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Interpersonal Trauma and Sexual Function and Satisfaction: The Mediating Role of Negative Affect Among Survivors of Military Sexual Trauma

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Abstract

Healthy sexual function among women service members/veterans (SM/Vs) is associated with higher quality of life, lower incidence and severity of mental health diagnoses, higher relationship satisfaction, and less frequent suicidal ideation. Although trauma exposure has been established as a predictor of poor sexual function and satisfaction in women SM/Vs, no study to date has examined whether specific trauma types, such as military sexual trauma (MST), increase risk for sexual issues. Moreover, the possible mechanisms of this association have not been explored. The current study examined whether posttraumatic stress disorder (PTSD) and depression symptom clusters mediated the association of trauma type and sexual function and satisfaction in 426 trauma-exposed women SM/Vs. Two hundred seventy participants (63.4%) identified MST as their index trauma. Path analyses demonstrated that MST was related to poorer sexual function and lower satisfaction relative to the other traumas ($\chi 2[28, N = 426] = 43.3, p = 0.03$, CFI = 1.00, TLI = 0.99, and RMSEA = 0.04), and this association was mediated by higher non-somatic depressive symptoms and PTSD symptom clusters of anhedonia and negative alterations in cognition and mood (NACM). Causality cannot be inferred due to the cross-sectional nature of the data. However, our findings suggest that interventions aimed at decreasing sexual issues among female SM/Vs with MST should target depressogenic symptoms, whether the origin is depression or PTSD. Longitudinal research exploring the etiological processes that contribute to sexual dysfunction among those with MST is needed.

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Healthy sexual functioning among women service members and veterans (SM/Vs) is an important aspect of general well-being that is associated with higher quality of life (Nunnink et al., 2012), lower incidence and severity of mental health diagnoses (Arbanas, 2010; Blais, Geiser, & Cruz, 2018; Blais, Monson, Livingston, & Maguen, 2019; Breyer et al., 2014; Hoisan, Latini, Kauth, Goltz, & Helmer, 2013; Wilcox et al., 2014), higher relationship satisfaction

among partnered SM/Vs (Blais, 2019), and less frequent suicidal ideation (Blais, Monteith, & Kugler, 2018). Unfortunately, studies of sexual function in women SM/Vs are somewhat limited in number, resulting in a narrow understanding of factors that contribute to sexual function. Studies identifying possible predictors of sexual function among women SM/Vs are sorely needed given that more than half are married or partnered (Patten & Parker, 2011), they report more sexual activity than their civilian counterparts (e.g., Lehavot et al., 2014), and show heightened sexual dysfunction relative to men veterans and women civilians (see review, Rosebrock & Carroll, 2017). Such research could aid in the development or augmentation of screening, assessment, and intervention strategies.

Extant literature shows that several traumatic experiences during military service are associated with sexual function. Military sexual trauma (MST), which is defined by the Department of Veterans Affairs (VA) as unwanted and uninvited sexual harassment (e.g., pressure for sexual favors, verbal remarks) or assault (e.g., force or threat of force to have nonconsensual sexual contact) that occurred during military service (U.S. Government, 2014), is one such experience. MST that involved assault was associated with poorer sexual function and satisfaction in women SM/Vs (Blais, 2019; Blais, Brignone, Fargo, Andresen, & Livingston, 2018). Moreover, combat exposure, which can include taking enemy fire, being ambushed, or causing death to an enemy combatant (Hoge et al., 2004), was associated with poorer sexual function among men and women veterans reporting posttraumatic stress disorder (PTSD; Cosgrove et al., 2002; Letourneau et al., 1997; Riggs, Byrne, Weathers, & Litz, 1998; Tran et al., 2015). Unfortunately, it is not well understood if specific traumas are uniquely related to sexual function and satisfaction. It is possible, for example, that more interpersonal traumas and those that are sexual in nature, such as MST, are associated with higher sexual dysfunction and lower sexual satisfaction relative to non-sexual traumas. Indeed, results from two epidemiological studies observed that a history of sexual violence was associated with poorer sexual function in women (Kadri et al., 2002; Laumann et al., 1999). When sexual traumas were compared to non-sexual traumas, a smaller civilian study observed that those who experienced sexual traumas reported greater sexual dysfunction relative to those who experienced nonsexual traumas (Bird et al., 2018). Preliminary research from a small pilot study conducted in women SM/Vs supports these trends: specifically, sexual traumas were associated with higher distress and lower sexual function relative to non-sexual traumas (DiMauro et al., 2018). Further, exposure to MST, specifically, was associated with greater dysfunction relative to combat exposures in service members (e.g., Blais & Monteith, 2019; Maguen et al., 2012), though the exact effects of MST vs combat were not statistically compared or the trauma exposures were not modeled as predictors of sexual dysfunction. One of the primary aims of the current study was to explore the processes by which sexual traumas may be more closely related to sexual dysfunction than non-sexual traumas in a sample of women SM/Vs.

Recent reviews of the literature on sexual function and PTSD concluded that trauma survivors may avoid sexual activity as a way to decrease trauma reminders or to prevent feelings of vulnerability in the presence of another person (see reviews, Tran et al., 2015; Yehuda et al., 2015). Thus, it is possible that trauma reactions may be key mechanisms of sexual dysfunction and low sexual satisfaction among trauma survivors. PTSD and depressive symptoms commonly

emerge after exposure to MST (Kimerling et al., 2007) and combat exposure (Hoge et al., 2004), and have been shown to be problematic for sexual function (Blais, Geiser, & Cruz, 2018; Hosain et al., 2013; Sadler et al., 2012; Sreelakshmy et al., 2017). However, these conditions are also notoriously heterogeneous in nature (e.g., Galatzer-Levy & Bryant, 2013). It is possible that specific depression and PTSD symptoms may be particularly important in increasing risk for sexual dysfunction. Some of the most frequently endorsed interpersonal problems following sexual assault include intrusive symptoms, fear of sexual stimuli, and emotional numbing (see reviews, Tran et al., 2015; van Berlo & Ensick, 2000), which implicates re-experiencing, avoidance, anhedonia, and anxious arousal symptom clusters of PTSD as contributing factors for poor sexual function. Moreover, Barlow's (1986) theory of sexual function states that individuals who experience negative affect are at risk for sexual dysfunction (Wiegel et al., 2007), suggesting that the affective symptoms (e.g., anhedonia, depressed mood) of depression may play a key role in sexual problems.

Two recent studies examined mechanisms of sexual function and satisfaction among SM/Vs with and without a history of MST. Blais, Geiser, and Cruz (2018) observed that MST that involved assault (relative to harassmentonly MST) and sexual function and satisfaction was mediated by higher PTSD-related anhedonia and dysphoric arousal symptom cluster severities. In a follow-up study, Blais, Livingston, and Fargo (2020) observed that higher depression severity also mediated the association of assault MST (relative to harassment-only MST) and sexual function after accounting for PTSD-related anhedonia and dysphoric arousal symptom clusters. Although informative, these studies did not compare MST to other traumas. It is possible that harassment-only MST is less likely to contribute to PTSD and depressive symptoms than other Criterion A trauma exposures, including combat. Moreover, these studies did not distinguish between different symptom clusters of depression. For example, Chekroud et al. (2017) examined several possible symptom cluster structures of the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) and found a 2-factor model of depression that included somatic and non-somatic symptoms to be most preferable. According to Barlow's theory of sexual function, it is possible that non-somatic symptoms of depression contribute more substantively to sexual dysfunction relative to somatic symptoms.

The purpose of the present study was to build on existing literature of sexual function and satisfaction in women SM/Vs. Specifically, we sought to determine (1) whether MST was associated with poorer sexual function and satisfaction relative to other traumas, and (2) whether this association was best explained by specific PTSD and depression symptom clusters. Given the interpersonal nature of MST, it was hypothesized that MST, relative to other traumas, would be associated with poorer sexual function and lower sexual satisfaction. We further hypothesized that specific depression and PTSD symptom clusters would mediate the association of trauma type and sexual function and satisfaction. With respect to depression, we hypothesized that non-somatic depression symptoms (e.g., anhedonia, depressed mood, feelings of worthlessness) would mediate the association of trauma type and sexual function and satisfaction but somatic depression symptoms (e.g., sleep difficulties, fatigue, appetite changes) would not serve as a mediator. With respect to PTSD symptom clusters, we hypothesized that re-experiencing, anhedonia, avoidance, and anxious arousal would mediate the association of trauma type and

sexual function and satisfaction, but dysphoric arousal and negative alterations in cognition and mood (NACM) would not mediate the association of trauma type and sexual function and satisfaction. These PTSD symptom clusters were selected as the symptoms comprising these clusters involve emotional numbing, avoidance of traumatic reminders, and emotional experiences (e.g., anger) that are problematic for healthy relationship function (Campbell & Renshaw, 2018; Renshaw, Blais, & Smith, 2010) as well as previous research showing their mitigating role on the association of trauma exposure and sexual function (Blais, Geiser, & Cruz, 2018; Blais, Livingston, & Fargo, 2020).

Method

Participants

Participants (n = 426; 51.1%) for the current study were drawn from a larger study (N = 833) that was conducted to understand the association of MST with relationship satisfaction in partnered women service members/veterans (Blais, 2019). Participants were included in the current study if they endorsed exposure to a potential Criterion A stressor and provided information describing their Criterion A stressor. Confirmation of exposure to probable Criterion A stressors were determined by two licensed clinical psychologists and study co-authors (R. K. B., A. K. Z.). Of the 407 (48.9%) participants excluded, 346 (85.01%), and were excluded because they did not report exposure to a probable Criterion A event and 61 (14.98%) were excluded because they did not include enough information to determine if their trauma rose to the level of a Criterion A exposure.

Procedure

Institutional Review Board (IRB)-approved advertisements targeted partnered women SM/Vs. Women interested in participating advanced to Qualtrics where they completed screening items confirming women sex, service in the military, and consenting age of 18 years and older. Those who passed initial screening items were provided with an IRB-approved Letter of Information and all study questionnaires. Identifying information was not collected with survey responses, but women wishing to be compensated $15 for participation were directed to a separate Qualtrics page to enter identifying information that was not linked to study responses. This study was approved by the Utah State University IRB.

Measures

A demographic inventory queried participants about age, income, education, marital status, relationship duration, branch of service, and discharge status. Age, relationship duration (measured in years), and marital status (married versus partnered but not married) were included as covariates.

Outcomes.

Sexual function was assessed with the Female Sexual Function Index (FSFI; Rosen et al., 2000). The FSFI is a 19-item self-report index assessing sexual function (e.g., desire, lubrication, orgasm). A sample item includes "Over the past four weeks, how often did you feel sexually

aroused?" Items are scored using a variably anchored Likert scale. Items are scored using an algorithm developed by the scale authors. Typically, scores range from 2 to 36, but we did not include the sexual satisfaction subscale as we used an alternate measure to assess this domain. In the current study, scores ranged from 1.2 to 30. Lower scores reflect poorer sexual function. Psychometric properties assessed in other studies reveal adequate internal consistency, test-retest reliability, and good construct and divergent validity (Rosen et al., 2000). The current sample showed excellent internal reliability (Cronbach's $\alpha = 0.97$).

Sexual satisfaction was evaluated with the Sexual Satisfaction Scale for Women (SSS-W; Meston & Trapnell, 2005). The SSS-W is a 30-item self-report scale that evaluates sexual satisfaction (e.g., compatibility with partner, satisfaction with communication) using a variably anchored Likert scale. A sample item includes "I feel content with the frequency of sexual intimacy." Items are scored using an algorithm developed by the scale authors and total scores range from 24 to 120. Lower scores are indicative of lower sexual satisfaction. Psychometric properties assessed in other studies demonstrated adequate internal consistency and validity (Meston & Trapnell, 2005). The current sample showed excellent internal reliability (Cronbach's $\alpha = 0.96$).

Independent variable.

Self-reported index traumas were assessed using a single open-ended question that was administered after the PTSD Checklist (Weathers et al., 2013) that asked: "The stressful military experience that I referenced was [please describe this experience below]." Responses were initially reviewed to develop over-arching categories and were subsequently coded into said categories by two co-authors (R. K B., A. K. Z.). Categories included MST, combat- or deployment-related, military non-combat, non-military, domestic violence, and exposure to suicide. Given the focus on understanding if MST is differentially associated with sexual function and satisfaction relative to other traumas, responses that included multiple index traumas (e.g., MST and combat) were coded MST.

Mediators.

The PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013) assessed severity of PTSD symptoms over the past month. Participants indicated how bothered they were by the 20 symptoms of PTSD using a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). Responses are summed for a total score that ranges from 0 to 80. Higher scores indicate higher distress. Symptom cluster severities are calculated by creating a sum score comprised by specific items within each cluster. A confirmatory factor analysis completed for a previous investigation using participants in the current study revealed that the Anhedonia model of PTSD fit the data most optimally (Blais, Geiser, & Cruz, 2018). The following clusters are found in the Anhedonia Model: re-experiencing (items 1 through 5; score range: 0 to 20), avoidance (items 6 and 7; score range: 0 to 8), NACM (items 8 through 11; score range: 0 to 16), anhedonia (items 12 through 14; score range: 0 to 12), dysphoric arousal (items 15, 16, 19, and 20; score range: 0 to 16), and anxious arousal (items 17 and 18; score range: 0 to 8). The current sample showed adequate

internal reliability for the full PCL-5 (Cronbach's α = 0.96) and all symptom subscales (Cronbach's αs range = 0.79–0.96).

The PHQ-9 (Kroenke et al., 2001) assessed severity of depression symptoms over the past two weeks. Participants indicated how frequently they were bothered by the nine symptoms of depression using a 4-point ordinal scale ranging from 0 (not at all) to 4 (nearly every day). Items are summed for a total score that ranges from 0 to 27 and higher scores are indicative of more severe depression symptoms. To evaluate the factor structure of the PHQ-9 in our sample we replicated the approach of Elhai et al. (2012) by conducting a series of four confirmatory factor analyses using MPlus version 5.1 (Muthén & Muthén, 1998–2011). The four models that were tested included a 1-factor model and three 2-factor models that have been empirically supported in the literature (see Table 1 for a list of the factor models and the factors on which items were mapped). Based on comparison of the fit statistics for the four models (see Table 1), a Model 2b was deemed to have the best fit, in which items 1 (anhedonia), 2 (depressed mood), 6 (feelings of worthlessness), and 9 (thoughts of death) loaded onto a non-somatic factor and items 3 (sleep difficulties), 4 (fatigue), 5 (appetite changes), 7 (concentration difficulties), and 8 (psychomotor agitation/retardation) loaded onto a somatic factor. Notably, this was the same model that was identified as the best fitting model by Elhai et al. (2012) using a sample of 2,615 Army National Guard soldiers from Ohio. Factor scores were created by summing the items on each of the two scales. In the current sample, the internal reliability was high for the total PHQ-9 (Cronbach's α = 0.91) and for the factor subscales of non-somatic depression (Cronbach's α = 0.85) and somatic depression (Cronbach's α = 0.86).

Table 1. Factor Models Tested and Fit Statistics for the PHQ-9.

	Model 1	Model 2a	Model 2b	Model 2c
PHQ-9 items				
Anhedonia	Depression	Non-somatic	Non-somatic	Somatic
Depressed mood	Depression	Non-somatic	Non-somatic	Non-somatic
Sleep difficulties	Depression	Somatic	Somatic	Somatic
Fatigue	Depression	Somatic	Somatic	Somatic
Appetite changes	Depression	Somatic	Somatic	Somatic
Feelings of worthlessness	Depression	Non-somatic	Non-somatic	Non-somatic
Concentration difficulties	Depression	Non-somatic	Somatic	Somatic
Psychomotor agitation/ retardation	Depression	Non-somatic	Somatic	Somatic
Thoughts of death	Depression	Non-somatic	Non-somatic	Non-somatic
Fit statistics				
X^2 (df)	255.68 (27)	163.687(26)	**125.721 (26)**	324.521 (26)
CFI	0.908	0.944	**0.960**	0.916
TLI	0.877	0.923	**0.944**	0.884
RMSEA	0.139	0.110	**0.093**	0.135
SRMR	0.046	0.042	**0.036**	0.043
BIC	9704.711	9618.805	**9580.839**	9689.639

Note. CFI = Comparative fit index; TLI = Tucker–Lewis Index; RMSEA = Root mean square error of approximation; SRMR = Standardized root mean square residual; BIC = Bayesian information criterion.

Statistical Analyses

Descriptive statistics were used to calculate sample characteristics of study and demographic variables. Associations between sexual function, sexual satisfaction, depression and PTSD symptom clusters, trauma type, and covariates of age, relationship status (married versus partnered but not married), and relationship duration were calculated using analyses of variance and Pearson's correlations. To determine whether the association of trauma type with sexual function and satisfaction was mediated by depression and PTSD symptom clusters, path analysis with full information maximum likelihood was used. Trauma type was included as the exogenous variable and sexual function and satisfaction were entered as covarying endogenous variables. PTSD symptom clusters of re-experiencing, avoidance, NACM, anhedonia, anxious arousal, and dysphoric arousal as well as depression symptom clusters of non-somatic and somatic symptoms were entered as covarying mediators. Direct paths were specified from trauma type to all mediators and from all mediators to sexual function and satisfaction. Direct paths were also specified from trauma type and covariates to sexual function and satisfaction. Age and relationship duration were allowed to covary. Indirect effects for all mediators were calculated. Model fit was evaluated using chi-square, the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). Fit statistics suggested by Hu and Bentler (1999) were employed and included ≥0.95 for CFI and TLI and ≤0.08 for RMSEA. Chi-square values that are non-significant have generally been believed to indicate good model fit, though this indicator has fallen out of favor by some given that the chi-square is easily influenced sample size (e.g., Bentler & Bonnet, 1980). Analyses were conducted in SPSS version 25 (IBM Corp, 2017) and R (R Core Team, 2018).

Results

Sample Descriptives

The majority of the sample identified as married (n = 315, 73.94%), reported service in the Army (n = 243, 57.04%), being discharged from the military (n = 346, 81.22%), receiving at least some college education (n = 398, 93.43%), and an income of $50,000+/year (n = 261, 61.27%). MST was reported as an index trauma exposure in 63.38% of participants (n = 270). The remaining participants reported their index traumas as combat- or deployment-related (n = 109, 25.59%), military non-combat (n = 21, 4.93%), nonmilitary (n = 9, 2.12%), exposure to suicide (n = 9, 2.12%), and domestic violence (1.88%, n = 8).

Bivariate Associations

Given the small cell sizes observed in some non-MST trauma exposures, index trauma exposure was dichotomized into MST (dummy code = 1) and all else (dummy code = 0). MST, relative to other traumas, was associated with lower sexual satisfaction and higher PTSD and depression symptom clusters (see Table 2). MST, relative to other traumas, trended toward being significantly associated with lower sexual function (p = 0.051) and younger age (p = 0.051). Table 2 also shows the associations of marital status (covariate) with study variables. Means,

standard deviations, and bivariate correlations between PTSD and depression symptom clusters, sexual function, and satisfaction, and linear covariates are shown in Table 3. Sexual function and satisfaction were positively correlated with a large effect size and negatively correlated with all PTSD and depression symptom clusters as well as relationship duration with small-to-large effect sizes.

Mediation Analysis

When depression and PTSD symptom clusters were entered as simultaneous mediators of the association of trauma type and sexual function and satisfaction, the model had an excellent fit to the data, $\chi^2(28, N = 426) = 43.33$, $p = 0.03$, CFI = 1.00, TLI = 0.99, and RMSEA = 0.04 (see Figure 1). Direct paths from MST (versus all other traumas) to each depression and PTSD symptom cluster were significant and positive, indicating that those who reported MST as their index trauma reported higher depression-related somatic and nonsomatic symptoms and higher PTSD-related anhedonia, anxious arousal, avoidance, dysphoric arousal, NACM, and re-experiencing relative to those who reported a different index trauma. Direct paths from PTSD-related anhedonia and depression-related non-somatic symptoms to sexual function were significant and negative, indicating that those who reported higher PTSD-related anhedonia or non-somatic depression symptoms reported lower sexual function. The indirect effects of trauma type on sexual function via PTSD-related anhedonia (estimate: –0.93, confidence interval [CI] = –1.67, –0.19) and non-somatic depression symptoms (estimate: –0.67, CI = –1.31, –0.02) were significant. Direct paths from PTSD-related anhedonia and NACM to sexual satisfaction were significant and negative, indicating that those who reported higher PTSD-related anhedonia and NACM reported lower sexual satisfaction. The indirect effects of index trauma type on sexual satisfaction via anhedonia (estimate: –3.00, CI = –5.16, –0.85) and NACM (estimate: –3.14, CI = –5.71, –0.56) were significant. The direct path from PTSD-related re-experiencing to sexual satisfaction was significant and positive, indicating that those who reported higher re-experiencing symptoms reported higher sexual satisfaction. The indirect effect of this association was also significant: estimate: 2.51, CI = 0.60, 4.43. This counter-intuitive association indicates a suppression effect given the negative bivariate association (see Table 3). Suppression effects are not uncommon in models with highly correlated predictor variables (Maassen & Bakker, 2001); as such, this association should not be interpreted.

Table 2. Bivariate Comparison Tests of Study Variables with T-tests (N = 426).

	Military Sexual Trauma			Marital Status		
	Yes M(SD)	No M(SD)	t-test	Married M(SD)	Non-married M(SD)	t-test
Sexual function	19.64 (9.62)	21.60 (10.35)	$t(419) = -1.96, p = 0.051$	19.50 (9.67)	22.78 (10.28)	$t(419) = -3.01, p = 0.003$
Sexual satisfaction	77.69 (24.28)	83.73 (24.60)	$t(393) = -2.37, p = 0.02$	76.78 (24.00)	88.67 (24.03)	$t(393) = -4.32, p < 0.001$
PTSD re-experiencing	9.57 (5.70)	6.73 (6.15)	$t(423) = 4.80, p < 0.001$	8.42 (5.96)	8.83 (6.22)	$t(423) = -0.62, p = 0.54$
PTSD avoidance	4.99 (2.68)	3.11 (2.79)	$t(423) = 6.85, p < 0.001$	4.27 (2.86)	4.38 (2.91)	$t(423) = -0.36, p = 0.72$
PTSD NACM	8.40 (4.92)	5.31 (4.75)	$t(420) = 6.29, p < 0.001$	7.23 (5.07)	7.39 (5.10)	$t(420) = -0.28, p = 0.78$
PTSD anhedonia	6.30 (3.92)	4.53 (4.00)	$t(419) = 4.43, p < 0.001$	5.67 (3.97)	5.63 (4.23)	$t(419) = 0.08, p = 0.94$
PTSD dysphoric arousal	7.61 (4.41)	6.45 (4.23)	$t(419) = 2.64, p = 0.009$	7.17 (4.33)	7.21 (4.52)	$t(419) = -0.09, p = 0.93$
PTSD anxious arousal	4.10 (2.69)	3.53 (2.82)	$t(422) = 2.09, p = 0.04$	3.84 (2.75)	4.04 (2.76)	$t(422) = -0.66, p = 0.51$
Depression non-somatic	5.00 (3.53)	3.40 (3.24)	$t(388) = 4.41, p < 0.001$	4.46 (3.54)	4.32 (3.41)	$t(388) = 0.33, p = 0.74$
Depression somatic	8.72 (4.21)	6.99 (4.66)	$t(383) = 3.74, p < 0.001$	8.28 (4.50)	7.57 (4.27)	$t(383) = 1.37, p = 0.17$
Age	32.00 (7.16)	33.43 (7.24)	$t(421) = -1.96, p = 0.051$	33.11 (7.41)	30.87 (6.37)	$t(421) = 2.82, p = 0.005$
Relationship duration	5.82 (5.34)	6.28 (5.07)	$t(410) = -0.87, p = 0.39$	7.15 (5.47)	2.70 (2.39)	$t(392) = 11.42, p < 0.001$

Note. PTSD = Posttraumatic stress disorder; NACM = Negative alterations in cognitions and mood.

Table 3. Associations among Sexual Function and Satisfaction, PTSD Symptom Clusters, Depression Symptom Clusters, Age, and Relationship Duration in Female Service Members and Veterans ($N = 426$).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Sexual function	–											
2. Sexual satisfaction	0.66***	–										
3. PTSD re-experiencing	−0.26***	−0.25***	–									
4. PTSD avoidance	−0.27***	−0.28***	0.76***	–								
5. PTSD NACM	−0.34***	−0.40***	0.75***	0.75***	–							
6. PTSD anhedonia	−0.43***	−0.48***	0.66***	0.64***	0.75***	–						
Arousal												
7. PTSD dysphoric Arousal	−0.37***	−0.41***	0.67***	0.63***	0.74***	0.78***	–					
8. PTSD anxious arousal	−0.24***	−0.23***	0.68***	0.66***	0.69***	0.61***	0.71***	–				
9. Depression non-somatic	−0.40***	−0.43***	0.54***	0.47***	0.61***	0.72***	0.63***	0.44***	–			
10. Depression somatic	−0.36***	−0.40***	0.55***	0.50***	0.55***	0.66***	0.68***	0.51***	0.76***	–		
11. Age	−0.07	−0.11*	−0.03	−0.01	−0.02	0.08	0.01	−0.04	0.03	0.03	–	
12. Relationship duration	−0.22***	−0.24***	0.02	0.01	0.00	0.04	−0.01	−0.02	0.02	0.09	0.57***	–
M	20.36	79.88	8.52	4.30	7.27	5.66	7.18	3.89	4.42	8.10	32.52	5.99
SD	9.93	24.54	6.02	2.87	5.08	4.03	4.37	2.75	3.51	4.45	7.21	5.24

Note. PTSD = Posttraumatic stress disorder; NACM = Negative alterations in cognitions and mood.

Relationship duration is measured in years.

*p < 0.05. **p < 0.01. ***p < 0.001.

Figure 1. PTSD and depression symptom clusters as mediators of trauma type and sexual function and satisfaction among female service members and veterans (N = 426).
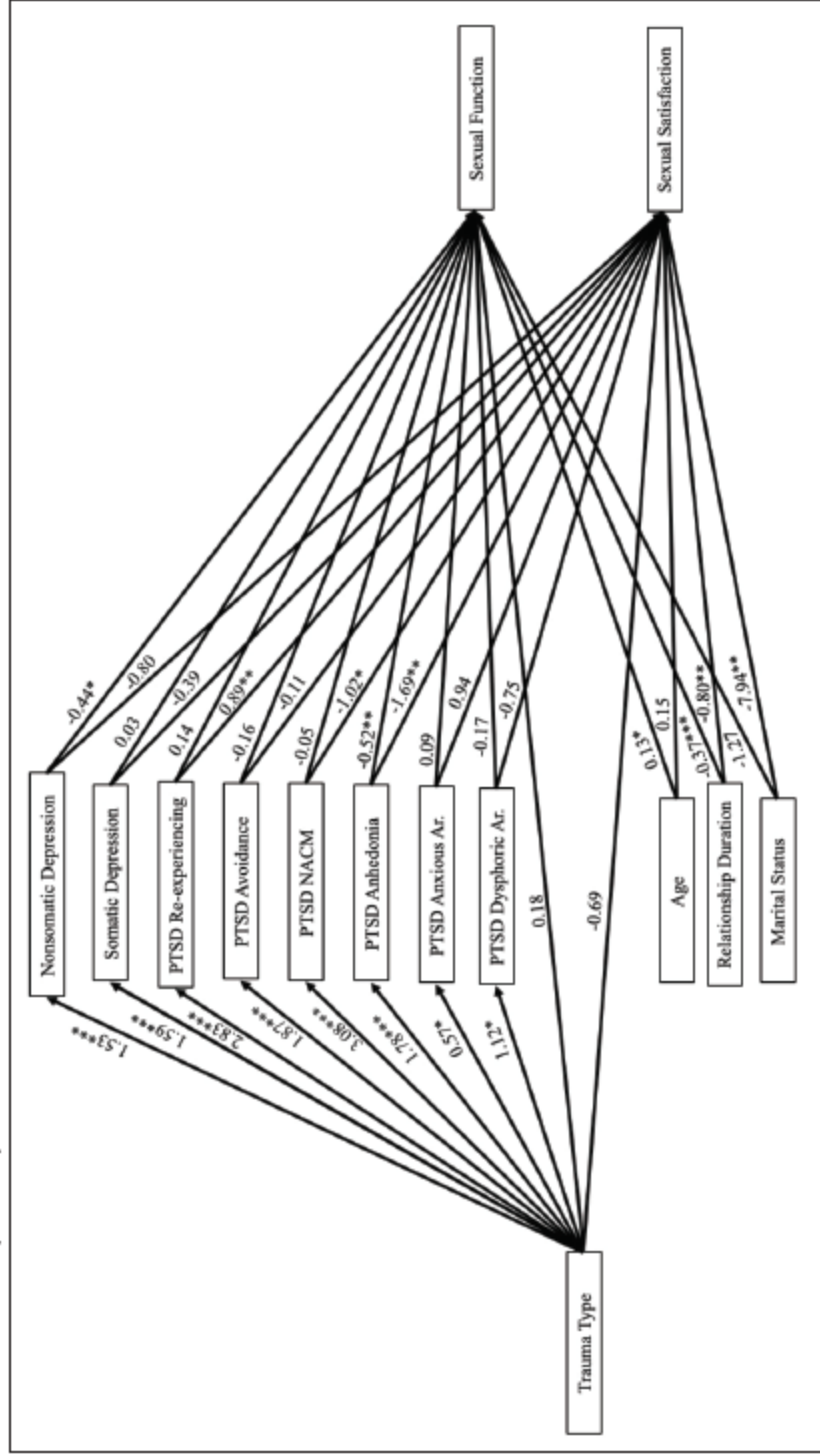
Note. PTSD = Posttraumatic stress disorder; NACM = Negative alterations in cognitions and mood; Ar. = Arousal. Due to the limited space, covariances between all mediators and covariances between age and marital status as well as age and relationship duration were not included in this figure. A covariance was also included between sexual function and sexual satisfaction. The trauma type variable was coded as 1 (MST) and 0 (all other traumas).

*p < 0.05. **p < 0.01. ***p < 0.001.

Discussion

The present study sought to understand the association of different index trauma exposures with sexual function and satisfaction among a sample of women SM/Vs who reported probable exposure to a Criterion A stressor. In particular, we explored depression and PTSD symptom clusters as possible mediators of this association. Our results indicate that SM/Vs who report MST as their index trauma experience poorer sexual function and satisfaction relative to those who report other index trauma types. PTSD-related anhedonia symptoms mediated the relationship of MST to both sexual function and satisfaction, suggesting that this may be a key mechanism by which MST affects sexual health among women SM/Vs. Additionally, non-somatic depression symptoms and NACM revealed significant indirect effects predicting sexual function and satisfaction, respectively. PTSD-related anhedonia and NACM symptom clusters represent the depressive components of PTSD and involve difficulties connecting with others, self or other blame, and challenges engaging in behaviors that are generally pleasurable and rewarding. Coupled with the findings that the more affective, rather than somatic, symptoms of depression were associated with poorer sexual function and lower satisfaction among MST survivors, our findings highlight the salience of depressive cognitions and behavior on sexual function and satisfaction, regardless of whether those symptoms are of PTSD or depression origin. Overall, these findings are consistent with Barlow's (1986) theory of sexual function and point to the importance of negative affect as a risk factor for sexual dysfunction among women SM/Vs with MST.

Implications for Screening and Intervention

From a screening perspective, clinicians providing mental or physical health care to those who are sexually active should consider screening for depression, PTSD-related anhedonia and NACM as well as identifying specific trauma exposures. While many mental health clinics serving veterans screen for PTSD and depression as well as trauma exposure, screening for sexual health issues is less common, as is considering the relative contribution of PTSD and depression on sexual health in case conceptualizations unless sexual health issues are the chief concern. From an intervention perspective, interventions would be most effective if they improved social connectedness, reduced self or other blame, and increased engagement in pleasurable activities. Cognitive-behavioral interventions may be well-suited to address these issues given the focus on altering maladaptive cognitions and encouraging engagement in behaviors that increase well-being. Indeed, cognitive-behavioral therapy aimed at reducing sexual dysfunction in women also lowered depressive symptoms and improved marital adjustment, suggesting that treating affect and sexual health can produce meaningful treatment gains (e.g., Ozturk & Arkar, 2017). Given that many medications that treat depressive symptoms in women can result in sexual complaints (e.g., Kanaly & Berman, 2002; Lorenz et al., 2019), use of such medications should be used with caution.

Interestingly, previous research from our laboratory revealed that higher PTSD-related anhedonia and PTSD-related NACM were associated with poorer function across several domains. Specifically, Blais (2020) observed that higher PTSD-related anhedonia was associated with lower relationship satisfaction. Blais and Geiser (2019) found that women who endorsed

exposure to MST that involved assault or attempted assault reported higher PTSD-related anhedonia, which was, in turn, associated with higher suicidal ideation. Moreover, Blais, Geiser, & Cruz (2018) observed that women who endorsed exposure to MST that involved assault or attempted sexual assault reported higher PTSD-related anhedonia and PTSD-related NACM, which was, in turn, associated with poorer sexual function and lower sexual satisfaction. The uniformity of these results suggests that the depressive components of PTSD may be most problematic for many personal and interpersonal outcomes. That said, these studies used the same sample for these lines of inquiry, so it will be important to replicate these findings in a different sample. Notwithstanding, other studies have observed that these specific components of PTSD are associated with poorer personal and interpersonal function (see review, Campbell & Renshaw, 2018), suggesting these findings may not be idiosyncratic to this sample.

Implications for Research

Although previous studies have suggested that the type of trauma exposure may be irrelevant when understanding interpersonal difficulties (Yehuda et al., 2015), our findings suggest that distinguishing between trauma types may provide useful information when understanding distress experienced by women SM/Vs. Among those in the current study, exposure to MST was related to higher depression and PTSD symptom severity relative to combator deployment-related stressors, domestic violence, exposure to suicide, and other military and non-military traumas, which were, in turn, associated with poorer sexual function and satisfaction. Since this study was restricted to women, this area of research would be strengthened by examining these associations in men. In addition, covarying for severity of these exposures as well as overall trauma load may be critical.

Limitations

The current study has limitations. These include the use of data gathered from a cross-sectional study design to explore possible mechanisms of sexual function and satisfaction among trauma-exposed women SM/Vs. The sample was also restricted to participants who provided enough information in the study survey to determine probable exposure to a Criterion A stressor. It is possible that certain participants were excluded because they did not provide enough information to determine if the threshold for this criterion was met. For example, many forms of MST that involve harassment but not assault may not meet the threshold of a Criterion A event. That said, it is possible that chronic harassment may eventually rise to the necessary threshold but the reporting process in this data collection did not allow for that determination. Finally, there is evidence that some women experience traumas that meet Criterion A but they are not viewed by the survivor as a trauma (Blais et al., 2018), which would have impacted participant selection in the current study. As such, our data may not generalize to all women who experienced a Criterion A trauma exposure. Data on sexual orientation were not included in the parent study from which these data are drawn. Future studies may consider covarying for sexual orientation. Data were gathered using convenience sampling and were based on self-report. The majority of the sample identified as White, so these data may not be generalizable to those who identify as minorities. This area of inquiry would also be strengthened by the use of a longitudinal study design, which would allow researchers to determine the temporal precedence

of these associations. Inclusion of men would help determine whether these results are idiosyncratic to women. Finally, the use of representative sampling procedures would be useful.

Conclusions

The current study builds on existing literature by elucidating the association of specific traumas with sexual function and satisfaction. Although it is not surprising that depressed mood, emotional numbing, feeling distant from others, and a lack of interest in activities would negatively impact sexual health, this is the first study to show that women SM/Vs who endorse symptoms related to MST report higher PTSD-related anhedonia, PTSD-related NACM, and non-somatic depressive symptoms than those with other index trauma types and that this may explain higher levels of sexual dysfunction for those with MST. Findings suggest that to improve sexual function and satisfaction, interventions should target depressive symptoms, regardless of whether their origin is PTSD or depression.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The views which are expressed by the authors are their own, and do not necessarily represent the views of Utah State University. The authors do not have any conflicts of interest to report.

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References

Arbanas, G. (2010). Does post-traumatic stress disorder carry a higher risk of sexual dysfunctions? *Journal of Sexual Medicine*, 7, 1816–1821.

Barlow, D. H. (1986). Causes of sexual dysfunction: The role of anxiety and cognitive interference. *Journal of Consulting and Clinical Psychology*, 54, 140–148. https://doi.org/10.1037/002-006X.54.2.140

Berlo, W. van., & Ensink, B. (2000). Problems with sexuality after sexual assault. *Annual Review of Sex Research*, 11, 235–257.

Bird, E. R., Seehuus, M., Heiman, J. R., Davis, K. C., Norris, J., & George, W. H.(2018). Sexual

vs Nonsexual currently most upsetting trauma: A fresh look at attenuation of sexual response, alcohol intoxication, and post-traumatic stress. *Journal of Sex Research*, 5, 915–926. https://doi.org/10.1080/00224499.2017.1380159

Blais, R. K., Monteith, L. L., & Kugler, J. (2018). Sexual dysfunction is associated with suicidal ideation in female service members and veterans. *Journal of Affective Disorders*, 226, 52–57. https://doi.org/10.1016/j.jad.2017.08.079

Blais, R. K., Brignone, E., Fargo, J. D., Galbreath, N. W., & Gundlapalli, A. V. (2018). Assailant identity and self-reported nondisclosure of military sexual trauma in partnered women veterans. *Psychological Trauma: Theory, Research, Practice, and Policy*, 10(4), 470–474. https://doi.org/10.1037/tra0000320

Blais, R. K., Geiser, C., & Cruz, R. A. (2018). Specific PTSD symptom clusters mediate the association of military sexual trauma severity and sexual function and satisfaction in female service members/veterans. *Journal of Affective Disorders*, 238, 680–688. https://doi.org/10.1016/j.jad.2018.05.052

Blais, R. K. (2019). Lower sexual satisfaction and function mediate the association of assault Military sexual trauma and relationship satisfaction in partnered female service members/veterans. *Family Process.* https://doi.org/10.1111/famp.12449

Blais, R. K., & Monteith, L. L. (2019). Suicide ideation in female survivors of military sexual trauma: The trauma source matters. *Suicide and Life-Threatening Behavior*, 49(3), 643–652. https://doi.org/10.1111/sltb.12464

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

Blais, R. K. (2020). Higher anhedonia and dysphoric arousal relate to lower relationship Satisfaction among trauma-exposed female service members/veterans. *Journal of Clinical Psychology*. Advance online publication. https://doi.org/10.1002/jclp.22937

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of Covariance structures. *Psychological Bulletin*, 88(3), 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Breyer, B. N., Cohen, B. E., Bertenthal, D., Rosen, R. C., Neylan, T. C., & Seal, K. H. (2014). Sexual dysfunction in male Iraq and Afghanistan war veterans: Association with post-traumatic stress disorder and other combat-related mental health disorders: A population-based cohort study. *Journal of Sexual Medicine*, 11, 75–83.

Campbell, S. B., & Renshaw, K. D. (2018). Posttraumatic stress disorder and relationship functioning: A comprehensive review and organizational framework. *Clinical Psychology Review*, 65, 152–162. https://doi.org/10.1016/j.cpr.2018.08.003

Chekroud, A. M., Gueorguieva, R., Krumholz, H. M., Trivedi, M. H., Krystal, J. H., & McCarthy, G. (2017). Reevaluating the efficacy and predictability of antidepressant treatments: A symptom clustering approach. *JAMA Psychiatry*, 74, 370–378. https://doi.org/1001/jamapsychiatry.2017.0025

Cosgrove, D. J., Gordon, Z., Bernie, J. E., Hami, S., Montoya, D., Stein, M. B., & Monga, M. (2002). Sexual dysfunction in combat veterans with post-traumatic stress disorder. *Urology*, 60, 881–884.

DiMauro, J., Renshaw, K. D., & Blais, R. K. (2018). Sexual vs non-sexual trauma, sexual

satisfaction and function, and mental health in female veterans. *Journal of Trauma & Dissociation*, 19, 403–416. https://doi.org/10.1080/15299732.2018.1451975

Elhai, J. D., Contractor, A. A., Tamburrino, M., Fine, T. H., Prescott, M. R., Shirley, E., Chan, P. K., Slembarski, R., Liberzon, I., Galea, S., & Calabrese, J. R. (2012). The factor structure of major depression symptoms: A test of four competing models using the Patient Health Questionnaire-9. *Psychiatry Research*, 199(3), 169–173. https://doi.org/10.1016/j.psychres.2012.05.018

Galatzer-Levy, I. R., & Bryant, R. A. (2013). 636,120 ways to have posttraumatic stress disorder. *Perspectives on Psychological Science*, 8, 651–662. https://doi.org/10.1177/1745691613504115

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, 351(1), 13–22.

Hosain, G. M., Latini, D. M., Kauth, M., Goltz, H. H., & Helmer, D. A. (2013). Sexual dysfunction among male veterans returning from Iraq and Afghanistan: Prevalence and correlates. *Journal of Sexual Medicine*, 10, 516–523.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55. https://doi.org/10.1080/10705519909540118

IBM Corp. (2017). IBM SPSS Statistics for Macintosh. Version 25.0.

Kadri, N., Alami, K. H. M., & Tahiri, S. M. (2002). Sexual dysfunction in women: Population-based epidemiological study. *Archives of Women's Mental Health*, 5, 59–63. https://doi.org/10.1007/s00737-002-0141-7

Kanaly, K. A., & Berman, J. R. (2002). Sexual side effects of SSRI medications: Potential treatment strategies for SSRI-induced female sexual dysfunction. *Current Womens' Health Reviews*, 2, 409–416.

Kimerling, R., Gima, K., Smith, M. W., Street, A., & Frayne, S. (2007). The Veterans Health Administration and military sexual trauma. *American Journal of Public Health*, 97, 2160–2166. https://doi.org/AJPH.2006.092999

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression Severity measure. *Journal of General Internal Medicine*, 16, 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Laumann, E. O., Paik, A., & Rosen, R. C. (1999). Sexual dysfunction in the United States: Prevalence and predictors: *JAMA*, 281, 537–544. https://doi.org/10.1001/jama.281.6.537

Lehavot, K., Katon, J. G., Williams, E. C., Nelson, K. M., Gardella, C. M., Reiber, G. E., & Simpson, T. L. (2014). Sexual behaviors and sexually transmitted infections in a nationally representative sample of women veterans and nonveterans. *Journal of Women's Health*, 23, 246–252. https://doi.org/10.1089/jwh.2013.4327

Letourneau, E. J., Schewe, P. A., & Frueh, B. C. (1997). Preliminary evaluation of sexual problems in combat veterans with PTSD. *Journal of Traumatic Stress*, 10, 125–132.

Lorenz, T., Rullo, J., & Faubion, S. (2019). Antidepressant-induced female sexual dysfunction. *Mayo Clinical Proceedings*, 2, 409–416.

Maassen, G. H., & Bakker, A. B. (2001). Suppressor variables in path models: Definitions and interpretations. *Sociological Methods & Research*, 30, 241–270. https://doi.org/10.1177/0049124101030002004

Maguen, S., Luxton, D. D., Skopp, N. A., & Madden, E. (2012). Gender differences in traumatic

experiences and mental health in active duty soldiers redeployed from Iraq and Afghanistan. *Journal of Psychiatric Research*, 46, 311–316. https://doi.org/10.1016/j.jpsychires.2011.11.007

Meston, C., & Trapnell, P. (2005). Development and validation of a five-factor sexual satisfaction and distress scale for women: The Sexual Satisfaction Scale for Women (SSS-W). *Journal of Sexual Medicine*, 2(1), 66–81. https://doi.org/10.1111/j.1743-6109.2005.20107.x

Muthén, L. K. and Muthén, B. O. (1998-2017). *Mplus User's Guide* (8th ed.). Los Angeles, CA: Muthén & Muthén.

Nunnink, S. E., Fink, D. S., & Baker, D. G. (2012). The impact of sexual functioning problems on mental well-being in U.S. veterans from the Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) conflicts. *International Journal of Sexual Health*, 24(1), 14–25. https://doi.org/10.1080/19317611.2011.639441

Ozturk, S., & Arkar, H. (2017). Effects of cognitive behavioral therapy on sexual satisfaction, Marital adjustment, and levels of depression and anxiety symptoms in couples with vaginismus. Turkish *Journal of Psychiatry*, 28, 172–180.

Patten, B. E., & Parker, K. (2011). Women in the U.S. Military: Growing share, distinctive profile. *Pew Social & Demographic Trends*. https://www.pewsocialtrends.org/2011/12/22/women-in-the-u-s-military-growing-share-distinctiveprofile/

R Core Team. (2018). *R: A language and environment for statistical computing*. R Foundation For Statistical Computing. https://www.R-project.org/

Renshaw, K. D., Blais, R. K., & Smith, T. W. (2010). Components of negative affectivity and Marital satisfaction: The importance of actor and partner anger. *Journal of Research in Personality*, 44, 328–334. https://doi.org/10.1016/j.jrp.2010.03.005

Riggs, D. S., Byrne, C. A., Weathers, F. W., & Litz, B. T. (1998). The quality of the intimate relationships of male Vietnam veterans: Problems associated with posttraumatic stress disorder. *Journal of Traumatic Stress*, 11, 87–101.

Rosebrock, L., & Carroll, R. (2017). Sexual function in female veterans: A review. *Journal of Sex & Marital Therapy*, 43, 228–245. https://doi.org/10.1080/0092623X.2016.1141822

Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsigh, R., Ferguson, D., & D'Agostino, R. (2000). The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex & Marital Therapy*, 26(2), 191–208. https://doi.org/10.1080/009262300278597

Sadler, A. G., Mengeling, M. A., Fraley, S. S., Torner, J. C., & Booth, B. M. (2012). Correlates of sexual functioning in women veterans: Mental health, gynecologic health, health status, and sexual assault history. *International Journal of Sexual Health*, 24, 60–77. https://doi.org/10.1080/19317611.2011.640388

Sreelakshmy, K., Velayudhan, R., Kuriakose, D., & Nair, R. (2017). Sexual dysfunction in females with depression: A cross-sectional study. *Trends in Psychiatry and Psychotherapy*, 39, 106–109. https://doi.org/10.1590/2237-6089-2016-0072

Tran, J. K., Dunckel, G., & Teng, E. J. (2015). Sexual dysfunction in veterans with post-traumatic stress disorder. *Journal of Sexual Medicine*, 12, 847–855. https://doi.org/1111/jsm.12823

U.S. Government. (2014). Veterans' benefits: Counseling and treatment for sexual trauma,

38 USC §1720D. https://www.gpo.gov/fdsys/pkg/USCODE-2014-title38/pdf/USCODE-2014-title38-partII-chap17-subchapII-sec1720D.pdf

Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. National Center for PTSD. https://doi.org/10.1037/t02622-000

Wiegel, M., Scepkowski, L. A., & Barlow, D. H. (2007). Cognitive-affective processes in sexual arousal and sexual dysfunction. In E. Janssen (Ed.), *The psychophysiology of sex* (pp. 143–165). Indiana University Press.

Wilcox, S. L., Redmond, S., & Hassan, A. M. (2014). Sexual functioning in military personnel: Preliminary estimates and predictors. *Journal of Sexual Medicine*, 11, 2537–2545.

Yehuda, R., Lehrner, A., & Rosenbaum, T. Y. (2015). PTSD and sexual dysfunction in men and women. *Journal of Sexual Medicine*, 12, 1107–1119. https://doi.org/10.1111/jsm.12856

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