

## RESEARCH ARTICLE

# Posttraumatic stress disorder and relationship functioning: Examining gender differences in treatment-seeking veteran couples

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## Author Note

This work was supported by Award Number 1I01RX002093-01 from the Rehabilitation Research & Development Service of the VA Office of Research and Development. The authors would like to thank Min Ji Sohn and the research assistants in the PIVOTT Lab for their assistance with data management.

## Abstract

Posttraumatic stress disorder (PTSD) symptoms are robustly associated with intimate relationship dysfunction among veterans, but most existing research has focused on male veterans and their female partners. Links between PTSD and relationship functioning may differ between female-veteran couples and male-veteran couples. The current study used actor-partner interdependence models (APIMs) to test the associations between PTSD symptoms (i.e., veteran self-report or significant others' collateral-report) and each partner's reports of six domains of relationship functioning, as well as whether these links were moderated by the gender composition of the couple. Data were from 197 mixed-gender couples ( $N = 394$  individuals) who completed baseline assessments for a larger randomized controlled trial of a couple-based PTSD treatment. Significant others' collateral PTSD reports were associated with their own ratings of relationship satisfaction, negotiation, psychological aggression, sexual pleasure, and sexual desire frequency,  $|\beta|s = .19-.67$ , and with veterans' ratings of negotiation and sexual desire frequency,  $|\beta|s = .20-.48$ . In contrast, veterans' self-reported PTSD symptoms were only associated with their own ratings of psychological aggression,  $\beta = .16$ . Gender moderated the associations between significant others' collateral PTSD reports and five of the six outcome variables; findings from exploratory subgroup analyses suggested links between reported PTSD symptoms and relationship functioning were generally more maladaptive for male-veteran couples, whereas female veterans showed more neutral or even helpful impacts of higher partner-perceived PTSD symptoms. These findings have implications for clinicians treating relational impacts of PTSD and emphasize the need for further research with female-veteran couples.

It is well documented that posttraumatic stress disorder (PTSD) is associated with deleterious effects on intimate relationships (Lambert et al., 2012; Taft et al., 2011). PTSD-related relationship dynamics, such as symptom accommodation and caregiver burden, have deleterious impacts on relationship satisfaction, support, and intimacy (Campbell & Renshaw, 2019; Manguno-Mire et al., 2007). Among couples, PTSD symptom severity has been shown to prospectively predict difficulties in communication (Fredman et al., 2017). Additionally, the PTSD-diagnosed partner may perceive their partner's communication as more hostile or negative, potentially increasing the chances of conflict (LaMotte et al., 2017), reducing positive behaviors (Miller et al., 2013), and impacting problem solving (Caska-Wallace et al., 2019). PTSD symptoms are also associated with poorer sexual functioning (Bachem et al., 2020; Dimauro & Renshaw, 2019), with PTSD-diagnosed individuals more likely to report sexual problems than the general population (Badour et al., 2015; Breyer et al., 2016). Links between PTSD and relationship dysfunction may be particularly strong for military service members and veterans (Taft et al., 2011).

Most research on the relational impact of PTSD for veteran couples has focused on male veterans and their female partners, with much less research focusing on female-veteran couples. However, the female veteran population continues to rapidly increase (Frayne et al., 2018). Given the intersection of gender roles with aspects of both relationship functioning and military service, associations between PTSD and relationship functioning may differ depending on veteran and partner gender. Vogt and colleagues (2017) explored the impacts of probable PTSD on work and family functioning for both male and female veterans and found some indication that PTSD may impair family functioning more for male veterans and work functioning more for female veterans, although the authors did not directly test gender differences. Examining the moderating effect of gender on the association between PTSD severity and couple functioning has been identified as an important gap in knowledge (see Campbell & Renshaw, 2018).

Women and men appear to have different likelihoods of experiencing different types of traumatic events as well as different posttraumatic trauma sequelae and outcomes. Some literature has concluded that, in general, women have a higher risk of developing PTSD (Christiansen & Elklit, 2012; Pietrzak et al., 2011) and endorse more severe symptoms (Hourani et al., 2015; Lehavot et al., 2018), whereas other research has not identified a differential risk for women and men if they are exposed to similar levels of stress and trauma (Perreira 2002; Rivollier et al., 2015). Women appear to be more likely than men to develop symptoms of depression and PTSD following

combat exposure (Luxton et al., 2010), whereas men have been shown to express higher degrees of distress following sexual trauma and adverse childhood experiences (Aronson et al., 2020; Hourani et al., 2015), although women are much more likely to experience both of these trauma types (Maguen et al., 2012; Tolin & Foa, 2006). Coping after traumatic events also differs by gender, with women experiencing more internalizing symptoms of withdrawal, rumination, and depression (Christiansen & Elklit, 2008; Tamres et al., 2002), and men experiencing more externalizing symptoms, such as substance abuse (Epstein et al., 2019; Olff, 2017). There also appear to be gender differences in the presentation of PTSD; for example, King et al. (2013) found that male veterans endorsed more frequent nightmares, numbing, and hypervigilance, and women veterans endorsed concentration issues and higher levels of distress from trauma reminders (King et al., 2013). Previous research has also identified a stronger association between PTSD and physical aggression among men compared with women (Marshall et al., 2005).

The gender of the individual experiencing PTSD may influence the way PTSD sequelae impact relationship functioning. Both female veterans and female significant others of veterans tend to experience more relationship distress secondary to emotional numbing symptoms than their male counterparts (Renshaw et al., 2014). Further, some research suggests that women in mixed-gender relationships tend to do more relational and household work than men (Ahn et al., 2017), which may indicate that women's PTSD-related impairment will have more consequences for the relationship. In addition, PTSD-related accommodation and caregiver burden seem to disproportionately fall on women (Hsiao, 2010; Mulud & McCarthy, 2017). However, other findings suggest that men's posttraumatic symptoms may be more detrimental to relationship functioning than women's: In a civilian sample of individuals exposed to a natural disaster, attachment avoidant reactions in male partners were more likely to negatively affect both partners' mental health outcomes, whereas avoidant reactions in female partners only impacted the woman's own depression and PTSD (Gallagher et al., 2017). Similarly, Hanley et al. (2013) found that a high level of PTSD symptom severity was associated with fewer supportive behaviors among male partners, but the same was not true for female partners with more severe PTSD symptoms. This previous research indicates there are likely to be gender differences in the links between PTSD symptoms and relationship functioning, but prior findings are mixed regarding the direction and precise nature of this association.

The present study aimed to better understand how gender may moderate the links between PTSD and aspects of romantic relationship functioning among United States

TABLE 1 Sample demographic characteristics, by veteran gender

Variable	Male-veteran couples (N = 163)			Female-veteran couples (N = 34)			Statistical comparison	P
	M	SD	%	M	SD	%		
SO veteran status			10.4			64.7	$\chi^2(1, 197) = 52.2$	< .001
SO PTSD symptoms (PCL-5)	16.8	14.3		19.1	16.8		$t(169) = -0.77$	.443
Relationship length (years)	13.8	12.7		8.1	9.6		$t(195) = 2.47$	.004
Married			79.1			55.9	$\chi^2(1, 197) = 8.14$	.004
Veteran age (years)	44.1	14.0		37.3	12.2		$t(195) = 2.62$	.010
Partner age (years)	42.6	14.2		38.3	12.2		$t(195) = 1.62$	.106
Black or African American race			21.3			32.4	$\chi^2(1, 194) = 1.94$	.164
Hispanic/Latino ethnicity			49.7			38.2	$\chi^2(1, 197) = 1.48$	.224
Veteran depression (BDI-II)	26.5	12.9		27.3	9.1		$t(55.7) = -0.45$	.657
Veteran alcohol use (AUDIT)	5.5	6.2		2.3	3.0		$t(92.4) = 4.47$	< .001

Note: SO = significant other; PTSD = posttraumatic stress disorder; PCL-5 = PTSD Symptom Checklist for DSM-5; BDI-II = Beck Depression Inventory-II; AUDIT = Alcohol Use Disorders Identification Test.

military veterans and their partners. We utilized data from mixed-gender couples who completed a baseline assessment before participation in a clinical trial of a couple-based PTSD intervention (i.e., cognitive behavioral conjoint therapy for PTSD [CBCT-PTSD]; Monson & Fredman, 2012). Using actor-partner interdependence models (APIMs; Cook & Kenny, 2005), we examined links between the severity of veterans' self-reported PTSD symptoms or their significant others' collateral-reported PTSD symptoms and multiple domains of relationship functioning, including relationship satisfaction, communication, verbal and sexual aggression, and sexual functioning. APIMs are advantageous for dyadic data (i.e., data from couples) because they allow for simultaneously testing the associations between one's own predictor and outcome variables (i.e., actor effects) as well as the associations between one's partner's predictor variables and one's own outcome variables (i.e., partner effects). We then tested whether these actor and partner effects were different depending on the gender composition of the relationship; that is, whether the couple consisted of a male veteran and female significant other or a female veteran and male significant other. Based on previous research, we hypothesized there would be significant actor and partner effects of PTSD symptom severity on each domain of relationship functioning. Due to limited and mixed existing research, tests of gender differences were exploratory, and we did not formulate specific hypotheses for these analyses.

## METHOD

### Participants and procedure

Participants were 197 veterans-significant other dyads; demographic characteristics are presented in Table 1. After providing informed consent, all participants completed

baseline assessments before being evaluated for engagement in a couples-based PTSD treatment study at a U.S. Veteran Affairs (VA) medical center in the southwestern United States (see Morland et al., 2019, for more details). The larger study was registered as a clinical trial at clinicaltrials.gov (NCT02720016). Participants could be of any gender and sexual orientation, but the present study evaluated only mixed-gender couples due to a small sample of same-gender couples ( $n = 21$ ). Couples were referred to the study after indicating to their clinical provider that they were interested in couples therapy and/or PTSD treatment. Veterans and their significant others were screened by phone to determine preliminary eligibility; couples were only excluded from the baseline assessment if either individual reported physical or sexual relationship violence and fear or intimidation ( $n = 7$  couples) or a suicide attempt ( $n = 1$  couple) in the past year. Couples that were eligible for the baseline assessment provided written informed consent and completed baseline measures on-site. The VA San Diego Institutional Review Board approved the protocol.

## Measures

### PTSD symptoms

Veterans' self-reported PTSD symptoms were assessed using the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013), which contains 20 self-report items that assess PTSD symptoms based on the diagnostic criteria in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*; American Psychiatric Association [APA], 2013). Items are rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*), with sum scores ranging from 0 to 80. Higher scores suggest more severe PTSD symptoms. The PCL-5 has demonstrated strong internal consistency, test-retest reliability, and convergent and

discriminant validity (Blevins et al., 2015). In the present sample, 85.0% of veterans and 14.5% of significant others met the screening criteria for likely PTSD based on the recommended cutoff score of 33 (Weathers et al., 2013); in 11.3% of couples, both partners meeting the screening criteria. In the present sample, the internal consistency was excellent for both male veterans, Cronbach's  $\alpha = .91$ , and female veterans, Cronbach's  $\alpha = .90$ .

Significant others' collateral-reported PTSD symptoms were measured using the PTSD Collateral Checklist for DSM-5 (PCL-5-C; Monson et al., 2011), a 20-item questionnaire that parallels the PCL-5. The PCL-5-C is used to assess significant others' perceptions of the veteran's PTSD symptoms (i.e., "How much has your partner been bothered by [symptom]?"). Items, response scales, and scoring are the same as the PCL-5. In the present sample, Cronbach's alpha was .95 for both male and female significant others.

### Veteran comorbidities

Veterans also reported symptom severity of two common comorbidities of PTSD: depression and alcohol use. Depression was assessed using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). Respondents score items using a scale of 0 to 3 indicating the frequency or severity of depression symptoms, such as sadness, pessimism, and anhedonia, with higher scores indicative of more severe depressive symptoms. In the present sample, internal consistency was very good, Cronbach's  $\alpha = .94$ .

Veterans' alcohol use was assessed using the 10-item Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993). Respondents score items related to drinking frequency and concerns, with response options ranging from 0 to 4. Higher scores indicate higher levels of problematic drinking. In the present sample, internal consistency was good, Cronbach's  $\alpha = .86$ .

### Relationship satisfaction

Relationship satisfaction was assessed using the 32-item Couples Satisfaction Index (CSI; Funk & Rogge, 2007). Item 1, which is used to measure the overall happiness of one's romantic relationship, is scored on a 7-point scale ranging from 0 (*extremely unhappy*) to 6 (*perfect*); the remaining items are scored on a 6-point scale ranging from 0 to 5, with varying response options to indicate endorsement or agreement with statements about relationship satisfaction and quality as well as happiness with the relationship. Total scores range from 0 to 161, with higher sum scores indicating higher degrees of relationship satisfaction. In the present sample, the internal consistencies were

excellent for all groups of participants, Cronbach's  $\alpha$ s = .97–.98.

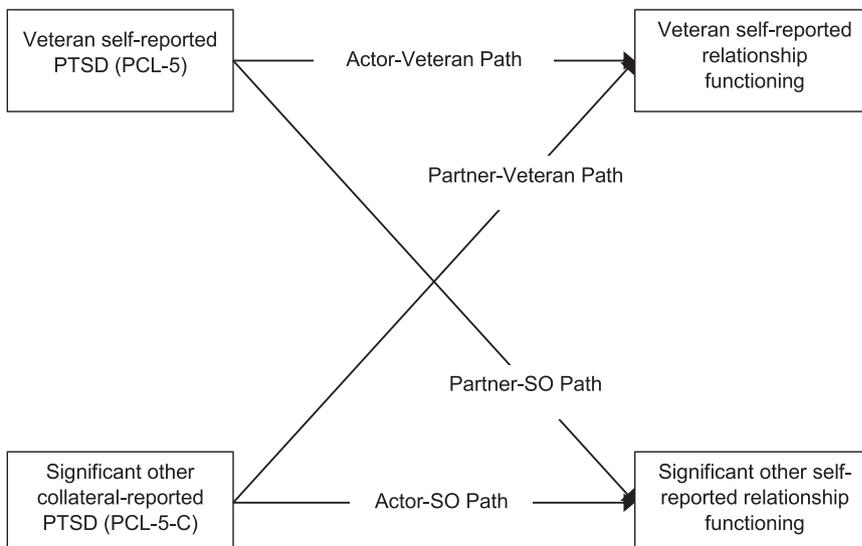
### Conflict behaviors

Conflict behaviors were measured using the short-form of the Revised Conflict Tactics Scale (CTS2S; Straus & Douglas, 2004), a self-report measure that uses 10 paired items (i.e., the respondent's own actions and the respondent's perception of their partner's actions) to assess conflict and intimate partner violence. The measure includes five domains: negotiation, psychological aggression, injury, physical assault, and sexual coercion. Because the screening criteria for the clinical trial resulted in low rates of physical assault and injury, the present study examined each person's report of the remaining three domains; that is, both their own and their partner's use of negotiation (i.e., constructive conflict), psychological aggression, and sexual coercion. The CTS2S uses an ordinal scale to assess the frequency of occurrence for each item, with response options ranging from 0 (*this has never happened*) to 6 (*more than 20x in the past year*). There are many possible ways to score CTS2S subscales (Straus & Douglas, 2004). Based on the score distributions in the current study, we used mean scores for frequency of past-year negotiation (continuously distributed), sum scores for frequency of past-year psychological aggression (positively skewed continuous distribution), and prevalence scores for past-year sexual coercion (present = 1, absent = 0; zero-inflated distribution). These scores were aggregated across each respondent's reports of both their own and their partner's behavior, thus representing occurrence in the relationship overall.

### Sexual functioning

Sexual functioning was measured using the Changes in Sexual Functioning Questionnaire (CSFQ-14; Keller et al., 2006), which includes 14 self-report items in corresponding versions for male and female respondents. The CSFQ-14 includes five subscales: Pleasure, Desire/Frequency, Desire/Interest, Arousal/Excitement, and Orgasm/Completion. The current study used the Pleasure (i.e., "Compared with the most enjoyable it has ever been, how enjoyable or pleasurable is your sex life right now?") and Desire/Frequency (i.e., "How often do you desire to engage in sexual activity?") subscales, as these subscales have relational components whereas the other three subscales reflect individual sexual functioning. The measure uses a 5-point scale for all items, with higher sum scores (i.e., 1–5 for Pleasure, 2–10 for Desire/Frequency) indicating higher levels of sexual functioning. In the

**FIGURE 1** The actor–partner interdependence model. Note: PTSD = posttraumatic stress disorder; PCL-5-C = PTSD Checklist for *DSM-5*–Civilian Version



present sample, Cronbach’s alpha for male and female veterans and significant others ranged from .80 to .89.

## Data analysis

The present analyses used APIMs (Cook & Kenny, 2005) run in the R structural equation modeling package *lavaan* (Rosseel, 2012). Missing data were accommodated using maximum likelihood estimation. Model estimation used bootstrapped standard errors, and models for sexual coercion were adjusted for binary outcomes using weighted least square mean and variance adjusted (WLSMV) estimation. We did not have sufficient data points to model all scales as latent variables; thus, all measures were traditionally modeled using observed variables (i.e., sum or mean scores). APIMs were constructed with paths from both the veteran’s self-reported PCL-5 score and the significant other’s PCL-5-C score to each partner’s report of a relationship variable (e.g., satisfaction), controlling for covariates. Due to significant gender differences in significant others’ veteran status, relationship length, marital status, veteran age, and veteran alcohol use (see Table 1), all analytic models controlled for these covariates. The first set of models (Model 1a) had four paths of interest: the actor path for veterans (i.e., veterans’ PCL-5 score predicting their own relationship assessment), the actor path for significant others (i.e., significant others’ PCL-5-C score predicting their own relationship assessment), the partner path for veterans (i.e., significant others’ PCL-5-C score predicting veterans’ relationship assessment), and the partner path for significant others (i.e., veterans’ PCL-5 score predicting significant others’ relationship assessment). We refer to these as the actor–veteran path, actor–SO path, partner–veteran

path, and partner–SO path. See Figure 1 for a visualization of this model.

To test for gender moderation on each of the four APIM paths, we then added interactions between couple gender (0 = male-veteran couples, 1 = female-veteran couples) and each PTSD score, controlling for main effects of couple gender (Model 2). Because of the small sample size of female-veteran couples and the exploratory nature of these analyses, we set an alpha level of .10 for interaction effects. We then ran our original APIMs as multigroup analyses, grouped by couple gender (Model 1b). In Model 1b, pathways that did not show significant interactions with gender in Model 2 were constrained to be equivalent for male-veteran couples and female-veteran couples, whereas pathways that demonstrated significant interactions with gender were allowed to vary. Thus, for a path that did not show a significant gender difference, one full-sample coefficient from Model 1a is reported. For a path that showed a significant gender difference, separate coefficients from Model 1b are reported for male-veteran and female-veteran couples because the full-sample coefficient was not interpretable due to the significant interaction. Relevant results from APIMs (i.e., Models 1 and 1b) are reported in Table 2. Full structural equation model results are available in the online [supplementary materials](#).

## Results

### Relationship satisfaction

The actor–SO path for relationship satisfaction was statistically significant,  $\beta = -.273$ ,  $p = .001$ , indicating that higher collateral PTSD reports from significant others were

**TABLE 2** Results from actor–partner independence models with posttraumatic stress disorder (PTSD) symptoms and relationship outcomes

Relationship outcome	Standardized path coefficients			
	Actor–veteran	Actor–SO	Partner–veteran	Partner–SO
Satisfaction	−0.135	−0.273**		0.031
Male veteran couple			−0.100	
Female veteran couple			−0.020	
Negotiation	0.111			0.124
Male veteran couple		0.000	−0.164	
Female veteran couple		0.666***	0.442**	
Psychological aggression	0.158*		−0.020	0.058
Male veteran		0.133		
Female veteran		0.546***		
Sexual pleasure		−0.186*	−0.161	0.150
Male veteran couple	−0.067			
Female veteran couple	0.197			
Sexual desire frequency	−0.099			−0.004
Male veteran couple		−0.115	−0.207*	
Female veteran couple		0.462**	−0.017	
Sexual coercion	0.009	0.137		−0.013
Male veteran couple			−0.002	
Female veteran couple			−0.496	

Note: When one path coefficient is reported, gender moderation was not significant, and the results come from Model 1a, which was estimated using the full sample. When two path coefficients are reported, gender moderation was significant, and the results come from Model 1b, which was estimated separately by couple gender. SO = significant other.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

associated with lower ratings of their own relationship satisfaction. The actor–veteran and partner–SO paths were nonsignificant. There was moderation by gender on the partner–veteran path, Wald = 1.68,  $p = .092$ . There was a nonsignificant association between female significant others' collateral PTSD reports and male veterans' relationship satisfaction,  $\beta = -.100$ ,  $p = .243$ , and the link between male significant others' collateral PTSD reports and female veterans' relationship satisfaction was also nonsignificant,  $\beta = -.020$ ,  $p = .899$ . Thus, although the partner–veteran pathway was not statistically significant for either gender group, the two slopes were significantly different from one another and suggest that male-veteran couples showed a more negative association between veterans' relationship satisfaction and their significant others' perceptions of PTSD symptoms than female-veteran couples.

## Negotiation

The actor–veteran and partner–SO pathways for negotiation were nonsignificant. There was moderation by gender for both the actor–SO path, Wald = 3.828,  $p < .001$ , and the partner–veteran path, Wald = 2.170,  $p = .030$ . For the

actor–SO path, there was no association between female significant others' reports of collateral PTSD and ratings of negotiation,  $\beta = .000$ ,  $p = .997$ . However, there was a significant link between male significant others' higher collateral PTSD scores and higher negotiation scores,  $\beta = .666$ ,  $p < .001$ . For the partner–veteran path, there was a nonsignificant association between female significant others' collateral PTSD ratings and male veterans' reports of negotiation,  $\beta = -.164$ ,  $p = .056$ . In female-veteran couples, on the other hand, there was a significant positive link between male significant others' collateral PTSD ratings and female veterans' reports of negotiation,  $\beta = .442$ ,  $p = .003$ . Thus, both the actor–SO and partner–veteran effects demonstrated that there may be more negotiation in female-veteran couples when male significant others report higher ratings of collateral PTSD symptoms, whereas this association was not evident in male-veteran couples.

## Psychological aggression

For psychological aggression, the actor–veteran path was statistically significant,  $\beta = .158$ ,  $p = .048$ , and was not moderated by gender, indicating that there was a positive

association between veterans' PTSD ratings and their own reports of psychological aggression. The partner–veteran and partner–SO pathways were nonsignificant. The actor–SO path was moderated by gender, Wald = 2.625,  $p = .009$ . There was a nonsignificant association between female significant others' reports of collateral PTSD and their own ratings of psychological aggression,  $\beta = 0.133$ ,  $p = .111$ , but there was a large positive association between male significant others' collateral PTSD reports and their own ratings of psychological aggression,  $\beta = 0.546$ ,  $p < .001$ . Thus, the link between significant others' perceptions of more severe veteran PTSD and perceptions of higher levels of psychological aggression in a relationship was stronger for female-veteran (i.e., male significant other) couples.

### Sexual pleasure

The actor–SO path was significant,  $\beta = -.186$ ,  $p = .025$ , showing a negative association between significant others' collateral PTSD reports and their sexual pleasure. The partner–veteran and partner–SO paths were nonsignificant. The actor–veteran path was moderated by gender, Wald = 1.888,  $p = .059$ . Among male-veteran couples, there was a nonsignificant association between the veteran's PTSD symptom severity and his own report of sexual pleasure,  $\beta = -.067$ ,  $p = .438$ . Female-veteran couples also showed a nonsignificant association between the veteran's PTSD symptom severity and her own report of sexual pleasure,  $\beta = .197$ ,  $p = .081$ . Thus, although neither male-veteran nor female-veteran couples showed significant actor–veteran pathways, the pathways were significantly different from each other and suggest links between PTSD symptoms and sexual pleasure may be in opposite directions for female and male veterans.

### Sexual desire frequency

The actor–veteran and partner–SO paths for sexual desire frequency were nonsignificant. There was moderation by gender on the actor–SO, Wald = 2.293,  $p = .022$ , and partner–veteran paths, Wald = 2.370,  $p = .018$ . For the actor–SO path, there was a nonsignificant association between female significant others' collateral PTSD ratings and their own reports of sexual desire frequency,  $\beta = -.115$ ,  $p = .189$ , whereas there was a significant positive association between male significant others' collateral PTSD ratings and their own reports of sexual desire frequency,  $\beta = .462$ ,  $p = .001$ . For the partner–veteran pathway, there was a significant negative association between female significant others' collateral PTSD ratings and male veterans' reports of sexual desire frequency,  $\beta = -.207$ ,  $p = .020$ ,

whereas there was no association between male significant others' PTSD ratings and female veterans' report of sexual desire frequency,  $\beta = -.017$ ,  $p = .886$ . Taken together, these findings suggest that men may show stronger negative links between PTSD symptoms and lower sexual desire frequency, irrespective of patient role and reporter.

### Sexual coercion

For sexual coercion, the actor–veteran, actor–SO, and partner–SO paths were all nonsignificant and were not moderated by gender. The partner–veteran path was moderated by gender, Wald =  $-2.013$ ,  $p = .044$ . There was no association between female significant others' collateral PTSD reports and male veterans' reports of sexual coercion,  $\beta = -.002$ ,  $p = .988$ . The association between male significant others' collateral PTSD reports and female veterans' reports of sexual coercion was also nonsignificant,  $\beta = -.496$ ,  $p = .420$ , although it was significantly different than the path for male-veteran couples. This suggests there may be a stronger link between veterans' experiences of sexual coercion and their significant others' perceptions of PTSD among female-veteran couples relative to male-veteran couples.

## DISCUSSION

The present study aimed to use an APIM framework to explore gender differences in the links between self- and partner-reported PTSD symptom severity and relationship functioning among a treatment-seeking sample of veterans and their significant others. Most of the significant effects in these models emerged for the two pathways linking significant others' collateral PTSD ratings to both their own and their veteran partner's ratings of relationship functioning. In the context of a couples-based PTSD intervention, this pattern of findings emphasizes the importance of attending to the nondiagnosed partner's perceptions of the veteran's PTSD symptoms. The only significant effect related to veterans' self-reported PTSD symptoms was a link with heightened veteran-reported psychological aggression. This fits with previous findings regarding the association between PTSD symptom severity and hostile and negative communication (Fredman et al., 2017).

Gender differences also emerged primarily for the pathways connected to significant others' collateral PTSD ratings. Gender moderated the way in which significant others' perceptions of PTSD symptoms were related to their own reports of negotiation (i.e., constructive conflict), psychological aggression, and sexual desire frequency, as well as to veterans' reports of satisfaction, negotiation,

sexual desire frequency, and sexual coercion. Regarding partner effects for veterans, relative to female-veteran couples, male-veteran couples generally showed poorer relationship functioning as collateral reports of PTSD increased. Previous research has suggested that women may engage in more PTSD-related caregiving and accommodation than men (Hsiao, 2010; Mulud & McCarthy, 2017), so this added caregiving burden may impact dyadic relationship functioning more when the veteran is male and the significant other is female. On the other hand, for female-veteran couples, male significant others' perception of more severe PTSD in their female veteran partner showed a less deleterious connection to relationship satisfaction, sexual desire, and sexual coercion and even displayed an association with higher negotiation.

This is contrary to some prior findings that suggest that higher degrees of PTSD symptom severity in female veterans are related to poorer relationship functioning (Renshaw et al., 2014), although it should be noted that in the current study's findings, PTSD severity was rated from the point of view of the male significant other and not the female veteran herself. It may be that female veterans perceive their significant others as more understanding or empathic when the significant other is able to recognize her PTSD symptoms, and male significant others who are able to recognize more severe symptoms may be better able to respond to these symptoms in helpful ways. Given the context of the couples' treatment research study from which this sample was drawn, it is also possible that male significant others who perceive their partner to have more severe PTSD symptoms are more willing to work on the relationship, including engaging in treatment together with the female veteran. It is also important to note that most of the significant others of the female veterans in the present study were also veterans, and although we controlled for significant-other veteran status statistically, it certainly may be the case that male significant others who are also veterans can better understand the traumatic experiences their partners have faced. Female veterans are understudied in the PTSD literature in general, and there is almost no research on couple functioning among female veterans and their male partners, whether veterans or civilians; thus, additional research is needed to more fully understand the experiences of this population.

Regarding the links between significant others' own relationship functioning and their perceptions of their veteran partners' PTSD severity, the present findings related to significant others' experiences of distress appear to be generally consistent with well-established findings on the negative impact of PTSD on veterans' significant others (Fredman et al., 2014; Miller et al., 2013). However, these associations were, overall, stronger and more maladaptive for male significant others of female veterans than

for female significant others of male veterans. For all significant others, higher levels of perceived PTSD symptom severity were associated with lower relationship satisfaction and lower sexual pleasure, and for male significant others, more severe perceived partner PTSD was also associated with heightened psychological aggression. On the other hand, male significant others also reported higher ratings of negotiation and sexual desire frequency when they perceived their female veteran partners' PTSD symptoms to be more severe. The combination of less sexual pleasure and higher sexual desire frequency may suggest that these couples are not having sex as frequently as the male significant others would like. Further, although we interpreted negotiation as constructive communication during conflict, in the context of lower satisfaction and higher psychological aggression, negotiation could also be consistent with an overall higher level of conflict in the relationship. It is notable that, relative to male veterans, female veterans reported higher ratings of relationship functioning when their partners perceived them to have more severe PTSD symptoms, as previously described, but here, the male significant others of these female veterans reported poorer relationship functioning the more severe they perceived her PTSD symptoms to be.

The only other gender difference that emerged was concerning the link between veterans' self-reported PTSD and their own sexual pleasure, which suggests that veteran women may experience a relatively more positive link between PTSD and sexual pleasure, whereas veteran men may experience a relatively more negative link. One possible explanation is that some veterans with more severe PTSD symptoms, and perhaps women veterans, in particular, may engage in sexual activity as a coping mechanism or as part of a cluster of sensation-seeking behaviors related to psychopathology. However, given that neither of the actor associations was significantly different from 0 in subgroup analyses, it is prudent to avoid making too much meaning of this finding without further replication. Additionally, we were unable to control for the potential impact of psychiatric medication, which may reduce both PTSD symptoms and sexual desire, confounding the association observed in the present data. Further research is needed to explore the interplay between medication, PTSD, and couples' sexual functioning.

It is intriguing that gender differences emerged primarily for the paths related to partners' collateral PTSD reports. It seems that gender dynamics may be particularly important when it comes to how veterans' significant others perceive PTSD symptoms in their relationship. Although the pattern of findings in the study was complex, the findings generally suggest that when male significant others perceive more severe PTSD symptoms in their female veteran partners, there are negative consequences for their

own relationship functioning but neutral or, perhaps, even adaptive impacts on the female veteran's relationship functioning can emerge. On the other hand, female significant others' perceptions of more severe PTSD symptoms in their male veteran partners generally confer a weak, negative connection to their own relationship functioning and a stronger negative impact on the veteran's own relationship functioning. The present findings demonstrate that each partner's gender and each partner's perceptions of PTSD may be important in future research and clinical practice.

Couples-based PTSD treatments often include an acknowledgment of the importance of both the PTSD-diagnosed individual's own experience of PTSD symptoms and the significant other's perceptions of these symptoms. However, treatment protocols typically do not address how patient and partner gender may factor into these experiences. Clinicians should be aware that each partner's PTSD reports, self or collateral, may have distinct associations with relationship functioning and that these associations might change depending on the gender composition of the couple. In particular, clinicians could be aware of the potential that a male significant other's awareness of more severe PTSD symptoms in his female partner may have a negative impact on his own relationship functioning but, potentially, a more positive influence on relationship functioning for his female PTSD-diagnosed partner. This awareness is also likely to be useful in individual PTSD treatment settings, where patients often discuss the interpersonal impacts of their symptoms and may benefit from better understanding their partners' perspectives. Helping individuals or couples understand these nuanced patterns may allow patients to better understand the ways in which PTSD impacts their relationships, even if each partner's experience of the impact of PTSD is different.

The present study was limited by the cross-sectional nature of the data. Although research supports the assumption that the direction of effects is from PTSD symptoms to relationship functioning (e.g., Erbes et al., 2012), there is also evidence for bidirectional links such that relationship functioning also influences the experience of PTSD symptoms (Campbell & Renshaw, 2018). Therefore, it is important to be cautious about interpreting the direction of the effects reported in the current study. It is possible that partners' experiences in a relationship influence their respective PTSD symptom ratings rather than the opposite. In addition, although the inclusion of female-veteran couples should be considered a strength of the current study given the dearth of research on the female-veteran population, the sample size of female-veteran couples was much smaller than the sample size of male-veteran couples. Our analyses may have been underpowered to detect significant effects among the female-veteran couple subsample. The study was also suscepti-

ble to inflated Type I error due to multiple comparisons, especially given our more liberal alpha value for interaction terms and the lack of specific hypotheses related to gender moderation. Further, although our data addressed depression and alcohol use, we were not able to control for other common comorbid mental health diagnoses, such as insomnia, or psychiatric medication use. These symptoms and medications may affect both PTSD and relationship functioning (e.g., medication commonly used to treat PTSD, such as antidepressants, often also reduce sexual desire), and their impacts could be more carefully explored in future research. Finally, our data were from a sample of mixed-gender couples from a clinical trial of a couples-based PTSD study conducted at a VA medical center, and, accordingly, the results may not be applicable to civilian couples, same-gender couples, non-treatment-seeking couples, or patients who prefer individual treatment. Because of these factors, our findings should be viewed from a hypothesis-generating rather than hypothesis-testing framework. We hope this study will encourage future research that tests hypotheses related to how gender may influence the links between PTSD and relationship functioning.

The present study demonstrates that well-established associations between PTSD symptom severity and relationship functioning may differ depending on the reporter (i.e., self-report or collateral report) and the gender of each partner. Future researchers should test hypotheses related to gender, PTSD, and relationship functioning, including the hypothesis that male significant others' collateral PTSD ratings may have negative links to their own relationship functioning but potentially helpful links to some aspects of their female partners' relationship functioning. Specific aspects of trauma exposure and PTSD, such as trauma type (e.g., combat vs. interpersonal) and symptom cluster (e.g., avoidance and numbing vs. hyperarousal) may differentially affect female and male veterans and their partners and should be explored in future studies. Researchers should also prioritize recruiting samples of female veterans and same-gender couples that are adequately sized to answer these questions. Ongoing research in this domain has the potential to inform and improve the clinical care of PTSD, particularly regarding its deleterious interpersonal impacts.

## OPEN PRACTICES STATEMENT

This secondary analysis was not preregistered. The data are considered VA sensitive information and are not publicly available. Full analysis code and results are not available in a permanent archive but can be requested from the first author at [kayla.knopp@va.gov](mailto:kayla.knopp@va.gov).

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### SUPPORTING INFORMATION

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**How to cite this article:** Knopp, K., Wrape, E. R., McInnis, R., Khalifian, C. E., Rashkovsky, K., Glynn, S. M., & Morland, L. A. (2021). Posttraumatic stress disorder and relationship functioning: Examining gender differences in treatment-seeking veteran couples. *Journal of Traumatic Stress*, 1–12. <https://doi.org/10.1002/jts.22761>