8-2020

Risk Factors Associated with Somatic Symptoms following Military Sexual Trauma in Members of the National Guard and Reserves

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Risk Factors Associated with

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in Members of the National Guard and Reserves

A Thesis

Presented to

the Faculty of the Department of Psychology

University of South Carolina Aiken

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

By

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August 2020

Abstract

Objective: The purpose of the present study is to expand existing literature on risk factors that are associated with poorer physical health outcomes following incidents of Military Sexual Trauma (MST) to include both Military Sexual Harassment and Military Sexual Assault in members of the United States National Guard and Reserve.

Method: The current study used archival data collected by a research team at the Veteran Affairs Boston Healthcare System in order to identify potential factors such as gender, social support, immediate medical treatment, Posttraumatic Stress Disorder, and Depression. Moderation and mediation analyses were performed to examine the association between experiences of Military Sexual Trauma and subsequent somatic symptoms.

Results: Analysis showed significantly more severe somatic symptoms in those who had experienced Military Sexual Assault compared to Military Sexual Harassment. Gender, social support, and immediate medical treatment did not moderate the relationship between Military Sexual Trauma and somatic symptoms. Further analysis showed that PTSD symptoms and depressive symptoms positively predicted greater somatic symptoms in those who had experienced both Military Sexual Assault and Military Sexual Harassment.

Conclusion: While gender, social support, and immediate medical treatment did not influence the relationship between experienced sexual trauma and somatic symptoms, the causal relationship between PTSD symptoms and depressive symptoms following experienced sexual trauma positively predicted more severe somatic symptoms. Further studies focused on examining the specific influence of PTSD symptoms on somatic outcomes following various experiences of Military Sexual Trauma would allow for greater understanding of potential treatment outcomes.

Keywords: Military Sexual Trauma, Reserves, somatic symptoms, posttraumatic stress

Risk Factors Associated with Somatic Symptoms following Military Sexual Trauma in

Members of the National Guard and Reserves

Despite efforts to reduce the rates of sexual assault and sexual harassment within the military, both problems remain persistent and undoubtedly intertwined. Military Sexual Trauma, which includes acts of both sexual harassment and sexual assault within the military workplace, involves unique contextual differences compared to similar sexual attacks in the civilian sector. While much research has focused on the frequency with which it occurs as well as the subsequent rates of diagnoses such as Posttraumatic Stress Disorder (PTSD) and depression, little research has examined the increase in somatic symptoms among victims of MST. Further, the mechanism by which chronic physical symptoms arise after traumatic events isn't yet understood. The identification of potential risk factors associated with more severe somatic symptoms could lead to a greater understanding of the connection between trauma and somatic symptoms, as well as potential avenues for treatment plans.

Somatization and Functional Somatic Syndromes

Somatization, or the manifestation of physical symptoms without an identifiable biological cause, is an enigmatic and distressing condition (Woolfolk & Allen, 2007). Smith, Monson, and Ray (1986) found that patients diagnosed with somatization seek medical treatment significantly more often than those without a diagnosis, and are likely to incur healthcare costs that are nine times the U.S. average. The disorder is particularly distressing, not only due to the persistent widespread pain and fatigue but also due to the overwhelming disregard for the condition by medical professionals; a large majority of patients receive little to no relevant treatment options after seeking medical attention (Peterson et al., 2019). Due to the lack of identifiable organic cause, many of these patients tend to adopt catastrophic thinking with

regards to their health, and often attribute their symptoms to a serious illness (Woolfolk & Allen, 2007).

Specific, co-occurring symptoms that meet criteria for somatization are described as Functional Somatic Syndromes (FSS), which include common diagnoses such as fibromyalgia (FM), chronic widespread pain, chronic fatigue syndrome, temporomandibular disorder, and irritable bowel syndrome (IBS). These diagnoses are highly prevalent within the general community, but little is known about the etiology of these conditions. Clear biological markers for these diagnoses are non-existent, making the categorization even more arduous; there is currently much debate regarding whether the functional somatic syndrome diagnoses represent separate conditions or one overarching diagnosis (Afari et al., 2015). A large overlap of symptomology exists between the somatic diagnoses, causing high rates of comorbidity between them; among those diagnosed with a somatic illness, 20-70% are diagnosed with one or more comorbid somatic illnesses (Hauser et al., 2011).

Identifying and measuring somatic symptoms for both diagnostic and research purposes is an arduous task, as there is currently no universally accepted definition that explains which symptoms are considered somatic symptoms (Chaturvedi & Desai, 2013). Often, somatic symptoms are categorized by nature and are examined in the context of these categories: somatoform disorders, psychiatric disorders (such as depression or anxiety), functional somatic syndromes, "symptom only" diagnoses (such as low back pain), or symptoms that are only partially explained by a medical disorder (such as chronic pain), though many individual presentations may overlap into multiple categories (Kapfhammer, 2006). Further, factors such as the pattern, frequency, severity, and number of symptoms can vary within these categories. Due to high comorbidity rates, as well as the diverse array of possible symptom presentations within

somatization, it can be difficult to properly identify and categorize the type of symptoms present. For this reason, many researchers combine the separate diagnoses into one larger group, commonly termed "somatic symptoms" or "somatization" (Afari et al., 2015; Hauser et al., 2011; Woolfolk & Allen, 2007).

Multiple measures have been created in order to identify the presence and severity of somatic symptoms in patients. A recent meta-analysis conducted by Chaturvedi and Desai (2013) found 44 empirically-based assessment measures that assess for somatic symptoms either as a part of general psychopathology measures (eg. Short Form 36 Health Survey; Ware, 1992), as a part of specific scales of depression or anxiety (eg. Beck Depression Inventory; Beck et al, 1988), or as a specific somatic symptom scale (eg. Patient Health Questionnaire – 15; Kroenke et al., 2002). As noted by Chaturvedi and Desai (2013), each of these measures includes a different definition of somatic symptoms, and may focus on one or multiple facets of somatic symptomology.

Trauma and Somatic Symptoms

Aside from the physiological symptoms such as sleep disturbances, chronic pain, and general fatigue, certain psychological symptoms are also associated with most somatic syndromes, to include anxiety, depression, and panic disorder. FSS diagnoses are significantly more common among patients presenting with psychological distress; among those diagnosed with a mental health disorder, 20-80% will also be diagnosed with a comorbid functional somatic illness (Hauser et al., 2011). Further, more than half of patients presenting with a FM diagnosis also meet criteria for PTSD (Cohen et al., 2002). Similarly, rates of PTSD range between 9.5% and 43.5% higher in people seeking treatment for chronic pain as opposed to the general population (Akerblom et al., 2017).

The relationship between psychological disorders and somatic symptoms is one that has been identified but not thoroughly understood. Specifically identified as a potential trigger for later chronic physiological complaints, a trauma history is widely prevalent among patients presenting with somatic symptoms (Cohen et al., 2002). Further, the presence of trauma in an FSS patient has been found to result in poorer physiological outcomes; Cohen et al. (2002) found that patients with post-trauma FM tend to present with more intense pain, more frequent sleep disturbances, and higher rates of low activity. On average, patients who present with chronic pain, a common symptom of most functional somatic conditions, score higher on levels of emotional distress and pain intensity when the diagnosis is comorbid with PTSD (Akerbom et al., 2017; Cohen et al., 2002).

Specific types of trauma such as the unexpected loss of a friend or family member, a serious motor vehicle accident, military combat, and sexual assault have all been identified as potential triggers for later complaints of somatic symptoms (Cohen et al., 2002; Hauser et al., 2011). Sexual assault has been an area of frequent study, as a history of self-reported sexual assault is associated with severe outcomes such as increased somatic distress, increased health anxiety and more frequent healthcare utilization (Stein et al., 2004). Walker and colleagues (1997) found that a self-reported history of sexual trauma is more common in women diagnosed with a somatic syndrome than those diagnosed with an organic disease, such as rheumatoid arthritis. Further, a recent meta-analysis found that individuals who reported any exposure to trauma were 2.7 times more likely to present with some form of somatic pathology, indicating a significant connection, the mechanism of which has yet to be fully understood (Afari et al., 2015).

Currently, many theories regarding the underlying mechanisms causing somatic symptoms in trauma survivors exist, but few have substantial empirical support. These theories include biological, psychological, and social factors, most of which are difficult to measure or have conflicting findings in the literature. Differences in sample size, sample characteristics (such as military versus non-military) and diagnostic criteria may account for the large variances between study results. Further, most studies are cross-sectional, preventing the identification of causation (Afari et al., 2015). Another limiting factor is our general lack of knowledge; little is known about the functional somatic syndromes due to their lack of biological markers or obvious etiology, making most studies in the field no more than formal speculation regarding an already ambiguous topic. It has been found that individuals with FM and similar diagnoses can experience delayed onset up to 18 months after the traumatic event, thus making the temporal connection difficult (Cohen et al., 2002). Despite these limitations, current research supports a biopsychosocial model to explain the prevalence of chronic somatic conditions in survivors of trauma.

Underlying Mechanisms

Biological Factors

One commonly cited hypothesis in the literature implicates the hypothalamic-pituitary-adrenal axis (HPA axis) and cortisol secretion in the manifestation of somatic symptoms following trauma (Cohen et al., 2002; Siegel et al., 2015). The HPA axis plays a major role in moderating the body's stress response to both emotional and physical pain, relating to both the experience of psychological symptoms prevalent following trauma as well as the physiological symptoms prevalent in FSS conditions (Sherin et al., 2011). When an individual experiences a traumatic event, the HPA-axis causes the increased release of cortisol, activating the sympathetic

nervous pathway and causing negative feedback to be sent to the hypothalamus and pituitary gland. In people who have experienced significant trauma, this reaction can become dysfunctional and can cause a chronic decrease in cortisol production, though the rates of this decrease in cortisol levels varies across different types and frequencies of trauma (Sherin et al., 2011). For example, Nijhof et al. (2014) found that patients diagnosed with Chronic Fatigue Syndrome (CFS) showed statistically lower salivary cortisol levels than that of their age matched controls. Fibromyalgia, an FSS condition, is characterized as a stress response disorder; similar to trauma, patients with fibromyalgia demonstrate a susceptibility to neuroendocrine dysfunctions. Weissbecker et al. (2005) found that FM patients statistically exhibit atypical patterns of daily cortisol secretion, as well as significantly low urine cortisol levels. At this time, it is not clear whether low cortisol levels caused susceptibility to PTSD and subsequently FSS, or whether the HPA axis dysfunction was a result of the initial trauma (Sherin et al., 2011). Longitudinal research beginning with pre-trauma patients would be required to identify the point at which the dysfunction occurs.

Psychological Factors

An association has been clearly demonstrated between traumatic events and somatic symptoms; patients with somatic syndromes such as fibromyalgia and IBS have significantly higher rates of both physical and sexual abuse prior to the onset of their physiological symptoms, as well as higher rates of previous emotional abuse, emotional neglect, and physical neglect compared to the general population (Yavne et al., 2018). While previous studies have found that the onset of physiological symptoms can occur up to 18 months after the traumatic incident, a meta-analysis by Yavne and colleagues (2018) found that childhood trauma, such as sexual abuse or maltreatment, can indicate an increased propensity for somatic syndrome onset later in

life. Extensive research in the field has established the propensity for chronic or recurrent trauma to result in negative health consequences (Irish, Kobayashi, & Delahanty, 2010), however, D'Andrea and colleagues (2011) have found that acute traumatic events can have similar, though often less severe, physiological outcomes.

Current theories propose an attentional bias as the psychological mechanism by which trauma and somatic symptoms are tied (Carleton et al., 2017; Hauser et al., 2011). The concept of attentional bias refers to the idea that traumatic events can cause individuals to become more attuned to their bodies, thus intensifying the perception of pain, fatigue, and other common somatic symptoms (Carleton et al., 2017). The initial traumatic event is interpreted as a threat to the body, and therefore the stress-response of the body takes on a new, heightened awareness to any potential subsequent threats. This attentional bias leads to a health anxiety, where the patient becomes increasingly concerned that common somatic symptoms are related to a physical disease or injury, and therefore, another potential bodily threat (Golding, 1994; Stein et al., 2004). An initial perception of lost control can further lead to this attentional bias; sense of control is negatively associated with symptom reporting, suggesting that somatic symptoms are more closely monitored when psychologically recovering from an incident of lost control (Golding, 1994; Pennebaker, 1982). Golding (1994) proposed that Functional Somatic Syndromes are a result of conditioned hyperarousal following a trauma; victims are conditioned to respond more sensitively to the somatic symptoms following a trauma by their attention to and reinforcement of the symptom existence. This feedback loop is similar to that of panic disorder, in which fear of a subsequent panic attack causes an increased hypervigilance towards - and exacerbation of - certain physiological symptoms, such as heart palpitations, dizziness, and breathlessness (Antony et al., 1995). The research on attentional bias is supported by the shared

vulnerability model, which suggests that the biological and psychological vulnerabilities in an individual, when met with an incidence of psychological trauma, causes the individual to experience a heightened emotional response that results in new cognitive biases. This attentional bias to physical pain is theorized to be a shared vulnerability for both symptoms of PTSD as well as Chronic Musculoskeletal Pain (CMP), a common symptom of most Functional Somatic Syndromes (Asmundson et al., 2002), and research has shown a significant attentional bias to pain-related stimuli in patients with both PTSD and CMP (Bardeen et al., 2013). On a broader scope, both pain and psychological disorders have been found to create a propensity to recall negative life events, suggesting this negative attentional bias could be exponentially heightened in those with comorbid diagnoses (Yavne et al., 2018).

Social Factors

While scientific data points to a combination of both biological and psychological triggers for the onset of FSSs in trauma patients, certain social factors may play a role in maintaining the physiological symptoms once established. One plausible theory related to the social underlying mechanism between trauma and physiological pain is the idea that somatic symptoms are a physical manifestation of emotional pain (Yavne et al., 2018). DeWall et al. (2010) found an overlap in the areas of the brain that process social and physical pain, specifically the dorsal anterior cingulate cortex and the anterior insula. Acetaminophen, a commonly used anti-inflammatory and pain medication, has been shown to relieve symptoms of both anxiety and pain when used in low doses on a regular basis (DeWall et al., 2010). From an evolutionary standpoint, this mechanism could be related to survival; humans, compared to all other mammals, have a long infancy in which they are dependent on social connections for survival. For this reason, it is hypothesized that the social attachment system in humans has

evolutionarily overlapped with the physical pain system in order to ensure survival; due to the extensive period of vulnerability of human offspring, as well as the necessity of social connection for survival, Eisenberger and colleagues (2003) theorized that feeling "hurt" from social isolation would ensure more focused attention to the problem (DeWall et al., 2010). This theory supports the idea that some physiological symptoms may be a physical manifestation of emotional turmoil (Yavne et al., 2018).

Military Sexual Trauma

Military Sexual Trauma is currently defined by the United States Department of Affairs (USDA) as "psychological trauma which resulted from a physical assault of a sexual nature, battery of a sexual nature, or sexual harassment which occurred while the veteran was serving on active duty, active duty for training, or inactive duty training" (38 U.S.C. § 1720D). According to the most recent Department of Defense Annual Report on Sexual Assault in the Military (2018), over $1M is spent annually on research to identify rates, risk factors, and prevention methods for MST across the military branches. This heavy emphasis is likely due to the large number of service men and women affected by MST, as well as the sheer complexity of the problem. A recent meta-analysis revealed that 15.7% of military personnel and veterans report a history Military Sexual Trauma, with roughly 38% of women in the military reporting at least one experience of Military Sexual Trauma (Wilson, 2016). While these statistics are only slightly higher than those of the civilian population, it is important to note that Military Sexual Trauma only examines an individual's time in service, while civilian statistics typically examine lifetime rates.

The USDA definition focuses on the psychological ramifications of sexual assault and harassment in the Military. MST, like other forms of trauma, has been found to increase the rate

of comorbid psychiatric diagnoses, the most common of which are generalized anxiety disorder, major depressive disorder, and post-traumatic stress disorder. MST is also associated with lower quality of life and a significant increase in suicide attempts (Rossi & Smith, 2014). Interestingly, female sexual assault survivors display the same distressing psychological patterns as combat veterans, such as detachment and estrangement; further, Graham et al. (2016) found that sexual assault and combat trauma were equally likely to result in a subsequent PTSD diagnosis in a sample of female veterans (DiMauro & Renshaw, 2019; Mattocks, et al., 2012). Though women do not frequently serve in combat roles, three quarters of women who were deployed to Iraq during Operation Iraqi Freedom (OIF) experienced one or more combat situations, and 15.1% of these women also reported military sexual trauma during deployment (Dutra et al., 2011; Kimerling et al., 2010).

MST vs. Civilian Sexual Trauma

While rates of military sexual assault and harassment are statistically similar to civilian sexual traumas, they are circumstantially different in many ways, and thus may lead to differences in both physical and psychological outcomes. Women have only been authorized to serve in the U.S. military within the last century; though many women served in support roles prior to World War II, Congress passed the Women's Armed Services Integration Act in 1948 which formally authorized women to serve as permanent members of the armed forces. While women have had a space in the civilian workplace - albeit in various capacities - for centuries, the incorporation of female troops in combat and training environments has had significant impacts on the rates of MST (Castro, Kintzle, Schuyler, Lucas, & Warner, 2015). This shift disrupted the patriarchal and hyper-masculine system of the military; in an environment where aggression, dominance, formality, rank, and control are highly valued, Turchik and Wilson

(2010) found that many military members have adopted a negative attitude towards women, and do not view their female counterparts as equals. A recent poll conducted by the Smithsonian in collaboration with the Department of Defense magazine Stars and Stripes showed that an astounding 70% of current male service members believe that the presence of women in basic training reduces the quality and standard of the training (Monmaney, 2019). The gender integration and resulting negative views of the female sex can lead to increased instances of sexual assault and harassment, as well as a decrease in appropriate responses to such events (Stander & Thomsen, 2016).

Civilian and military workplace structures differ significantly, and these differences lend themselves to the potential for increased opportunities for MST (Stander & Thomsen, 2016). Military workplace boundaries often become blurred, as many service members live together in barracks, seek social contact from their fellow service members, and experience deployments in which work and personal life are completely merged (Stander & Thomsen, 2016). This common overlap of work and personal life has the potential to lend itself to a greater reinforcement of negative attitudes surrounding women in the military, and increases the opportunities for workplace sexual harassment. The values of rank, respect of authority, and loyalty within the military, when pushed to the extreme, result in greater opportunity for quid pro quo behaviors in which a leader is able to coerce a subordinate into sexual acts on the premise of award, promotion, or other similar benefits (Bell, Turchik, & Karpenko, 2014). Though these behaviors occur in the civilian workplace as well, the culture of the military lends itself to more frequent use of such tactics and, more severely, the blind acceptance of these behaviors as an unspoken aspect of military culture (Stander & Thomsen, 2016).

While many civilian workplaces employ human resource personnel to field complaints of sexual harassment and assault, the military has no such position. Instead, a member of the service is trained as the unit's Sexual Assault and Harassment Prevention Officer (SHARP/SAPR), and is usually a senior ranking non-commissioned officer or junior officer (Department of Defense, 2015). Research has demonstrated that the ranks with the highest risk of MST are those in a junior enlisted rank, from E-1 to E-4: the bottom of the chain of command (Suris & Lind, 2008). Troops are often taught to tackle problems at the "lowest level," which requires junior service members to avoid involving senior members in their conflicts (Stander & Thomsen 2016). As such, a junior service member may hesitate to contact their SHARP/SAPR officer for fear of internal reprisal. Further, this dynamic puts the responsibility of addressing the sexual trauma on the victim, instead of the perpetrator and/or leadership team. The frequency with which the victim must interact with their attacker exacerbates the already grueling aftermath of an attack; often, when unreported, victims of MST must continue to live near and work with their assailants on a daily basis (Stander & Thomsen, 2016). This not only increases the level of distress that the individual may experience, but increases the likelihood of re-victimization (Kimerling et al., 2007; Stander & Thomsen, 2016).

Rates of previous sexual assaults also differ between civilian and military populations. Compared to the civilians, rates of childhood and adolescent sexual assault among military members are usually greater and range anywhere from 15-49% of women and 1.5-22.5% of men (Turchik & Wilson, 2010). Sadler, Booth, Cook, and Doebbeling (2003) found that individuals who have experienced a previous sexual assault are roughly 2-5 times more likely to be re-victimized, thus leaving a greater portion of the military population statistically more likely to be victims of sexual assault during their military service. While the exact cause is unknown,

researchers hypothesize that the emotional repercussions of sexual abuse, such as self-blame, hostility, and difficulties with emotional regulation make these individuals easier targets for later re-victimization (Stander & Thomsen, 2016). These individuals who experience recurrent sexual trauma are also at an increased vulnerability to experience greater physical symptoms and health problems following their attacks (Suris, Lind, Kashner, & Borman, 2007).

MST and Somatic Symptoms

Military Sexual Trauma lends itself to unique complications and outcomes for the victims when compared to similar civilian experiences, specifically with regards to overall health and physical functioning. When comparing Civilian Sexual Assault (CSA) and Military Sexual Assault (MSA), Suris et al. (2007) found that somatic outcomes differ between the two groups; women who had experienced MSA reported lower satisfaction with health as well as increased overall bodily pain. Within the female veteran population specifically, those who have experienced MST report a larger number of somatic symptoms compared to those who have not experienced MST; those with a history of MST report more frequent somatic issues such as back pain, headaches, chronic fatigue, and gastrointestinal symptoms (Frayne et al., 1999). A previous study using the SF-36 Health Survey (SF-36) demonstrated that women who had experienced sexual assault while serving in the military reported an overall lower level of physical functioning across all scales of the survey compared to those who had not experienced a sexual assault (Skinner, 2000).

Though both men and women experience MST, much of the current literature focuses on female veterans and their outcomes; this is likely due to the proportionally larger population of women who report experiencing MST. Women who have experienced MST report significantly higher rates of female-related somatic complaints, including pelvic pain, endometriosis, and

interstitial cystitis (Latthe, Mignini, Gray, Hills, & Khan, 2006). Likely due to these

complications, a significantly higher percentage of women undergo hysterectomies compared to

the civilian population, and the majority of the surgeries occurred at an earlier age (Ryan et al.,

2016). Cichowski and colleagues (2017) found that specific chronic pain diagnoses were

positively associated with MST experiences, which included IBS, fibromyalgia, headaches, back

pain, and joint pain. Limited research on the physical effects of MST on male veterans shows a

similarly high rate of problematic somatic symptoms, to include liver disease, chronic pulmonary

disease, weight-related disorders, and paralysis (Kimerling et al., 2007). Men who have

experienced MST are also more likely to develop sexual-related disorders, to include sexual

dysfunction disorder, sexually transmitted infections, and HIV (Turchik et al., 2012).

Separating Sexual Harassment and Sexual Assault

Due to the frequency of overlap between sexual harassment and sexual assault in the

military, these two occurrences are often screened for under one umbrella term: Military Sexual

Trauma. While this strategy may be efficient, recent research shows that screening for Military

Sexual Assault (MSA) and Military Sexual Harassment (MSH) separately has benefits in

identifying potential risk factors and possible later diagnoses (Blais, Brignone, Fargo,

Livingston, & Andresen, 2019). In this study, Blais and colleagues (2019) found that levels of

PTSD, depression, sexual satisfaction and functional symptoms, and suicidal ideation were

measured in female veterans reporting either MSH-only or MSA. Prognosis for female veterans

reporting MSA was significantly poorer compared to the MSH-only group; these individuals

were more likely to report greater severity of PTSD symptoms, were more likely to have a PTSD

diagnosis, and were more likely to report suicidal ideation (Blais et al., 2019). Similarly, a study

examining differences in MSA and MSH outcomes for both female and male veterans found

that, while both experiences led to greater instances of depression, somatic symptoms, and PTSD compared to the control group, those who experienced MSA were significantly more likely to show severe signs of both psychological and physiological distress following their trauma (Street et al., 2008).

Potential Risk Factors

Gender

While roughly 85.5 percent of all service members are men, female service members are far more likely to experience Military Sexual Trauma (Bell, Turchik, & Karpenko, 2014). Further, reported rates of MSA are staying stagnant for men at 0.7% but have increased from 4.3% to 6.2% in female veterans from 2017-2018, according to the Department of Defense 2018 Annual Report on Sexual Assault in the Military (2019). Statistically, females are more likely to develop somatic symptoms following a traumatic event, such as a sexual assault; McCall and colleagues (2014) attribute this to gender preferences in coping mechanisms, as females are more likely to demonstrate internalizing coping behaviors compared to male externalizing behaviors. Seedat, Stein, and Carey (2005) found that biological factors, such as the differing sensitization to stress hormones, may also contribute to the varying levels of somatization following sexual trauma. In a recent study examining the specific effect of gender on somatization following trauma, women showed more severe somatic symptoms than men, both independently and when examining the moderating effects of depression and PTSD (McCall et al., 2014). Though the National Guard and Reserve forces endure unique circumstances compared to their active duty counterparts, it is likely that similar gender effects would be seen in the levels of somatization following Military Sexual Trauma. Among men, however, sexual coercion is the type of trauma most likely to cause later physical complaint, suggesting that disparities in somatization amongst

gender within those who have experienced MST may not be as significant when compared to that of the civilian population (Prospero & Fawson, 2010).

Social Support

The presence of social support in the lives of sexual assault survivors has shown to moderate later somatic symptoms in patients (Kimerling & Calhoun, 1994). Sexual assault survivors display lower levels of physiological complaints such as chronic fatigue and widespread pain when they reported the ability to confide in friends or family members following the traumatic incident. Kimmerling and Calhoun (1994) found that the immediate association to a positive social network was significantly related to lower medical facility utilization one-year post-assault. Similarly, more recent research has demonstrated that the perception of social support can have a longitudinal impact on PTSD symptoms over time (Dworkin, Ojalehto, Bedard-Gilligan, Cadigan, & Kaysen, 2018). In a recent study focused on victims of MST, those who did not receive social support not only reported higher levels of vague somatic symptoms, but also reported a higher preoccupation with their medical concerns (McManus et al., 2018). This phenomenon supports the previously mentioned theory of somatic syndromes being a physical manifestation of emotional pain; physical symptoms are largely more positively accepted by the greater public as well as being easier to communicate to loved ones, medical professional, and to one's self (Kimmerling & Calhoun, 1994; Woolfolk & Allen, 2007). While current studies have examined social support following MST in active duty, none have yet examined the same factors within the National Guard and Reserve.

Seeking Medical Care

Within the civilian population, sexual assault victims are reportedly more likely to seek medical care for physical distress than mental health services or victim advocacy programs

(Koss, Koss, & Woodruff, 1991). Despite heightened likelihood to seek medical attention initially, Kimmerling and Calhoun (1994) found that utilization of health care services increases after one year post-sexual assault. Increased utilization of medical care suggests a heightened attentional bias towards physical symptoms compared to psychological symptoms, and implies that an initial request for medical care could lead to subsequent heightened somatic symptoms related to the trauma.

The military poses a unique climate with regards to seeking treatment post-assault; rates of reporting are significantly lower those in the civilian sector, likely due to fears of retaliation, potential loss of position, as well as heightened levels of shame or guilt – specifically for male victims in a hypermasculine setting (Turchik & Wilson, 2009). Many times, victims are required to continue serving beside their assailants, making the reporting process even more difficult. Further, many service members fear seeking mental health treatment due to the potential to be discharged from service (Mullins, 2005). For these reasons, it is likely easier for service members to report physical symptoms compared to psychological symptoms following a sexual trauma.

PTSD and Depression

Individuals who have experienced Military Sexual Trauma are three times more likely to experience psychological disorders such as depression, anxiety, and impaired interpersonal functioning (Kimerling et al, 2010). Many somatic diagnoses positively associated with MST experiences are also influenced by risk factors such as smoking, alcohol use, drug use, risky sexual behavior, and unhealthy eating – all examples of unhealthy coping skills commonly utilized by individuals experiencing psychological distress (Kimerling et al., 2007). Post-Traumatic Stress Disorder is common amongst female veterans who have experienced MST;

Suris and colleagues (2004) found that those individuals are nine times more likely to develop PTSD than their veteran counterparts with no sexual trauma history. Tien, Schlaepher, and Fisch (1998) found that, when comparing men and women survivors of sexual trauma, women are significantly more likely to develop PTSD than men, while men are more likely to develop externalizing disorders such as substance abuse.

Depression and PTSD are highly comorbid among sexual trauma survivors; nearly half of sexual assault victims displaying PTSD symptomology carry a comorbid Major Depressive Disorder diagnosis (Contractor et al., 2013). Recent studies demonstrate that heightened levels of the numbing and dysphoric factors within PTSD are associated with greater occurrences of comorbid depression (Gootzeit & Markon, 2011; Simms et al, 2012). Current literature has not yet identified the impact that these diagnoses have on somatic symptomology in sexual trauma survivors, in either civilian or military settings.

Limitations of Current Research

Despite recent efforts to better understand the Military Sexual Trauma epidemic, rates are still on the rise and little is known regarding the psychological and physiological outcomes within various military populations (Department of Defense, 2019). While current literature has identified many outcomes of Military Sexual Trauma, it is lacking in comprehensive measures of physiological ramifications and the potential risk factors associated. Due to the gender differences in MST experiences and frequencies, most of the current research focuses on either male or female veterans, but does not compare and contrast the experiences of these two groups. Further, the bulk of research regarding MST and somatic symptoms focuses on the experiences of active duty members, while research on similar patterns within the National Guard and Reserve forces is limited.

Present Study

In the present study, I examined potential risk factors for somatic symptoms among individuals who have experienced MST. Archival survey data collected by Street et al. (2008) was used to identify risk factors for somatic symptoms such as gender, social support, medical attention, PTSD symptoms, and depressive symptoms within a sample of National Guard and Reserve veterans.

All data was analyzed using the Statistical Package for the Social Sciences software (SPSS; IBM Corporation, 2017). For hypotheses 2-5, PROCESS macro was used. The PROCESS macro is a statistical tool which generates a bias-corrected confidence interval through nonparametric bootstrapping in conjunction with an ordinary least squares regression. It is commonly used in order to estimate direct and indirect effects in single and multiple mediator models, as well as two and three way interactions in moderation models (Hayes, 2013).

Hypotheses

Hypothesis 1. It was predicted that somatic symptoms, measured by the Physical Composite Score of the Short Form 12 Health survey (PCS-12; Ware, Kosinski, & Keller, 1996), would be greater among those who have experienced both military sexual assault and harassment than those who experienced military sexual harassment but not sexual assault. The findings from this initial analysis determined whether subsequent hypotheses would remain grouped as MST or would be divided between MSA and MSH-only as it was thought that this separation would provide a more accurate understanding of the relationships between these various forms of MST and physical health.

Hypothesis 2. It was predicted that the relationship between MST frequency and somatic symptoms would be moderated by gender, in that the relationship between MST frequency and somatic symptoms would be stronger in females than males.

Hypothesis 3. It was predicted that the relationship between MST frequency and somatic symptoms would be moderated by the seeking of and the outcome of social support, in that the relationship between MST frequency and somatic symptoms would be stronger in those who sought social support and had a negative outcome or did not seek social support than those who sought social support and had a positive or neutral outcome.

Hypothesis 4. It was predicted that the seeking of medical attention following the MST incident would moderate the relationship between frequency of MST and somatic symptoms, in that the relationship between MST and somatic symptoms would be stronger in those who sought medical attention.

Hypothesis 5. It was predicted that symptoms of PTSD and depression would mediate the relationship between frequency of MST and somatic symptoms.

Methods

Participants

Data was collected in order to examine the prevalence of sexual harassment and sexual assault, as well as the impact of these experiences, in former members of the National Guard and Reserve forces. The original research team surveyed a total of 3,946 participants, 2,319 of which were women; contact information for these individuals was provided by the Defense Manpower Data Center (DMDC). Oversampling caused a disproportionate sample population of women; due to the nature of the original study, and the higher frequency of MST experienced by women, more female National Guard and Reserve veterans were surveyed. All participants served in one

of the National Guard or Reserve branches of the military (i.e., Army Reserve, Army National

Guard, Marine Corps Reserve, Naval Reserve, Air Force Reserve, Air National Guard, and Coast

Guard Reserve). On average, participants had terminated their reserve service 9.12 years prior to

the 2002-2003 data collection. Further demographic information can be found in Table 1. The

sample used in the current study will be those who reported experiences of sexual harassment

and/or assault; participants who either refused to answer certain aspects of the phone interview or

did not experience any incidents of sexual assault or sexual harassment will be omitted from the

analysis.

Measures

      Demographics. Information regarding the participant demographics, to include gender

and nature of military service, was collected via self-report survey. The demographic questions

can be found in Appendix A.

      Somatic Symptomology. Somatic symptomology was measured using the 12-item Short

Form Health Survey (SF-12; Ware, Kosinski, & Keller, 1996), a health survey adapted from the

SF-36 for use in identifying a patient's perceived physical limitations over the previous 4 weeks.

The 12-question survey includes items related to pain levels, energy levels, daily limitations due

to health, and overall physical functioning. Reliability of the short-form survey has been

demonstrated, as well as good criterion and construct validity compared to the 36-question

original survey; test-retest reliability is .89 (Ware et al., 1996). Questions vary from a two-point

"yes" or "no" scale to a six-point scale with the following options: all of the time, most of the

time, a good bit of the time, some of the time, a little of the time, or none of the time. Four items

on the SF-12 are reverse scored. Indicator variables are weighted utilizing regression coefficients

from the general U.S. population, aggregated, and standardized, with possible scores ranging

from 0 to 100, and higher scores indicating better functioning (Ware et al., 1996). Chronbach's alpha for this measure was .80 for female participants and .77 for male participants.

The SF-12 consists of two summary scores: the SF-12 Physical Component Summary (PCS-12) and the SF-12 Mental Component Summary (MCS-12). Both summary scores in the SF-12 have been validated against the respective SF-36 summary scores. Somatic symptoms in this study will be measured using the PCS-12, which consists of items related to physical functioning, limitations due to physical health, bodily pain, and general health. The PCS-12 is scored using norm-based methods, and each response item on the SF-12 is weighted independently. The PCS-12 is transformed to have a mean of 50 and a standard deviation of 10, and lower scores indicate worse physical functioning (Ware et al., 1995). The SF-12 can be found in Appendix B.

Military Sexual Trauma. Military sexual harassment and assault were measured using the version of the Sexual Experiences Questionnaire (SEQ-DoD; Fitzgerald, Magley, et al., 1999) adapted specifically for military members and frequently used amongst active duty populations. The 24 survey questions pertain to the four subgroups of sexual harassment identified in the Fitzgerald et al. (1999) study, to include sexist hostility gender harassment, sexual hostility gender harassment, unwanted sexual attention, and sexual coercion. Chronbach's alpha for this measure was .81 for female participants and .78 for male participants. In keeping with the Street et al. (2008) study, participants were considered to have experienced Military Sexual Harassment if the individual self-reported at least four separate potential experiences of harassment or one severe experience (e.g., quid-pro-quo). Participants were considered to have experienced sexual assault if they reported experiencing coerced genital fondling, attempted rape, or completed rape under the sexual coercion subgroup. All of the participants who reported

sexual assault also reported experiencing sexual harassment. Participants were consistently reminded throughout the survey to answer only in regards to their time in the Guard or Reserves, and were asked to exclude any civilian experiences.

Participants answered the 24 questions regarding their experiences with unwanted sex-related encounters on a five-point scale with the following response options: "never," "once or twice," "sometimes," "often," or "very often". Participants were also afforded the opportunity to respond with "not sure," or to refuse to answer completely, both of which will be considered a score of 0 for that particular question. Item responses were added to compute SEQ-DoD scores with possible scores ranging from 0 to 120. The SEQ-DoD can be found in Appendix C.

Social Support. During the telephone interview, each participant was asked to think about the MST event that had the greatest effect on them, and were then asked subsequent questions related to their actions after the event. The following question was used to measure level of social support sought: "While this was happening, did you try to get emotional support from friends and relatives?" This question was answered on a 4-point scale, as either "Yes, and it made things better," "Yes, but it made no difference," "Yes, and it made things worse," or "No, I did not do this." Data from this measure is categorical in nature.

Seeking Immediate Medical Services. When asked to recall the MST event that had the greatest effect, participants were asked the following question "Did you seek medical care for this situation within a few months of when it happened?" Answers from this prompt were recorded as either "yes" or "no" and were recorded to measure the participants' attempt at seeking immediate medical services.

Posttraumatic Stress Disorder. Posttraumatic Stress Disorder symptomology directly related to the participants' military sexual trauma experience was measured using the PTSD

Checklist (PCL; Weathers et al., 1993; $M = 27.3$, $SD = 13.8$). Chronbach's alpha was .93 for female participants and .95 for male participants. Upon administration, participants were asked to answer the questions while thinking about the worst period of time since the sexual trauma incident. The PCL was comprised of 17 questions relating to the 17 PTSD symptoms in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychological Association, 2000). Due to the data having been collected prior to the release of the DSM-5 (American Psychological Association, 2013) and subsequent updated PCL-5, the PCL did not fully measure current criteria for PTSD. The newest version of the PCL is a 20-question survey that includes 16 of the original PCL questions but eliminated prompt 12: "Feeling as if your future will somehow be cut short?" The PCL-5 added four additional questions in order to address the updated PTSD symptomology, to include strong negative beliefs towards the self or others, sense of blame towards self or others, strong negative beliefs such as fear or guilt, and taking risks that could cause harm (PCL-5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013). Due to the large overlap of questions between the PCL and PCL-5, and to keep the current study in line with the most updated DSM-5 PTSD criteria, PCL scores were used with the exception of prompt 12. Item responses were added to compute PCL scores with possible scores ranging from 16 to 80. The PCL can be found in Appendix D.

      Depression. Symptoms of Major Depressive Disorder were assessed using the Center for Epidemiological Studies Depression Scale (CES-D; Joseph & Lewis, 1995; $M = 5.0$, $SD = 5.8$), a 10-item self-report measure in which participants are asked to indicate how frequently they experience each symptom. The CES-D has acceptable internal consistency ($\alpha = .86$-$.88$), moderate test-retest reliability ($r = .41$-$.70$). The measure looks at current symptoms, asking questions in reference to the last week on a four-point scale, from 0 (none of the time to less than

1 day) to 3 (5 to 7 days). Two items on the CES-D are reverse scored prior to scoring. Item

responses were added to compute CES-D scores with possible scores ranging from 0 to 30. The

CES-D can be found in Appendix E.

Procedure

A research team with the Veterans Affairs Boston Healthcare System collected data over

a period of seven months between 2002 and 2003. The random sample of former Reservists was

provided by the Defense Manpower Data Center. The names provided were then matched with

current contact information by the National Institute of Occupational Safety and Health. The

research team mailed letters to the potential participants two weeks prior to the start of the phone

survey; in this letter, an explanation of the study was provided and an opportunity to withdraw

from the study was given. Participants were then telephoned by a team of experienced female

interviewers from the contracted survey firm, Schulman, Ronca, and Bucuvalas, Inc. All

participants were prompted with the same interview script, which included a demographic

survey, a survey assessing income and health care utilization, a medical illness questionnaire,

and a health diagnoses questionnaire. Participants were then prompted with the following

measures: Short Form Health Survey (SF-12), PTSD Scale (PCL), Center for Epidemiologic

Studies Depression Scale (CES-D), Sexual Experiences Questionnaire (SEQ-DoD), and an

adapted questionnaire from the National Women's Study (NWS). The average interview length

was 40 minutes.

Results

Hypothesis 1. It was predicted that participants who experienced both MSH and MSA

would have significantly greater somatic symptoms than the participants who experienced MSH

only as measured by the PCS-12. An independent samples *t*-test was conducted to compare the

PCS-12 scores in those who had experienced both MSA and MSH and those who had only experienced MSH. The results showed that individuals who had experienced both MSH and MSA had significantly greater somatic symptoms as indicated by lower PCS-12 scores (*M*=48.15, *SD*=10.46) compared to those who had experienced MSH-only (*M*=49.80, *SD*=9.74); $t(1775) = 3.25$, $p < .001$. Due to the significant difference in somatic symptoms between the two groups, the subsequent hypotheses were analyzed separately among those who have experienced MSH-only and MSA when applicable.

Hypothesis 2a. It was predicted that the relationship between Military Sexual Trauma, as measured by the Sexual Experiences Questionnaire (SEQ-DoD), and somatic symptoms, as measured by the PCS-12, would be moderated by gender among those who had experienced MSH-only. It was specifically predicted that there would be a stronger association between sexual trauma and somatic symptoms in female participants than male participants. A moderation analysis was conducted using Model 1 of PROCESS (Hayes, 2013) in order to determine the extent to which gender was related to participants' report of somatic symptoms following MSH. The predictor variable was the reported frequency of MSH as measured by the Sexual Experiences Questionnaire (SEQ-DoD; Fitzgerald et al., 1999) score, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 1, see Figure 1.

The regression model used to assess for gender differences included total SEQ scores, gender, and an SEQ*gender interaction variable as predictors of the PCS-12 scores. The overall model was not significant, $R^2 = .00$, $F(3, 1209) = 1.11$, $p = .35$. There was not a significant association between MST frequency and somatic symptoms, $\beta = -.27$, $t(1209) = -1.22$, $p = .22$. Gender was not significantly associated with somatic symptoms, $\beta = -.72$, $t(1209) = -.70$, $p =$

.49. Further, gender did not moderate the relationship between experienced MST and somatic symptoms, $\beta = .11$, $t(1209) = .98$, $p = .33$ (See Table 3). Therefore, the hypothesis that gender would moderate the relationship between experienced military sexual trauma and somatic symptoms among participants who had experienced MSH-only was not supported.

  Hypothesis 2b. It was predicted that the relationship between Military Sexual Trauma, as measured by the SEQ-DoD, and somatic symptoms, as measured by the PCS-12, would be moderated by gender among those who had experienced both MSH and MSA. It was specifically predicted that there would be a stronger association between sexual trauma and somatic symptoms in female participants than male participants. A moderation analysis was conducted using Model 1 of PROCESS (Hayes, 2013) in order to determine the extent to which gender was related to participants' report of somatic symptoms following MSH and MSA. The predictor variable was the reported frequency of MSH and MSA as measured by the Sexual Experiences Questionnaire (SEQ-DoD; Fitzgerald et al., 1999) score, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 1, see Figure 1.

  The regression model used to assess for gender differences included total SEQ-DoD scores, gender, and an SEQ*gender interaction variable as predictors of the PCS-12 scores. The overall model was significant, $R^2 = .03$, $F(3, 560) = 5.24$, $p < .01$. There was a significant association between MST frequency and somatic symptoms, $\beta = -.75$, $t(560) = -2.09$, $p = .04$. Gender was not significantly associated with the somatic symptoms, $\beta = -3.46$, $t(560) = -1.11$, $p = .27$. Further, moderation effects of gender on the relationship between experienced MST and somatic symptoms only trended towards significance, $\beta = .33$, $t(560) = 1.84$, $p = .07$ (See Table 3). The hypothesis that gender would moderate the relationship between experienced military

sexual trauma and somatic symptoms within participants who had experienced both MSH and MSA was not supported, though a trend towards significance should be noted.

Hypothesis 3a. It was predicted that the relationship between MST, as measured by the SEQ-DoD, and somatic symptoms, as measured by the PCS-12, would be moderated by the seeking of social support following the MST event among those who experienced MSH-only. It was significantly predicted that there would be a stronger association between sexual trauma and somatic symptoms in those who did not seek social support compared to those who had. Participants who answered "Yes, but it made no difference" and "Yes, and it made things worse" were excluded from the analysis due to the small number of participants who responded to this question with these options. A moderation analysis with a multi-categorical moderating variable was conducted using Model 1 of PROCESS (Hayes, 2013) in order to determine the extent to which the seeking of and outcome of social support was related to participants' report of somatic symptoms following MSH. The moderating variable of social support was multi-categorical and had four levels: the participant sought social support and it helped, the participant sought social support and it made no difference, the participant sought social support and it made it worse, or the participant did not seek social support. The predictor variable was the reported frequency of MSH as measured by the SEQ-DoD, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 1, see Figure 1.

The regression model included total SEQ-DoD scores, use of social support, and an SEQ*social support interaction variable as predictors of the PCS-12 scores. The overall model was not significant, $R^2 = .00$, $F(3, 1127) = 1.26$, $p = .29$. There was not a significant association between experienced MST and somatic symptoms, $\beta = -.10$, $t(1127) = -1.09$, $p = .28$. Use of social support was not significantly associated with somatic symptoms, $\beta = .44$, $t(1127) = .11$, p

= .91. Further, use of social support did not moderate the relationship between MST frequency and somatic symptoms, $\beta = .02$, $t(1127) = .63$, $p = .53$ (See Table 4). Thus, the hypothesis that use of social support would moderate the relationship between experienced MST and somatic symptoms within participants who had only experienced MSH-only was not supported.

Hypothesis 3b. It was predicted that the relationship between MST, as measured by the SEQ, and somatic symptoms, as measured by the PCS-12, would be moderated by the seeking of social support following the MST event among those who experienced both MSH and MSA. IT was significantly predicted that there would be a stronger association between sexual trauma and somatic symptoms in those who did not seek social support compared to those who had. Participants who answered "Yes, but it made no difference" and "Yes, and it made things worse" were excluded from the analysis due to the small number of participants who responded to this question with these options. A moderation analysis with a multi-categorical moderating variable was conducted using Model 1 of PROCESS (Hayes, 2013) in order to determine the extent to which the seeking of and outcome of social support was related to participants' report of somatic symptoms following MSH and MSA. The moderating variable of social support was multi-categorical and had four levels: the participant sought social support and it helped, the participant sought social support and it made no difference, the participant sought social support and it made it worse, or the participant did not seek social support. The predictor variable was the reported frequency of MSH and MSA as measured by the SEQ-DoD, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 1, see Figure 1.

The regression model included total SEQ-DoD scores, use of social support, and an SEQ*social support interaction variable as predictors of the PCS-12 scores. The overall model

was significant, $R^2 = .02$, $F(3, 533) = 3.98$, $p = .01$. However, there was not a significant association between SEQ-DoD scores and PCS-12 scores, $\beta = -.06$, $t(533) = -1.18$, $p = .24$. Use of social support was also not significantly associated with the PCS-12 scores, $\beta = .51$, $t(533) = .91$, $p = .36$. Further, use of social support did not moderate the relationship between MST frequency and somatic symptoms, $\beta = -.01$, $t(533) = -.45$, $p = .65$ (See Table 5), thus the hypothesis that use of social support would moderate the relationship between experienced MST and somatic symptoms within participants who had experienced both MSH and MSA was not supported.

Hypothesis 4. It was predicted that the relationship between MST, as measured by the SEQ-DoD, and somatic symptoms, as measured by the PCS-12, would be moderated by seeking medical attention shortly following the MST event among those who experienced both MSH and MSA. It was specifically predicted that there would be a stronger association between sexual trauma and somatic symptoms in those who did not seek medical attention compared to those who had. Participants who had experienced MSH-only were excluded from hypothesis 4 because they were not asked about seeking medical attention. A moderation analysis was conducted using Model 1 of PROCESS (Hayes, 2013) in order to determine the extent to which seeking medical attention was related to participants' report of somatic symptoms following MSA. The moderating variable of seeking medical attention had two levels: the participant sought medical attention within a few months following the MSA incident, or the participant did not seek medical attention. The predictor variable was the experienced frequency of MSA as measure by the SEQ-DoD, and the criterion variable was somatic symptoms as measured by the SF-12. For a visual representation of Model 1, see Figure 1.

The regression model used included total SEQ-DoD scores, use of medical services, and an SEQ*medical attention interaction variable as predictors of the PCS-12 scores. The overall model was not significant, $R^2 = .01$, $F(3, 292) = 1.36$, $p = .26$. There was not a significant association between MST frequency and somatic symptoms, $\beta = -.19$, $t(292) = -1.22$, $p = .22$. Use of medical attention was not significantly associated with somatic symptoms, $\beta = -1.45$, $t(292) = -.372$, $p = .71$. Further, use of medical attention did not moderate the relationship between MST frequency and somatic symptoms, $\beta = .08$, $t(292) = .96$, $p = .34$ (See Table 6), thus the hypothesis that use of medical attention would moderate the relationship between experienced MST and somatic symptoms within participants who had experienced MSH and MSA was not supported.

Hypothesis 5a. It was predicted that Posttraumatic Stress Disorder symptoms, as measured by the Posttraumatic Stress Disorder Checklist (PCL), and depressive symptoms, as measured by the Center for Epidemiologic Studies Depression Scale (CES-D), would have serial multiple mediation effects on the relationship between experienced MST and somatic symptoms as measured by the SEQ-DoD and PCS-12 among those who had experienced MSH-only. It was specifically predicted that greater levels of experienced sexual trauma would result in greater symptoms of PTSD, which would result in greater symptoms of depression, which would in turn result in greater somatic symptoms. A serial mediator analysis was conducted using Model 6 of PROCESS (Hayes, 2013) in order to determine the direct and indirect effects of MSH on somatic symptoms, while also examining the relationships between MSH, PTSD symptoms, depression symptoms, and somatic symptoms. The first mediating variable of PTSD symptoms was a continuous variable measured by the PCL. The second mediating variable of depression symptoms was a continuous variable measured by CES-D. The predictor variable was the

experienced frequency of MSH as measured by the SEQ-DoD, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 6, see Figure 2.

MST frequency exerted an indirect effect on somatic symptom scores through the serial mediation effects of PTSD symptoms and depressive symptoms (See Table 8). The regression model estimation results can be seen in Table 7. The path from MST frequency to PTSD symptoms was significant, $\beta = .42$, $t(1097) = 12.58$, $p < .001$. The path from PTSD symptoms to depressive symptoms was significant, $\beta = .30$, $t(1096) = 15.94$, $p < .001$. The path from PTSD symptoms to somatic symptoms was significant, $\beta = -.10$, $t(1095) = -2.64$, $p = .01$. The path from depressive symptoms to somatic symptoms was significant, $\beta = .-.36$, $t(1095) = -6.85$, $p < .001$. The mediating variables of PTSD symptoms and depressive symptoms were necessary to the significant association between experienced sexual trauma and somatic symptoms; experienced sexual trauma was associated with greater symptoms of PTSD, which were then associated with greater depressive symptoms, which then was associated with greater somatic symptoms. The PTSD and depression variables are integral to the understanding of the relationship between sexual trauma and somatic symptoms. Further, the indirect effect of MST frequency and PTSD symptoms on somatic symptoms was significant without the influence of acute depressive symptoms, suggesting that depressive symptoms resulting from PTSD symptoms are not necessary to predict somatic symptoms following Military Sexual Harassment. Contrast pairwise comparisons between the indirect effect of both mediator variables (SEQ-DoD → PCL → CES-D → PCS-12) and PTSD symptoms only (SEQ-DoD → PCL → PCS-12) indicated there was no significant difference in effect. The hypothesis that PTSD and depression symptoms would have

a serial multiple mediation effect on the relationship between experienced MST and somatic symptoms among those who had experienced MSH-only was supported.

Hypothesis 5b. It was predicted that Posttraumatic Stress Disorder symptoms, as measured by the PCL, and depressive symptoms, as measured by the CES-D, would have serial multiple mediation effects on the relationship between experienced MST and somatic symptoms as measured by the SEQ-DoD and PCS-12 among those who had experienced MSH and MSA. It was specifically predicted that greater levels of experienced sexual trauma would result in greater symptoms of PTSD, which would result in greater symptoms of depression, which would in turn result in greater somatic symptoms. A serial mediator analysis was conducted using Model 6 of PROCESS (Hayes, 2013) in order to determine the direct and indirect effects of MSA on somatic symptoms, while also examining the relationships between MSA, PTSD symptoms, depression symptoms, and somatic symptoms. The first mediating variable of PTSD symptoms was a continuous variable measured by the PCL. The second mediating variable of depression symptoms was a continuous variable measured by CES-D. The predictor variable was the experienced frequency of MSA as measured by the SEQ-DoD, and the criterion variable was somatic symptoms as measured by the PCS-12. For a visual representation of Model 6, see Figure 2.

Results found that MST frequency exerted an indirect effect on somatic symptom scores through the serial mediation effects of PTSD symptoms and depressive symptoms (See table 10). The regression model estimation results can be seen in Table 9. The path from MST frequency to PTSD symptoms was significant, $\beta = .45$, $t(504) = 12.09$, $p < .001$. The path from PTSD symptoms to depressive symptoms was significant, $\beta = .21$, $t(503) = 10.51$, $p < .001$. The path from depressive symptoms to somatic symptoms was significant, $\beta = -.31$, $t(502) = -4.31$, $p <$

.001. Similar to hypothesis 5a, the mediating variables of PTSD symptoms and depressive symptoms were necessary to the significant association between experienced sexual trauma and somatic symptoms. The hypothesis that PTSD and depression symptoms would have a serial multiple mediation effect on the relationship between experienced MST and somatic symptoms among those who had experienced both MSH and MSA was supported.

Discussion

Military Sexual Trauma is a unique type of sexual trauma that affects roughly 15.7% of active duty and veteran military personnel, and is associated with a variety of physical and psychological symptoms (Wilson, 2016). Due to the high rates of sexual trauma within the military, as well as the severe consequences associated with these incidents, a greater understanding of potential risk factors associated with these detrimental outcomes is imperative. Previous research has shown greater somatic symptoms in those who had experienced Military Sexual Assault compared to Civilian Sexual Assault (Surik et al., 2007). Despite limited research on outcomes in male veterans, Kimerling et al. (2007) found that both women and men report significantly greater somatic symptoms following events of Military Sexual Trauma than a sample of civilians who had experienced sexual trauma. The purpose of the present study was to increase our knowledge of risk factors that may be associated with these somatic symptoms following MST, and to examine the relationship between posttraumatic stress disorder, depression, and physical health outcomes in National Guard and Reserve veterans who had experienced MST.

MSH and MSA

Though the phrase Military Sexual Trauma has widely been accepted as an umbrella term to encompass incidents of both sexual assault and sexual harassment in the military, Blaise and

colleagues (2019) found that the combination of terms doesn't allow for the identification of unique physical and psychological outcomes associated with incidents of military sexual assault compared to sexual harassment. For this reason, it was first determined if differences in the degree of somatic symptoms existed between those who experienced MSA and MSH before moving forward with further analyses. As predicted, those who had experienced military sexual assault reported significantly greater somatic symptoms compared to those who experienced military sexual harassment only. While, to our knowledge, previous literature has not yet examined differences in overall physical functioning between the two types of MST, Blaise et al (2019) found that those who had experienced MSA were more likely to report symptoms of PTSD and depression, as well as probable sexual function diagnosis compared to those who had experienced MSH. The current results support the recommendation of Blaise et al. (2019) to separate the term Military Sexual Trauma into its components of Military Sexual Harassment and Military Sexual Assault in dialogue, research, and treatment consideration as it would allow for a greater understanding of the risk factors and physiological outcomes associated with these distinct experiences. Thus, in the present study all remaining hypotheses examined those who experienced Military Sexual Assault and those who experienced Military Sexual Harassment separately when there was data on both groups.

Gender

Hypothesis Two was designed to determine if there was a stronger association between experienced sexual trauma and somatic symptoms in female National Guard and Reserve members compared to male members. The hypothesis was not supported for either the MSA or the MSH-only group. Contrary to the prediction, the relationship between experienced sexual trauma and subsequent somatic symptoms was not stronger for women who had experienced

either MSA or MSH-only compared to men, as gender was not a significant moderating variable. Though these findings were unexpected, they were not unprecedented. When examining the effects of gender on somatic symptoms following trauma, Prospero and Fawson (2010) found that sexual coercion is the type of trauma most likely to cause later physical complaints in men, suggesting that disparities in somatization amongst gender within those who have experienced MST may not be as significant when compared to other traumatic experiences. Further, the hyper-masculine environment within the military may encourage males to focus on physiological symptoms following trauma as opposed to psychological symptoms, which may cause their somatic complaints following MST to be comparable to those of female victims. In one study conducted by Schuyler, Kintzle, Lucas, Moore, and Castro (2017), male veterans were 4 times as likely to report severe physical distress following sexual assault compared to female veterans, indicating inconsistent findings across previous literature. A major difference between the study conducted by Schuyler and colleagues (2017) and the current study is the proportion of male and female participants; while Schuyler and colleagues examined a sample of 2,208 male veterans and 327 female veterans (roughly 13% female), the current study sample was comprised of 75% women, which may account for differences in findings. Further, many previous studies examining sexual trauma outcomes have primarily male participants or examine female-only populations (e.g., Rossiter & Smith, 2014; Schuyler et al., 2017; Suris et al., 2007).

Another explanation for the null result could be a lack of consideration of service-connected disability ratings and subsequent somatic symptoms in the current study. An analysis conducted by the VA discovered that, on average, male veterans receive $8,937 in disability pay, which is roughly $700 more than the average female veteran ($8,248; Institute for Defense Analysis, 2006). Though previous studies have displayed a higher rate of somatic symptom

reporting in women compared to men, there is an apparent higher rate of physical disability reporting and respective compensation specifically for male veterans (Institute for Defense Analysis, 2006; Schyuler et al., 2017). This could be a result of higher risk associated with jobs held primarily by male service members, such as combat positions, or a result of higher rates of reporting for disability compensation purposes in males compared to females. These differences, when considered with the results of current study, may have negated the higher rates of symptom reporting in women. In order to accurately account for these differences, further research should consider service-connected disabilities as a potential factor when assessing for physical health and somatic symptoms.

Social Support

Hypothesis Three was designed to determine if seeking social support is a moderating variable between experienced sexual trauma and somatic symptoms in members of the National Guard and Reserve forces. The hypothesis was not supported for those who had experienced MSA or MSH-only, in that there was not a stronger association between sexual trauma and somatic symptoms in those who did not seek social support compared to those who had. One explanation for the null result in the study could be the phrasing of the variable itself, and the lack of differentiation between presence of social support and seeking social support. Previous literature has found that low levels of social support are associated with greater pain intensity and disability in those with chronic pain, and have similarly found that adverse interpersonal relationships negatively affect somatic outcomes (Driscoll et al., 2015). While the current study examined whether or not the participant sought social support following their sexual trauma, perhaps the more appropriate question would have examined the perceived presence of potential social support regardless of whether the participant actively sought the support or not.

Participants who did not seek social support may have benefitted from the presence of positive interpersonal relationships without the need to disclose their experience (Evers, Kraaimaat, Greenen, Jacobs, & Bijlsma, 2003).

Another consideration for the null hypothesis is the setting of the National Guard and Reserve forces compared to data typically examined within an active duty environment. Seeking social support may be a more vital resource for active duty members following an experience of sexual assault or harassment, as many victims continue working in the same environment as the perpetrator. Members of the National Guard and Reserve may have to encounter the perpetrator during drill weekends or occasional active duty training events, but have a separation from the military environment due to their full-time civilian positions (Stander & Thomsen, 2016). Further, at the time of the survey, participants had been separated from the military for an average of 9.12 years. These individuals may not accurately recall whether they sought support from friends or family members given the significant amount of time that had passed between the incident and the survey.

Medical Attention

Hypothesis Four was designed to determine if seeking medical attention is a significant moderating variable between experienced sexual trauma and somatic symptoms in members of the National Guard and Reserve. This hypothesis was only examined within the Military Sexual Assault sample, as it did not apply to the Military Sexual Harassment group. The hypothesis was not supported, in that the association between sexual trauma and somatic symptoms was not stronger in those who had received medical attention compared to those who had not. One previous study found that, while the experience of civilian sexual assault was associated with a significant increase in medical care utilization, the experience of MSA was not, indicating that

there may be additional factors present that keep service members from seeking medical treatment compared to civilians following sexual trauma (Suris et al., 2004). This difference could be explained by the threat of career-related consequences; many service members fear medical discharge, and may be reluctant to seek medical treatment following a traumatic event such as a sexual assault in order to maintain their career security. For female service members in particular, Turchik et al. (2014) found that gender-related concerns such as discomfort with male service providers and an overall perceived lack of support from the military affected a female service member's likelihood to utilize health care.

Further, it's important to recognize the method of measuring medical attention in the current study compared to trends common in previous literature. The current study asked a single question regarding whether or not the participant sought immediate medical care following the assault. Kimmerling and Calhoun (1994), however, found that individuals are more likely to seek frequent medical care in the one-year post assault regardless of whether they sought immediate medical attention following the assault. Conversely, roughly 14% of service members seek immediate medical attention following an incident of MSA (Kintzle et al., 2015; Turchik et al., 2014). The attentional bias implicated in higher rates of somatic symptoms and medical use following incidents of trauma are likely better observed with health care use trends over time rather than an isolated incident of seeking medical care, as the two may or may not be as closely associated.

PTSD and Depression

Hypothesis Five predicted that rates of PTSD and depression symptomology would influence the relationship between experienced sexual trauma and somatic symptoms, in that PTSD symptomology in the time following an MST incident would predict depressive

symptoms, which would in turn predict somatic symptoms. This hypothesis was supported in both the Military Sexual Assault and Military Sexual Harassment groups (See Figures 3 & 4). These findings suggest that the specific pattern of PTSD symptoms and subsequent symptoms of depression interact to influence somatic symptoms in those who have experienced Military Sexual Trauma of either type. Depression and PTSD are highly comorbid among sexual trauma survivors; Contractor et al. (2013) found that nearly half of sexual assault victims displaying PTSD symptomology carry a comorbid Major Depressive Disorder diagnosis. Another study conducted with 2,863 Iraq combat veterans found that psychiatric comorbidity, specifically PTSD and depression, was associated with significantly greater somatic symptoms compared to those who met criteria for PTSD alone (Hoge, Terhakopian, Castro, Messer, & Engel, 2007). Further, when somatic symptoms accompany behavioral and psychological presentations of depression, the course of the illness is often more severe and leads to heightened health-related anxiety and attentional bias towards physiological sensations (Kapfhammer, 2006). The results of the current study support recent findings that heightened levels of PTSD symptoms are associated with greater occurrences of depression following MST, and suggest a further relationship between these two factors and subsequent somatic symptom severity (Gootzeit & Markon, 2011; Simms et al, 2012).

It is important to note, however, that the measures used to examine PTSD symptomology and symptoms of depression were examining different time periods following the MST event. When responding to prompts on the PCL, participants were asked to think about their worst time since the MST event. Depending on how long the participant had been separated from service, this time period could range from years to decades for each participant. The CES-D, however, asked participants to report only symptoms that had been experienced in the last week. This

difference implies that the presence of PTSD symptoms at any point following the sexual trauma predicts acute depressive symptoms, which in turn influence the severity of somatic symptoms. Examining long-term PTSD and acute depression with regards to somatic symptoms following MST is a relationship that has not yet been examined in previous literature, and should be explored further in order to identify whether the time-frame of depressive symptoms is a significant factor to consider.

When examining indirect effects of PTSD and depression in the MSA group, neither the PTSD symptoms as measured by the PCL nor the depression symptoms as measured by the CES-D were significant in influencing somatic symptoms as stand-alone mediating variables. When examining partial mediation effects of PTSD and depression in the MSH group, however, experienced sexual trauma and PTSD symptoms were found to have a significant indirect effect on somatic symptoms without the influence of depressive symptoms. Further, the difference between the indirect effect of PTSD symptoms and depressive symptoms compared to PTSD symptoms alone was not significant, suggesting that the presence of depressive symptoms did not predict somatic symptoms above and beyond PTSD symptoms alone in those who had experienced Military Sexual Harassment. Blaise et al. (2019) found that, in a sample of 656 female veterans, compared to those who had not experienced any Military Sexual Trauma, those who had experienced MSA were more likely to report higher PTSD and depressive symptoms while those who had experienced MSH-only were more likely to report higher PTSD symptoms, but not depressive symptoms. Further research is required to distinguish the mechanism by which depression plays less of a role in somatic symptom outcome for those who have experienced MSH compared to MSA.

Limitations and Future Directions

The current study had several limitations that should be considered in the interpretation. One significant limitation was that the analysis was conducted using an existing data set, therefore, the author was unable to design the survey questions and measures used in order to explore the relationships. Further, the data was collected between 2002-2003. Since data collection, the criteria for Posttraumatic Stress Disorder in the Diagnostic and Statistical Manual has been updated (DSM-5; American Psychological Association, 2013). The Posttraumatic Stress Disorder Checklist (PCL) has since been updated to be consistent with DSM-5 criteria. Though measures were taken to align the data with current PTSD criteria, the PCL was not used in a format that has been empirically validated and may therefore be unreliable. Further, previous literature has determined that self-report measures of PTSD result in higher reports of symptomology compared to clinician interviews such as the Structured Clinical Interview for DSM-5, and should therefore be interpreted with caution (Bergman, Przeworski, & Feeny, 2017). Future research would benefit from replicating analyses with the appropriate and current measures.

At the time of data collection, an average of 9.12 years had passed since the participants had served in the National Guard or Reserve. Many of the questions referred back to their time in service, may have been increasingly difficult for participants to answer accurately depending on the amount of time since the military service and/or the sexual trauma. The disparity in both the time since participants served in the military and the time since participants experienced military sexual trauma may have resulted in inconsistent reporting across participants, as well as recall-bias and systematic response distortions. Similarly, the cross-sectional nature of the data may have resulted in a reporting of somatic and/or psychological symptoms that were not a direct or

indirect result of the MST incident(s), and may reflect symptomology related to events prior to the MST or completely unrelated. Future research would benefit from collecting survey responses shortly after separation from service.

Further, though all branches of the National Guard and Reserve were examined in the current study, differences between the dynamics of each branch and the resources related to them may have influenced the experiences of Military Sexual Trauma and the resulting consequences. For example, proximity to an active duty military installation may affect a service member's ability to seek appropriate medical services in a timely manner. While some National Guard and Reserve bases are close to these installations, many are in rural areas that lack adequate healthcare resources. Gender differences between branches can be observed as well; while the Air Force and its reserve components are currently comprised of 20% female service members, the Marines are 8% female (Reynolds & Shendruk, 2018). These gender differences may influence the rates of MST as well as the reaction to and resources available for victims of MST, and should therefore be considered in future research.

Additionally, many other variables have been shown to be associated with the psychological and physiological impact of sexual trauma in the military, to include age, enlisted rank, marital status, and education level (Turchik & Wilson, 2010). Experiences of sexual trauma prior to military service may also influence the experience of and reaction to MST (Schuyler et al., 2017). These factors were not examined in the current analysis and may have influenced the results of the study. Further research may consider the possible interactions of these variables in conjunction with comorbid PTSD and depression symptomology in order to have a greater understanding of the influence of these symptoms on poorer physical health prognosis, as well as the aspect by which depression plays a role in the manifestation of those somatic symptoms.

Future research may examine the efficacy of targeting depressive symptoms in treatment of MST-related pathology.

Conclusions

It is estimated that 15.7% of all military service members and 38% of female service members will encounter some form of Military Sexual Trauma during their time in service (Turchik & Wilson, 2010; Wilson, 2016). Experiences of Military Sexual Trauma have been shown to result in rates of PTSD comparable to combat experiences (DiMauro & Renshaw, 2019; Mattocks, et al., 2012). Due to the high prevalence rates of sexual trauma within the military, as well as the significant psychological and physiological outcomes associated with MST, it is imperative to better understand the risk factors that are associated with poorer outcomes as well as potential avenues for efficacious prevention and treatment. Preliminary analyses supported previous findings that the two components of Military Sexual Trauma - assault and harassment - result in different somatic outcomes and should therefore be grouped and analyzed separately when research is conducted (Blais et al., 2019). This study sought to expand on current research regarding variables associated with somatic symptomology of victims of MST, the differences between those who had experienced MSA compared to MSH, as well as the unique outcomes for those who experienced MST in the National Guard and Reserves. Results indicated that gender did not influence the severity of somatic symptoms in those who had experienced assault or harassment while on duty. Further, results indicated that seeking medical attention or social support following the MST experience did not influence the severity of the somatization. When examining the influence of PTSD and depression symptomology, however, the serial mediation effect of both PTSD and depression was significant in predicting higher levels of somatization in those who had experienced MSA as well

as those who had experienced MSH-only. Developing the existing literature examining the

effects of PTSD and depression on somatic symptoms following MST, as well as the possibility

of introducing therapeutic treatment of depression to address somatic symptoms following MST,

could lead to a better understanding of the prevention and treatment of sexual trauma-related

issues amongst our military forces.

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Appendix A: Demographics Questions

1. Are you male or female?
   a. Male
   b. Female
   c. Refused to Answer

2. Were you ever a member of the Reserves or the National Guard?
   a. Yes
   b. No
   c. Not sure
   d. Refused to Answer

3. Please tell me which branch or branches of the Military you served in when you were in the Reserves or National Guard.
   a. Army National Guard
   b. Army Reserves
   c. Naval Reserves
   d. Marine Corps Reserves
   e. Air National Guard
   f. Air Force Reserves
   g. Coast Guard Reserves
   h. Not Sure
   i. Refused to Answer

4. Were you ever ordered to Active Duty other than for training purposes only?
   a. Yes
   b. No
   c. Not sure
   d. Refused to Answer

5. Did you serve the full period for which you were called to active duty?
   a. Yes
   b. No
   c. Not Sure
   d. Refused to Answer

6. After September 7th, 1980, did you serve for 24 months of continuous active duty?
   a. Yes
   b. No
   c. Not sure
   d. Refused to Answer

7. What was your paygrade when you left the Reserves/Guard?
    a. E1-E4
    b. E5-E9
    c. W1-W5
    d. O1-O3
    e. O3-O6+

8. Did you leave the Reserves/Guard at the end or before the end of your enlistment or term?
    a. At the end
    b. Before the end
    c. Not sure
    d. Refused to Answer

9. Do you have a service connected disability?
    a. Yes
    b. No
    c. Not sure
    d. Refused to Answer

10. In general, do you think your life is better, the same, or worse due to your service in the Reserves/Guard?
    a. Better
    b. Same
    c. Worse
    d. Not sure
    e. Refused to Answer

Appendix B: Short Form Health Survey (SF-12)

1. In general, would you say your health is:
    a. Excellent
    b. Very Good
    c. Good
    d. Fair
    e. Poor

2. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf. Does your heath now limit you a lot, limit you a little, or not limit you at all?
    a. Yes, limited a lot
    b. Yes, limited a little
    c. No, not limited at all

3. Climbing several flights of stairs. Does your heath now limit you a lot, limit you a little, or not limit you at all?
    a. Yes, limited a lot
    b. Yes, limited a little
    c. No, not limited at all

4. During the past 4 weeks, have you accomplished less than you would like as a result of your physical health?
    a. Yes
    b. No

5. During the past 4 weeks, were you limited in the kind of work or other regular daily activities you do as a result of your physical health?
    a. Yes
    b. No

6. During the past 4 weeks, have you accomplished less than you would like as a result of any emotional problems, such as feeling depressed or anxious?
    a. Yes
    b. No

7. During the past 4 weeks, did you not do work or other regular activities as carefully as usual as a result of any emotional problems, such as feeling depressed or anxious?
    a. Yes
    b. No

8. During the past 4 weeks, how much did the pain interfere with your normal work, including both work outside the home and housework?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

9. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities like visiting with friends or relatives?
   a. All of the time
   b. Most of the time
   c. A good bit of the time
   d. Some of the time
   e. A little of the time
   f. None of the time

10. How much of the time during the past 4 weeks have you felt calm and peaceful?
    a. All of the time
    b. Most of the time
    c. A good bit of the time
    d. Some of the time
    e. A little of the time
    f. None of the time

11. How much of the time during the past 4 weeks did you have a lot of energy?
    a. All of the time
    b. Most of the time
    c. A good bit of the time
    d. Some of the time
    e. A little of the time
    f. None of the time

12. How much of the time during the past 4 weeks have you felt downhearted and blue?
    a. All of the time
    b. Most of the time
    c. A good bit of the time
    d. Some of the time
    e. A little of the time
    f. None of the time

Appendix C: Department of Defense Sexual Experiences Questionnaire (SEQ-DoD)

During your Reserve or National Guard service, how many times has someone:

1. Repeatedly told sexual stories or jokes that were offensive to you?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

2. Whistled, called, or hooted at you in a sexual way?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

3. Made unwelcome attempts to draw you into a discussion of sexual matters, for example, attempted to discuss or comment on your sex life?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

4. Made crude and offensive sexual remarks, either publicly, like your workplace, or to you privately?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

5. Treated you differently because of your gender, for example, mistreated, slighted, or ignored you?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

6. Made offensive remarks about your appearance, body, or sexual activities?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

7. Made gestures or used body language of a sexual nature that embarrassed or offended you?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

8. Displayed, used, or distributed sexist or suggestive materials, for example, pictures, stories, or pornography that you found offensive?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

9. Made offensive sexist remarks, for example, suggesting that people of your gender are not suited for the kind of work you do?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

10. Made unwanted attempts to establish a romantic sexual relationship with you despite your efforts to discourage it?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

11. Put you down or was condescending to you because of your gender?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

12. Stared, leered, or ogled you in a way that made you feel uncomfortable?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

13. Exposed themselves physically, for example, "flashed" you, in a way that embarrassed you or made you feel uncomfortable?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

14. Continued to ask you for dates, drinks, dinner, etc., even though you said "no"?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

15. Made you feel like you were being bribed with some sort of reward or special treatment to engage in sexual behavior?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

16. Made you feel threatened with some sort of retaliation for not being sexually cooperative, for example, by mentioning an upcoming review?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

17. Touched you in a way that made you feel uncomfortable?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

18. Made unwanted attempts to stroke, fondle, or kiss you?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

19. Treated you badly for refusing to have sex?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

20. Implied faster promotions or better treatment if you were sexually cooperative?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

21. Made you afraid you would be treated poorly if you didn't cooperate sexually?
   a. Never
   b. Once or twice
   c. Sometimes
   d. Often
   e. Very often
   f. Not sure
   g. Refused to Answer

22. Offered to be sexually cooperative to you in exchange for a favor or special treatment from you, for example, offered sex in exchange for a good assignment?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

23. Attempted to have sex with you without your consent or against your will, but was unsuccessful?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

24. Had sex with you without your consent or against your will?
    a. Never
    b. Once or twice
    c. Sometimes
    d. Often
    e. Very often
    f. Not sure
    g. Refused to Answer

Appendix D: PTSD Checklist (PCL)

At any time since it happened, during the worst time:

1. How much were you bothered by repeated, disturbing memories, thoughts, or images of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

2. How much were you bothered by repeated, disturbing dreams of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

3. How much were you bothered by suddenly acting or feeling as if the situation were happening again, as if you were reliving it?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

4. How much were you bothered by feeling very upset when something reminded you of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

5. How much were you bothered by having physical reactions, such as your heart pounding, trouble breathing, or sweating, when something reminded you of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

6. How much did you avoid thinking or talking about the situation or avoid having feelings related to it?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

7. How much did you avoid activities or situations because they reminded you of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

8. How much did you have trouble remembering important parts of the situation?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

9. How much were you bothered by loss of interest in activities that you used to enjoy?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

10. How much did you feel distant or cut off from other people?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

11. How much did you feel emotionally numb or been unable to have loving feelings for those close to you?
    a. Not at all
    b. A little bit
    c. Moderately
    d. Quite a bit
    e. Extremely

12. How much were you bothered by trouble falling or staying asleep?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

13. How much were you bothered by feeling irritable or having angry outbursts?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

14. How much were you bothered by difficulty concentrating?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

15. How much were you "superalert" or watchful or on guard?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

16. How much were you bothered by feeling jumpy or easily startled?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely

Appendix E: Center for Epidemiological Studies Depression Scale (CES-D)

Below is a list of statements that may or may not describe how you have felt or behaved in the past week. Please examine each one carefully, then decide how often you felt or behaved that way in the past week.

1. I felt depressed.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

2. I felt everything I did was an effort.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

3. My sleep was restless.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

4. I was happy.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

5. I felt lonely.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

6. People were unfriendly.
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

7. I enjoyed life.
   a. None of the time to less than one day
   b. One to two days
   c. Three to four days
   d. Five to seven days

8. I felt sad.
   a. None of the time to less than one day
   b. One to two days
   c. Three to four days
   d. Five to seven days

9. I felt that people disliked me.
   a. None of the time to less than one day
   b. One to two days
   c. Three to four days
   d. Five to seven days

10. I could not get "going."
    a. None of the time to less than one day
    b. One to two days
    c. Three to four days
    d. Five to seven days

Table 1

Demographic characteristics of participants (N =3946)

Characteristic	N	%
Gender		
Male	1627	41.2
Female	2319	58.8
Race		
European American	2739	69.4
African American	733	18.6
Asian or Pacific Islander	41	1.0
Hispanic	196	5.0
Western Hemisphere Indian	40	1.0
Other	89	2.3
Sexual Trauma Type		
None	2079	52.7
Sexual Harassment	1244	31.5
Sexual Assault	589	14.9
Refused to Answer	34	0.9

Table 2

Hypothesis 2a. Results from analysis examining the moderation effect of gender on SEQ scores and PCS-12 scores in participants with MSH-only.

		Coeff.	*SE*	*t*	*p*
Constant	i_y	51.69	1.84	28.04	.00
SEQ (X)	b_1	-.27	.22	-1.22	.22
Gender (W)	b_2	-.73	1.04	-.70	.49
SEQ*Gender (XW)	b_3	.11	.12	.97	.32

$R^2 = .003$, MSE = 94.88

$F(3,1209) = 1.108$, $p = .345$

Table 3

Hypothesis 2b. Results from analysis examining the moderation effect of gender on SEQ scores and PCS-12 scores in participants with MSH and MSA.

		Coeff.	*SE*	*t*	*p*
Constant	i_y	57.34	6.05	9.47	.00
SEQ (X)	b_1	-.75	.36	-2.09	.04
Gender (W)	b_2	-3.46	3.11	-1.11	.27
SEQ*Gender (XW)	b_3	.33	.18	1.84	.07

$R^2 = .027$, MSE $= 106.94$

$F(3,560) = 5.24$, *p = .001*

Table 4

Hypothesis 3a. Results from analysis examining the moderation effect of social support on SEQ scores and PCS-12 scores in participants with MSH-only.

		Coeff.	*SE*	*t*	*p*
Constant	i_y	49.99	1.45	3.56	.00
SEQ (X)	b_1	-.10	.09	-1.09	.28
Social Support (W)	b_2	.04	.40	.11	.91
SEQ*Social Support (XW)	b_3	.02	.03	.63	.53

$$R^2 = .003, \text{MSE} = 95.58$$
$$F(3,1127) = 1.26, p = .285$$

Table 5

Hypothesis 3b. Results from analysis examining the moderation effect of social support on SEQ
scores and PCS-12 scores in participants with MSH and MSA.

		Coeff.	SE	t	p
Constant	i_y	48.84	1.79	27.34	.00
SEQ (X)	b_1	-.07	.05	-1.18	.24
Social Support (W)	b_2	.51	.56	.91	.36
SEQ*Social Support (XW)	b_3	-.01	.02	-.45	.65

$R^2 = .022$, MSE $= 106.91$
$F(3,533) = 3.98, p = .008$

Table 6

Hypothesis 4. Results from analysis examining the moderation effect of seeking medical attention on SEQ scores and PCS-12 scores in participants with MSH and MSA.

		Coeff.	SE	t	p
Constant	i_y	51.26	7.44	6.89	.00
SEQ (X)	b_1	-.19	.16	-1.22	.22
Medical Attention (W)	b_2	-1.49	3.89	-.37	.71
SEQ*Medical Attention (XW)	b_3	.08	.09	.96	.34

$R^2 = .014$, MSE $= 117.99$

$F(3,292) = 1.36$, $p = .256$

Table 7.

Hypothesis 5a. Results from analysis examining the serial mediation effects of SEQ scores, PCL scores, and CES-D scores on PCS-12 scores in participants with MSH-only.

IV	DV	β	*SE*	*t*	*p*	R^2
SEQ	PCL	.42	.03	12.58*	< .001	.13
SEQ	CES-D	-.04	.02	-1.61	.11	.20
PCL	CES-D	.30	.02	15.94*	< .001	
SEQ	PCS-12	.02	.04	.49	.63	.07
PCL	PCS-12	-.10	.04	-2.64**	< .01	
CES-D	PCS-12	-.36	.05	-6.85*	< .001	

Note. * p < .001, ** p < .01; PCL = Posttraumatic Checklist score, SEQ = Sexual Experiences Questionnaire score, CES-D = Center for Epidemiologic Studies Depression Scale score, PCS-12 = Short Form Health Survey 12, Physical Composite Score

Table 8

Bias-corrected Bootstrapping Indirect Effects and 95% Confidence Interval for Hypothesis 5a

Model Pathways	Effect	BootSE	95% CI	
			LL	UL
Path 1: SEQ → PCL → PCS-12	-.04***	.02	-.08	-.004
Path 2: SEQ → CES-D → PCS-12	.01	.01	-.01	.004
Path 3: SEQ → PCL → CES-D → PCS-12	-.05***	.01	-.07	-.03
Total Indirect Effect	-.07***	.02	-.11	-.03

Note. *** 95% confidence interval (CI) does not overlap with zero; BootSE = Bootstrap Standard Error, LL = lower limit, UL = upper limit

Table 9

*Hypothesis 5b. Results from analysis examining the serial mediation effects of SEQ scores, PCL scores, and CES-D scores on PCS-12 scores in participants with MSH and MSA.*

IV	DV	*β*	*SE*	*t*	*p*	*R²*
SEQ	PCL	.45	.04	12.09*	< .001	.22
CES-D	CES-D	.01	.02	.63	.53	.23
PCL	CES-D	.21	.02	10.51*	< .001	
SEQ	PCS-12	-.03	.03	-.86	.39	.08
PCL	PCS-12	-.07	.04	-1.85	.07	
CES-D	PCS-12	-.31	.07	-4.31*	< .001	

Note. * *p* < .001; PCL = Posttraumatic Checklist score, SEQ = Sexual Experiences Questionnaire score, CES-D = Center for Epidemiologic Studies Depression Scale score, PCS-12 = Short Form Health Survey 12, Physical Composite Score

Table 10

Bias-corrected Bootstrapping Indirect Effects and 95% Confidence Interval for Hypothesis 5b

Model Pathways	Effect	BootSE	95% CI	
			LL	UL
Path 1: SEQ → PCL → PCS-12	-.03	.02	-.07	.01
Path 2: SEQ → CES-D → PCS-12	.00	.01	-.02	.01
Path 3: SEQ → PCL → CES-D → SF12	-.03***	.01	-.05	-.01
Total Indirect Effect	-.06***	.02	-.10	-.03

Note. *** 95% confidence interval (CI) does not overlap with zero; BootSE = Bootstrap Standard Error, LL = lower limit, UL = upper limit

Model 1

Conceptual Diagram
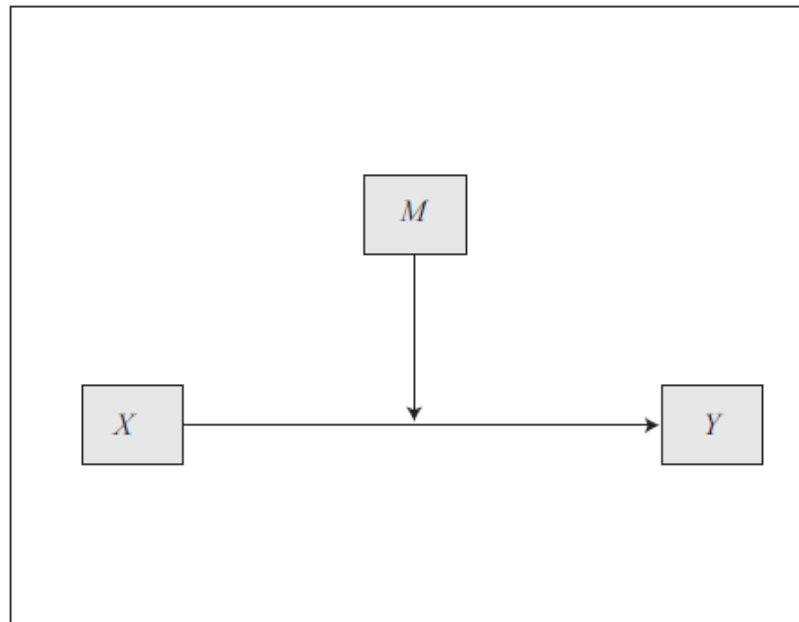
Figure 1. Conceptual diagram of Model 1, a simple moderation model for Process in SPSS.

In hypothesis 2, this model will be used to assess potential differences in how gender (M) moderates the relationship between frequency of MST (X) and somatic symptoms (Y).

In hypothesis 3, this model will be used to assess potential differences in how the seeking of social support and the outcome of the received social support (M) moderates the relationship between frequency of MST (X) and somatic symptoms (Y).

In hypothesis 4, this model will be used to assess potential differences in how the seeking of immediate medical attention (M) moderates the relationship between frequency of MST (X) and somatic symptoms (Y).

Model 6
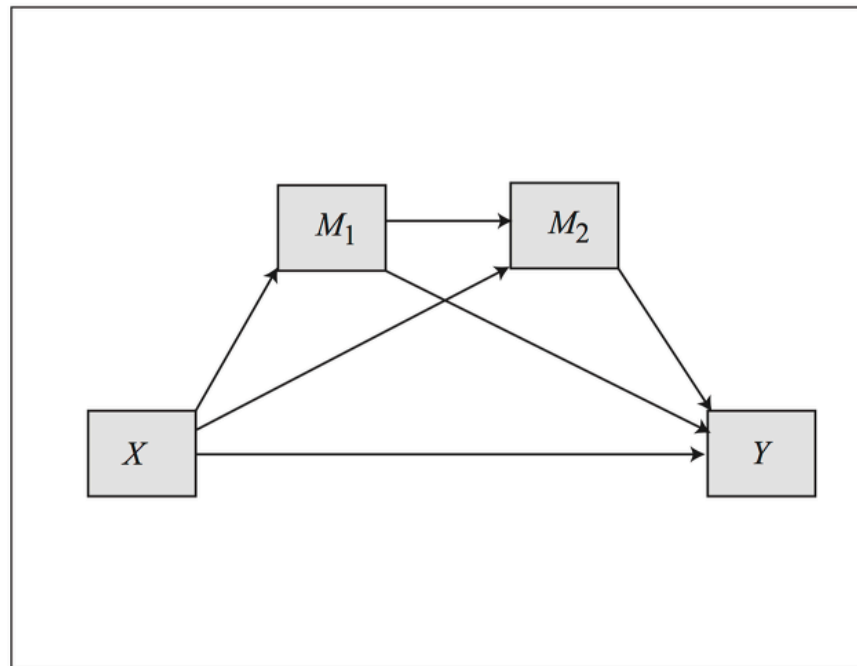(2 mediators)

Conceptual Diagram

Figure 2. Conceptual diagram of Model 6, a serial mediation model for Process in SPSS. In hypothesis 5, this model will be used to assess determine the direct and indirect effects of MST (X) on somatic symptoms (Y), while also examining the relationships between MST, PTSD symptoms (M_1), depression symptoms (M_2), and somatic symptoms.
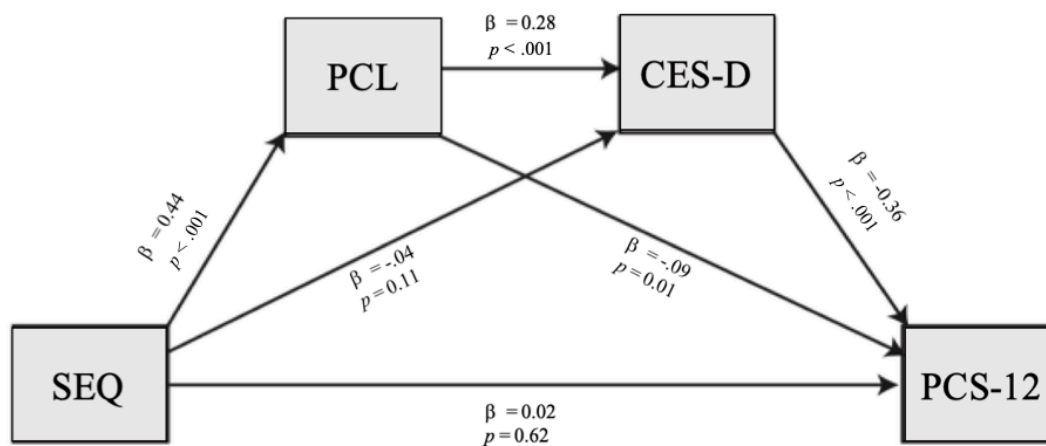
Figure 3. Hypothesis 5a. Serial Mediation Model displaying the direct and indirect effects of MST (X) on somatic symptoms (Y), while also examining the relationships between MST, PTSD symptoms (M_1), depression symptoms (M_2), and somatic symptoms in a sample of National Guard and Reserve veterans who had experienced Military Sexual Harassment.
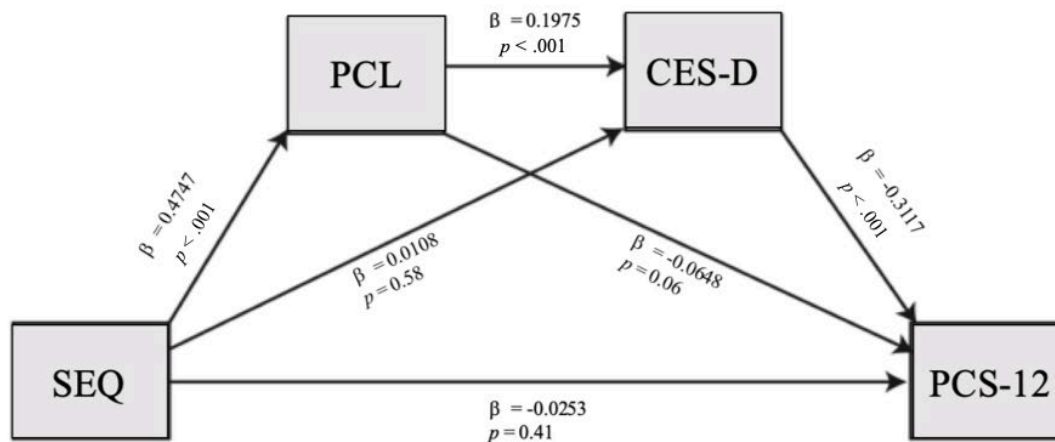
Figure 4. Hypothesis 5b. Serial Mediation Model displaying the direct and indirect effects of MST (X) on somatic symptoms (Y), while also examining the relationships between MST, PTSD symptoms (M_1), depression symptoms (M_2), and somatic symptoms in a sample of National Guard and Reserve veterans who had experienced Military Sexual Assault.