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THE ASSOCIATION OF MILITARY SEXUAL HARASSMENT/ASSAULT WITH
SUICIDAL IDEATION, PLANS, ATTEMPTS, AND MORTALITY
AMONG SERVICE MEMBERS AND VETERANS:
A META-ANALYSIS AND RESEARCH STUDY

by

Whitney S. Livingston

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

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2022

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ABSTRACT

The Association of Military Sexual Harassment/Assault with Suicidal Ideation, Plans, Attempts, and Mortality Among Service Members and Veterans:

A Meta-Analysis and Research Study

by

Whitney S. Livingston, Master of Science

Utah State University, 2022

Major Professor: Dr. Rebecca Blais
Department: Psychology

Death by suicide and military sexual harassment/assault (MSH/A) rates are higher among service members/veterans than rates of suicide and sexual violence among civilians. However, meta-analyses examining the association among suicide and sexual violence are limited to civilians, and current theoretical models of suicide do not adequately predict suicide in this population. The first study in this two-study dissertation is a meta-analysis of the association between MSH/A and suicide-related outcomes with an examination of moderators, including gender, marital status, discharge status, and military branch. The second study used path analysis to examine a novel *Three-Step Theory of Suicide* to determine if it explains suicide risk in this sample. This theory identifies that a risk factor for suicide is psychological pain, which was operationalized as exposure to MSH/A in the current study.

The meta-analysis revealed that MSH/A and suicide ideation and attempts are significantly associated with a small effect size, and this association is higher among those who are women, married, service members, and in the Air Force relative to men,

those who are not married, veterans, and all other branches, respectively. Due to low study count, it was not possible to test the association of MSH/A and suicide plans (n=1) and mortality (n=2). The second study indicated higher hopelessness and lower connectedness were associated with increased suicide ideation, whereas MSH/A and other factors were not associated with suicide ideation and attempts. A post hoc analysis allowed for increased statistical power by combining military or premilitary sexual harassment/assault, which represented exposure to psychological pain. This analysis indicated that the combination of exposure to psychological pain and higher hopelessness were associated with suicide ideation.

Given the dearth of studies on suicide plans and mortality, the suicide literature would be strengthened by additional work in this area. Service members/veterans with histories of MSH/A should be considered at higher risk of suicide, and those who identify as women, married, a service member, or in the Air Force may be at greatest risk. To reduce suicide risk in men, interventions that reduce feelings of hopelessness may be particularly helpful.

PUBLIC ABSTRACT

The Association of Military Sexual Harassment/Assault with Suicidal Ideation, Plans, Attempts, and Mortality Among Service Members and Veterans:

A Meta-Analysis and Research Study

Whitney S. Livingston

Rates of death by suicide and sexual harassment/assault that occurs during military service (MSH/A) are higher among service members/veterans than rates of suicide and sexual violence among civilians. Suicide risk includes thoughts and attempts, and research examining the strength of the relationship between suicide risk and sexual violence across past studies that examined this association are limited to civilians. Moreover, current theories hypothesizing which factors are related to suicide risk do not adequately predict suicide among service members and veterans, and do not account for factors such as MSH/A. This two-study dissertation first calculated the magnitude of the relationship between suicide risk and MSH/A among service members/veterans across studies and tested for factors that may increase this association (gender, marital status, service member versus veteran status, and military branch). Second, a novel theory, *The Three-Step Theory of Suicide*, was tested to identify whether it explains suicide risk among men service members and veterans. This theory indicates that a risk factor for suicide is psychological pain, which was operationalized as exposure to MSH/A in the current study.

Findings indicate MSH/A and suicidal thoughts and attempts are related.

Moreover, the relationship of these factors is stronger among women, married, service members, and those in the Air Force relative to men, those who are not married, veterans, and all other branches, respectively. When testing *The Three-Step Theory of Suicide*, higher hopelessness and lower connectedness were associated with increased suicide ideation, whereas MSH/A and other factors were not associated with suicide ideation and attempts. A secondary analysis allowed for increased statistical power by combining military and/or premilitary sexual harassment/assault, which represented exposure to psychological pain. This analysis indicated that the combination of exposure to psychological pain and higher hopelessness were associated with suicide ideation.

Service members/veterans with histories of MSH/A should be considered at higher risk of suicide, and those who identify as women, married, a service member, or in the Air Force may be at greatest risk. To reduce suicide risk in men, interventions that reduce feelings of hopelessness may be particularly helpful.

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My mother, Sue, instilled in me early on the importance of helping others and a life-long pursuit of learning. Throughout graduate school, she was a steady support, there for me in the most difficult of times. Her kindness and love is immense. My brother, Ryan, early on challenged me to explore and test the extent of my own abilities. He taught me how strong I can be when I put my mind to it. I would not have made it to this point without these two. Even without him being physically present, my father is undoubtedly woven into me and who I am as a human.

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I will end on a heavy note but an important one. Losing someone to suicide sends ripple effects through everyone it touches. We are still so far from preventing death by suicide, but the one thing that we know is that just simply connecting with others can be so instrumental to reducing risk of suicide. Take that moment, make that connection, human to human.

Whitney S. Livingston

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Chapter I

Introduction

Service members and veterans go through a unique experience by serving in the military, and specific military experiences are associated with higher suicide risk. Indeed, higher suicide ideation, attempts, and mortality among service members and veterans are associated with combat exposure (see meta-analysis, Bryan et al., 2015b), killing in combat (Maguen et al., 2012), military sexual trauma (Blais & Geiser, 2019; Kimerling et al., 2016; Livingston et al., 2020), and perceptions of institutional betrayal from the military (Monteith et al., 2016b). Moreover, since the start of the Operation Enduring Freedom (OEF) and Operation Iraqi Freedom Conflicts (OIF), deaths by suicide continue to increase among service members (Tucker et al., 2020) and veterans (Veterans Affairs [VA], 2019). The VA considers prevention of suicide a “top priority” (VA, 2019), with 285 service members (Tucker et al., 2020), and 6,139 veterans dying of suicide in 2017 (VA, 2019). In order to identify potential points of intervention to reduce suicide mortality among service members and veterans, it is useful to turn to theory of suicide.

The *Three-Step Theory of Suicide* proposed by Klonsky and May (2015) provides a theoretical framework that may aid in identifying service members and veterans at higher risk for suicide (see Figure 1). The theory identifies three components to suicide risk. First, the *Three-Step Theory* indicates that the combination of presence of psychological pain and greater feelings of hopelessness predict suicide ideation. Psychological pain is intentionally not defined as there can be many types, such as feelings of defeat, negative self-perceptions, and aversive experiences, such as trauma

exposure (Klonsky & May, 2015). Second, the theory identifies that a buffer to suicide ideation is connectedness, which is defined as feeling connection to others or to a perceived purpose that results in feeling invested in living. The theory states that higher connectedness can act as a preventive factor against suicide ideation among individuals who experience both psychological pain and feelings of hopelessness. Third, the theory suggests that suicide attempts are facilitated by the presence of suicide ideation and dispositional, acquired, and practical capacities for suicide. Dispositional capacity includes factors related to genetics (e.g., pain sensitivity), acquired capacity includes acclimatization of pain or death (e.g., through combat exposure), and practical capacity includes accessibility to knowledge or lethal objects used for suicide (e.g., access to firearms). Notably, the theory adheres to the *ideation-to-action* framework (Chu et al., 2017), which suggests that suicide ideation and attempts should be treated as separate concepts. The theory provides a comprehensive approach to identifying factors of suicide ideation and attempts, however, due to the undefined nature of psychological pain, it is important to pinpoint what this may be in service members and veterans.

Previous research observed that psychological pain can be triggered by trauma (Bolger, 1999), specifically sexual trauma (Thornhill & Thornhill, 1990; Thornhill & Thornhill, 1989). Therefore, a kind of psychological pain that may be relevant among military samples is sexual trauma that occurs during military service. Experiences of sexual trauma include sexual harassment and assault. Sexual harassment is comprised of unwanted and uninvited sexual attention, verbal remarks, or physical contact that is threatening in nature, whereas experiences of sexual assault are comprised of force of sexual contact and physical assault that is sexual in character (U.S. Government, 2014).

To label experiences of sexual harassment or assault that occurred during military service the current study used the term military sexual harassment/assault (MSH/A).

Previous research establishes that exposure to MSH/A is positively associated with suicide-related outcomes relative to no MSH/A (Bryan et al., 2015a; Kimerling et al., 2007; Pavao et al., 2013; White et al., 2018), however research has yet to examine whether MSH/A is differentially related to suicide ideation, plans, attempts, and mortality. Indeed, the *ideation-to-action* framework suggests that it is critical to treat ideation and attempt separately given that these experiences have unique predictors. It is possible to also determine which service members and veterans who experienced MSH/A are at highest risk of suicide by testing demographic (gender and marital status) and military (discharge and branch) moderators to determine if the strength of the association increases among certain groups of military service members and veterans. Therefore, the first study of this 2-study dissertation included a meta-analysis on the association of MSH/A and suicide-related outcomes. Outcomes included suicide ideation, plans, attempts, and mortality. The meta-analysis also examined moderators of the association between MSH/A and suicide-related outcomes. Such findings can inform research aimed at predicting risk of suicide, such as research on suicide theory.

Building on the aforementioned meta-analysis, the *Three-Step Theory of Suicide* (Klonsky & May, 2015) offers a model for testing *how* MSH/A and suicide-related outcomes may be associated. The *Three-Step Theory* has not been tested in service members and veterans, however, previous research among US veterans has examined the various components that make up the model. Indeed, findings show that samples of veterans who report suicide ideation also report higher psychological pain (Reist et al.,

2017), higher hopelessness (Fisher et al., 2015; Pfeiffer et al., 2014), and lower connectedness (Fanning & Pietrzak, 2013; Teo et al., 2018). Additionally, combat exposure, which has been suggested as a metric of capacity (Bryan et al., 2017), is associated with making a suicide attempt (Griffith & Vaitkus, 2013). Moreover, previous research indicates other prominent theories of suicide, such as the *Interpersonal Theory of Suicide* (Joiner, 2005), are not strong predictors of suicide among veteran populations (Kugler, 2018; Pfeiffer et al., 2014), suggesting that alternate models of suicide need to be tested among veterans. Therefore, the second study of this 2-study dissertation examined the *Three-Step Theory of Suicide* (Klonsky & May, 2015) as a model of suicide risk in a sample of men service members and veterans. Results of this dissertation aid in both integrating existing research on MSH/A and suicide-related outcomes, as well as extending understanding of pathways through which these factors are associated, with the completion of a meta-analysis and research study.

Chapter II

The association of military sexual harassment/assault with suicide ideation, plans, attempts, and mortality among service members/veterans:

A systematic review and meta-analysis

Abstract

Suicide rates continue to increase among service members and veterans. Military sexual harassment/assault (MSH/A) may increase risk of suicide in this population, but little is known about specific effect sizes between MSH/A and suicide outcomes, including ideation, plan, attempt, and mortality. Thus, there is a critical need for a systematic review of the literature.

The current meta-analysis examined the relationship of MSH/A with these suicide outcomes, and tested potential moderators of gender, marital status, discharge status, and military branch. PsycInfo, PubMed, Dissertations/Theses, citation lists of relevant papers, and conference brochures were reviewed for papers that included: quantitative analyses in English, U.S. military samples, measures of MSH/A and suicide ideation/plan/attempt/mortality. This search identified 22 studies (N=10,898,875) that measured the association of MSH/A with suicide ideation (k=15), plans (k=1), attempts (k=14) and mortality (k=2).

The fixed effect estimates for the associations of MSH/A and suicide ideation and attempts were significant but small. The association of MSH/A with suicide plans and

mortality was not tested due to the low number of studies reporting those effect sizes. The association of MSH/A and suicide ideation and attempts was higher among women relative to men, those identifying as married versus not married, actively serving compared to discharged, as well as those reporting service in the Air Force relative to all other branches.

The small effect sizes for the associations of MSH/A and suicide ideation and attempts suggests MSH/A is part of a larger network of risk factors for suicide. Moderators indicate that suicide risk is higher among specific groups, and prevention strategies would be most effective if they targeted these individuals.

Introduction

Among those in the military, suicide is a leading cause of preventable death (Maynard et al., 2018). The prevalence of suicide was higher among those in the military compared with civilians in 2017, with 21.9 service members (Tucker et al., 2020) and 27.7 veterans dying of suicide (Veterans Affairs [VA], 2019), relative to 18.2 civilians, per 100,000 (Tucker et al., 2020). Rates of suicide continue to increase among service members, too, with 16.1 suicides occurring in 2008 (Kinn et al., 2011), compared to 24.8 in 2018 per 100,000 service members (Tucker et al., 2020). For veterans, the prevalence of suicide from 2005-2017 increased 6.1% (VA, 2019). Moreover, in 2017 veterans accounted for 7.9% of the U.S. adult population, but represented 13.5% of suicides among U.S. adults (VA, 2019). Though risk for suicide is generally well studied, a systematic review of past studies would be helpful to determine if certain factors specific to military service differentially increase risk of suicide across the spectrum of outcomes, including ideation, plans, attempts, and mortality.

Theory indicates that the various levels of suicide-related outcomes, such as suicide ideation, plans, attempts, and mortality, are separate concepts and should be distinguished (Chu et al., 2017; Joiner, 2005; Klonsky & May, 2015). Suicide ideation relates to thoughts about suicide and is a significant risk factor for dying by suicide (Brown et al., 2000). Suicide plans are identified by thoughts of how, where, and when an individual will die by suicide, but does not include intent to follow through with a suicide attempt (Bryan & Rudd, 2006). Suicide attempts are defined by intentional behaviors that are self-injurious (e.g., deliberate overdosing on medication) and include the intent to die,

but attempts do not result in actual death by suicide (Crosby et al., 2011). Suicide mortality is defined by an individual's intentional and self-directed behavior to end their life that results in death (Crosby et al., 2011). Trauma exposure can increase risk of suicide, and one service-related trauma that has been identified as a risk factor for suicidal ideation (Blais & Geiser, 2019), plans (Bryan et al., 2015a), attempts (Livingston et al., 2020), and mortality (Kimerling et al., 2016) is military sexual harassment and assault (MSH/A).

The Department of Defense (DoD) and VA have different ways of defining MSH/A, though both stipulate that the harassment or assault needs to occur during military service. The DoD distinguishes between types of sexual trauma to identify *sexual harassment*, such as unwanted sexual advances or comments of a sexual nature, versus *sexual assault*, such as intentional force, intimidation, and threats without consent that result in sexual contact (DoD, 2017, 2018b). Among DoD, prevalence of sexual harassment that is reported is 21.4% among females and 5.7% among males (Davis et al., 2017), while prevalence of sexual assault is 4.3% among females and 0.6% among males (DoD, 2018a). The VA defines such sexual harassment and assault during military service as "military sexual trauma" (MST), and indicates that MST includes undesired, recurrent, or threatening sexual attention or sexual contact (U.S. Government, 2014). Rates of MST among VA-enrolled veterans are 29.1% among females and 1.6% among males (VA, 2018). However, these may be underestimates of the prevalence of MST, as a meta-analysis indicates that rates of MST are as high as 38.4% among women and 3.9% among men (Wilson, 2018). For the purposes of this paper, we refer to sexual harassment

and/or assault that is experienced by service members/veterans during military service as MSH/A.

Theory suggests that suicide is caused by unbearable psychological pain and feelings of guilt, shame, humiliation, fear, and loneliness (*The Psychache Theory*; Shneidman, 1993), resulting in individuals using suicide as a way to escape such intolerable pain (Pompili et al., 2008). This relationship is supported by a meta-analysis that observed large effect sizes for the association of psychological pain and suicidal ideation and attempts (see meta-analysis, Ducasse et al., 2018). A type of psychological pain is sexual trauma (Thornhill & Thornhill, 1990; Thornhill & Thornhill, 1989). Among civilians, meta-analyses showed a moderate effect size for the association between exposure to sexual assault and suicide-related outcomes (see meta-analysis, Dworkin et al., 2017). Among service members and veterans, previous research examined the association of MSH/A and various constructs of suicide-related outcomes (Bryan et al., 2015a; Kimerling et al., 2016) and reviewed this literature (Monteith et al., 2019b), however, it remains unknown whether MSH/A has stronger associations with more or less severe types of suicide-related outcomes among service members and veterans. Thus, the first aim of this study is to identify whether MSH/A is differentially associated with various suicide-related outcomes, such as suicidal ideation and suicide attempts.

The second aim is to identify moderators of this association, including demographic (gender and marital status) and military (discharge status and military branch) moderators. Gender may be a moderator of this association based on theory and past research. For example, the theory of *Rape Myth* (Burt, 1980) indicates that there are

false beliefs about individuals who experience sexual assault, which may be particularly detrimental to men. For instance, if a man holds myths that ‘men do not get raped’ (O'Brien et al., 2015), it may be more difficult for them to cope with sexual trauma as they are processing both the sexual assault and their gender identity, thereby increasing their risk for suicide. In addition, *Male Gender Role Stress* (Eisler & Skidmore, 1987; Eisler et al., 1988; Juan et al., 2017) indicates that there are traditional societal standards of behavior associated with the male gender, such as being strong, confident, and not emotional. Men with MSH/A may struggle to uphold or stay consistent with these standards, thereby undergoing great mental distress and increasing suicide risk. This theory may be particularly salient among men in the military environment, as hyper-masculine beliefs related to maintaining control are prominent (Castro et al., 2015). Findings from previous research indicates that the association between MST and suicide ideation was stronger for men compared to women veterans (Monteith et al., 2016a), whereas other research indicates gender was not a moderator (Tannahill et al., 2020). Moreover, unwanted sexual experiences in the military (not including sexual assault) among men, relative to women, were positively associated with suicidal ideation and plans, but not attempts (Bryan et al., 2015a). Thus, it was hypothesized that the associations of MSH/A and suicide ideation and plans are stronger among men than women, but that there are no differences among genders when examining MSH/A and suicide attempts and mortality.

It is possible marital status also moderates this association, in that being unmarried among those who experienced MSH/A increases risk of suicide-related outcomes. A study on 3.9 million service members observed that the rate of suicide was

highest among those who were never married (21.75), relative to those who were separated/divorced (17.06) or married (13.21; Reger et al., 2015). Increased risk of suicide was also found among unmarried relative to married veterans (Kang et al., 2015; Livingston et al., 2020). Married status may provide a proxy for connectedness, which theory indicates can be protective against suicide risk (Joiner, 2005; Klonsky & May, 2015). Therefore, it was hypothesized that the association between MSH/A and suicide risk is stronger among those who are unmarried than those who are married.

There may also be military characteristics that moderate the positive association between MSH/A and suicide-related outcomes. For example, suicide risk following MSH/A may be worse among service members relative to veterans. MSH/A is most frequently perpetrated by service members serving within the same unit as the survivor (Andresen et al., 2019). Therefore, service members will continue to be in the environment in which they experienced MSH/A, which may subject them to ongoing contact with the service member who sexually harassed/assaulted them (Surís et al., 2013). The inability to escape the individual who sexually harassed/assaulted them may increase the unbearable psychological pain the service member is in after MSH/A, thereby increasing suicide risk. Conversely, veterans can create distance and separation from the service member who sexually harassed/assaulted them following discharge. It was hypothesized that the association of MSH/A and suicide risk is stronger among service members than veterans.

Service members/veterans in certain military branches that experienced MSH/A may be at increased risk of suicide. Across branches, rates of suicide per 100,000 service members are highest among Marine Corps (31.4), and lower among the Army (29.5),

Navy (20.7), and Air Force (18.5; Tucker et al., 2020). Other research indicates Marines relative to Army were associated with *lower* risk of suicide and intentional self-inflicted injury (Livingston et al., 2020), or that observed military branch was not associated with suicidal ideation (Blais & Geiser, 2019). In concern to MSH/A, Marines Corps have higher rates of sexual assault than the Navy, Army, and Air Force (Morral et al., 2016). Due to the mixed results from past research, it was hypothesized that the relationship between MSH/A and suicide risk will not differ based on military branch.

The current meta-analysis aims to 1) calculate the effect sizes of MSH/A and each type of suicide-related outcome, including suicidal ideation, plans, attempts, and mortality among service members and veterans based on previous research, and 2) examine whether gender, marital status, discharge status, and military branch moderate the associations between MSH/A and suicide-related outcomes among service members and veterans.

Methods

A comprehensive search was conducted to identify relevant articles to be considered in the current meta-analysis. First, searches in the online databases of PsycInfo and PubMed were conducted by entering the following search terms: (military sexual trauma AND suicid*), (sexual trauma AND suicid* AND service members), (sexual harassment AND suicid* AND military), and (sexual assault AND suicid* AND military). An asterisk was used to search for any terms that are related to suicidal behaviors (e.g. "suicid*"). The online database of Digital Dissertations and Theses Global was also searched with the above terms in order to include research that has not

been published, potentially due to the “file drawer problem.” The above search terms were also used with this database, however, they were limited to abstracts due to the large return in results (>78,000 papers). Second, backward search procedures were completed by searching reference lists of relevant articles. Third, accessible brochures for relevant conferences (American Psychological Association, Association for Behavioral and Cognitive Therapies, and International Society for Traumatic Stress Studies) were searched for titles and abstracts that included the search terms listed above. Lastly, corresponding authors were contacted if they reported both variables of MSH/A and suicide-related outcomes but did not report the effect size. These authors were also asked if they had any unpublished data and findings that could be included in the current meta-analysis. The final review of the literature occurred in June, 2021.

Operationalization of MSH/A-Related Outcomes

The current study defined MSH/A as any sexual harassment, assault, and trauma experienced during military service, as is consistent with both the DoD and VA definitions (DoD, 2017, 2018b; U.S. Government, 2014).

Operationalization of Suicide-Related Outcomes

Suicide-related outcomes were categorized by the following groups: suicidal ideation, suicide plan, suicide attempt, and suicide mortality. Definitions for these terms are included in the introduction.

Inclusion Criteria

Studies were included if they met the following criteria. First, articles with available full-text papers that involved quantitative analyses and were written in English were included. Second, research was included if it was based on U.S. military samples, whether that includes active duty service members, National Guard, and/or veterans. Third, a measure for MSH/A had to be included in the study. Studies reporting solely childhood sexual trauma were excluded from the current meta-analysis. Fourth, studies were included if they compared MSH/A to no history of MSH/A or included a continuous scale of MSH/A experiences including ‘no experiences of MSH/A’. Studies were excluded if the entire sample was comprised of participants who experienced MSH/A, as no comparison group was provided. Fifth, studies had to include a measurement of suicide ideation, plan, attempt, or mortality. Studies with dichotomous or continuous scales of suicide ideation, plans, attempts, and mortality were included, whereas studies that included solely non-suicidal self-harm or non-suicidal self-injury were excluded. This extends to studies that reported suicidal ideation, however, their measure refers to self-harm that is not specific to suicidal thoughts. Seventh, studies that removed participants from the analyses due to increased suicide risk (e.g., participants who reported a suicide attempt in the past five years were excluded), were not included. Eighth, if studies incorporate an intervention, only the effect sizes that preceded interventions were included in the current study. Figure 1 details the PRISMA flow diagram.

There were several studies that used the same dataset to report on variables of MSH/A and suicide-related outcomes. When the dataset was used by different authors, these studies were pooled to estimate the average effect size across studies using the same

dataset prior to estimating the overall effect size. When the same study authors report findings from a single dataset across papers, just one of these papers is used to represent the effect size. Of note, for one paper the information necessary to calculate the effect size was reported in different tables (Stahlman et al., 2015), thus a study provided by a different author that used the same dataset was used as the sole representation of this dataset (Greb, 2020).

Coding of Included Studies

The effect sizes of the association between MSH/A and suicide-related outcomes were coded. Moderators, including gender (men, women), marital status (unmarried, married), military discharge status (service member, veteran), and military branch (Marines, Navy, Army, and Air Force) were coded in the dataset. Moderators were tested by their grouping, including gender (both continuous based on the percentage of men and dichotomous based on men versus women samples or separate effect sizes for each gender), marital status (based on the percentage of married individuals), discharge status (service member versus veteran), and military branch (based on the percentage of those in each branch versus all other branches, e.g., Navy versus all else). For study identification purposes, the publication year, author, and title were coded. Age, race, and ethnicity information were coded in order to report on sample compositions. For computational purposes, the sample size was coded, and the weight, standard error, variance, and Fisher's Z_r were calculated.

Intercoder Reliability

Papers were double coded by two study authors (W.S.L. and H.S.T.) based on a coding manual created by the lead author (the complete coding manual for this meta-analysis can be found at <https://mfr.osf.io>). These authors discussed and reached a consensus on all differences in information collected and coded.

Statistical Analysis

Calculations of effect sizes for independent studies. Pearson correlations, r , were the reported effect size. All effect sizes reported by original study authors as a Pearson correlation, were coded as this original r . Effect sizes that were reported as any other type of effect size than a Pearson correlation, such as Cohen's d , odds ratio, 2x2 summary table, or chi-square, were transformed into Pearson correlations. Effect sizes were transformed using functions in the "esc" R package (Lüdtke, 2018). The magnitude of the Pearson correlation was interpreted based on Cohen's suggestions (1992) of small (0.10), medium (0.30), or large (0.50). Card (2012) was used to reference meta-analysis procedures throughout.

Merging and comparing effect sizes across studies. The weighted mean effect size was calculated with fixed effects analyses, which is advantageous for meta-analyses with fewer effect sizes (Lin et al., 2020). Heterogeneity of the sample was assessed using the Q_{total} statistic, which identifies heterogeneity of the effect sizes included based on a chi-square distribution.

The effect size of MSH/A with suicide ideation and suicide attempts was calculated. Due to the few papers that examined the association of MSH/A and suicide plans ($k=1$) and mortality ($k=2$), it was not possible to calculate the effect sizes for these

outcomes. For calculating the association of MSH/A and suicide attempts there were studies that incorporated ICD codes as their indicator of suicide risk, which identifies “suicide and intentional self-inflicted injury.” Research examining the association of MST and suicide risk frequently include this ICD code as an indicator of suicide risk (Gibson et al., 2020; Gross et al., 2020; Kimerling et al., 2007; Livingston et al., 2020; Montgomery et al., 2021; Pavao et al., 2013; Tannahill et al., 2020). This code can be considered a measure of suicide attempts, however, due to the vagueness of the metric, the effect size for MSH/A and suicide attempts was also run and reported without studies that used this to measure suicide risk.

To test for moderators, meta-regressions were used to regress the association of MSH/A and suicide-related outcomes on moderators. All calculations for overall effect sizes and moderator analyses were computed through the R package “metafor” (Viechtbauer, 2010).

Testing for publication bias. To test for publication bias, a failsafe N was calculated. The Rosenthal failsafe number identifies how many studies with average effect sizes of zero would need to be included in the calculation of the mean effect size for the association of MSH/A and suicide-related outcomes to not significantly differ from zero (Rosenthal, 1979).

Results

Twenty-two studies included associations of MSH/A and suicide risk among service members and veterans. Study characteristics for articles examining the

association of MSH/A and suicide ideation are described in Table 1, and articles examining the association of MSH/A and suicide attempts are described in Table 2. Averages across studies are provided for those that examined suicide ideation or attempts, as there were too few studies reporting suicide plans and mortality to estimate demographic averages and overall effect sizes. Across studies reporting prevalence of MSH/A by gender of women and men, 38.09% (SD=20.36, k=13) of women and 4.40% (SD=3.89, k=12) of men service members and veterans reported MSH/A. There was only one study that included transgender veterans (N=221; Beckman et al., 2018), and this study found 15.2% of transgender women and 30.0% of transgender men veterans reported MSH/A. For suicide-related outcomes, 24.25% (SD=16.34, k=6) of women and 17.32% (SD=13.55, k=4) of men reported suicide ideation, and 10.25% (SD=9.33, k=9) of women and 9.19% (SD=8.37, k=7) of men reported suicide attempts. The single study on transgender veterans did not report the prevalence of suicide ideation. Demographic and military study characteristic averages stratified by suicide-related outcome of suicide ideation and attempts are described in Table 3.

The Association of MSH/A and Suicide Ideation

Fifteen studies ($n=128,047$) measured the association of MSH/A and suicide ideation. The fixed effect size was small but statistically significant across all studies, $r=.14$, 95% CI [.12, .16]. This effect size indicates that exposure to MSH/A is associated with increased suicide ideation ($p<.05$).

Moderators of the association between MSH/A and suicide ideation. Tests of heterogeneity (Q statistic) and moderation analyses are reported in Table 4.

Heterogeneity was tested for each moderator analysis. There was significant heterogeneity in effect sizes across studies that reported gender (continuous and dichotomous), marital status, discharge status, Army Branch and Air Force. Results from these moderation analyses reveal that the association of MSH/A and suicide ideation was higher among women relative to men, married relative to unmarried, service members relative to veterans, those in the Air Force relative to all other branches, and all other branches relative to those in the Army ($p < .05$). Marine and Navy branches did not moderate the association of MSH/A and suicide ideation ($p > .05$).

The Association of MSH/A and Suicide Plans

Only one study ($n=646$) measured the association of MSH/A and suicide plans (see Bryan et al., 2015a). Therefore, it was not possible to conduct a meta-analysis on this association, though the effect size was $r = .18$ (standard error = 0.02).

The Association of MSH/A and Suicide Attempts

Fourteen studies ($n=4,510,109$) measured the association of MSH/A and suicide attempts. Seven studies ($n=4,505,100$) were pooled prior to calculating the overall effect size as they all included VA-enrolled veterans. Results indicate the fixed effect size was small but statistically significant, $r=.11$, 95% CI [.06, .16]. This effect size indicates that exposure to MSH/A is associated with increased risk for suicide attempts ($p < .05$).

The effect size across studies examining MSH/A and suicide attempts without papers using ICD codes as their measure of suicide attempts was also calculated. Results

indicate the effect size was larger than the overall result for MSH/A and suicide attempts but still considered a small association, $r=.23$, 95% CI [.18, .28], $p<.05$.

Moderators of the association between MSH/A and suicide attempts.

Heterogeneity tests (Q statistic) and moderation analyses are reported in Table 5.

Significant heterogeneity in effect sizes was found among studies that reported variables on gender (continuous and dichotomous), marital status, discharge status, and military branches. Results from these individual moderator analyses indicate that the positive association of MSH/A and suicide attempts is higher among women relative to men, married relative to unmarried, service members relative to veterans, Air Force relative to all other branches, and all other branches relative to Marines, Army, and Navy branches ($ps<.05$).

The Association of MSH/A and Suicide Mortality

Two studies ($n=6,352,500$) reported on the association of MSH/A and suicide mortality (see Gradus et al., 2013b; Kimerling et al., 2016). Calculating the overall effect size for these two studies would not be entirely meaningful or representative, particularly as one includes more than six million VHA-enrolled veterans (Kimerling et al., 2016) and the other includes 646 Marines (Gradus et al., 2013b). Therefore, an average for the association of MSH/A and suicide mortality was not included, nor were moderation analyses examined. That said, the effect sizes for the Kimerling and colleagues (2016) study were $r = .18$ (SE=0.03) for women and $r = .03$ (standard error =0.005) for men veterans. For the Gradus and colleagues paper (2013b) it was not possible to calculate the

effect size given the data reported. Specifically, there were no participants who experienced MSH/A and who died of suicide.

Publication Bias

Publication bias was tested with failsafe *N*s. For the association of MSH/A and suicide ideation, 4,266 papers with effect sizes of zero would be needed to find a null result. Likewise, for MSH/A and suicide attempts, 67,846 studies with effect sizes of zero would be necessary to receive a null result. It is unlikely that these analyses are at risk of publication bias.

Discussion

The current meta-analysis examined the overall association between MSH/A and suicide ideation and MSH/A and suicide attempts among service members and veterans and explored potential demographic and military moderators of these associations. The current study also sought to examine the association of MSH/A with suicide plans and mortality, but too few studies were conducted with these outcomes, therefore precluding meta-analysis.

Results from this meta-analysis revealed that MSH/A was associated with both increased risk for suicide ideation and attempts among service members and veterans and the overall effect size was small. Due to the complexity of suicide and magnitude of the overall effect size ($r=.14$ for suicide ideation and $.11$ for suicide attempts as the outcome), it is likely that MSH/A is single component of many factors related to

increased suicide risk. Indeed, prominent theories of suicide indicate that there are several constructs that increase risk for suicide (Joiner, 2005; Klonsky & May, 2015; Van Orden et al., 2010), including hopelessness, thwarted belonging and lack of connectedness, feeling like a burden to others, and having the capability for suicide. Moreover, research has investigated whether MSH/A is associated with suicide risk through pathways or interactions, including PTSD and depression (Blais & Geiser, 2019; Gradus et al., 2013b; Livingston et al., 2020), post-deployment social support (Monteith et al., 2018), lower resilience and social support (Greb, 2020), higher hopelessness, and lack of connectedness (Livingston et al., 2022). Thus, mental health providers can consider service members and veterans who experienced MSH/A as having potential for higher risk for suicide ideation and attempts, but they should also consider other factors that may compound the effects of MSH/A and increased risk for suicide.

Findings from this meta-analysis indicated women who experienced MSH/A are at higher risk of suicide ideation and attempts than men service members and veterans. Rates of suicide are highest among men veterans relative to women (VA, 2021), which suggests that MSH/A plays a unique role in increasing risk of suicide ideation and attempts among women veterans. These findings follow a common trend, in that research indicates women who experience MSH/A relative to men in the military are at increased risk of alcohol- and drug-use disorders (Gilmore et al., 2016; Goldberg et al., 2019), PTSD, and depression (Tannahill et al., 2021; Tannahill et al., 2020). Qualitative research indicates that men veterans who have experienced MSH/A face barriers to care such as beliefs of men being less affected than women, difficulty upholding beliefs of their masculine identity, and issues with intimacy (Turchik et al., 2013). However, qualitative

research on women veterans indicates they face difficulties seeking help for MST in the male-dominated military environment (Turchik et al., 2013), which highlights a direct barrier to receiving treatment and suicide prevention. Moreover, theories that suggest suicide ideation may be worse among men (Eisler & Skidmore, 1987; Eisler et al., 1988; Juan et al., 2017) may not apply for women service members and veterans due to pressures women face to prove one's masculinity, toughness, and resiliency, which are promoted in the military (Turchik et al., 2013). It will be important to expand on this research by examining gender beyond this binary structure of cisgender men and women by studying these factors among gender diverse service members and veterans, particularly given the increased risk of suicide among sex and gender minority veterans (Lynch et al., 2020).

Service members who reported MSH/A were at increased risk for suicide ideation and attempts relative to veterans. Research in this area tends to examine either service members or veterans (e.g., Gradus et al., 2013b; Kimerling et al., 2007), or combine the two into a single sample (e.g., Blais & Geiser, 2019; Livingston et al., 2022), suggesting this meta-analysis provides novel information regarding the importance of distinguishing between samples when conducting this research. Study authors hypothesized that risk for suicide would be higher for service members who experienced MSH/A due to the service member who harassed/assaulted them frequently residing in the same unit as the survivor (Andresen & Blais, 2019), relative to veterans who likely have separation from that service member, thereby reducing suicide risk. Findings from the current meta-analysis indicate that greater focus on supporting service members who report MSH/A may be warranted.

Contrary to hypotheses, suicide ideation and attempts among those who experienced MSH/A is higher among those who are married relative to those who are not married. Research suggests unmarried service members are at heightened risk for suicide (Reger et al., 2015), indicating that when MSH/A is accounted for, it plays a particular role in marital status increasing risk of suicide. Specifically, it is possible that this interpersonal trauma of MSH/A makes it difficult to relate with a spouse, or engage in vulnerable and intimate relations that commonly occur in partnered relationships (Blais, 2020b, 2021; Blais et al., 2019; Blais & Livingston, 2021; Blais et al., 2020; DiMauro et al., 2018). For instance, a qualitative study highlighted the theme of relationship difficulties, of which men veterans identified that they pulled away from relationships, struggled with intimacy and distrust in their relationships, and experienced multiple failed relationships following MSH/A (Monteith et al., 2019a). Among women veterans, research indicates sexual trauma, but not nonsexual trauma, is associated with suicide risk through worse sexual function (DiMauro et al., 2018 2018). Another consideration is whether marital status could be considered a proxy for connectedness to others, which is theorized to be protective of suicide (Klonsky & May, 2015). However, an important distinction could be made here that this assumes strong relationship satisfaction within the marriage. Indeed, lower relationship satisfaction is associated with presence of suicide ideation (Blais, 2020a). Moreover, a study examining the association of MSH/A and suicide risk found that couples satisfaction did not buffer the effects of sexual trauma and hopelessness, in part due to the low couples satisfaction reported among the partnered men service members/veterans (Livingston et al., 2022). Thus, marital status may provide a unique factor that increases risk of suicide ideation and attempts among

those who experienced MSH/A, however, the satisfaction within the marriage may further indicate the degree of suicide risk.

The observation that the association of MSH/A and suicide ideation and attempts was highest among those in the Air Force relative to all other branches was unexpected. Moreover, the findings that this association was *lower* for those in the Army when examining moderators of MSH/A and suicide ideation, and for those in the Marines, Army, and Navy when examining moderators of MSH/A and suicide attempts, were contrary to study hypotheses. The US Air Force Suicide Prevention Program was implemented in 1997 and provides a multifaceted approach in order to reduce rates of suicide. Indeed, the prevention program works to identify warning signs, intervene early on, reduce stigma in the community, and track suicide attempts (Knox et al., 2010). Importantly, this program also provides a team to support service members following major traumatic or stressful events, such as terrorist attacks or serious accidents. It is possible that despite the US Air Force Suicide Prevention Program, the experience of MSH/A plays a specific role in increasing risk of suicide among those in the Air Force. Future research may explore pathways through which those in the Air Force may experience increased suicide attempts following MSH/A. Lastly, some caution should be considered with these analyses, in that across military branch moderator analyses only four to eight studies reported on military branch and could thus be included. Additionally, these analyses highlight differences between one branch relative to all other branches, preventing comparison of suicide risk given MSH/A between two branches.

The association of MSH/A and suicide-related outcomes across racial and ethnic groups is important to treatment and prevention efforts, and while the current study was

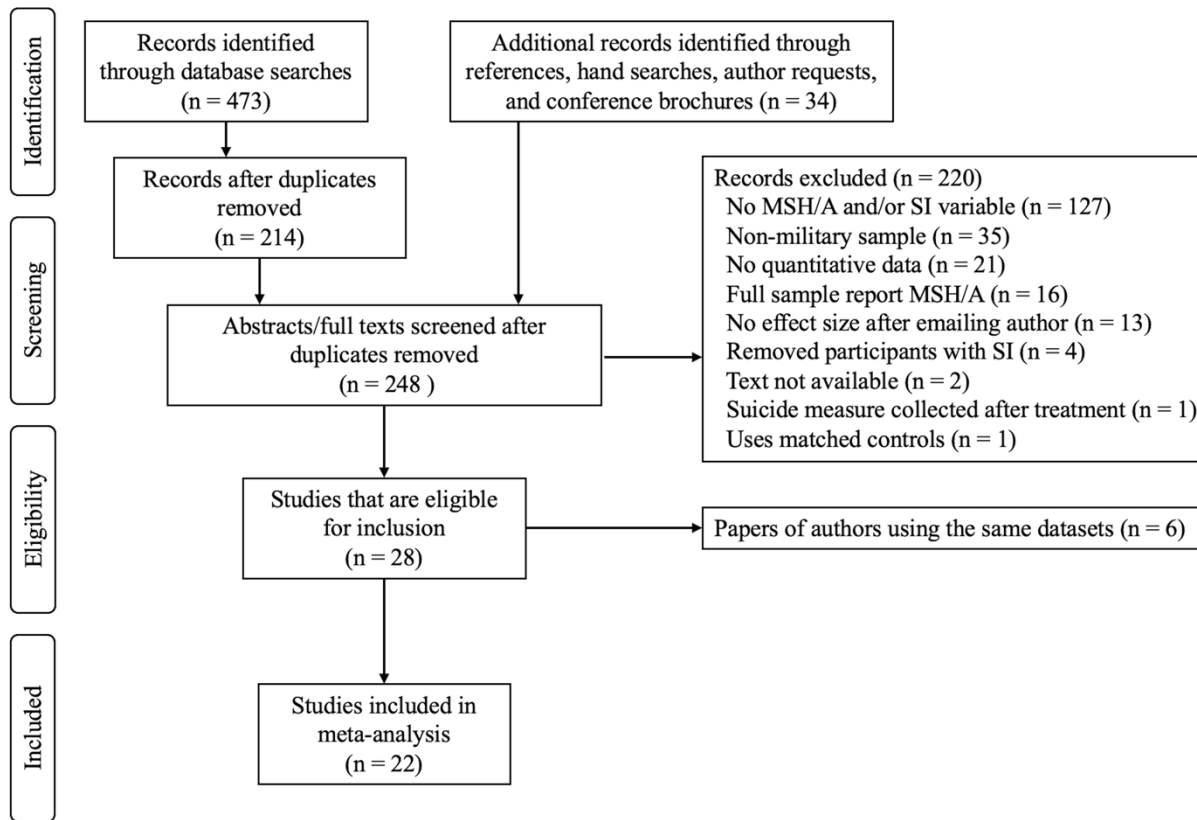
unable to test these relationships in a meaningful way because studies solely report the percent of the sample that identified as a specific racial or ethnic group, and these groupings greatly differ across studies, it is pertinent to dissect the many layers of these associations. First, findings from previous research show mixed results on the association of suicide risk among different racial and ethnic groups. For instance, past research indicates that risk of suicide is highest among White service members/veterans (Blais & Geiser, 2019; Department of Defense, 2019; Kaplan et al., 2007; Livingston et al., 2020; Maguen et al., 2015a; Schoenbaum et al., 2014) while other research indicates risk is highest among Asian/Pacific Islander service members (DoD, 2020), Native Americans/Alaskan Native service members (Reger et al., 2015), or that there is no association between race, ethnicity, and suicidal ideation (Lemaire & Graham, 2011; Pietrzak et al., 2010). Second, aspects of institutionalized racism, negative stereotypes of sexuality aimed at individuals who are racial minorities, and secondary revictimization due to “victim-blaming” creates increased barriers to reporting sexual harassment/assault among individuals who identify as minority races or ethnicities (see review, Tillman et al., 2010), which may prevent accurate estimates on the association of MSH/A and suicide-related outcomes. Moreover, research indicates that death among individuals of minority groups are more frequently misclassified as “undetermined,” whereas individuals who are White are more accurately classified as “suicide” (Rockett et al., 2010). Individuals of racial and ethnic minority groups tend to have more severe mental health symptoms (Gross et al., 2021) and fewer gains from treatment (Fortuna et al., 2010), suggesting further research on the association of MSH/A and suicide-related outcomes among minority racial and ethnic groups, in addition to creating culturally-

informed suicide prevention programs, is pertinent, particularly among service members and veterans.

There are limitations to this meta-analysis. First, study authors initially hoped to examine MSH/A and suicide risk scale types as methodological moderators, however, this was not possible due to some of these measures being used in specific subpopulations, such as the VA MST Screener only being used among VHA-enrolled veterans. Future studies may examine whether one type of measure may better detect the association of MSH/A and suicide risk. Second, all included effect sizes were cross-sectional, precluding any statements of causality. Third, there is nuance to MSH/A that is not captured in the current meta-analysis and that may increase or decrease the risk of suicide, including harassment versus assault (Blais et al., 2019) and what relationship the MSH/A survivor has with the person who sexually harassed or assaulted them (White et al., 2018). Moreover, some measures of MSH/A were specific to deployment, whereas others solely assessed MSH/A during military service.

This meta-analysis is the first to examine the association of MSH/A and suicide-related outcomes across past studies, and test moderators of these associations. Findings indicate there is an association between MSH/A and suicide ideation and attempts, and identify increased risk of suicide given MSH/A among women, those who are married, service members, and those in the Air Force relative to other branches. Results from the current meta-analysis provide greater clarity on the association of MSH/A and suicide-related outcomes, and provide clinical implications for identifying which individuals who experienced MSH/A may be at greatest risk for suicide.

Figure 1. PRISMA Flow Diagram of Study Selection



Note. MSH/A = military sexual harassment/assault, SI = suicide ideation

Table 1*Study Characteristics and Mean Effect Size from Each Study with MSH/A and Suicide Ideation*

Author, year	<i>N</i>	Age	% Men	% Married	Discharge Status	% Army	% Marines	% Air Force	% Navy	<i>r</i>
Beckman et al., 2018	221	48.8	13.6 ^a	NR	V	38.8	9.7	23.3	25.7	.11
Blais & Geiser, 2019	756	32.2	0.0	74.1	ServM/V	54.1	10.0	17.8	15.5	.09
Bryan et al., 2015	464	36.2	71.9	NR	ServM/V	40.1	7.5	30.6	19.2	.15
Greb, 2020	31,705	NR	68.8	64.0	ServM	17.4	20.9	29.0	19.0	.14
Gross et al., 2019	810	36.2	58.4	50.7	V	NR	NR	NR	NR	.16
Klingensmith et al., 2014	1,468	60.4	89.4	72.7	V	41.9	7.7	22.0	23.6	.07
Lemaire et al., 2011	1,173	29.4	88.5	42.8	V	NR	NR	NR	NR	.02
Livingston et al., 2022	302	39.1	100.0	77.0	ServM/V	54.9	7.4	15.2	16.2	.15
Monteith et al., 2015	199	32.5	85.9	NR	V	67.8	23.6	4.5	4.0	.18
Monteith et al., 2016	354	49.6	87.6	NR	V	NR	NR	NR	NR	.10
Monteith et al., 2018	817	34.3	58.3	NR	V	NR	NR	NR	NR	.13
Monteith et al., 2020	447	55.6	0.0	54.1	V	44.1	7.3	29.5	21.5	.15
Montgomery et al., 2021	86,327	48.7	90.5	NR	V	NR	NR	NR	NR	.05
Schry et al., 2015	2,042	37.3	100.0	59.2	ServM/V	NR	NR	NR	NR	.09
White et al., 2018	962	34.8	82.5	NR	ServM	NR	NR	NR	NR	.19

Note. ^a Sample is comprised of transgender veterans. ServM = service member, V = veteran, NR = not reported in the paper.

Table 2*Study Characteristics and Mean Effect Size from Each Study with MSH/A and Suicide Attempts*

Author, year	<i>N</i>	Age	% Men	% Married	Discharge Status	% Army	% Marines	% Air Force	% Navy	<i>r</i>
Bryan et al., 2015	464	36.2	71.9	NR	ServM/V	40.1	7.5	30.6	19.2	.24
Gibson et al., 2020	70,864	65.8	0.0	37.0	V	NR	NR	NR	NR	.22
Gradus et al., 2013a	646	19.3	46.6	NR	ServM	0.0	100.0	0.0	0.0	.10
Gross et al., 2020	750,176	33.1	87.7	43.0	V	NR	NR	NR	NR	.00
Kimerling et al., 2007	3,035,000	56.3	95.6	62.7	V	NR	NR	NR	NR	.10
Klingensmith et al., 2014	1,468	60.4	89.4	72.7	V	41.9	7.7	22.0	23.6	.09
Livingston et al., 2022	302	39.1	100.0	77.0	ServM/V	54.9	7.4	15.2	16.2	.19
Monteith et al., 2016	354	49.6	87.6	NR	V	NR	NR	NR	NR	.11
Monteith et al., 2018	813	34.3	58.3	NR	V	NR	NR	NR	NR	.15
Monteith et al., 2020	445	55.6	0.0	54.1	V	44.1	7.3	29.5	21.5	.06
Montgomery et al., 2021	86,327	48.7	90.5	NR	V	NR	NR	NR	NR	.07
Pavao et al., 2013	126,598	51.6	92.96	13.5	V	NR	NR	NR	NR	.06
Tannahill et al., 2020	435,690	32.0	87.7	43.2	V	62.7	14.5	10.0	NR	.09
White et al., 2018	962	34.8	82.5	NR	ServM	NR	NR	NR	NR	.25

Note. ServM = service member, V = veteran, NR = not reported.

Table 3*Demographic and Military Characteristics Stratified by Suicide Ideation and Attempts Outcomes*

	MSH/A and Suicide Ideation Articles			MSH/A and Suicide Attempts Articles		
	Number of Studies	Average (SD)	Weighted Average (SD)	Number of Studies	Average (SD)	Weighted Average (SD)
Age	14	41.08 (9.67)	47.82 (4.19)	14	44.05 (13.24)	49.95 (10.48)
Gender	10	78.18% (12.76)	84.36% (9.90)	11	80.98% (15.60)	93.29% (3.57)
Married	6	57.25% (10.49)	63.01% (4.71)	7	46.60% (19.19)	55.62% (11.54)
Black/African-American	11	14.97% (10.96)	29.70% (5.54)	14	15.38% (11.12)	11.63% (6.32)
Asian	6	1.87% (1.20)	0.85% (0.33)	7	1.57% (1.30)	0.54% (0.28)
Native Am./Alaskan Native	7	2.01% (0.95)	1.42% (0.21)	6	2.28% (0.69)	1.43% (0.19)
White	14	71.64% (13.57)	60.08% (5.55)	14	67.39% (13.99)	48.39% (8.74)
Latin Ethnicity	10	8.86% (3.82)	7.93% (1.27)	12	7.53% (4.15)	4.43% (3.95)
Army Branch	8	44.89% (14.81)	20.56% (9.39)	5	48.74% (9.69)	62.58% (1.54)
Marines Branch	8	11.76% (6.60)	19.61% (3.88)	5	8.88% (3.15)	14.46% (0.54)
Air Force Branch	8	21.49% (8.86)	28.21% (3.05)	5	21.46% (8.93)	10.09% (1.15)
Navy Branch	8	18.09% (6.66)	19.08% (1.68)	4	20.12% (3.17)	21.65% (2.55)

Note. All variables except age represent the percent of the sample that identified as that demographic or military characteristic. Weighted averages were calculated based on sample size.

Table 4*Moderation Analyses for the Association of Military Sexual Harassment/Assault and Suicidal Ideation*

Moderator	Q(1) Statistic	Estimate	Standard Error	p-value
Gender – continuous (k=10)	192.29***	-0.004	0.000	<.001
Gender – dichotomous (ref = women; k=8)	6.58*	-0.02	0.01	.01
Marital Status - continuous (k=6)	4.23*	0.002	0.001	.04
Discharge - dichotomous (k=11)	256.75***	-0.09	0.01	<.001
Marines - continuous (k=8)	2.85	0.001	0.001	.09
Army - continuous (k=8)	4.08*	-0.001	0.00	.04
Air Force - continuous (k=8)	4.81*	0.002	0.001	.03
Navy - continuous (k=8)	0.05	0.001	0.003	.82

Note. Each row indicates an individual moderator analysis and all estimates were transformed into Pearson *r*. Variables that are continuous are based on percentage of the sample that reported that identity. For instance, when interpreting the gender (continuous) moderation results, for every 10 percentage point decrease in the percent of men (versus women), the association between MSH/A and suicide ideation increases .04 units. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 5*Moderation Analyses for the Association of Military Sexual Harassment/Assault and Suicide Attempts*

Moderator	<i>Q</i> (1) Statistic	Estimate	Standard Error	<i>p</i> -value
Gender – continuous (k=11)	189.66***	-0.007	0.001	<.001
Gender – dichotomous (k=11)	16781.62***	-0.14	0.001	<.001
Marital Status – continuous (k=7)	37.83***	0.001	0.00	<.001
Discharge - dichotomous (k=12)	357.17***	-0.17	0.01	<.001
Marines - continuous (k=5)	79.39***	-0.01	0.002	<.001
Army - continuous (k=5)	74.76***	-0.01	0.001	<.001
Air Force - continuous (k=5)	81.38***	0.01	0.001	<.001
Navy - continuous (k=4)	12.27***	-0.02	0.005	<.001

Note. Each row indicates an individual moderator analysis and all estimates were transformed into Pearson *r*. Variables that are continuous are based on percentage of the sample that reported that identity. For instance, when interpreting the gender (continuous) moderation results, for every 10 percentage point decrease in the percent of men (versus women), the association between MSH/A and suicide attempts increases .07 units*** *p*<.001

Chapter III

Application of The Three-Step Theory of Suicide among men service members and veterans with and without exposure to military sexual harassment and assault

Abstract

Men service members/veterans (SM/Vs) die by suicide at increased rates relative to civilians and women SM/Vs, and men SM/Vs who experienced military sexual harassment/assault (MSH/A) are at even further risk of suicide behaviors. The *Three-Step Theory of Suicide* may explain the association of MSH/A and suicide risk among men SM/Vs but this model has not been applied in this population.

Men SM/Vs ($n=499$) completed survey items assessing psychological pain measured as MSH/A, hopelessness, connectedness, suicide capacity, ideation, and attempts.

Path analysis results indicated that higher hopelessness and lower connectedness were significantly associated with the presence of suicide ideation, whereas MSH/A and the interaction of MSH/A, hopelessness, and connectedness were not associated with suicide ideation, nor was capacity related to suicide attempts. A post hoc analysis testing military and premilitary sexual harassment/assault as psychological pain indicated that the combination of exposure to psychological pain and higher hopelessness was associated with suicide ideation.

Hopelessness, lower connectedness, and exposure to sexual harassment/assault increases risk of suicide among men SM/Vs, particularly a combination of sexual harassment/assault exposure and hopelessness, but full support for the *Three-Step Theory of Suicide* was not observed in the current study.

Introduction

Prevention of suicide is identified as a “top clinical priority” by Veterans Affairs (VA; VA, 2019), and among those in the military, suicide is one of the top causes of preventable death (Maynard et al., 2018). Men in the military are at particularly heightened risk for suicide. Research posits that increased use of lethal means such as firearms (Callanan & Davis, 2012), reduced fear due to increased exposure to violence (e.g., through guns and violent sports; Van Orden et al., 2010; Van Orden et al., 2008), and increased pain tolerance (Riley III et al., 1998) may put men at increased risk for suicide, particularly those in the military. Indeed, men service members comprised 85.4% of the military force in 2012, however, accounted for 92.5% of suicides (Department of Defense [DoD], 2012). Men veterans die by suicide at more than double the rate of women veterans (VA, 2019). Moreover, men service members are at increased risk of completing suicide if they attempt, with one study identifying the ratio of non-lethal suicide attempts to lethal attempts among men service members as 2.32, relative to the 6.58 ratio among men civilians (Anestis & Bryan, 2013). The increased rates of death by suicide among men service members/veterans (SM/Vs) indicate that continuing to identify factors that relate to suicide is particularly pertinent for this population.

Psychological theories are a way to identify critical factors that can help inform prevention and intervention for suicide reduction. Past theories aimed at predicting suicide include the *Psychache Theory* (Shneidman, 1996), *Hopelessness Theory* (Beck et al., 1990; Beck et al., 1985), *Sociological Theory* (Durkheim, 1897), and the *Interpersonal Theory of Suicide* (IPTs; Joiner, 2005). These theories identify extreme

psychological pain, higher hopelessness, social isolation, and capability for suicide as causes of suicide-related outcomes. However, aside from the IPTS, a limitation of these theories is the lack of explanation of why some individuals experience suicide thoughts whereas others engage in suicide behaviors or die by suicide (Klonsky & May, 2015; Selby et al., 2014). Indeed, 2.54% of veterans report suicide ideation, whereas 0.31% of veterans report suicide attempts in the past 12 months (Bossarte et al., 2012). This suggests there is a difference between those who have thoughts of suicide and those who progress to obtaining means and attempting suicide. Therefore, it is important to identify what factors lead men SM/Vs to suicide ideation, and what specific factors result in men SM/Vs attempting suicide, in order to determine those at increased risk of death by suicide. Recent theories have sought to explain this difference through an *ideation-to-action* framework (Chu et al., 2017), which recognizes that the factors that predict suicide ideation are not the same factors that predict suicide attempts.

The *ideation-to-action* framework was introduced in one of the most prominent theories of suicide, the IPTS (Joiner, 2005). Despite its prominence, the theory was originally tested among civilians and findings on the IPTS are generally mixed when testing this model in military populations. For instance, one study with 934 service members (Anestis et al., 2015) and a case-study on two service members observed full support of the IPTS model (Anestis et al., 2009). Conversely, two studies found weak support for the IPTS model (Kugler, 2018; Monteith et al., 2013), and four studies that examined components of the IPTS model also reported poor support (Bryan et al., 2010b; Bryan et al., 2013a; Monteith et al., 2017; Pfeiffer et al., 2014). It is possible that in military samples, theories that do not directly account for trauma may have challenges

given the heightened exposure to traumatic events that SM/Vs experience through their military service relative to civilians. Fortunately, a recent model that also adheres to the *ideation-to-action* framework may improve identification of suicide risk as it accounts for factors that are particularly prevalent among SM/Vs, such as trauma.

Klonsky and May (2015) developed a model of suicide called the *Three-Step Theory of Suicide* (Figure 2). This model provides a novel theory for predicting risk of suicide among SM/Vs that can accommodate for traumatic events, which are prevalent in this population (Seal et al., 2009). Indeed, 93% of veterans report some exposure to traumatic events (Dedert et al., 2009). The *Three-Step Theory* first indicates that suicide ideation is predicted by the combination of psychological pain and higher feelings of hopelessness. The theory states that psychological pain is intentionally not defined, but can include a range of adverse experiences (Klonsky & May, 2015), such as traumatic events. Second, it indicates that suicide ideation can be prevented by strong feelings of connectedness among individuals who experience both increased psychological pain and hopelessness. Finally, the theory suggests that among those with suicide ideation, suicide attempts are predicted by three types of capacity for suicide, including dispositional capacity (e.g., genetics such as not having a phobia of blood), acquired capacity (e.g., habituation to injury/death through exposure during combat), and practical capacity (e.g., access to information or objects used for suicide such as medications used to overdose). Preliminary evidence through studies examining this model among civilians indicates that the predictors of psychological pain, increased hopelessness, higher connectedness, and capacity proposed through the *Three-Step Theory of Suicide* adequately explained suicide

ideation and attempts (Dhingra et al., 2019; Klonsky & May, 2015; Tsai et al., 2021; Yang et al., 2019).

There is some indication that the *Three-Step Theory* may fit for men SM/Vs as it simultaneously accounts for factors related to trauma, lack of connectedness, and habituation to death. For instance, a type of psychological pain is trauma (Bolger, 1999). Trauma is important to account for as psychological disorders related to trauma, such as posttraumatic stress disorder (PTSD), are particularly prevalent among men SM/Vs. For instance, relative to 1.8% of men civilians (Harvard Medical School, 2007), 12.94% of men service members and 22% of men veterans are diagnosed with PTSD (Judkins et al., 2020; Maguen et al., 2010). Further, psychological pain can include sexual trauma (Thornhill & Thornhill, 1990; Thornhill & Thornhill, 1989), which is related to suicide ideation among veterans (Blais & Geiser, 2019; Blais & Monteith, 2019; Khan et al., 2019; Monteith et al., 2015). Lack of connectedness may also be a concern for men SM/Vs. Service members may be isolated from their support systems throughout their military career, including during deployment (e.g., separation from family) and after discharge when they may lose the community that they built through the military (see review, Wilson et al., 2018). Additionally, repeated exposure to killing and fatalities, such as during combat, can reduce the aversive reaction and lead to habituation of fear and death (Bryan et al., 2010a; Selby et al., 2010). This habituation to death may increase men SM/V's capacity for suicide attempts. Lastly, while the model has not been tested in SM/Vs, previous research tested components of the theory and found significant associations. Specifically, research on samples of SM/Vs report suicide ideation is associated with psychological pain (Reist et al., 2017), hopelessness (Fisher et al., 2015;

Pfeiffer et al., 2014), and lower connectedness (Blais, 2020a; Blais et al., 2021; Fanning & Pietrzak, 2013; Teo et al., 2018). Previous research also suggests acquired capability, a similar construct to capacity, is associated with increased risk of suicide behaviors, such as suicide attempts (Bryan & Cukrowicz, 2011; Kerbrat et al., 2015). The following study will examine the *Three-Step Theory of Suicide* among men SM/Vs (Figure 3).

Sexual Trauma as Psychological Pain

Sexual trauma is defined by a single or numerous sexual violations that result in significant distress (Yuan et al., 2006), and research suggests that sexual trauma in the military is associated with increased risk for suicide ideation/behaviors (Blais et al., 2019; Kimerling et al., 2007; Livingston et al., 2020; Monteith et al., 2015; White et al., 2018). Military sexual harassment and/or assault (MSH/A) includes any unwanted sexual comments/advances or intentional force or threat of force that results in unwanted sexual contact during military service, respectively. The DoD reported that of men service members, 5.7% experienced military sexual harassment and 0.6% experienced military sexual assault (DoD, 2018b). The VA combines military sexual harassment and assault into the single construct of “military sexual trauma,” and reports that 1.6% of men veterans report military sexual trauma (VA, 2018). MSH/A is associated with increased suicide ideation among men SM/Vs (Schry et al., 2015), a risk that is further heightened in men relative to women SM/Vs (Monteith et al., 2016a). Testing MSH/A as a proxy for psychological pain may provide valuable information on how MSH/A relates to suicide risk within the context of *Three-Step Theory of Suicide* (Klonsky & May, 2015).

Hopelessness

The *Three-Step Theory* also identifies feelings of hopelessness as a key predictor of suicide ideation (Klonsky & May, 2015). A study conducted on 116 veterans seeking VA outpatient mental health treatment observed that hopelessness was positively associated with suicide ideation with a medium-to-large effect size (Fisher et al., 2015). Similar findings were reported in a study with 443 VHA-enrolled veterans with depressive diagnoses, such that higher hopelessness was positively associated with suicide ideation (Pfeiffer et al., 2014).

Connectedness with Their Partner

Aspects of discharging from the military can put strain on a veteran's sense of community and identity, thereby reducing their sense of connectedness (Wilson et al., 2018). Moreover, it can also be difficult to build and maintain relationships while in the military due to frequent deployments, potentially leaving veterans with fewer connections or more strained relationships when they return to civilian life (Wilson et al., 2018). Previous research reported that among SM/Vs, lower social connectedness was associated with the presence of suicide ideation (Fanning & Pietrzak, 2013; Lemaire & Graham, 2011; Pietrzak et al., 2011; Teo et al., 2018; Whisman et al., 2020). This association may be particularly detrimental among men in the military, as research indicates men veterans report lower social support than women veterans (Herbert et al., 2018). Moreover, research indicates that women veterans who reported a failed relationship in the past 90 days were at 0.86 odds for suicide, whereas men veterans were at 1.42 increased odds of suicide (Maguen et al., 2015b). In testing the *Three-Step*

Theory, the current study will measure connectedness through relationship satisfaction among partnered men SM/Vs.

Capacity for Suicide

The last component of the *Three-Step Theory of Suicide* model indicates that suicide ideation and suicide attempts relate through capacity for suicide. SM/Vs may have high capacity for suicide through exposure to death and killing during combat, which habituates service members to violent actions or observing the consequences of such actions (Bryan et al., 2017). Moreover, the OEF/OIF conflicts show longer deployments and more redeployments to combat zones (Hosek et al., 2006), suggesting increasing rates of veterans are exposed to combat and, thus, more veterans will have increased capacity for suicide. In testing the *Three-Step Theory*, the current study will assess for capacity for suicide through a measure designed to examine an individual's habituation to pain and fearlessness surrounding mortality (Van Orden et al., 2008).

Study Aim

The aim of the current study is to examine the *Three-Step Theory of Suicide* (Klonsky & May, 2015) among a sample of men SM/Vs in a single model (see Figure 3), which will expand on Klonsky and May's study where the three steps were tested in separate analyses and conducted among civilians. Covariates of age, race/ethnicity, military branch, and premilitary sexual trauma will be included. These covariates were chosen given that ages 18-25 (Maguen et al., 2015a), White race (Kaplan et al., 2007;

Livingston et al., 2020), Marines/Army branch (Kang et al., 2015), and premilitary sexual trauma (Bryan et al., 2015a) are associated with suicide-related outcomes.

Methods

Participants

The current study extracted data from a parent study aimed at examining sexual function and MSH/A among 508 men SM/Vs (Blais, 2021). Participants from the parent study were included if they reported being partnered or married at the time of participation, as relationship satisfaction was the proxy variable for connectedness. Therefore, participants who reported being single ($n=9$, 1.77%) were removed from the current study, resulting in a final sample of 499 men SM/Vs.

Procedure

Participants were recruited through social media advertisements targeting military SM/Vs. Individuals interested in participating were directed to a Qualtrics survey, where they completed screening questions confirming they identified as a man, were of consenting age (≥ 18), were currently in a partnered or married relationship, and served in the military. Participants that met these inclusion criteria were provided with all study details through an Institutional Review Board Letter of Information (LoI). Those who wanted to continue with the study following the LoI provided consent. Participants were offered compensation of \$15. This study was approved by the Utah State University IRB.

Measures

The variables of suicide ideation and attempts were assessed with 2 of the 4 items from the Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001). The second and fourth questions identify suicide ideation and suicide attempts, respectively. Item 2 states “How often have you thought about killing yourself in the past year?” Participants indicated their response through a Likert scale from 1 (*never*) to 5 (*very often, 5 or more times*). Scores for this item range from 1-5, with higher scores indicating greater suicide ideation. Item 4 states “How likely is it that you will attempt suicide someday?” Participants indicated their response through a Likert scale from 0 (*never*) to 6 (*very likely*). Scores for this item range from 0-6, with higher scores indicating greater risk of suicide attempts. The scale has adequate validity and reliability (Osman et al., 2001).

The variable of MSH/A was assessed through the VA Military Sexual Trauma Screening Questionnaire. This is a two-item self-report screener that identifies unwanted/uninvited sexual attention, harassment, and/or assault that occurs during military service. The two items are, “When you were in the military, did you receive uninvited and unwanted sexual attention?” and “Did someone ever use force or threat of force to have sexual contact with you against your will?” Affirmative responses to one or both of these items were coded as 1 (MSH/A), whereas participants who denied having these experiences were scored as 0 (no MSH/A).

Hopelessness was assessed through a single item in the Patient Health Questionnaire-9 (PHQ-9, Kroenke et al., 2001). The second item was used to identify hopelessness and asks “Over the past 2 weeks, how often have you been bothered by

feeling down, depressed, or hopeless?” This item was scored on a Likert scale that ranged from 0 (*not at all*) to 3 (*nearly every day*).

Connectedness was assessed through the Couples Satisfaction Index-4 (CSI-4; Funk & Rogge, 2007). The CSI-4 is a four-item self-report measure that assesses relationship satisfaction. A sample item includes “In general, how satisfied are you with your relationship?” The four items were scored on a Likert scale with varying anchors that range from 0-6 or 0-5. The total score is calculated by summing the four responses. The total scores range from 0 to 21, with higher scores indicating greater levels of satisfaction in the relationship. The CSI-4 is a valid and reliable measure (Funk & Rogge, 2007). Cronbach’s alpha for the CSI-4 using data from the current sample was adequate, .87.

Capacity for suicide was assessed through the Acquired Capability for Suicide Scale-Fearlessness about Death (ACSS-FAD; Ribeiro et al., 2014). The ACSS-FAD is a seven-item self-report measure that examines an individual’s fearlessness of death. A sample item includes: “I am not at all afraid to die.” The seven items were scored on a Likert scale that ranged from 0 (*not at all like me*) to 4 (*very much like me*). All items were summed to identify the total score, which ranged from 0 to 28. Higher scores indicated greater fearlessness of death. The ACSS-FAD is a valid measure (Ribeiro et al., 2014). Cronbach’s alpha for the ACSS-FAD using data from the current sample was adequate, .76.

For the current study, age, race and ethnicity (African American/Black, American Indian/Alaska Native, Latino/Hispanic, Bi-racial/Multi-racial, and White), military branch (Marines, Navy, Air Force, Coast Guard, and Army), and premilitary sexual

trauma were included as covariates and were assessed through a demographic inventory included in the parent study. Marital status (married and non-married) and discharge status (active duty and veteran status) are reported to describe the composition of the sample. While the authors intended to examine the increased risk of suicide for each race/ethnicity and military branch, the number of participants who endorsed various races/ethnicities and military branches were too small to examine. Thus, the race/ethnicity variable was coded as 1 (minority race/ethnicity) and 0 (White race) as the majority of participants identified as White. Additionally, military branch was coded as 1 (Army) and 0 (all other branches) as the majority of participants identified as serving in the Army branch. Exposure to premilitary sexual trauma was dummy coded 1 (affirmative premilitary sexual trauma) and 0 (no premilitary sexual trauma).

Analytic Plan

Sample characteristics were examined using descriptive statistics. Pearson correlations then tested differences between continuous variables. *T*-tests were used to examine differences in the continuous variable of suicide ideation and attempts, hopelessness, connectedness, and capacity for suicide across the dichotomous variable of MSH/A.

A single analysis was used to examine Klonsky and May's *Three-Step Theory of Suicide* (2015) through a path analysis (see Figure 3). Continuous variables of hopelessness, connectedness, capacity for suicide, and age were centered and scaled. Direct paths were calculated from exogenous variables of MSH/A, hopelessness, connectedness, MSH/A x hopelessness, MSH/A x connectedness, hopelessness x

connectedness, and MSH/A x hopelessness x connectedness to suicide ideation. The mediation test of capacity on the association of suicide ideations and attempts was tested by calculating the indirect path from suicide ideation to capacity, and capacity to suicide attempts, as well as the direct path from suicide ideation to suicide attempts. Direct paths from covariates to suicide ideation and suicide attempts were included. All study variables were free to covary within the path analysis.

Model fit was tested through fit indices, including chi-square, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA). The following guidelines were applied to determine strong model fit: chi-square with a p -value $\geq .05$, a CFI and TLI $\geq .95$ (Hu & Bentler, 1999), and a SRMR and RMSEA $\leq .08$ (Browne & Cudeck, 1992; Hu & Bentler, 1999). To take all available data points into account, full information maximum likelihood (FIML) was estimated. All analyses were conducted through R (R Core Team, 2021).

Results

Sample Characteristics

Characteristics of the sample and results of the t -tests for study variables are reported in Tables 6 and 7. The majority of the sample identified as White ($n=435$, 87.17%), with other participants identifying as African American/Black ($n=23$, 4.61%), Native American/Alaskan Native ($n=14$, 2.81%), Latino/Hispanic ($n=33$, 6.61%), bi-racial/multi-racial ($n=14$, 2.81%) or selecting “other” race/ethnicity ($n=3$, 0.60%). A few

participants declined to answer questions related to their race/ethnicity ($n=4$, 0.80%). The majority reported service in the Army ($n=274$, 54.91%), with other participants reporting service in the Air Force ($n=76$, 15.23%), Navy ($n=81$, 16.23%), Marines ($n=37$, 7.41%), or multiple branches ($n=20$, 4.01%). The average age was 39.05 ($SD=10.76$), and the majority of the sample were married ($n=384$, 76.95%), and veterans ($n=332$, 66.53%). A minority of participants reported experiencing MSH/A ($n=64$, 12.83%) and premilitary sexual trauma ($n=75$, 15.03%).

Bivariate Associations

Results of Pearson correlations between continuous variables are reported in Table 6. Suicide ideation was significantly associated with suicide attempts and higher hopelessness with large effect sizes. Suicide ideation was also significantly associated with lower connectedness with a small-to-medium effect size. Suicide attempts were associated with higher hopelessness with a medium-to-large effect size and lower connectedness with a small-to-medium effect size. Higher hopelessness was associated with lower connectedness with a medium-to-large effect size ($ps < .001$). Variables of capacity for suicide and age were not significantly associated with any other continuous variables ($ps > .05$).

Results of independent sample t -tests between MSH/A and continuous study variables are reported in Table 7. Suicide ideation, suicide attempt, and hopelessness scores were significantly higher among those who reported MSH/A relative to those who did not report MSH/A ($ps < .05$). There were no significant differences in connectedness or capacity for suicide scores between those with and without MSH/A ($ps > .05$).

Path Analysis

The path model depicted in Figure 3 provided a strong model fit to the data, as indicated by the following fit indices: $\chi^2(18, N=499)=22.50, p=.21, CFI=0.99, TLI=0.98, SRMR=0.02, \text{ and } RMSEA=0.02$. Table 8 shows the estimates for this model. Consistent with hypotheses, higher hopelessness and lower connectedness were associated with increased suicide ideation. Additionally, increased suicide ideation was significantly associated with higher risk of suicide attempts. Contrary to hypotheses and theory, MSH/A and all interactions (MSH/A x hopelessness, MSH/A x connectedness, hopelessness x connectedness, and MSH/A x hopelessness x connectedness) were unrelated to suicide ideation. Also contrary to hypotheses, capacity for suicide did not significantly mediate the association between suicide ideation and suicide attempts ($B=0.003, 95\% \text{ CI } [-0.003, 0.008], p .365$).

Post Hoc Analysis

The initial analysis revealed that p-values for estimates of MSH/A and an interaction of MSH/A and hopelessness trended towards significant ($ps=.07$), which, when coupled with the low frequency of MSH/A (12.83%), might suggest low power for MSH/A. Therefore, a post hoc analysis was carried out to examine sexual harassment/assault that occurred prior to and/or during military service (termed sexual harassment/assault [SH/A] in this study) as the proxy variable for psychological pain and a predictor of suicide ideation. This resulted in an additional 48 people meeting this criterion for psychological pain (SH/A $n = 112$). The same model described above was

rerun with this new sample distinction. The path model is shown in Figure 4 and had strong fit to the data as evidenced by the following fit indices:

$\chi^2(17, N=499)=18.85, p=.34, CFI=1.00, TLI=0.99, SRMR=0.02, \text{ and } RMSEA=0.02.$

Table 9 shows the estimates for this model. Consistent with the *Three Step Theory of Suicide* (Klonsky & May, 2015), SH/A (relative to no SH/A), higher hopelessness, lower connectedness, and the interaction of SH/A x hopelessness were associated with increased suicide ideation. Contrary to the theory, the other interaction terms (SH/A x connectedness, hopelessness x connectedness, and SH/A x hopelessness x connectedness) were not significantly associated with suicide ideation. The significant interaction of SH/A x hopelessness was plotted and is shown in Figure 5. Based on this plot, when hopelessness reaches the highest level, those who report SH/A have greater suicide ideation relative to those who did not report SH/A. The results of this analysis also indicated that increased suicide ideation was significantly associated with increased suicide attempts. Finally, capacity for suicide was not a significant mediator for the relationship of suicide ideation and suicide attempts in this post hoc analysis ($B=0.003, 95\% \text{ CI } [-0.003, 0.009], p .365$).

Discussion

The current study examined the *Three-Step Theory of Suicide* (Klonsky & May, 2015) among a sample of men SM/Vs. This theory indicates that the presence of psychological pain and increased hopelessness are predictors of suicide ideation, while connectedness can act as a buffer to preventing suicide ideation. Moreover, the theory

states that among individuals with suicide ideation, those who have the capacity will attempt suicide (Klonsky & May, 2015). We observed that higher hopelessness and lower connectedness were significantly associated with suicide ideation, whereas MSH/A, representing psychological pain, and its interaction with hopelessness and connectedness were not associated with suicide ideation. Additionally, suicide ideation was associated with suicide attempts, however, suicide ideation and attempts were not mediated by capacity for suicide. The combination of exposure to MSH/A and hopelessness approached significance and given the small number of participants reporting MSH/A, a post hoc analysis revealed that when MSH/A and premilitary sexual trauma were examined as psychological pain, the combination of SH/A and higher hopelessness were associated with suicide ideation. Such results suggest that when preventing suicide risk among men SM/Vs that experienced SH/A, it may be helpful to target feelings of hopelessness, particularly as they pertain to past sexual trauma. This research supports the first hypothesis of the *Three-Step Theory of Suicide* (Klonsky & May, 2015) and suggests that this mix of psychological pain, such as SH/A, and feelings of hopelessness may better identify those at risk of suicide ideations.

The finding that higher hopelessness was associated with suicide risk is consistent with previous research (Fisher et al., 2015; Pfeiffer et al., 2014). Increased hopelessness and suicide-risk are symptoms of depression (American Psychiatric Association, 2013). While hopelessness may be treated in the context of depression interventions, unfortunately, a meta-analysis of 13 articles revealed that treatment of depression does not decrease suicide ideation (Cuijpers et al., 2013). However, previous studies indicate that among individuals with high hopelessness, the ability to adapt cognitive styles to

more optimistic perspectives can reduce suicide risk (Rudd et al., 2006), suggesting an important area for intervention. For instance, a study that included 97 treatment-seeking active duty Air Force personnel (59% men) reported that increased hopelessness was associated with severe suicide ideation among those who reported poor optimism (Bryan et al., 2013b).

Lower connectedness was also associated with suicide ideation in the current study, however, lower connectedness was not a significant buffer for the association between psychological pain and hopelessness. Connectedness was measured through relationship satisfaction among the partnered men SM/Vs, which previous research indicates is associated with suicide ideation among SM/Vs (Blais, 2020a; Langhinrichsen-Rohling et al., 2011). It is possible that connectedness was not a buffer in the current study due to a low average level of connectedness in this sample. Specifically, the average score on the CSI-4 was 13.32 (SD=4.48), which indicates relationship dissatisfaction (<13.5; Funk & Rogge, 2007). Thus, this sample of men SM/Vs may report such a lack of connection with their partners that they would not have adequate connectedness to buffer their experiences of psychological pain and hopelessness. Future research would extend this line of inquiry by testing this model among men SM/Vs who report higher levels of relationship satisfaction.

In addition to connectedness not acting as a buffer in the current study, there are a couple other ways that the current study differs from previous research that tested the theory (Dhingra et al., 2019; Klonsky & May, 2015; Tsai et al., 2021; Yang et al., 2019). First, these previous studies were tested in civilian samples, whereas the current study was tested in a sample of SM/Vs. Testing this model among SM/Vs is important as these

individuals have higher rates of suicide than civilians (Kaplan et al., 2007; Tucker et al., 2020; VA, 2019). However, measurement of certain components in the model, such as capacity, may not adequately differentiate those with suicide ideations from attempts among men SM/Vs due to service-related experiences. Indeed, men SM/Vs, relative to women, report more war zone-related trauma (Freedy et al., 2010). A component of capacity for suicide is related to access to lethal means, of which nearly half of all veterans own at least one firearm and ownership is more common among men veterans (Cleveland et al., 2017). It is possible that due to their exposure to combat, death, and violence (Bryan et al., 2017) and the knowledge that they carry about lethal means, standard measures of capacity may not distinguish between men SM/Vs at higher risk of suicide due to a ceiling effect caused by occupational exposures. Additionally, a review of the ACSS measure states that refinement, such as through relying on more objective than subjective reports, may improve measurement of this construct among those in the military (Kramer et al., 2020). Further research on improving measurement of this construct among those in the military is warranted.

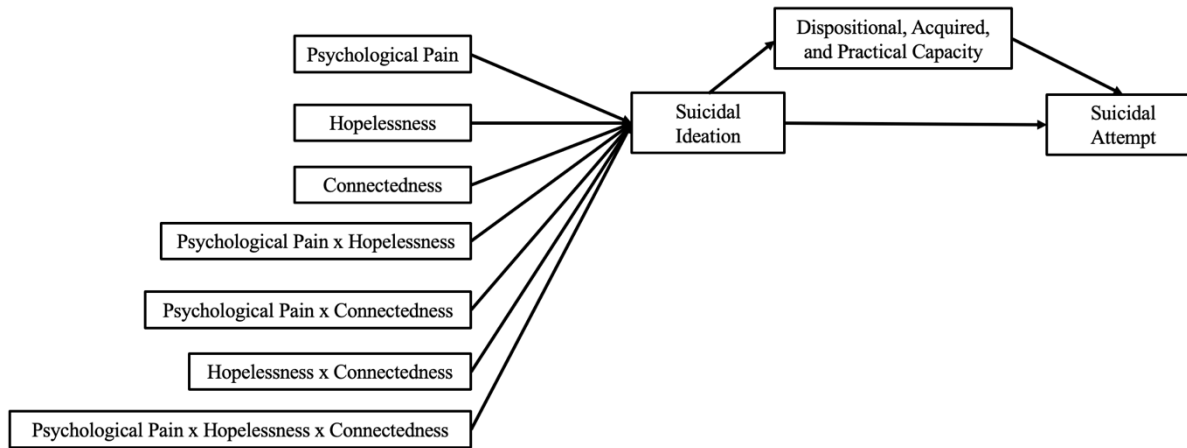
Second, the current study used a different data analytic plan than the previous studies that tested this model (Dhingra et al., 2019; Klonsky & May, 2015; Tsai et al., 2021; Yang et al., 2019). Specifically, these previous studies used separate tests (e.g., *t*-tests, regressions) to examine each of the hypotheses and limited the sample to subgroups of participants to test certain associations. For instance, the interaction of psychological pain and hopelessness as predictors of suicide ideation were tested with a *t*-test, and then the sample was limited to those with high psychological pain before testing the association of connectedness as a buffer of psychological pain and hopelessness.

While this allows for testing this association in individuals with higher pain, it prevents examination of how all the components fit together. The current study uses path analysis to test the complete theory in one model. This approach takes the full model into account with a single analysis while accounting for such factors as measurement error, however, it also means that a three-way interaction is necessary in order to test the buffer effect of connectedness for MSH/A and increased hopelessness. Three-way interactions are difficult to detect statistically. Future research may explore whether these differing statistical methods are responsible for these discrepant results.

There are limitations to the current study. The data were extracted from a convenience sample of partnered men SM/Vs. This suggests that findings from this study may not be generalizable to women or single men SM/Vs. Data collection was cross-sectional, therefore, temporality cannot be assumed. Lastly, psychological pain was measured through MSH/A. However, due to men SM/Vs experiencing other traumatic events including combat, it is possible this factor may be better captured through a more general measure of psychological pain, such as the Scale of Psychache (Shneidman, 1993).

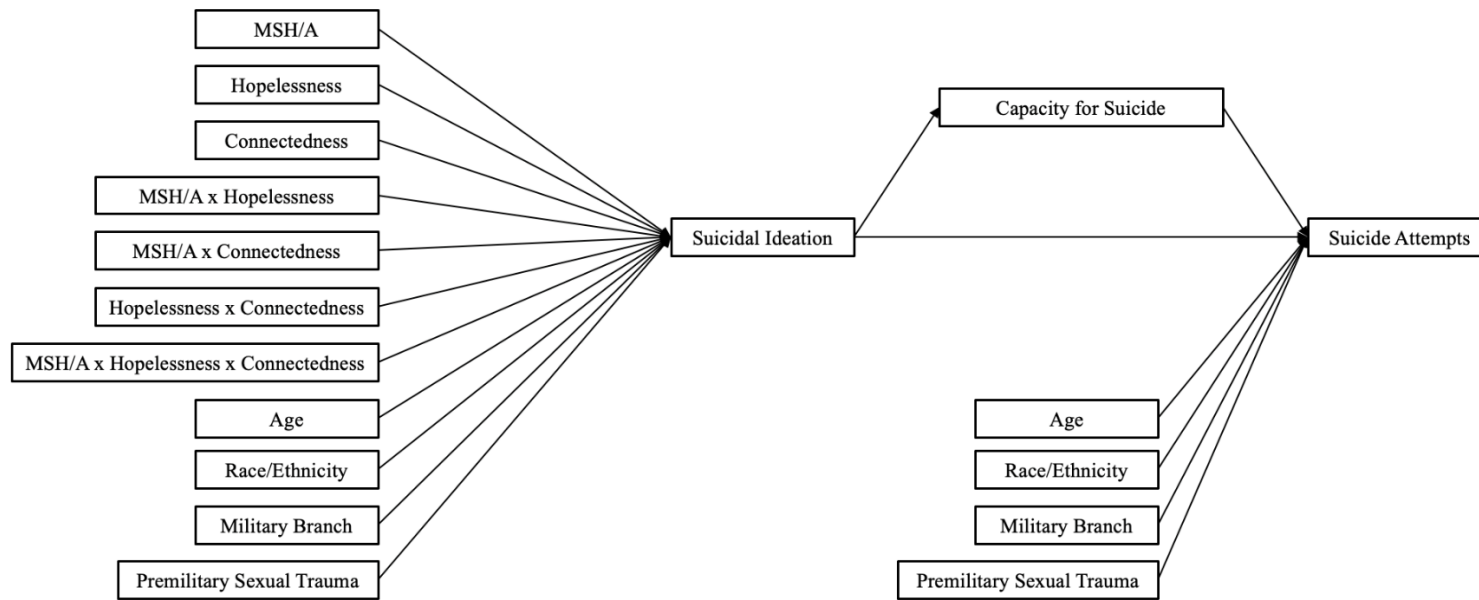
The current study examined the *Three-Step Theory of Suicide* (Klonsky & May, 2015) in a single model among men SM/Vs. This study provides preliminary findings that intervening on hopelessness among those who report SH/A, and improving connectedness among partnered men SM/Vs, may reduce suicide ideations. Lastly, capacity for suicide was not the mechanism between suicide ideations and attempts. An improved measure of capacity specified for men SM/Vs may differentiate those with suicide ideations versus attempts.

Figure 2. A Single Model Adaptation of the Three-Step Theory of Suicide



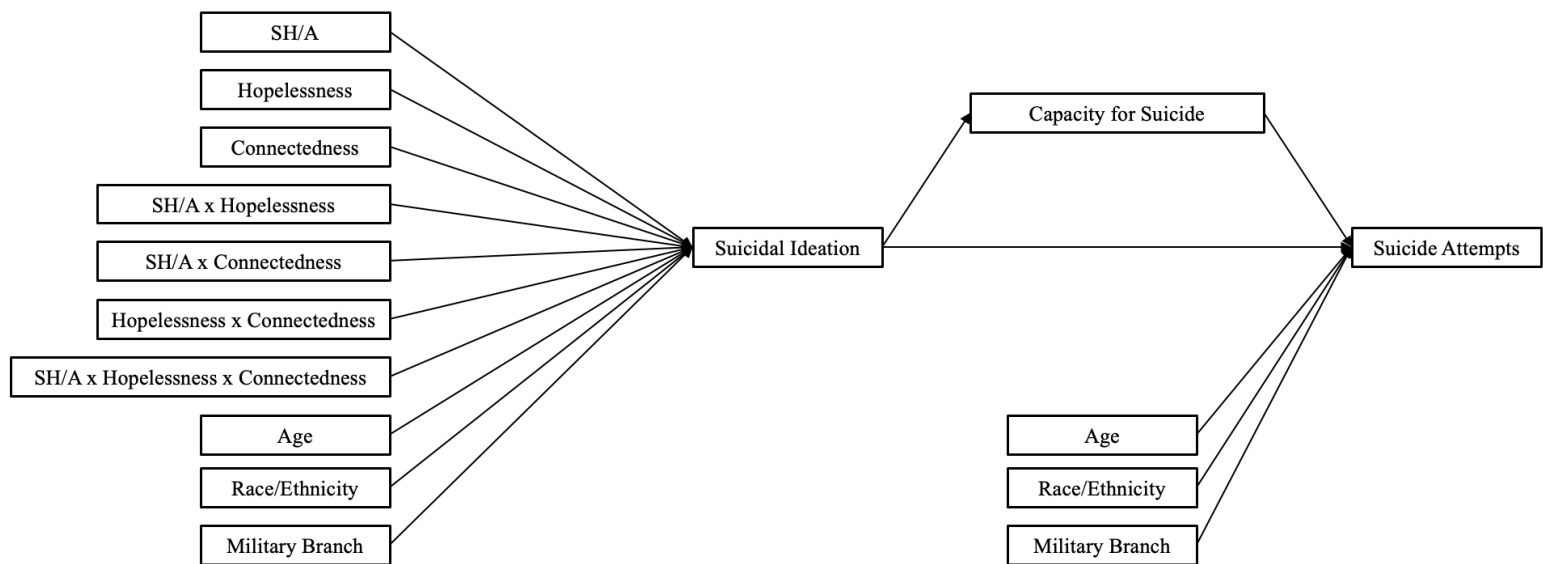
Note. Figure adapts the *Three-Step Theory of Suicide* to a single model.

Figure 3. Testing the Three-Step Theory of Suicide in a Sample of Men Service Members and Veterans with Military Sexual Harassment/Assault Representing Psychological Pain ($n=499$)



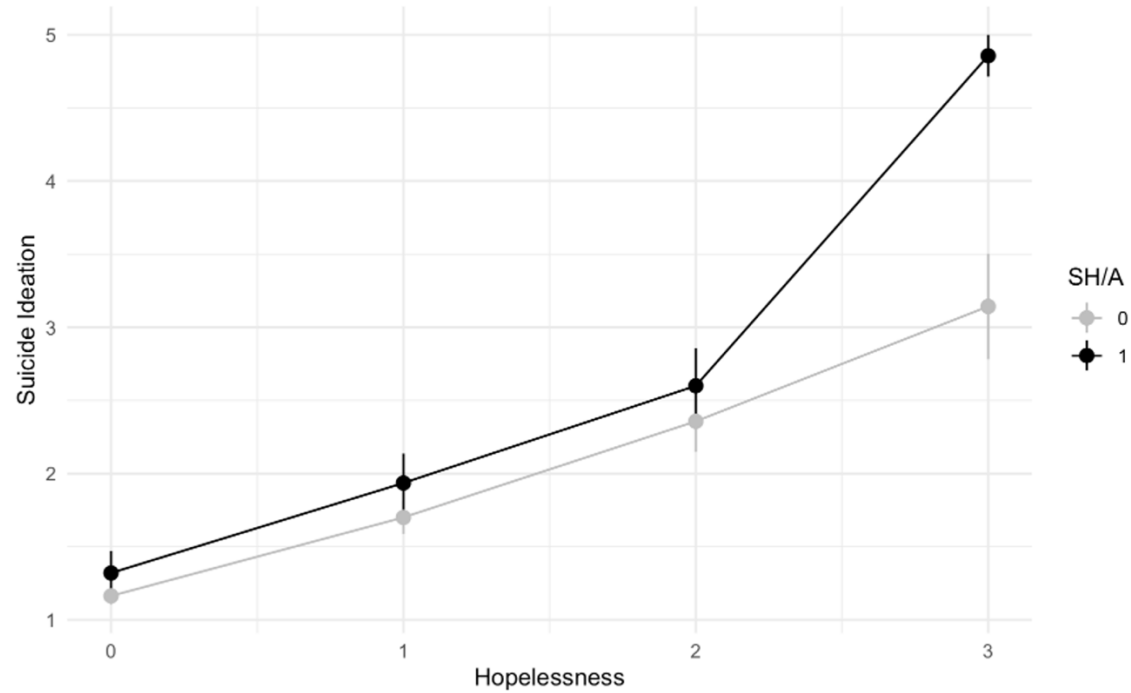
Note. MSH/A = military sexual harassment/assault. MSH/A represents psychological pain from the *Three-Step Theory of Suicide*. All study variables were free to covary in the path analysis.

Figure 4. Post Hoc Analysis Testing the *Three-Step Theory of Suicide* in a Sample of Men Service Members and Veterans with Premilitary Sexual Trauma and Military Sexual Harassment/Assault Representing Psychological Pain ($n=499$)



Note. SH/A = sexual harassment/assault. SH/A represents the combination of premilitary sexual trauma and/or military sexual harassment/assault, relative to no premilitary sexual trauma and military sexual harassment/assault. SH/A represents psychological pain from the *Three-Step Theory of Suicide*. All study variables were free to covary in the path analysis.

Figure 5. Plot of the Significant Interaction Between Sexual Harassment/Assault and Hopelessness with Suicidal Ideation as the Outcome Among Men Service Members/Veterans ($n=499$)



Note. SH/A = sexual harassment/assault, which includes both premilitary sexual trauma and/or military sexual harassment/assault.

Table 6

Correlations, Means, and Standard Deviations of Suicidal Ideation, Suicide Attempts, Hopelessness, Connectedness, Capacity for Suicide, and Age Among Men Service Members and Veterans

	1.	2.	3.	4.	5.	6.
1. Suicidal Ideations ^a	--					
2. Suicide Attempts ^a	.67***	--				
3. Hopelessness ^a	.55***	.47***	--			
4. Connectedness ^b	-.29***	-.24***	-.36***	--		
5. Capacity for Suicide ^a	.05	.07	.01	-.03	--	
6. Age	-.09	-.02	-.03	-.03	-.02	--
<i>M</i>	1.83	0.95	0.97	13.32	18.02	39.05
<i>SD</i>	1.21	1.27	0.97	4.48	6.22	10.76

Note. ^aHigher scores indicate worse functioning. ^bLower scores indicate worse functioning.
* $p < .05$; ** $p < .01$; *** $p < .001$

Table 7

Bivariate Associations of Continuous Variables Between Military Sexual Harassment/Assault and No Military Sexual Harassment/Assault Among Men Service Members and Veterans (N=434)

	No MSH/A <i>n</i> =370	MSH/A <i>n</i> =64	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>t</i> -test
Suicidal Ideation	1.74 (1.15)	2.24 (1.44)	<i>t</i> (60)=-2.33, <i>p</i> =.02
Suicide Attempts	1.83 (1.13)	2.47 (1.70)	<i>t</i> (56)=-2.53, <i>p</i> =.01
Hopelessness	0.88 (0.93)	1.25 (1.01)	<i>t</i> (339)=-2.65, <i>p</i> =.01
Connectedness	13.67 (4.31)	12.61 (5.08)	<i>t</i> (397)=1.72, <i>p</i> =.09
Capacity for Suicide	18.02 (6.23)	18.50 (6.00)	<i>t</i> (285)=-0.49, <i>p</i> =.62

Note. Missing data from 65 service members/veterans. MSH/A = military sexual harassment/assault

Table 8

Path Analysis of the Three-Step Theory of Suicide with Military Sexual Harassment/Assault Representing Psychological Pain Among Men Service Members and Veterans (N = 499)

	Unstand. Estimate	95% Confidence Interval	<i>p</i>	R ²
Suicidal Ideations regressed on				.37
MSH/A (ref = no MSH/A)	0.32	[-0.02, 0.66]	.07	
Hopelessness	0.58	[0.45, 0.71]	<.001	
Connectedness	-0.16	[-0.29, -0.04]	.01	
MSH/A x Hopelessness	0.32	[-0.02, 0.66]	.07	
Hopelessness x Connectedness	-0.13	[-0.27, 0.01]	.07	
MSH/A x Connectedness	0.25	[-0.08, 0.58]	.14	
MSH/A x Hopelessness x Connectedness	0.07	[-0.09, 0.23]	.39	
Army Branch (ref = other military branch)	-0.22	[-0.43, 0.00]	.05	
Age	-0.10	[-0.21, 0.00]	.05	
Minority Race (ref = White race)	-0.18	[-0.48, 0.12]	.24	
Premilitary Sexual Trauma (ref = no Premilitary Sexual Trauma)	0.12	[-0.19, 0.44]	.45	
Capacity for Suicide regressed on				.004
Suicidal Ideations	0.05	[-0.04, 0.14]	.30	
Suicide Attempts regressed on				.49
Capacity for Suicide	0.06	[-0.04, 0.16]	.25	
Suicidal Ideations	0.70	[0.62, 0.78]	<.001	
Army Branch (ref = other military branch)	-0.17	[-0.37, 0.04]	.11	
Age	0.07	[-0.03, 0.17]	.15	
Minority Race (ref = White race)	0.41	[0.13, 0.68]	.003	
Premilitary Sexual Trauma (ref = no Premilitary Sexual Trauma)	0.00	[-0.27, 0.27]	.99	

Note. MSH/A = military sexual harassment/assault.

Table 9

Post Hoc Path Analysis of the Three-Step Theory of Suicide with Premilitary Sexual Trauma and Military Sexual Harassment/Assault Representing Psychological Pain Among Men Service Members and Veterans (N = 499)

	Unstand. Estimate	95% Confidence Interval	<i>p</i>	R ²
Suicidal Ideations regressed on				.38
SH/A (ref = no SH/A)	0.35	[0.08, 0.61]	.01	
Hopelessness	0.53	[0.39, 0.66]	<.001	
Connectedness	-0.17	[-0.31, -0.03]	.02	
SH/A x Hopelessness	0.39	[0.11, 0.67]	.01	
Hopelessness x Connectedness	-0.14	[-0.29, 0.01]	.07	
SH/A x Connectedness	0.19	[-0.07, 0.44]	.16	
SH/A x Hopelessness x Connectedness	0.10	[-0.07, 0.26]	.25	
Army Branch (ref=other military branch)	-0.21	[-0.42, 0.01]	.06	
Age	-0.11	[-0.22, -0.01]	.04	
Minority Race (ref = White race)	-0.16	[-0.46, 0.14]	.29	
Capacity for Suicide regressed on				.004
Suicidal Ideations	0.05	[-0.04, 0.14]	.30	
Suicide Attempts regressed on				.49
Capacity for Suicide	0.06	[-0.04, 0.16]	.25	
Suicidal Ideations	0.70	[0.62, 0.78]	<.001	
Army Branch (ref=other military branch)	-0.17	[-0.37, 0.04]	.11	
Age	0.07	[-0.03, 0.17]	.15	
Minority Race (ref = White race)	0.41	[0.13, 0.68]	.003	

Note. SH/A = sexual harassment/assault. The SH/A variable represents those that experienced premilitary sexual trauma and/or military sexual harassment/assault, relative to those who did not experience premilitary sexual trauma and military sexual harassment/assault.

Chapter IV

Conclusion

This two-study dissertation explored the relationship of MSH/A and suicide-related outcomes. The first of these studies encompassed *what* this relationship is by testing the association of MSH/A and suicide-related outcomes through a comprehensive and systematic review of the literature and meta-analysis. This research further explored this association by testing demographic and military moderators of these associations, including gender, marital status, discharge status, and military branch. This study reports that MSH/A and suicide ideation and attempts were associated with a small effect size, and this association was higher among women, married individuals, active duty service members, and those in the Air Force. The second of these studies encompassed *how* these factors are related by examining the relationship of MSH/A and suicide ideation and attempts through a novel model of suicide, the *Three-Step Theory of Suicide* (Klonsky & May, 2015). This study found partial support for the *Three-Step Theory of Suicide*. Specifically, MSH/A and premilitary sexual trauma interacted with higher hopelessness to increase risk of suicide ideation among men service members and veterans, however, connectedness was not a buffer for suicide ideation and capacity for suicide was not related to increased risk of suicide attempts.

Whereas the meta-analysis demonstrated that the average effect size of MSH/A and suicide ideation and attempts was small in size, it does not articulate direct causation. Moreover, whereas this study examines *what* the association is, future research is necessary to better understand *why* this association is worse among certain individuals.

For instance, the association of MSH/A and suicide ideation/attempts was higher among service members relative to veterans. The DoD has made efforts to reduce MSH/A through offices such as The Sexual Assault Prevention and Response Office (SAPR). However, a recent Independent Review Commission (IRC) identified that the DoD was delayed in their response to sexual assault in the military and called for a review and restructuring of their policies (IRC, 2021). Understanding why the association of MSH/A and suicide risk is worse among service members will provide information on how to improve intervention methods for offices such as SAPR. Similar research is necessary for understanding why the association of MSH/A and suicide ideation/attempts are higher among women, those who are married, and those in the Air Force. Finally, it was not possible to meta-analyze the association of MSH/A and suicide plans and mortality due to a low number of studies conducted on these topics. Additional research is necessary.

The second paper found partial support for a novel theory of suicide, the *Three-Step Theory of Suicide* (Klonsky & May, 2015). This is the first study to test this theory among those in the military, to our knowledge. Additional research is necessary to test whether these findings are replicable. Moreover, a post hoc analysis was necessary due to the low proportion of men service members and veterans reporting MSH/A. Future research may examine this theory among a larger sample of men service members and veterans, or among individuals of other genders. Lastly, this study was focused on understanding how MSH/A and suicide-related outcomes were related, however, due to the other military-related traumas that service members and veterans experience, including combat, future research may test whether other measures of psychological pain are also related to suicide based on this theory.

Suicide is a critical issue among service members and veterans, and identifying factors that are related to suicide, who is at higher risk for suicide, and how these factors relate among service members and veterans is one step in the direction of preventing suicide in this population. This two-study dissertation examined these factors and provides insight of what the literature reports, and new ways to look at these factors. Continued efforts to apply this research to clinical settings and examine why certain individuals may be at higher risk for suicide, is pertinent for prevention of suicide among service members and veterans.

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| Doctoral Student Researcher of the Year Award for Emma Eccles Jones
College of Education and Human Services from USU | 2021 |
| Military Suicide Research Consortium Training Travel Award
Awarded \$1,000 in funding for travel. | 2020 |
| Walter R. Borg Scholarship for Research Productivity
Awarded \$3,250 in funding from College of Education and Human Services, USU. | 2019 |
| Society Leadership Program, American Psychological Association Division 19
Awarded \$1,500 in funding for attendance to APA annual conference. | 2019 |
| Presidential Doctoral Research Fellow
Awarded \$91,200 for stipend and tuition remission from USU. | 2016-2022 |
| National Institutes of Health (NIH) Intramural Research Training Award
Awarded a stipend of \$58,600 over the course of two years. | 2014-2016 |

Publications

19. **Livingston, W. S.**, Fargo, J. D., & Blais, R. K. (2022). Depression symptoms as a potential mediator of the association between disordered eating symptoms and sexual function in women service members and veterans. *Military Psychology*.

18. Blais, R. K. & **Livingston, W. S.** (2021). The association of assault military sexual trauma and sexual function among partnered female service members and veterans: The mediating role of depression and sexual self-schemas. *European Journal of Psychotraumatology*, *12*(1). <https://doi.org/10.1080/20008198.2021.1872964>
17. Blais, R. K., Zalta, A. K., & **Livingston, W. S.** (2020). Interpersonal trauma and sexual function and satisfaction: The mediating role of negative affect among survivors of military sexual trauma. *Journal of Interpersonal Violence*. <https://doi.org/10.1177/0886260520957693>
16. **Livingston, W. S.**, Fargo, J. D., Gundlapalli, A. V., Brignone, E., & Blais, R. K. (2020). Comorbid PTSD and depression diagnoses mediate the association of military sexual trauma and suicide and intentional self-inflicted injury in VHA-enrolled Iraq/Afghanistan veterans, 2004-2014. *Journal of Affective Disorders*, *274*, 1184-1190. <https://doi.org/10.1016/j.jad.2020.05.024>
15. Tannahill, H.S., **Livingston, W. S.**, Fargo, J. D., Brignone, E., Gundlapalli, A. V., & Blais, R. K. (2020). Gender moderates the association of military sexual trauma and risk for psychological distress among VA-enrolled veterans. *Journal of Affective Disorders*, *268*, 215-220. <https://doi.org/10.1016/j.jad.2020.03.017>
14. Blais, R. K., **Livingston, W. S.**, & Fargo, J. D. (2020). Higher depression severity mediates the association of assault military sexual trauma and sexual function in partnered female service members/veterans. *Journal of Affective Disorders*, *261*, 238-244. <https://doi.org/10.1016/j.jad.2019.09.072>
13. Goldberg, S. B., **Livingston, W. S.**, Blais, R. K., Brignone, E., Suo, Y., Lehavot, K., Simpson, T. L., Fargo, J. D., & Gundlapalli, A. V. (2019). A positive screen for military sexual trauma is associated with greater risk for substance use disorders in women Veterans. *Psychology of Addictive Behaviors*, *33*(5), 477-483. <https://doi.org/10.1037/adb0000486>
12. Blais, R. K., Brignone, E., Fargo, J. D., **Livingston, W. S.** & Andresen, F. (2019). The importance of distinguishing between harassment and assault military sexual trauma during screening. *Military Psychology*, *31*(3), 227-232. <https://doi.org/10.1080/08995605.2019.1598218>
11. Blais, R. K., Monson, C., **Livingston, W. S.**, & Maguen, S. (2019). The association of disordered eating and sexual health with relationship satisfaction in female service members/veterans. *Journal of Family Psychology*, *33*, 176-182. <https://doi.org/10.1037/fam0000493>
10. **Livingston, W. S.**, Brignone, E., Fargo, J. D., Gundlapalli, A. V., Maguen, S., & Blais, R. K. (2019). VHA-enrolled homeless veterans are at increased risk for eating disorder diagnoses. *Military Medicine*, *184*, e71-e75. <https://doi.org/10.1093/milmed/usy175>
9. Rusch, H. L., Rosario, M., Levison, L. M., Olivera, A., **Livingston, W. S.**, Wu, T., & Gill, J. M. (2019). The effect of mindfulness on sleep quality: A systematic review and meta-analysis of randomized controlled trials. *Annals of the New York Academy of Sciences*, *1445*, 5-16. <https://doi.org/10.1111/nyas.13996>

8. Martin, C., Kim, H., Yun, S., **Livingston, W. S.**, Fetta, J., Mysliwiec, V., Baxter, T., & Gill, J. (2017). Circulating miRNA associated with posttraumatic stress disorder in a cohort of military combat veterans. *Psychiatry Research*, *251*, 261-265.
<https://doi.org/10.1016/j.psychres.2017.01.081>
7. **Livingston, W. S.**, Gill, J. M., Cota, M. R., Olivera, A., O'Keefe, J. L., Martin, C., & Latour, L. L. (2017). Differential gene expression associated with meningeal injury in acute mild traumatic brain injury. *Journal of Neurotrauma*, *34*, 853-860.
<https://doi.org/10.1089/neu.2016.4479>
6. Gill, J., Merchant-Borna, K., Jeromin, A., **Livingston, W. S.**, & Bazarian, J. (2017). Acute plasma Tau relates to prolonged return to play after concussion. *Neurology*, *88*, 595-602.
<https://doi.org/10.1212/WNL.0000000000003587>
5. Cho, Y. E., Latour, L. L., Kim, H., Turtzo, L. C., Olivera, A., **Livingston, W. S.**, Wang, D., Martin, C., Lai, C., Cashion, A., & Gill, J. (2016). Older age results in differential gene expression after mild traumatic brain injury and is linked to imaging differences at acute follow-up. *Frontiers in Aging Neuroscience*, *8*, 168.
<https://doi.org/10.3389/fnagi.2016.00168>
4. **Livingston, W. S.**, Rusch, H. L., Nersesian, P. V., Baxter, T., Mysliwiec, V., & Gill, J. M. (2015). Improved sleep in military personnel is associated with changes in the expression of inflammatory genes and improvement in depression symptoms. *Frontiers in Psychiatry*, *6*, 59. <https://doi.org/10.3389/fpsyt.2015.00059>
3. Barr, T., **Livingston, W. S.**, Guardado, P., Baxter, T., Mysliwiec, V., & Gill, J. (2015). Military personnel with traumatic brain injuries and insomnia have reductions in PTSD and improved perceived health following sleep restoration: A relationship moderated by inflammation. *Annual Review of Nursing Research, Special Issue on Traumatic Brain Injuries*, *33*, 249-266.
2. Gill, J. M., Merchant-Borna, K., Lee, H., **Livingston, W. S.**, Olivera, A., Cashion, A., Wang, D., & Bazarian, J. J. (2015). Sports-related concussion results in differential expression of Nuclear Factor- κ B Pathway Genes in peripheral blood during the acute and sub-acute period. *The Journal of Head Trauma Rehabilitation*, *31*(4), 269-276.
<https://doi.org/10.1097/HTR.0000000000000191>
1. Heinzelmann, M., Lee, H., Rak, H., **Livingston, W.**, Barr, T., Baxter, T., Scattergood-Keeper, L., & Gill, J. (2014). Sleep restoration is associated with reduced plasma c-reactive protein and depression symptoms in military personnel with sleep disturbance after deployment. *Sleep Medicine*, *15*(12), 1565-70.
<https://doi.org/10.1016/j.sleep.2014.08.004>

Published Abstract

1. Gill, J., **Livingston, W.**, & Latour, L. (2015). Meningeal injury detected by contrast enhanced fluid attenuated inversion recovery images and differential gene expression. *Journal of Neurotrauma*, *32*, A-1-A 152.

Manuscripts Under Review or In Preparation

4. **Livingston, W. S.**, Fargo, J. D., & Blais, R. K. (2021). *Application of The Three-Step Theory of Suicide among men service members and veterans with and without exposure to military sexual harassment and assault*. Manuscript submitted for publication.
3. Blais, R. K., **Livingston, W. S.**, Barrett, T. S., & Tannahill, H. S. (2021). *Individual and interpersonal outcomes associated with single and multiple exposures to civilian and military sexual violence*. Manuscript submitted for publication.
2. **Livingston, W. S.**, Tannahill, H. S., Meter, D. J., Fargo, J. D., & Blais, R. K. (2022). *The association of military sexual harassment/assault with suicide ideation, plans, attempts, and mortality among US service members/veterans: A systematic review and meta-analysis*. Manuscript submitted for publication.
1. **Livingston, W. S.**, Carter, S. P., Leitner, R., Ton, A., Gebhardt, H., Zoellner, L., Mizik, N., Rojas, S., Buchholz, J., & Reger, M. A. (2021). *Veteran peer support Caring Letters suicide intervention: A pilot study on feasibility and effectiveness*. Manuscript submitted for publication.

National Presentations

5. **Livingston, W. S.**, Fargo, J. D., & Blais, R. K. (2021, November). *Application of The Three-Step Theory of Suicide among men service members and veterans with and without exposure to military sexual harassment and assault*. Poster presentation at the annual meeting of the International Society for Traumatic Stress Studies, virtual conference.
4. **Livingston, W. S.**, Fargo, J. D., & Blais, R. K. (2019, November). *Depression mediates the association of assault-related military sexual trauma and poor sexual function in female service members and veterans*. Oral presentation at the annual meeting of the International Society for Traumatic Stress Studies, Boston, M.A.
3. **Livingston, W. S.**, Brignone, E., Fargo, J. D., Gundlapalli, A. V., Maguen, S., & Blais, R. K. (2018, November). *Veterans Affairs-enrolled homeless veterans are at increased risk for eating disorder diagnoses*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Washington, D.C.
2. **Livingston, W. S.**, Fargo, J. D., Gundlapalli, A. V., & Blais, R. K. (2018, November). *PTSD and depression diagnoses mediate the association of military sexual trauma and suicidal ideation in Veterans Affairs-enrolled Iraq/Afghanistan veterans*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Washington, D.C.
1. **Livingston, W. S.** & Blais, R. K. (2017, August). *Military sexual trauma and eating disordered behavior relates to higher sexual dysfunction in female military personnel and veterans*. Poster presented at the annual meeting of the American Psychological Association, Washington, D.C.

Local, Regional, and Division Presentations

11. **Livingston, W. S.** & Barnes, M. L. (2021, December). *Ethnoracial differences in treatment-seeking veterans with substance use disorders and co-occurring PTSD: Presenting characteristics and response to integrated exposure-based treatment by Brown et al. (2020)*. Oral co-presentation for the Seattle VA MIRECC PTSD and Co-Occurring Disorders Journal Club, Seattle, WA.
10. **Livingston, W. S.** (2021, November). *Military sexual harassment/assault and suicidal ideation, plans, attempts, and mortality among service members and veterans: A meta-analysis and research study*. Oral presentation for the Seattle VA HSR&D PTSD Research Forum, Seattle, WA.
9. **Livingston, W. S.** (2019, August). *Increasing engagement of Division 19 Student Chapter Members and supporting their transition to Early Career Psychologists*. Oral presentation at the annual meeting for Division 19 Society for Military Psychology during the American Psychological Association National Conference, Chicago, IL.
8. **Livingston, W. S.**, Fargo, J. D., & Blais, R. K. (2019, April). *Depression mediates the association of disordered eating behaviors and sexual function in female service members and veterans*. Oral presentation at Utah State University's Student Research Symposium, Logan, UT.
7. **Livingston, W. S.**, Brignone, E., Fargo, J. D., Gundlapalli, A. V., Maguen, S., & Blais, R. K. (2017, April). *Homelessness and eating disorders among a sample of OEF/OIF recently returned U. S. veterans*. Oral presentation at Utah State University's Student Research Symposium, Logan, UT.
6. **Livingston, W. S.**, Lejbman, T., Olivera, A., French, L. M., Mysliwicz, V., Gill, J. M. (2015, October). *Peripheral concentrations of Amyloid- β and Tau are increased in military personnel who sustain a traumatic brain injury during deployment*. Poster presented at National Institute of Nursing Research's 30th Annual Symposium, Bethesda, MD.
5. **Livingston, W. S.**, Gill, J. M., Cota, M. R., Destefano, J. L., Latour, L. L. (2015, April). *Evidence of meningeal injury detected by contrast enhanced FLAIR images and differential gene expression*. Presented at NIH's Postbac Poster Day, Bethesda, MD. Awarded Outstanding Poster for this presentation.
4. **Livingston, W. S.**, Rusch, H. L., Nersesian, P. V., Baxter, T., Mysliwicz, V., Gill, J. M. (2015, April). *Improved sleep in military personnel is associated with changes in the expression of inflammatory genes and improvement in depression symptoms*. Poster presented at the 10th Annual Amygdala, Stress and PTSD Conference: Of Mice and Man, Walter Reed National Military Medical Center, Bethesda, MD.
3. **Livingston, W. S.**, Gill, J. M., Cota, M. R., Destefano, J. L., Latour, L. L. (2015, March). *Evidence of meningeal injury detected by contrast enhanced FLAIR images and differential gene expression*. Poster presented at The National Capital Area Traumatic Brain Injury Research Symposium, Bethesda, MD.

2. Rusch, H. L., Shvil, E., Szanton, S.L., **Livingston, W. S.**, Neria, Y., Gill, J. M. (2014, September). *Greater mastery is associated with psychological resistance and recovery in assaulted women and related to maintenance of physical health*. Poster presented at the 2014 annual National Institute of Health Research Festival: The Era of the Brain, Bethesda, MD.
1. **Livingston, W. S.**, Merchant-Borna, K., Lee, H., Guardado, P., Cashion, A., Wang, D., Bazarian, J. J., Gill, J. M. (2014, September). *Sports-related concussions result in reduced expression of inflammatory cytokines and increased expression of inflammatory regulator gene CCR2 during the acute and sub-acute period*. Poster presented at the 2014 National Advisory Council for Nursing Research, Bethesda, MD.

Research Experience

Veterans Affairs Puget Sound – Seattle Division Psychology Intern Researcher: Veteran Peer Support Caring Letters Suicide Intervention Advisor: Mark Reger, PhD	2021-2022
Veterans Affairs Salt Lake City Health Care System Research Assistant: Military Sexual Trauma Research Projects Advisor: Adi V. Gundlapalli, MD, PhD and Harrison Weinstein, PhD	2016-2021
Utah State University Research Assistant: Military Social Science Lab Advisors: Rebecca Blais, PhD and Jamison Fargo, PhD, MS Epi	2016-2021
National Institutes of Health Postbaccalaureate Intramural Research Training Award: Longitudinal study on traumatic brain injury Advisor: Jessica Gill, PhD	2014-2016
American University Capstone Proposal on PTSD Advisor: Bryan Fantie, PhD	2013-2014
Walter Reed National Military Medical Center Research Intern: Clinical Psychophysiology of PTSD Advisor: Connie Duncan, PhD	2012
American Association of Suicidology Research Intern: Military Suicide Project Advisor: Alan Berman, PhD, ABPP	2011

Clinical Experience

Veterans Affairs Puget Sound – Seattle Division Psychology Intern in the PTSD Outpatient Clinic (1 st Rotation) Psychology Intern in the Inpatient Psychiatric Clinic (2 nd Rotation) Psychology Intern in the Addiction Treatment Clinic (3 rd Rotation) Supervisors: Jane Luterek, PhD, Aaron Norr, PhD, and Heather Gebhardt, PhD	2021-2022
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Utah Center for Evidence Based Treatment Doctoral Student Therapist, Dialectical Behavior Therapy Team Supervisor: Kimberly Applewhite, PsyD	2020-2021
Veterans Affairs Salt Lake City Health Care System Doctoral Student Neurocognitive Assessment Provider Supervisor: Patrick Miller, PhD	2019-2020
Utah State University Health and Wellness Clinic Doctoral Student Therapist Supervisor: Scott DeBerard, PhD	2018-2020
Veterans Affairs Salt Lake City Health Care System Doctoral Student PTSD Assessment Provider Supervisor: Harrison Weinstein, PhD	2018-2019
Utah State University Psychology Community Clinic Doctoral Student Therapist Supervisors: Scott DeBerard, PhD, Sara Boghosian, PhD, & Marietta Veeder, PhD	2017-2018

Provision of Mentorship Experience

Utah State University Mentored two Psychology undergraduate students on meta-analysis skills.	2019
National Institutes of Health Co-led Psychoneuroimmunology Journal Club and mentored 17 NIH research fellows.	2015
National Institutes of Health Mentored undergraduate summer research fellow on research skills and data collection.	2015

Journal Editorial Experience

Ad Hoc Reviewer, <i>Stress and Health Journal</i>	2020
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Professional Affiliations

American Psychological Association (APA) Division 19 Society for Military Psychology	2016-present
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Leadership and Community Experience

VA Puget Sound – Seattle Division, <i>PTSD Clinic Racial Justice Workgroup</i>	2021-present
VA Puget Sound – Seattle Division, <i>Intern Selection Committee</i>	2021-present
VA Puget Sound – Seattle Division, <i>Intern Seminar Committee</i>	2021-present
VA Puget Sound – Seattle Division, <i>Diversity Committee</i>	2021-present
APA Division 19 Society for Military Psychology, <i>Campus Representative</i>	2019-2021
USU, <i>Military Psychology Club President</i>	2019-2020
USU, <i>Grant Reviewer for Undergraduate Research and Creative Opportunities</i>	2018

NIH, <i>Co-Chair of the Postbaccalaureate Social Committee</i>	2014-2016
Warrior Canine Connection, <i>Volunteer</i>	2014-2015

Advanced Training

Psychwire, <i>Foundations in Dialectical Behavior Therapy</i>	2021
UCEBT, <i>Acceptance and Commitment Therapy for OCD and OCPD Training</i>	2020
CBTIweb, <i>Cognitive Behavioral Therapy for Insomnia Training</i>	2020
USU, <i>LGBTQ+ Allies on Campus Training</i>	2018
USU, <i>Safe Passages 4 U Diversity Training</i>	2018
USU, <i>Acceptance and Commitment Therapy Workshop</i>	2017
USU, <i>Introductory and Intermediate Trainings in R</i>	2017
NIH, <i>Traumatic Brain Injury Rounds</i>	2014-2016