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CLINICAL RESEARCH ARTICLE

The association of assault military sexual trauma and sexual function among partnered female service members and veterans: the mediating roles of depression and sexual self-schemas

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ABSTRACT

Background: Military sexual trauma (MST) that involves assault is associated with poorer sexual function in U. S. women service members/veterans (SM/Vs). Theory of sexual function suggests that the presence of higher depression severity and more negative sexual self-schemas may contribute to sexual dysfunction. This has yet to be examined in partnered women SM/Vs who are survivors of MST.

Objective: Using path analysis, the current study examined the associations of MST type, depression, sexual self-schemas, and sexual function in 818 partnered women SM/Vs.

Method: Three separate mediation models were tested, all testing indirect effects of depression and sexual self-schemas on the association of MST type and sexual function. In Model 1, the mediation model assumed that exposure to MST predicted more severe depression, which then predicted more negative sexual self-schemas. More negative sexual self-schemas, in turn, predicted poorer sexual function. In Model 2, the mediation model assumed that exposure to MST predicted more negative sexual self-schemas, which then predicted more severe depression. More severe depression, in turn, predicted poorer sexual function. In Model 3, the mediation model assumed a parallel mediation in that exposure to MST predicted more severe depression *and* more negative sexual self-schemas, which in turn, predicted poorer sexual function.

Results: The best fitting model suggested a parallel mediation of higher depression severity (estimate: −1.30, confidence interval: −1.91,-.69) and more negative sexual self-schemas (estimate: −2.09, confidence interval: −2.94,-1.24) on the association of assault MST and poorer sexual function (Model 3). Harassment-only MST was unrelated to sexual function through mediated pathways.

Conclusions: Interventions to improve sexual function among MST survivors who experienced assault should address negative sexual self-schemas related to sexual performance and depressive symptoms. Cognitive behavioural interventions that include challenging maladaptive cognitions may be well suited to address this clinical need.

HIGHLIGHTS
• Mechanisms of poor sexual function in military sexual trauma (MST) survivors are under-studied.
• Depression and sexual self-schemas mediated this association in assault survivors.
• Cognitive behavioral therapies that challenge maladaptive cognitions may decrease sexual dysfunction.

La Asociación Del Trauma Por Agresión Sexual Militar Y La Función Sexual De Las Mujeres Militares Activas Y Veteranas Con Pareja: Los Roles Mediadores De La Depresión Y Autoesquemas Sexuales

Antecedentes: El trauma sexual militar (MST por sus siglas en inglés) que involucra agresión sexual (a diferencia de una experiencia en la que únicamente hubo acoso) está asociado con una función sexual más pobre en las mujeres militares activas o veteranas de los EE. UU. (SM/Vs por sus siglas en inglés). La teoría de la función sexual sugiere que la presencia de una mayor severidad de la depresión y de autoesquemas sexuales más negativos pueden contribuir con la disfunción sexual. Esto aún tiene que ser examinado en mujeres SM/Vs que tengan parejas sobrevivientes a MST.

Objetivo: Usando el análisis de ruta, el presente estudio examinó la asociación del tipo de MST (ej., ninguno, solo acoso, agresión), depresión, autoesquemas sexuales y función sexual en 818 mujeres SM/Vs con pareja.

Método: Se evaluaron tres modelos de mediación distintos, todos probando efectos indirectos de la depresión y los autoesquemas sexuales en la asociación del tipo de MST y la función sexual. En el Modelo 1, el modelo de mediación asumía que la exposición al MST predecía una depresión más severa, lo que a su vez predecía autoesquemas sexuales más negativos. Los auto- esquemas sexuales más negativos, a su vez, predecian una función sexual más probre. En el Modelo 2, el modelo de mediación asumía que la exposición al MST predecía autoesquemas sexuales más negativos, lo cual entonces predecía una depresión más severa. La depresión más severa, a su vez, predecía una función sexual más pobre. En el Modelo 3, el modelo de mediación asumía una mediación paralela en que la exposición al MST predecía depresión más severa *y* autoesquemas sexuales más negativos, los que a su vez, predecían una funcion sexual más pobre.

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Resultados: El mejor modelo de ajuste sugirió una mediación de mayor severidad de la depresión (estimación:-1.30, intervalo de confianza: −1.91, −.69) y auto-esquemas sexuales más negativos (estimación: −2.09, intervalo de confianza: −2.94,-1.24) en la asociación de la agresión MST y función sexual más pobre (Modelo 3). El haber presentado una experiencia únicamente de acoso no tuvo relación con la función sexual a través de las vías mediadas.

Conclusiones: Las intervenciones para mejorar la función sexual entre las sobrevivientes del MST que experimentaron agresión deberían abordar los autoesquemas sexuales negativos relacionados con el rendimiento sexual y los síntomas depresivos. Las intervenciones cognitivo-conductuales que incluyen el debate de cogniciones desadaptativas pueden ser adecuadas para abordar esta necesidad clínica.

有伴侣的女性服役人员和退伍军人中的军队性侵犯创伤和性功能之间的关联:抑郁和性自我图式的中介作用

背景: 涉及性侵犯的军队性创伤 (MST) (区别于纯骚扰经历) 与美国女性服役人员/退伍军人 (SM/Vs) 的性功能较弱有关。性功能理论表明, 较高的抑郁严重程度和更负面的性自我图式的存在可能会导致性功能障碍。这一点尚未在MST幸存的有伴侣的女性SM/Vs中进行研究。

目的: 本研究使用路径分析在818名有伴侣的女性SM/Vs中, 考查了MST类型 (即无, 仅骚扰, 攻击), 抑郁, 性自我图式和性功能的相关性。

方法: 检验了三种独立的中介模型, 均考查了抑郁和性自我图式对MST类型与性功能之间关联的间接影响。在模型1中, 中介模型假设MST暴露可以预测更严重的抑郁, 从而预测更多的负面性自我图式。反过来, 更多的负面自我性图式预测更差的性功能。在模型2中, 中介模型假设MST暴露会预测更多的负面性自我图式, 进而预测更严重的抑郁。反过来, 更严重的抑郁预测更差的性功能。在模型3中, 中介模型假设了一种平行中介关系, 即MST暴露会预测更严重的抑郁和更负面的性自我图式, 从而预测更差的性功能。

结果: 最佳拟合模型表明, 较高抑郁严重程度 (估计值:-1.30, 置信区间:-1.91,-.69) 和较负面自我性图式 (估计值:-2.09, 置信区间:-2.94,-1.24) 对MST侵犯与较弱的性功能之间关联的平行中介作用 (模型3) 。仅有骚扰的MST通过中介路径与性功能无关。

结论: 对遭受性侵犯的MST幸存者进行提升性功能的干预措施, 应解决与性能力和抑郁症状相关的负面性自我图式。包括挑战适应不良认知的认知行为干预措施可能非常适合解决这一临床需求。

Among women service members/veterans (SM/Vs), poorer sexual function and satisfaction with sexual intimacy is associated with higher psychological distress (e.g. Blais, Geiser, & Cruz, 2018a), poorer relationship satisfaction (SM/Vs; Blais, 2019), and increased risk for suicide (Blais, Monteith, & Kugler, 2018b). Healthy sexual function among women can include an absence of dysfunction, diagnosis, or complaints related to sexual satisfaction, as well as the ability to experience the full sexual response cycle, which consists of desire for sexual activity, physiological arousal, orgasm, and resolution. Prevalence estimates of sexual disorders among women veterans suggest that <1% to 2.4% are diagnosed with a sexual disorder (Cohen et al., 2012; Turchik et al., 2012), but these estimates likely under-represent this issue due to lack of routine screening and under-reporting (Reissing & Giulio, 2010; see review, Rosebrock & Carroll, 2017). As women SM/Vs (1) represent the fastest growing cohort of service members (e.g. Patten & Parker, 2011), (2) report a higher number of sexual partners compared to women civilians (e.g. Lehavot et al., 2014), (3) experience lower sexual function compared to their women civilians and male veteran counterparts (see review, Rosebrock & Carroll, 2017), and (4) are at heightened risk for suicidal ideation when experiencing sexual problems

(Blais et al., 2018b), a better understanding of sexual function is a critical issue that could inform screening methods and interventions for women SM/Vs.

0.1. Factors impacting sexual function

According to Barlow (1986), sexual dysfunction is related in part to higher negative affect and the presence of failure expectancies. Negative affect can be manifested by depressive symptoms, which are commonly linked to poor sexual function (Barata, 2017; Murdoch, Pryor, Polusny, & Gackstetter, 2007). According to this theory, individuals who experience sexual dysfunction are most likely to approach sexual activity with depressed mood, apprehension, worry, and tension, which can create a negative feedback loop. That is, their unsatisfying participation and experiences may be fuelled by failure expectancies and vice versa. In 2007, Barlow and colleagues updated this theory to incorporate the contribution of sexual self-schemas on sexual function (Wiegel, Scepkowski, & Barlow, 2007). Sexual self-schemas are cognitive representations of an individual's sexual self that relates to their past experiences and affects how new information is processed, which ultimately guides sexual behaviour (Andersen & Cyranowski, 1994; Kilimnik, Boyd, Stanton, & Meston, 2018). Negative sexual self-schemas are particularly problematic and

may include beliefs that an individual cannot please their partner, they are inadequate or unattractive, or that any sexual difficulties they experience will cause problems for their relationship. Negative self-schemas can alter an individual's engagement with sexual activity by worsening their negative affect or depressive symptoms, ultimately resulting in worse sexual function. That is, fears of failure may lead individuals with sexual dysfunction to attend to information that confirms their negative expectancies, resulting in a self-sustaining negative feedback loop. Among women, fears of not satisfying one's partner are particularly salient (Wiegel et al., 2007), suggesting that negative sexual self-schemas and negative affect may be paramount issues among women.

The theory of sexual function proposed by Barlow in 1986 and updated in 2007 is supported by studies conducted in civilians (e.g. Cyranowski & Andersen, 1998; Kuffel & Heiman, 2006; Rellini & Meston, 2011), yet few studies using this theory have been conducted in SM/Vs. However, recent research conducted in a women military sample who were exposed to sexual violence examined components of Barlow's theory. Findings revealed that higher negative affect, as measured by depression severity (Blais, Livingston, & Fargo, 2020), and depressive-components of PTSD, including anhedonia and dysphoric arousal (Blais et al., 2018a), were related to poorer sexual function. Though informative, these two studies did not examine how sexual self-schemas relate to sexual function or the potential temporal order of depression and sexual self-schemas in their association with sexual function. Additional research exploring the relative contributions of both depression and sexual self-schemas on sexual function would provide novel information that could be used to develop or augment interventions aimed at improving sexual function among women SM/Vs.

0.2. Sexual function among survivors of military sexual trauma

Examining risk for sexual dysfunction may be particularly relevant among SM/Vs reporting a history of interpersonal violence that includes sexual trauma. Indeed, sexual self-schemas are developed, in part, based on previous sexual experiences. Sexual trauma that occurred during military service was coined 'military sexual trauma' or 'MST' by the Department of Veterans Affairs (VA; U.S. Government, 2014, p. 285). Estimates show that 29% of women seen for care at the VA report MST (VA, 2018), but research not circumscribed to VA users suggests this estimate is low. A recent meta-analysis suggests that as many as 40% of women veterans report MST (Wilson, 2018), and discrepant estimates may be due to under-reporting (Blais, Brignone, Fargo, Galbreath, & Gundlapalli,

2018c). One way sexual trauma survivors may cope with their history of sexual violence is to avoid sexual activities or decrease emotional involvement with partners so as not to elicit memories of their sexual trauma (Maltz, 2013; Staples, Rellini, & Roberts, 2012; Wiegel et al., 2007). Moreover, those who do engage in sexual activity may become distracted by memories of the trauma or corresponding maladaptive sexual self-schemas related to their sexual performance.

Given the negative feedback loop proposed by Barlow and colleagues (Barlow, 1986; Wiegel et al., 2007), women SM/Vs who experienced MST are at particularly heightened risk for sexual dysfunction. Extant literature shows that women SM/Vs reporting MST, and assault in particular, report poorer sexual function relative to those reporting less severe forms of MST or no MST (Blais, Brignone, Fargo, Livingston, & Andresen, 2019; DiMauro, Renshaw, & Blais, 2018; Turchik et al., 2012). Though Barlow's theory of sexual function has been tested in civilians, women SM/Vs report higher rates of sexual trauma (Stander & Thomsen, 2016), suggesting that relying on civilian data to understand the sexual health of women SM/Vs who have experienced interpersonal sexual violence will likely underestimate the issues these women experience.

0.3. The role of sexual self-schemas and depression on sexual function: suggested pathways

Barlow's theory of sexual function (Barlow, 1986; Wiegel et al., 2007) indicates that self-schemas and depression play critical roles in the onset and maintenance of sexual dysfunction. However, it is unclear how depression and sexual self-schemas may relate to sexual function among MST survivors. There are three potential pathways with which sexual self-schemas and depression could relate to sexual function among MST survivors. First, it is possible that a depressed mood makes individuals more susceptible to more negative self-schemas (e.g. Teasdale & Cox, 2001). Indeed, studies show that as depressive symptoms decrease, self-schemas become more positive (e.g. Haaga, Dyck, & Ernst, 1991; Scott, Williams, Brittlebank, & Ferrier, 1995), suggesting that depression may be a prerequisite for more negative self-schemas. Second, it is possible that more negative self-schemas increase risk for higher depressive symptoms. There is evidence among a non-traumatized sample that more negative self-schemas were related to a subsequent onset of depression (e.g. Evans, Heron, Lewis, Araya, & Wolke, 2005). Third, it is possible that depression and negative self-schemas work in tandem, resulting in a cyclic process – as depression increases, self-schemas become more negative and vice versa. This latter explanation has yet to be studied, but is

supported by cognitive therapies treating depression (e.g. Beck, Rush, & Emery, 1987). Notwithstanding, extant research examining the association of MST and sexual function suggests that the relationship is best explained by indirect effects, such as poor mood and maladaptive cognitions (e.g. Blais et al., 2018a, 2020). As such, each of these theorized pathways could be plausible explanations of sexual dysfunction among interpersonal sexual violence survivors.

0.4. Purpose of the current study

The purpose of the current study is to extend the extant literature by examining Barlow's model of sexual function in a sample of women SM/Vs with a history of MST. In particular, we sought to model the association of MST severity (none, harassment-only, assault), sexual self-schemas, depression severity, and sexual function. It was hypothesized that women SM/Vs reporting a history of MST, and assault in particular, would report higher sexual dysfunction, and the mechanism of this association would include more negative self-schemas and higher depressive symptoms. As noted above, there is little-to-no literature concluding whether higher depression results in more negative self-schemas, more negative self-schemas result in higher depression, or whether both higher depression and more negative self-schemas relate to poorer sexual function among MST survivors in a parallel mediation process. As such, we took an exploratory approach to understanding how sexual self-schemas and depression relate to MST and sexual function. A series of three mediation models were tested using path analysis (see Figure 1a-c). Path analysis is an optimal modelling strategy to explore these associations because path analysis allows all direct and indirect paths to be specified and model superiority can be statistically tested using the chi-square difference test (Werner & Schermelleh-Engel, 2010).

1. Methods

1.1. Participants

Data for this secondary analysis were extracted from a larger study ($N = 833$) that focused on sexual function and satisfaction (mediators) as predictors of romantic relationship satisfaction (outcome) among women who experienced sexual trauma (independent variable) during their military experience (Blais, 2019). The parent study did not include analyses that explored how depression and sexual self-schemas (current study's mediators) relate to sexual function (current study's outcome) among trauma-exposed women (current study's independent variable). As such, the current study represents a novel and separate study that extends the literature on sexual function in women whereas the parent study extended the literature on relationship satisfaction in women. Participants were included in this secondary analysis if they completed measures of MST and reported being in a romantic relationship (married or partnered but not married) at the time of survey completion. Of the original sample, 818 (98.2%) fit enrolment criteria and comprise the current sample.

The majority of the sample identified as non-Latina White ($n = 627$, 76.65%) and 49 (5.99%) identified as Latina. Of those 49 who identified as Latina, one (2.04%) identified as Latina and White. Seventy-nine (9.66%) identified as more than one race/ethnicity, 39 (4.77%) identified as Black, 4 (0.49%) identified as American Indian, and 20 (2.44%) did not provide information related to their racial/ethnic identity. The majority of the sample reported service in the Army (vs another branch; $n = 445$, 54.44%), being married ($n = 614$, 75.06%), and being discharged from service ($n = 611$, 74.69%).

Several guidelines for determining adequate power have been suggested, including (1) ensuring there are at least 10 participants per parameter (Bentler & Chou, 1987), having 10 participants per variable (Nunnally, 1967), or having 100–200 participants in the sample
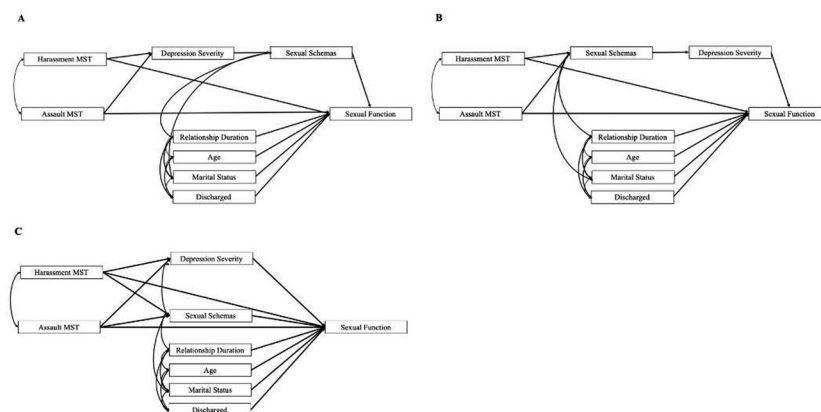
Figure 1. Three path models of sexual functions, MST history/type, and covariates with depression and self-schemas as mediators. Reference group for MST History/Type is No MST (dummy code = 0). The reference group for material status is partnered but not married (dummy code = 0). The reference group for discharged is not discharged (dummy code-0).

(Boomsma, 1982, 1985). Alternatively, it has been suggested that detecting a significant effect is adequate for establishing power (Greenland, Senn, Rothman, & Altman, 2016). In the current study, metric #1 would require at least 190 participants and metric #2 would require at least 100 participants. Using any of these metrics, the inclusion of 818 participants indicates we were adequately powered to conduct these analyses.

1.2. Procedure

Women SM/Vs were recruited to participate through the use of advertisements on a social media site (Facebook) and electronic listservs. Inclusion criteria for the parent study included female gender, history of military service (current or past), appropriate consenting age (≥18), and being in a relationship. Those who were interested in participating advanced to Qualtrics to read an Institutional Review Board (IRB) Letter of Information (LoI). Those who agreed to participate advanced in the survey to complete all study measures. Monetary compensation of 15 USD was offered for participation. The Utah State University IRB approved the parent study from which these data were extracted. As noted above, to be included in the current study, participants had to complete measures related to exposure to MST and report being partnered or married at the time of study participation.

1.3. Measures

1.3.1. Demographics/covariates

Information on covariates of age, relationship status (married, partnered but not married), relationship duration, and discharge status were collected in a demographic inventory designed for the parent study. Other demographic information was collected solely for the purpose of describing the study sample and included race and branch of service.

1.3.2. Sexual function

The *Female Sexual Function Index* (FSFI; Rosen et al., 2000) was used to measure sexual function using 19 self-report questions. A sample item includes 'Over the past 4 weeks, how often did you experience discomfort or pain during vaginal penetration?' Responses are rated using a variable anchor Likert scale. Items are scored using an algorithm designed by the scale authors and total scores range from 2–36. Lower scores indicate poorer sexual function. Scores <26.55 suggest probable issues with sexual function (Wiegel, Meston, & Rosen, 2005). The current sample showed adequate internal reliability (Cronbach's α = .97).

1.3.3. MST

A modified version of the *VA MST Screening Questionnaire* determined history (yes/no) and severity (harassment/assault) of MST. Participants reported harassment MST by indicating through electronic checkmark whether they experienced verbal remarks, touching, cornering, and/or pressure for sexual favours during their service in the military. Reporting any type of harassment MST during service was coded as a positive screen for harassment MST. Participants reported experiencing assault MST by providing an affirmative response to the item: 'When you were in the military, did someone ever use force or threat of force to have sexual contact with you against your will?' No endorsement of any harassment or assault MST items was dummy coded 'No MST [0]'. Endorsement of only harassment MST items was dummy coded 'harassment-only MST [1]' and endorsement of assault MST (could include any harassment MST items, too) was dummy coded 'assault MST [2]'.

1.3.4. Depression

The *Patient Health Questionnaire-9* (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to measure depression severity using nine self-report questions. A sample item includes 'Over the past 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless?' Responses are scored based on an ordinal scale, ranging from '0' (*not at all*) to '3' (*nearly every day*). Total scores are calculated by summing all individual items. Total scores range from 0–27, with higher scores indicating worse depression. The current sample showed adequate internal reliability (Cronbach's α = .92).

1.3.5. Sexual self-schemas

The relational concern subscale of the *Sexual Satisfaction and Distress Scale for Women* (SSS-W; Meston & Trapnell, 2005) was used to measure sexual self-schemas. This subscale contains 6 items that reflect sexual self-schemas. A sample item includes 'I'm worried that my partner views me as a less of a woman because of my sexual difficulties.' Responses are scored on a Likert scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The relational concern subscale score ranges from 6–30 and higher scores indicate more positive self-schemas. The current sample showed adequate internal reliability (Cronbach's α = .93).

1.4. Analytic plan

Descriptive statistics were used to calculate sample characteristics of study and demographic variables. Associations between sexual function, depression, sexual self-schemas, age, and relationship duration were calculated with Pearson's correlations. To determine whether sexual function, depression, sexual self-schemas, age, marital status, discharge status, and relationship duration differed based on MST history/ severity, analyses of variance (ANOVA) with Tukey's

post hoc comparisons and chi-square tests were run. As Barlow's model of sexual function suggests that depression and negative self-schemas can interact to produce higher sexual dysfunction, we tested the aforementioned associations in three separate path models. In each model, two correlated dummy-coded variables were specified as exogenous variables, which represented harassment-only MST and assault MST. The 'no MST' group was the reference category for both types of MST. Sexual function was specified as the endogenous, outcome variable in all models. All models included a mediated effect. Direct effects from the two MST variables to sexual function were specified in each model. Age, relationship duration (measured in years), marital status, and discharge status were specified as correlated covariates with direct paths to sexual function. Bivariate correlations revealed that relationship duration and marital status were significantly associated with sexual self-schemas (all ps <. 05). As such these covariates were also allowed to covary with sexual self-schemas.

In Model 1 (see Figure 1a), direct paths from the two MST variables were specified to depression and sexual function. A direct path from depression to self-schemas was also specified. Finally, a direct path from self-schemas to sexual function was specified. In Model 2 (see Figure 1b), direct paths from the two MST variables were specified to self-schemas and sexual function. A direct path from self-schemas to depression was also specified. Finally, a direct path from depression to sexual function was specified. In Model 3 (see Figure 1c), direct paths from the two MST variables were specified to depression, self-schemas, and sexual function. Depression and self-schemas were allowed to correlate. Direct paths from depression and self-schemas to sexual function were specified.

Goodness of model fit was examined using chi-square, the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). Model fit was evaluated using fit statistics suggested by Hu and Bentler (1999), including ≥.95 for CFI and TLI and ≤.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 favour by some given that the chi-square is easily influenced by sample size (e.g. Bentler & Bonett, 1980). Model

Table 1. Means, standard deviations, and bivariate associations of sexual function, depression, self-schemas, age, and relationship duration.

	M (SD)	1.	2.	3.	4.
1. Sexual Function	22.06 (9.78)	–			
2. Self-Schemas	21.46 (7.81)	.52***	–		
3. Depression	10.16 (7.67)	−.39***	−.45***	–	
4. Age	32.07 (7.45)	−.19***	−.07*	.03	–
5. Relationship Duration	6.18 (5.57)	−.17***	−.11**	.03	.61***

***p ≤ .001. **p ≤ .01. *p ≤ .05

superiority was calculated using the chi-square difference test (Werner & Schermelleh-Engel, 2010) and a visual comparison of the aforementioned fit indices. Missing data were handled using full information maximum likelihood. Analyses were conducted in SPSS version 25 (2017) and R Core Team (2018).

2. Results

2.1. Sample characteristics and simple associations

One hundred fifty-one (18.46%), 389 (47.56%), and 278 (33.99%) reported no MST, harassment-only MST, and assault MST, respectively. Means, standard deviations, and intercorrelations for sexual function, depression, self-schemas, age, and relationship duration can be found in Table 1. Differences in study variables as a function of MST type (no MST, harassment-only, assault) can be found in Table 2. The average score on the sexual function inventory suggested that this sample was experiencing at least some level of clinical dysfunction based on the suggested cut-off by Rosen et al. (2000). The average score on the PHQ-9 indicates that the sample was experiencing at least moderate depression (Kroenke et al., 2001).

Higher sexual function, as evidenced by higher total scores, was associated with more positive self-schemas, also evidenced by higher total scores, with a large effect size, lower depression with a medium-to-large effect size, and younger age and shorter relationship duration with small-to-medium effect sizes. More positive self-schemas were associated with lower depressive symptoms with a medium-to-large effect size and negatively associated with age and relationship duration with small effect sizes. Age and relationship duration were positively associated with a large effect size. Depression was unrelated to age and

Table 2. Means, standard deviations, and group comparisons of sexual function, self-schemas, depression severity, age, and relationship duration stratified by MST history type.

	No MST (n = 159)	Harassment MST (n = 389)	Assault MST (n = 278)	
	M (SD)	M (SD)	M (SD)	Test of Difference
Sexual Function	23.87[a] (10.03)	23.21[a] (9.36)	19.51[b] (9.72)	$F(2,804) = 15.06, p < .001$
Sexual Schemas	23.15[a] (7.10)	22.47[a] (7.47)	19.14[b] (8.12)	$F(2,809) = 19.76, p < .001$
Depression Severity	7.90[a] (6.97)	8.75[a] (7.22)	13.20[b] (7.68)	$F(2,730) = 34.51, p < .001$
Age	31.60[a] (8.12)	31.98[a] (7.31)	32.46[a] (7.27)	$F(2,812) = 0.71, p = .49$
Relation Duration	6.71[a] (6.00)	6.18[a] (5.60)	5.90[a] (5.27)	$F(2,791) = 1.01, p = .37$

MST = military sexual trauma. Means in the same row that do not share a superscript are significantly different.

relationship duration (see Table 1). Those reporting assault MST reported significantly lower sexual function and more negative self-schemas as well as higher depressive symptoms relative to those reporting no MST or harassment-only MST, though sexual function, self-schemas, and depression were not significantly different among the no MST or harassment-only MST groups. (see Table 2). There were no significant differences observed between those in no MST, harassment-only MST, and assault MST groups with regard to age, relationship duration (see Table 2) or being married versus partnered (χ^2[2, $N = 818$] = 2.44, $p = .30$). Sixty-eight percent, 74%, and 80% of the no MST, harassment-only MST, and assault MST groups reported being discharged from service, respectively (χ^2[2, $N = 818$] = 6.92, $p = .03$).

2.2. Model fit testing and selection

All models are fully described in the analytic plan and shown in Figure 1a-c. Model 1 (see Figure 1a) had an adequate fit (χ^2[17, $N = 818$] = 91.95, $p < .001$, CFI = .95, TLI = .90, RMSEA = 0.07) and was therefore retained. Model 2 (see Figure 1b) had a poor fit (χ^2[17, $N = 818$] = 239.69, $p < .001$, CFI = .86, TLI = .71, RMSEA = 0.13) and was therefore rejected. Model 3 (see Figure 1c) had an adequate fit (χ^2[14, $N = 818$] = 55.93, $p < .001$, CFI = .97, TLI = .93, RMSEA = 0.06) and was also retained. With a difference of 3 degrees of freedom between Models 1 and 3 (Figure 1a and Figure 1c, respectively), the critical value for a chi-square difference test had to meet or exceed 9.35. Model 1: χ^2 [91.95] -Model 3: χ^2 [55.93] = 36.02, suggesting one model was statistically superior to the other. A visual comparison of fit statistics suggested Model 3 (Figure 1c) was superior. Model 3 was therefore retained in the current study.

2.3. Path analysis

As noted above, Model 3, which specified parallel indirect effects of self-schemas and depression on the

association of MST and sexual function, had an excellent fit to the data (see above). As shown in Figure 2, assault MST was associated with more negative self-schemas (as evidenced by a negative correlation) and higher depression severity (as evidenced by a positive correlation). Harassment-only MST was unrelated to self-schemas or depression. The direct effects of harassment-only and assault MST on sexual function were non-significant. Higher depression severity (as evidenced by a negative correlation) and more negative self-schemas (as evidenced by a positive correlation) were associated with poorer sexual function. Indirect effects and their 95% confidence intervals (CI) of depression (estimate: −1.30 [CI: −1.91, −.69], $p < .001$) and sexual self-schemas (estimate: −2.09 [CI: −2.94, −1.24], $p < .001$) on the association of assault MST and sexual function were significant. The indirect effects and 95% CIs of depression (estimate: −.24 [CI: −60, .13], $p = .20$) and sexual self-schemas (estimate: −.30 [CI: −1.04, .45], $p = .44$) on the association of harassment-only MST and sexual function were non-significant. Overall, our findings suggest that assault MST is associated with poorer sexual function, and the mechanisms of this association include more negative self-schemas and higher depression symptoms. Age, marital status, and discharge status were unrelated to sexual function, but those reporting longer relationship durations reported lower sexual function.

3. Discussion

The current study was designed to fill an important gap in the literature in women SM/Vs. Namely, we examined the association of MST severity (none, harassment-only, assault), sexual self-schemas, depression severity, and sexual function among a sample of women SM/Vs who experienced interpersonal sexual violence during their military service. We tested three separate mediation models that assumed indirect effects of depression and sexual self-schemas on the association of MST and sexual function. Our findings
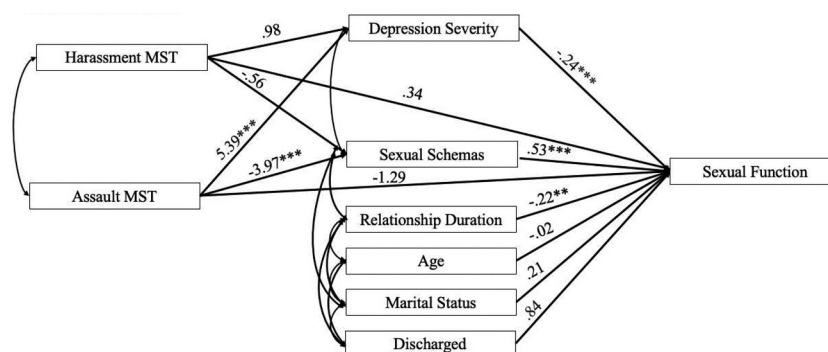
Figure 2. Path model of sexual function, MST history/type, and covariates with depression and self-schemas as simultaneous mediators. Reference group for MST History/Type is No MST (dummy code = 0). The reference group for material status is partnered but not married (dummy code = 0). The reference group for discharged is not discharged (dummy code-0).

revealed that the association of assault MST with sexual function was indirect, through simultaneous higher depression severity and more negative self-schemas related to sexual performance. Harassment-only MST was unrelated to sexual function through these mediators. This model had a superior fit to the data relative to models that predicted that higher depression would result in more negative sexual self-schemas or vice versa. Our findings are consistent with cognitive models of depression that suggest depression and maladaptive cognitions can be cyclic and work in tandem (Beck & Haigh, 2014). That is, as depression gets worse, so too do self-schemas and vice versa. Our findings have important implications for future research, targeted screening strategies, and clinical interventions.

Though the study design was cross-sectional and temporal precedence could not be established, results from the current study showed that the most optimal model for understanding the association of MST with sexual function was the model that included depression and sexual self-schemas as parallel mediators. This is somewhat distinct from previous studies that suggested that self-schemas may precede depression (Evans et al., 2005) or vice versa (Teasdale & Cox, 2001). Our results are preliminary but suggest that depression and sexual self-schemas may work in a cyclic pattern to impact sexual function. Future research in this area would be strengthened by examining these associations using a longitudinal study design aimed at replicating these results or determining the temporal precedence of depression and sexual self-schemas following MST.

At present, there is no universal screening for sexual function in large medical centres serving SM/Vs (e.g. VA medical centres) despite the fact that women who have served in the military report a higher number of sexual partners compared to women civilians (e.g. Lehavot et al., 2014), they report lower sexual function compared to their women civilians and male veteran counterparts (see review, Rosebrock & Carroll, 2017), and those who report higher sexual dysfunction report higher risk for suicidal ideation (Blais et al., 2018b). Our findings suggest that screening for sexual function among partnered women who reported that their MST involved assault may be helpful in identifying those who may benefit from intervention. Moreover, findings suggest that partnered women reporting higher depressive symptoms and more negative self-schemas related to sexual performance may be an important cohort to screen for sexual dysfunction.

Our findings suggest that when attempting to reduce sexual dysfunction among MST survivors, it may be critical to focus on reducing depression and challenging maladaptive cognitions related sexual activity such as sexual self-schemas. In the current study, more negative self-schemas included fears of disappointing a sexual partner, leaving the partner sexually unfulfilled, and concerns that sexual difficulties would lead to the dissolution of the relationship. These findings were consistent with the sexual function concerns observed among women in previous research (Wiegel et al., 2007). Cognitive-behavioural therapy (CBT) for depression in veterans has been shown to be largely effective (see review, Hundt, Barrera, Robinson, & Cully, 2014), and may be particularly well-suited in helping SM/Vs explore the validity of maladaptive sexual self-schemas and corresponding behaviours that may result in less-than-satisfying sexual experiences. Indeed, research shows that CBT was effective in reducing sexual dysfunction in women, but these results were circumscribed to those experiencing infertility (Sahraeian et al., 2019) or recovering from breast cancer (Hummel et al., 2017).

In addition to CBT, a recent review of the literature revealed that couples' therapy was effective in simultaneously reducing posttraumatic stress disorder (PTSD) symptoms and improving relationship satisfaction among partnered SM/Vs with a history of trauma (see Kugler, Andresen, Bean, & Blais, 2019). Moreover, couples' interventions specifically aimed at treating PTSD and relationship satisfaction also effectively reduced depression symptoms and other maladaptive coping strategies (e.g. Schumm, Monson, O'Farrell, Gustin, & Chard, 2015). Given that assault MST, which may serve as a Criterion A event for PTSD, was associated with poorer sexual function and sexual function is a component of relationship satisfaction, couples' therapy focused on mitigating the negative effects of trauma might be an effective tool to decrease the effects of depression and maladaptive schemas related to sexual performance.

The finding that harassment-only MST was unrelated to sexual function underscores the importance of distinguishing between MST exposures when studying the sequelae of sexual trauma that occurred during military service. This is consistent with the conclusion of Blais et al. (2019), who observed that assault, relative to harassment-only, MST was associated with higher psychological distress. In the current study, the experience of rape or threat of rape distinguished assault MST from harassment-only; thus, it appears that MST that is more severe is associated with poorer outcomes. That said, there are several ways to study severity including frequency of experiences, number of assailants, and whether the trauma resulted in injury. For example, recent research examined differing conceptualizations of severity including categorizations of physical vs non-physical assault, physical assault that did not include rape or attempted rape vs physical assault that included rape or attempted rape, and number of sexual trauma experiences. Results

showed that psychological outcomes were worst when the sexual trauma included rape or threat of rape, regardless of the number or type of sexual trauma experiences (Andresen & Blais, 2019). Future research could determine whether the null association of harassment-only MST and sexual function observed in the current study was due to harassment-only MST being less severe or whether there is some other component of assault MST that causes more severe distress relative to harassment-only.

There are limitations to the current study that should be considered when interpreting these findings. The study design was cross-sectional, so the temporal ordering of these events cannot be concluded. Indeed, individuals who experience sexual dysfunction may generate negative self-schemas following instances of sexual problems or may experience poor self-schemas that negatively influence their abilities to experience fulfiling sexual activities. As noted by Wiegel et al. (2007), longitudinal studies that help identify the temporal precedence of these events are needed. All measures were based on self-report and future studies may meaningfully extend this literature by exploring these associations in a sample of women experiencing clinical levels of depression and/or diagnosable sexual health concerns (e.g. vaginismus). The sample was also a convenience sample of women SM/Vs who were partnered, which can impact generalizability of findings. This literature could be extended by exploring these associations with unpartnered women who are sexually active. In addition to limiting generalizability, the methods of recruitment and data collection did not allow us to verify service in the military with written documentation. That said, a number of indicators were checked to confirm probable service. Other investigators have used a similar approach to data collection with service members (e.g. Pedersen, Naranjo, & Marshall, 2017). In the current sample, only four participants reported assault MST did not include harassment. While it would have been informative to separate the assault MST group into two (assault only, assault and harassment MST), we did not have adequate cell sizes within the assault only group to conduct meaningful statistical comparisons. It may be useful in future studies to compare the following groups with regard to sexual function: no MST, harassment-only MST, assault-only MST, and harassment and assault MST. Such studies may also consider how PTSD symptoms relate to sexual schemas and sexual function among those whose sexual trauma experiences meet the diagnostic criterion for a PTSD. It is possible that those who experience severe sexual trauma may develop beliefs that all sexual engagement is dangerous or an opportunity to be revictimized. Fears of revictimization may prevent people from engaging in sexual activity or experiencing meaningful sexual relations. Of the studies that have examined PTSD and sexual function in MST survivors, findings observed that it was mostly the depressive components of PTSD that were most problematic (e.g. Blais, Geiser, & Cruz, 2018a; Blais et al., 2020); however, these studies did not explore post-traumatic cognitions or sexual schemas following the trauma. Finally, measures of depression and sexual function assessed problems in these domains with varying durations (e.g. 2 weeks vs 4 weeks). Future studies would strengthen this area of inquiry by studying issues using a single timeframe.

Notwithstanding these limitations, the current study provides a preliminary framework with which to understand the interplay of the association of assault MST, depression, self-schemas, and sexual function. Findings suggest that targeted screening may help identify those who might experience poor sexual function secondary to MST and that cognitive behavioural interventions may be well-suited to address these clinical concerns.

Data availability

Disclosure statement

Funding

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