a high level of confidence.

"Derivative" is a file, image, or statistic derived from the Confidential Data that poses disclosure risk to any Private Person in the Confidential Data obtained through this Agreement. Derivatives include copies of the Confidential Data received from ICPSR, subsets of the Confidential Data, and analysis results that do not conform to the guidelines in Section 6.G. "Scientific Research" is any systematic investigation of the data intended for the purpose of producing generalized knowledge. The results of scientific research are generally (but not always) disseminated publicly in the form of reports and peer-review publications.

2. Description of Disclosure Risk

a. Deductive disclosure of an individual's identity from research data is a major concern of federal agencies, researchers, and IRBs. If a person is known to have participated in ANY survey or study or whose information is known to be included in files or a database from which the Confidential Data were obtained, then a combination of his or her personal characteristics may allow someone to determine which record corresponds to that individual. Investigators and Institutions who receive any portion of Confidential Data are obligated to protect the individual's confidential information from deductive disclosure risk by strictly adhering to the obligations set forth in this Agreement and otherwise taking precautions to protect the Confidential Data from non- authorized use.

3. Requirements of Investigators

a. Investigators must meet the following criteria:

i. Have a Ph.D. or other terminal degrees; and
ii. Hold a faculty appointment or research position at Institution
iii. Is a graduate student under the direct supervision of a PhD or other terminal degree professional who holds a faculty appointment or research position at the Institution.

b. The Investigator assumes the responsibility of completing the Army STARSS VDE application and required documents, reports, and amendments. The Investigator agrees to responsibly manage and use Confidential Data and implement all VDE security procedures.

4. Requirements of Institution

a. The Institution must meet the following criteria:

i. Be an institution of higher education; a research organization; a research arm of a government agency; or a non-governmental, not for profit organization.

ii. Have a demonstrated record of using Confidential Data according to commonly accepted standards of research ethics and applicable statutory requirements.

5. Obligations of ICPSR

a. Provide the Confidential Data requested by the Investigator in the Confidential Data application within a reasonable time of execution of this Agreement by appropriate ICPSR officials and to make the Confidential Data available in the ICPSR Virtual Data Enclave. Data files and accompanying metadata will be made available via the VDE. ICPSR will provide instructions on establishing user accounts within a reasonable amount of time after the execution of this agreement.

b. Provide electronic documentation of the origins, form, and general content of the Confidential Data, in the same time period and manner as the Confidential Data.

c. Please note that when your application to use the Army STARRS public use data is approved by ICPSR, your name, institutional affiliation and the project summary from your application will be shared in confidence with a designated committee of scientific representatives of the U.S. Army, the U.S Department of Defense and the

National Institute of Mental Health.

ICPSR MAKES NO REPRESENTATIONS NOR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR THAT THE USE OF THE CONFIDENTIAL DATA WILL NOT INFRINGE ANY PATENT, COPYRIGHT, TRADEMARK, OR OTHER PROPRIETARY RIGHTS. Unless prohibited by law, Investigator and Institution assume all liability for claims for damages against them by third parties that may arise from the use or disclosure of the Confidential Data.

6. Obligations of Investigator, Research Staff, and Institution

Confidential Data provided under this Agreement shall be accessed by the Investigator, Research Staff, and Institution in strictest confidence and can be disclosed only in compliance with the terms of this Agreement. In consideration of the promises in Section 5 of this Agreement, and for use of Confidential Data from ICPSR, the Investigator, Research Staff, and Institution agree:

a. That the Confidential Data will be used solely for research or statistical purposes relative to the research project identified on the Army STARRS VDE Application, and for no other purpose whatsoever without the prior written consent of ICPSR. Further, no attempt will be made to identify private persons, no Confidential Data of private person(s) will be published or otherwise distributed, and Confidential Data will be protected against deductive disclosure risk by strictly adhering to the obligations set forth in this Agreement and otherwise taking precautions to protect the Confidential Data from non- authorized use.

b. To supply ICPSR with a completed Army STARRS VDE application for that will include the following:

    i. A signed Agreement
    ii. A Research Description describing Investigator's research goals and objectives using the Army STARRS Confidential Data.
    iii. Confidential Data Order Summary specifying which files and documentation are requested
    iv. Pledges of Confidentiality for the Investigator and each Research Staff member
    v. A copy of a document signed by the Institution's Institutional Review Board (IRB) approving or exempting the research project.
    vi. Investigator curriculum vitae

vii. Provide ICPSR user fee of $350.00 per user per year.

c. To comply fully with the Army STARRS VDE requirements at all times relevant to this agreement.

d. That no persons other than those identified in this Agreement or in subsequent amendments to this Agreement, as Investigator, Research Staff and who have executed this Agreement, be permitted access to the contents of Confidential Data files or any files derived from Confidential Data files.

e. That within one (1) business day of becoming aware of any unauthorized access, use, or disclosure of Confidential Data, or access, use, or disclosure of Confidential Data that is inconsistent with the terms and conditions of this Agreement, the unauthorized or inconsistent access, use, or disclosure of Confidential Data will be reported in writing or email to ICPSR.

f. That, unless prior specific approval is received from ICPSR, no attempt under any circumstances will be made to link the Confidential Data to any individual, whether living or deceased, or with any other dataset, including other datasets provided by ICPSR.

g. To avoid inadvertent disclosure of private persons by being knowledgeable about what factors constitute disclosure risk and by using disclosure risk guidelines, such as but not limited to, the following guidelines in the release of statistics or other content derived from the Confidential Data

    i. No release of a sample unique for which only one record in the Confidential Data obtained through sampling (e.g., not a census) provides a certain combination of values from key variables. For example, in no table should all cases in any row or column be found in a single cell.

    ii. No release of a sample rare for which only a small number of records (e.g., 3, 5, or 10 depending on sample characteristics) in the Confidential Data provide a certain combination of values from key variables. For example, in no instance should the cell frequency of a cross- tabulation, a total for a row or column of a cross-tabulation, or a quantity figure be fewer than the appropriate threshold as determined from the sample characteristics. In general, assess empty cells and full cells for disclosure risk stemming from sampled records of a defined group reporting the same

characteristics.

iii. No release of a population unique for which only one record in the Confidential Data that represents the entire population (e.g., from a census) provides a certain combination of values from key variables. For example, in no table should all cases in any row or column be found in a single cell.

iv. No release of the statistic if the total, mean, or average is based on fewer cases than the appropriate threshold as determined from the sample characteristics.

v. No release of the statistic if the contribution of a few observations dominates the estimate of a particular cell. For example, in no instance should the quantity figures be released if one case contributes more than 60 percent of the quantity amount.

vi. No release of data that permits disclosure when used in combination with other known data. For example, unique values or counts below the appropriate threshold for key variables in the Confidential Data that are continuous and link to other data from ICPSR or elsewhere.

vii. No release of minimum and maximum values of identifiable characteristics (e.g., income, age, household size, etc.) or reporting of values in the "tails," e.g., the 5th or 95th percentile, from a variable(s) representing highly skewed populations.

viii. Release only weighted results if specified in the data documentation.

ix. No release of ANOVAs and regression equations when the analytic model that includes categorical covariates is saturated or nearly saturated. In general, variables in analytic models should conform to disclosure rules for descriptive statistics (e.g., see #ii above) and appropriate weights should be applied.

x. In no instance should data on an identifiable case, or any of the kinds of data listed in preceding items 1-9, be derivable through subtraction or other calculation from the combination of tables released.

xi. No release of sample population information or characteristics in greater detail than released or published by the researchers who collected the Confidential Data. This includes but is not limited to publication of maps.

xii. The above guidelines also apply to charts as they are graphical representations of cross-tabulations. In addition, graphical outputs (e.g., scatterplots, box plots, plots of residuals) should adhere to the above guidelines.

h. That if the identity of any private person should be discovered, then:

i. No use will be made of this knowledge;
ii. will be advised of the incident within five (5) business days of discovery of the incident;
iii. The information that would identify the private person will be safeguarded or destroyed as requested by ICPSR; and
iv. No one else will be informed of the discovered identity.
v. Investigators requiring the Confidential Data beyond completion of this Agreement should submit a request for continuation three months prior to the end date of the Agreement.
vi. To ensure that the Confidential Data are managed and used in compliance with the terms and conditions of this Agreement and with all applicable statues and regulations. Noncompliance with this Agreement by any Research Staff shall be deemed noncompliance and a breach by Investigator and Institution for purposes of section 7 below.
vii. To notify ICPSR of a change in institutional affiliation of the Investigator. Notification must be in writing and must be received by ICPSR at least six (6) weeks prior to Investigator's last day of employment with Institution. Investigator's separation from Institution terminates this Agreement. Investigator may reapply for access to Confidential Data as an employee of the new institution. Re-application requires:

i. Execution of a new Agreement for the Use of Confidential Data by both the Investigator and the proposed new Institution;

ii. Execution of any Supplemental Agreement(s) with Research Staff and Pledges of Confidentiality by Research Staff at the proposed

new institution; and

iii. Evidence of approval or exemption by the proposed new Institution's IRB.

i. To notify ICPSR of a change of location of the computer to access the VDE, including a move within the same building or a move to another building at the Institution. Investigator will need to update the Army STARRS VDE application noting an office or building change.

j. That if the Investigator who is changing institutions does not have the new agreement executed by the time they leave their institution, ICPSR will temporarily deactivate the Investigator's account but will maintain the Investigator's profile to save their work during the transition. Upon approval of the new Army STARRS VDE application, ICPSR will reactivate the Investigator's account. If a new agreement is not executed within three (3) months, the Investigator's account will be deleted.

k. To submit annual reports to ICPSR on or before each anniversary of the initial date of the agreement period. Such reports must include:

   i. A list of public presentations at professional meetings using results based on the Army STARRS restricted-use data.

   ii. A list of papers accepted for publication using the Army STARRS restricted-use data, with complete citations.

   iii. A list of grants and contracts that have been awarded for use of the Army STARRS restricted-use data.

   iv. A list of graduate and/or undergraduate students using the Army STARRS restricted-use data for dissertations or theses, the titles of these papers, and the dates of completion.

l. That any books, articles, conference papers, theses, dissertations, reports, or other publications that employed the Confidential Data or other resources provided by ICPSR reference the bibliographic citation provided by ICPSR in the study description.

m. That use of the Confidential Data will be consistent with the Institution's policies

regarding scientific integrity and human subjects research.

n. To respond fully and in writing or email within ten (10) working days after receipt of any written inquiry from ICPSR regarding compliance with this Agreement.

7. Violations of this Agreement

a. The Institution will treat allegations by ICPSR or other parties of violations of this Agreement as allegations of violations of its policies and procedures on scientific integrity and misconduct. If the allegations are confirmed, the Institution will treat the violations as it would violations of the explicit terms of its policies on scientific integrity and misconduct.

b. In the event Investigator or Institution breaches any provision of this Agreement, they shall be jointly and severally responsible to promptly cure the breach and mitigate any damages. Investigator and Institution hereby acknowledge that any breach of the confidentiality provisions herein may result in irreparable harm to ICPSR not adequately compensable by money damages. Investigator and Institution hereby acknowledge the possibility of injunctive relief in the event of breach, in addition to money damages. In addition, ICPSR may:

i. Terminate this Agreement upon notice and terminate access to the Confidential Data and any derivatives thereof;

ii. Deny Investigator and Institution future access to ICPSR Confidential Data; and/or

iii. Report the inappropriate use or disclosure to the appropriate federal and private agencies or foundations that fund scientific and public policy research.

c. Institution agrees, to the extent permitted under the law, to indemnify, defend, and hold harmless The University of Michigan, ICPSR, Army STARRS, and the sources of Confidential Data from any or all claims and losses accruing to any person, organization, or other legal entity as a result of Investigator's, Research Staff's, and/or Institution's acts, omissions, or breaches of this Agreement.

8. Confidentiality

a. The Institution is considered to be a contractor or cooperating agency of ICPSR;

as such, the Institution, the Investigator, and Research Staff are authorized to protect the privacy of the individuals who are the subjects of the Confidential Data by withholding their identifying characteristics from all persons not connected with the conduct of the Investigator's research project. Identifying characteristics are considered to include those data defined as confidential under the terms of this Agreement.

9. Incorporation by Reference

a. The Application for Army STARRS VDE data b. A copy of the Institution's IRB approval or exemption of the Research Project

10. Miscellaneous

a. All notices, agreement correspondence, and return of Army STARRS related materials under this Agreement on behalf of the Investigator shall be made in writing or email and delivered to the address below: Army STARRS Restricted Data Manager, ICPSR, P.O. Box 1248, Ann Arbor, MI 48106-1248

b. This agreement shall be effective for 24 months from execution.

c. The respective rights and obligations of ICPSR and Investigator, Research Staff, and Institution pursuant to this Agreement shall survive termination of the Agreement.

d. This Agreement may be amended or modified only by the mutual written consent of the authorized representatives of ICPSR and Investigator and Institution. Investigator's research project, Data Security Plan, Research Staff may be amended or modified only by submitting such amendments or modifications to ICPSR and receiving approval from the authorized representatives of ICPSR. This Agreement may be extended only by submitting an extension request to the IDARS and receiving approval from the authorized representatives of ICPSR. Investigator and Institution agree to amend this Agreement to the extent necessary for ICPSR to comply with the requirements of any applicable regulatory authority.

e. The persons signing this Agreement have the right and authority to execute this Agreement, and no further approvals are necessary to create a binding agreement.

f. The obligations of Investigator, Research Staff, and Institution set forth within this

Agreement may not be assigned or otherwise transferred without the express written consent of ICPSR.

Institutional Signatures (please do not use black ink)

Investigator Signature

Date

Print Name

Title

Institution

Building/Room Number

Street Address

City/State/ZIP

Telephone

Email

The below signer represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Agreement on behalf of the Institution. He/she represents and warrants that the execution and delivery of the Agreement and the performance of such party's obligations hereunder have been duly authorized, and that the Agreement is a valid and legal agreement binding on such party and enforceable in accordance with its terms.

Representative of Your Institution

Signature

Date

Print Name

Title

Institution

Building/Room Number

Street Address

City/State/ZIP

Telephone

Email

APPENDIX E: PERMISSIONS

House <mahouse@umich.edu>

Fri, Jul 16, 8:41 AM

Hello Francisco - This is Meredith House, project director for STARRS projects at the University of Michigan. We spoke by phone two days ago.

Taking a look at the copyright language in the questionnaires at ICPSR, reproduction of the questionnaires would be covered, as it would seem your dissertation falls under "fair use."

Also, I reached out to ICPSR and they said they provided the following statement to you: "As long as it is part of the publicly downloadable files for the STARRS study - which the survey instruments are - you may append them to your dissertation. You may also append our DUA, which is likewise publicly available to anyone."

In addition, I spoke with Paul Hurwitz at USUHS. He said that he told Christina Forte that the research team gives their permission to use the publicly downloadable files at ICPSR.

You should have more than you need to proceed with including these materials with your dissertation. There is really nothing more the study or ICPSR can provide. I hope this allows you to move forward. Good luck with your dissertation!

Best,
Meredith

Meredith House
Survey Director, Survey Research Operations
Survey Research Center, Institute for Social Research
University of Michigan
(734) 647-5374

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November 30, 2023

Francisco Ramirez
[redacted]
xxxxx.xxxxxxx@xxxxxxx.xxx

Permission Request #PL20412

Dear Francisco,

I am responding to your request to reproduce the items listed below in your dissertation, "A Quantitative Analysis of Susceptibility Risk Factors Associated With Posttraumatic Stress in Service Members: Results From The Army Study To Assess Risk and Resilience," published by Antioch University:

From Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision: Posttraumatic Stress Disorder Diagnostic Criteria: Posttraumatic Stress Disorder in Individuals Older Than 6 Years

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Sincerely, Samantha Kralstein
Licensing Coordinator