A Cross-Lagged Panel Approach to Understanding Social Support and Chronic Posttraumatic Stress Disorder Symptoms in Veterans: Assessment Modality Matters

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Although there is a strong and consistent association between social support and posttraumatic stress disorder (PTSD), the directionality of this association has been debated, with some research indicating that social support protects against PTSD symptoms, whereas other research suggests that PTSD symptoms erode social support. The majority of studies in the literature have been cross-sectional, rendering directionality impossible to determine. Cross-lagged panel models overcome many previous limitations; however, findings from the few studies employing these designs have been mixed, possibly due to methodological differences including self-report versus clinician-administered assessment. The current study used a cross-lagged panel structural equation model to explore the relationship between social support and chronic PTSD symptoms over a 1-year period in a sample of 264 Iraq and Afghanistan veterans assessed several years after trauma exposure. Approximately a third of the sample met criteria for PTSD at the baseline assessment, with veterans' trauma occurring an average of 6 years prior to baseline. Two separate models were run, with one using PTSD symptoms assessed via self-report and the other using clinician-assessed PTSD symptoms. Excellent model fit was found for both models. Results indicated that the relationship between social support and PTSD symptoms was affected by assessment modality. Whereas the self-report model indicated a bidirectional relationship between social support and PTSD symptoms over time, the clinician-assessed model indicated only that baseline PTSD symptoms predicted social support 1 year later. Results highlight that assessment modality is one factor that likely impacts disparate findings across previous studies. Theoretical and clinical implications of these findings are discussed, with suggestions for the growing body of literature utilizing these designs to dismantle this complex association.

NUMEROUS STUDIES HAVE EXAMINED risk factors associated with PTSD, with a consistent finding in the literature demonstrating a strong association between social support and PTSD symptoms (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Many theories have been put forward to explain the interrelation between social support and PTSD symptoms, with two general types of conceptualizations emerging from the literature. Social causation theories view social support as having an antecedent effect upon PTSD symptoms, positing that lack of social support serves as a risk factor for the development of PTSD symptoms, whereas greater support protects against developing PTSD symptoms (e.g., Joseph, Williams, & Yule, 1997; Lepore, 2001).

The other set of theories, referred to as social selection theories, proposes that social support is affected by PTSD symptoms. These theories assert that the development of PTSD symptoms increases relationship discord and negative interactions with others, thus eroding social support and interpersonal resources over time. Hypotheses within this framework include speculations about caregiver burden (Zarit, Todd, & Zarit, 1986), secondary traumatization (Figley, 1989), ambiguous loss (Boss, 2007), and the cognitive-behavioral interpersonal theory of PTSD (Monson, Stevens, & Schnurr, 2005).

As outlined above, these two conceptualizations hypothesize different directional processes for the association between PTSD symptoms and social support. However, the vast majority of studies that have examined this relationship are cross-sectional, making inferences about the directionality of this relationship difficult to determine (Kaniasty, 2005; Monson, Taft, & Fredman, 2009). Relatedly, the association between social support and PTSD symptoms may be bi-directional, further limiting the utility of cross-sectional designs. Cross-lagged panel models are a type of longitudinal analysis that allows for testing of bidirectional relationships within the same model when both variables have been measured repeatedly (Selig & Little, 2012). Cross-lagged panel models also account for other sources of variance (e.g., the associations between the same variable measured across time), which helps to more precisely determine whether variables of interest actually influence one another over time. These models overcome a number of limitations within the previous literature and may further elucidate the relationship between interpersonal processes and PTSD symptom, which can be complex and dynamic.

To date, only a handful of studies have used cross-lagged models to explore the association between social support and PTSD symptoms, and findings have been mixed, with considerable variability in study characteristics, such as the elapsed interval following trauma exposure in which participants were assessed, the type of sample examined, and the measures used. Of six cross-lagged panel studies, three indicated that PTSD symptoms predicted subsequent social support, but did not find that social support predicted subsequent PTSD symptoms. In the first, King, Taft, King, Hammond, and Stone (2006) assessed 2,249 male Gulf War veterans 18 to 24 months postdeployment and again 5 years later. The specific time since trauma exposure for participants was not reported. Self-reported PTSD symptom severity at 18 to 24 months postdeployment predicted social support 5 years later (assessed using a 6-item version of RAND's Medical

Outcome Study; Stewart, Hays, & Ware, 1988). However, no association was found between social support at 18 to 24 months (assessed using a 10-item measure adapted from the National Vietnam Veterans Readjustment Study; Kulka et al., 1990) and PTSD symptoms at 5-year follow-up. Another study of 116 veterans (56% of whom had a PTSD diagnosis at the initial assessment based upon self-report cutoff scores) being treated for cannabis dependence assessed participants every 2 months over a 6-month period (Carter et al., 2016). Time since trauma exposure was not reported. At each time point, PTSD symptom severity negatively predicted subsequent social support (assessed using the Life Stressors and Social Resource Inventory for Adults; Moos, Fenn, & Billings, 1988), but no associations were found between social support and subsequent PTSD. The final and most recent study (Fredman et al., 2017) used cross-lagged panel analyses to explore the longitudinal association between PTSD and dyadic conflict communication (assessed using the Communication Patterns Questionnaire; Christensen & Sullaway, 1984) in 114 survivors of a motor vehicle accident. Approximately 42% of the sample met diagnostic criteria for PTSD at the initial assessment using self-report cutoff scores, and results indicated that PTSD symptom severity 4 weeks post-accident negatively predicted dyadic conflict communication 16 weeks post-accident; however, the reverse relationship was not found.

Three studies found evidence for bi-directional processes between social support and PTSD. Kaniasty and Norris (2008) assessed 557 survivors of severe flooding in Mexico. Social support (assessed using 8 items from the 22-item Provisions of Social Relations Scale; Turner & Marino, 1994) and PTSD symptoms were measured at 6, 12, 18, and 24 months post-flood. Twenty-four percent of the sample met diagnostic criteria for PTSD at the initial assessment based upon a binary coding of symptoms using a clinical interview. Findings showed that from 6 to 12 months post-disaster, social support predicted subsequent PTSD symptoms, but PTSD symptoms did not predict lower levels of social support. However, 12 to 18 months post-disaster, a bi-directional relationship was found between social support and PTSD symptoms; and from 18 to 24 months post-disaster, only PTSD symptoms predicted later social support. In a sample of 658 natural disaster survivors, Platt, Lowe, Galea, Norris, and Koenen (2016) found a bi-directional relationship between PTSD symptoms and emotional support (assessed using the Inventory of Postdisaster Social Support; Kaniasty & Norris, 2000) shortly following a hurricane, but no association between these variables was found from 5–9 months

and 14–19 months post-disaster. In the final study, Shallcross et al. (2016) assessed a sample of 521 National Guard soldiers at 3, 15, and 27 months postdeployment (time since trauma exposure was not reported) to Iraq and found a bi-directional relationship between social support (assessed using the Post-Deployment Social Support scale; PDSS; King, King, & Vogt, 2003) and PTSD.

Overall, studies examining the directionality between social support and PTSD symptoms using cross-lagged models have yielded mixed results, with half of the literature finding a bi-directional association between PTSD symptoms sand social support, whereas the other half of studies found only evidence for social selection processes. Factors contributing to this mixed picture include wide variability in study methodology, including measures to assess PTSD symptoms and social support, time elapsed since trauma exposure, and time interval between assessment points. Additionally, many studies omit information that may be important for interpreting the context of the findings, such as the time since trauma exposure, especially in studies of interpersonal trauma samples including veterans. Findings from Kaniasty and Norris (2008) suggest that the amount of elapsed time since trauma exposure may be a relevant factor that influences the relationship between social support and PTSD symptoms over time, with social support exerting stronger effects upon PTSD symptoms shortly following trauma exposure, and PTSD symptoms exerting stronger effects upon social support much later in time as caregivers become especially taxed (Beck, 2010). However, it should be noted that other studies have not replicated this pattern of findings, even in studies examining recently traumatized samples (e.g., Fredman et al., 2017), making it unclear how time since trauma exposure affects the relationship between social support and PTSD symptoms.

One of the most significant limitations of these studies is that, with the notable exception of Kaniasty and Norris (2008), they have relied on self-report measures of PTSD symptoms instead of clinician interview. Notably, no studies in the cross-lagged panel literature have used the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995), considered the gold-standard assessment of PTSD. Additionally, no cross-lagged panel studies have compared findings across self-report and clinician-assessed PTSD measures. This may be important given previous trauma research suggesting that assessment modality can impact findings, and studies within the cross-lagged panel literature have varied in this regard (Monson et al., 2008; Woodward et al., 2013). This examination can provide greater insight into the

nature of the complex relationship between social support and PTSD symptoms, as well as provide greater understanding of potential factors accounting for the widely discrepant findings within previous longitudinal studies examining these two factors.

AIMS AND HYPOTHESES

The purpose of the current study was to explore the directionality of the association between social support and chronic PTSD symptoms within a 1-year interval in a sample of veterans who served in support of the wars in Iraq and Afghanistan (approximately a third of whom met diagnostic criteria for current PTSD and whose trauma occurred an average of 6 years prior to the baseline assessment, indicating that many were suffering from chronic PTSD symptoms) using cross-lagged panel structural equation modeling. The second aim was to improve upon prior research by examining whether findings varied depending upon assessment modality, through use of a self-report measure of PTSD symptoms (i.e., PTSD Checklist; Weathers, Litz, Herman, Huska, & Keane, 1993) versus a clinician-administered assessment of PTSD symptoms (i.e., CAPS; Blake et al., 1995). In order to account for factors that may potentially influence the relationship between social support and PTSD symptoms, we included three control variables in our models: time since the occurrence of the deployment-related trauma, the number of civilian traumas experienced, and whether participants received mental health treatment between the baseline and annual time points. This decision was based upon prior research demonstrating that trauma exposure itself has been shown to reduce levels of social support and that social isolation and social dysfunction are targeted in many mental health interventions (Kaniasty & Norris, 1993).

Consistent with social selection theories, several previous studies employing cross-lagged models documented evidence that PTSD symptoms predict subsequent social support, in both recently traumatized samples and samples assessed farther out from trauma exposure (e.g., Fredman et al., 2017; Kaniasty & Norris, 2008; King et al., 2006). This finding may be especially likely for the current sample, whose traumas occurred on average several years prior, thus indicating that for most participants their trauma symptoms were chronic. Therefore, we predicted that PTSD symptom severity at baseline would demonstrate a significant negative association with social support assessed 1 year later (Hypothesis One).

Although several cross-sectional studies have asserted that social support shapes PTSD symptoms, findings from cross-lagged panel studies have been mixed with regard to this pathway. Results

from Kaniasty and Norris (2008) found evidence of this process shortly after a natural disaster, but this pathway was not significant when examining intervals after 18 months postdisaster. These findings suggest that social causation processes may be more likely to occur closer in proximity to a trauma, limiting the design of the current study in examining this pathway. Given that the current study recruited a sample of veterans returning on average several years after deployment, we predicted that there would not be a significant association between social support at baseline and PTSD symptoms one year later (Hypothesis Two).

Method

PARTICIPANTS

Participants initially included 309 veterans who served in support of the wars in Iraq and Afghanistan and participated in a larger study examining functional outcomes in returning veterans. Participants for the larger study were recruited from locations across the Central Texas Veterans Healthcare System using a variety of methods, including randomized mailings to veterans enrolled in the system (47% of the sample), referral from another study (30%), flyers posted at VA hospitals and other community locations (19%), and other methods (e.g., referral from a VA provider or another veteran; 4%). Both male and female veterans were recruited.

Veterans were included in the larger study if they were at least 18 years of age, able to provide informed consent, able to complete the assessment procedures, and agreed to be contacted for follow-up assessments. Individuals were excluded from the larger study if they had plans to move out of the area within 4 months of the baseline assessment ($n = 1$) or screened positive for a psychotic or bipolar disorder during the baseline assessment ($n = 21$). An additional 45 participants were excluded from the current analyses, as they did not experience a war-related Criterion A traumatic event for PTSD, bringing the final sample to 264 participants.

PROCEDURE

Potential participants were screened by telephone to determine initial study eligibility. Participants then scheduled an in-person baseline appointment for a more in-depth assessment. At the baseline appointment, participants completed a clinical interview assessing PTSD symptoms, as well as a variety of self-report measures assessing demographic variables, military service experiences, mental health symptoms, and social support. Participants were then contacted 1 year later to complete an annual in-person appointment assessing similar outcomes. All procedures were approved by the local Institutional Review Board.

MEASURES

Social Support
Social support was assessed using the Deployment Risk and Resilience Inventory (DRRI; King et al., 2003). The DRRI is a comprehensive measure containing 13 individual self-report scales assessing a variety of predeployment, deployment, and postdeployment factors. The Post-Deployment Social Support scale (PDSS), a subscale of the DRRI, was used to assess social support in the current study. The PDSS contains 15 items assessing aspects of emotional and instrumental support and includes items such as "The American people made me feel at home when I returned," "I am carefully listened to and understood by family members or friends," and "There are people to whom I can talk about my deployment experiences." Items are rated on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale. A total score is calculated by summing all 15 items, with higher scores indicating a greater level of support. Previous research found the PDSS to have excellent psychometric properties across a variety of samples (King et al., 2003), including high internal consistency (Cronbach's alpha $\geq$ .84). Cronbach's alpha in the current study was .87 at baseline and .89 at the annual time point.

PTSD
PTSD symptoms within the past month were assessed using criteria from DSM-IV-TR (APA, 2000), as data collection began prior to the publication of DSM-5 (APA, 2013).

Self-Reported PTSD. Self-reported PTSD symptoms were assessed using the PTSD Checklist–Military Version (PCL-M; Weathers et al., 1993). The PCL-M consists of 17 items that map onto DSM-IV-TR symptom criteria for PTSD (APA, 2000). Items are rated on a 1 (*not at all*) to 5 (*extremely*) scale, with higher scores indicating greater severity of PTSD symptoms. Participants were instructed to complete the measure with regard to how often they had been bothered over the past month by symptoms related to "stressful military experiences." The scale has shown excellent psychometric properties in previous research, with an internal consistency ranging from .94 to .97 (Blanchard et al., 1996; Weathers et al., 1993). Cronbach's alpha for the current study was .96 at both the baseline and annual time points.

Clinician-assessed PTSD. Clinician-assessed PTSD symptoms were evaluated using the CAPS (Blake et al., 1995). The CAPS is a semistructured interview that was administered by trained, master's, and doctoral-level interviewers. Like the PCL-M (Weathers et al., 1993), the CAPS measured PTSD symptoms according to DSM-IV-TR criteria (APA, 2000) over the past month. Participants were asked to describe the most traumatic deployment-related event they experienced in theatre, and the CAPS was administered with regard to this event. This interview procedure was preceded by administration of a series of checklists (i.e., the Full Combat Experiences Scale; Hoge et al., 2004; the Relationships within Unit subscale of the DRRI; King et al., 2003) assessing participants' combat and military sexual trauma experiences, which was used to assist in determining whether participants experienced a military-related criterion A event for PTSD (APA, 2000). The CAPS assigns individual symptoms a frequency score ranging from 0 (*the symptom does not occur*) to 4 (*the symptom occurs nearly every day*), as well as an intensity score ranging from 0 (*not distressing*) to 4 (*extremely distressing*). Frequency and intensity scores from individual symptoms are summed to create a total score for overall PTSD symptom severity.

The CAPS is widely considered the gold-standard of PTSD symptom assessment and has demonstrated excellent reliability and validity in previous research (Weathers, Keane, & Davidson, 2001). Prior to conducting interviews independently, interviewers underwent a series of stepped training procedures that consisted of (a) observing one interview conducted by a trained interviewer and attempting to match on diagnoses, (b) listening to audio recordings of previous baseline interviews and matching on diagnoses and +/- 5 points on the CAPS total severity score for a minimum of 3 interviews, (c) conducting a joint interview with a trained interviewer and matching on diagnoses for at least one interview, (d) conducting at least 2 interviews independently while being observed by a trained interviewer, and (e) matching on diagnoses and within 5 points of the CAPS total severity score as rated by the trained interviewer who observed the interview. Interviewers presented each case in weekly diagnostic review group meetings attended by doctoral-level staff to determine consensus on whether participants met full symptom criteria for PTSD. These diagnostic review groups also reached consensus on individual symptom ratings that were crucial in making each diagnosis (i.e., when a veteran had the minimum number of symptoms for each cluster, all symptoms within that cluster were discussed in detail). Given this intensive review process at the symptom level, interviews were not also rated by a second interviewer. As such, no formal assessment of interrater reliability was available. However, Cronbach's alpha for the sum of frequency and intensity ratings for each symptom indicated high

internal consistency at the baseline (α = .91) and annual (α = .93) time points.

Control Variables

Time since trauma exposure. The elapsed time (in months) from the index deployment-related trauma to the baseline assessment was ascertained during the CAPS interview.

Mental health treatment involvement. Whether participants received mental health treatment over the period between the baseline and annual assessment was assessed using the Treatment Involvement Form (TIF; unpublished measure) created for the larger study. The TIF is a 23-item measure that assesses participants' involvement in a variety of forms of treatment, including psychiatric, psychological (e.g., individual/group therapy), and other forms of treatment (e.g., self-help group). The variables assessing whether participants had received individual therapy, group therapy, or seen a doctor/psychiatrist for medication management of a mental health problem were used to create a binary variable (mental health treatment: yes or no).

Civilian trauma. The number of civilian traumatic events experienced at baseline was assessed using the TLEQ (Kubany et al., 2000). The TLEQ is a 23-item self-report measure assessing a variety of different types of traumatic experiences, such as natural disasters, assault, and motor vehicle accidents. Respondents indicate how many times the event occurred, with responses ranging from 0 (*never*) to 6 (*more than 5 times*). Items were summed to create a total score. Items assessing warfare/combat exposure were removed from the total score in order to create an index of civilian trauma exposure.

DATA ANALYSIS

Prior to data analysis, data were screened for violations of normality using guidelines from Tabachnick and Fidell (2007), including examination and correction for univariate and multivariate outliers, skewness, and kurtosis. Descriptive statistics did not indicate any issues with skew, kurtosis, univariate (z > 3.29) or multivariate outliers. Examination of bivariate correlations between the variables of interest did not indicate any issues with multicollinearity ($r \geq .90$). Data were analyzed in a cross-lagged panel model, using analysis techniques similar to related studies (Kaniasty & Norris, 2008; King et al., 2006). Cross-lagged panel models were tested using structural equation modeling (SEM), using Mplus software (version 7.4) and parameters were estimated using maximum likelihood estimation.

Both social support and PTSD were analyzed as latent variables. Latent variables were composed of indicators created using an item parceling approach. PTSD was composed of three indicators encompassing reexperiencing symptoms, avoidance symptoms, and hyperarousal symptoms, which mapped on to DSM-IV criteria and is consistent with the approach used in previous studies employing SEM highlighted above (APA, 2000; Kaniasty & Norris, 2008; King et al., 2006). Social support was likewise composed of three indicators encompassing support from friends and family, reception as a veteran, and general support, determined by examination of the domain referenced in individual items. Error variances of corresponding indicators measured across time (e.g., reexperiencing symptoms at baseline and reexperiencing symptoms at annual) were allowed to covary given that these constructs were composed of the same items. Control variables were entered into the model all at once by specifying paths from the control variables to the endogenous latent variables at both time points. Nonsignificant paths were trimmed from the final models.

Model fit was evaluated by consideration of a variety of indices, including the chi-square statistic and corresponding *p*-value, root-mean-square error of approximation (RMSEA), standardized root-mean-square residual (SRMR), comparative fit index (CFI), and Tucker-Lewis index (TLI). Acceptable model fit was determined by examination of a number of indices, including a nonsignificant chi-square value, an RMSEA smaller than .08, an SRMR smaller than .10, and a CFI and TLI greater than .90. Excellent model fit was determined by an RMSEA smaller than .05, an SRMR smaller than .08, and a CFI and TLI greater than .95. These values correspond with recommendations from previous research (Bentler, 1990; Hu & Bentler, 1999).

Results

SAMPLE CHARACTERISTICS AND BIVARIATE CORRELATIONS

Sample characteristics are presented in Table 1 (see below). The sample was primarily male (66.3%), Caucasian (54.9%), and had an average age of 38.8 (SD = 9.8). Participants had an average of 14.0 years of education (SD = 2.1). Participants' worst combat-related trauma occurred an average of 72.7 months (range = 10–131, SD = 30.1) from the baseline assessment. Thirty-three percent of the sample was diagnosed with current PTSD at baseline and 53.8% of the sample was diagnosed with lifetime PTSD, based upon DSM-IV-TR criteria (APA, 2000) assessed using the CAPS. Participants obtained an average total score on the CAPS for past-month PTSD of 33.0 (SD = 27.6).

Table 1
Sample Demographics at Baseline (N = 264)

Descriptor [a]	Percentage/Mean (SD)
Gender (male)	66.3%
Hispanic Ethnicity	21.2%
Race	
Caucasian	54.9%
African American	36.0%
Asian American	1.5%
Other	5.3%
Household Income	
$0 - $14,9999	16.7%
$15,000 – $29,999	25.4%
$30,000 – $44,999	26.5%
$45,000 – $59,999	11.7%
$60,000 or above	17.4%
Relationship Status	
Single, not dating	7.6%
Single, in relationship	15.2%
Engaged or married	64.8%
Divorced	7.6%
Current PTSD Diagnosis	31.4%
Lifetime PTSD Diagnosis	53.8%
Age (years)	38.8 (9.8)
Years of Education	14.0 (2.1)
Time Since Trauma (months)	72.7 (30.1)

Note. Numbers in parentheses represent the standard deviation. PTSD = post-traumatic stress disorder. CAPS = Clinician Administered PTSD Scale

[a] Some categories may not sum to 100% due to incomplete responding

Of the 264 participants assessed at baseline, 91.7% (n = 242) completed the annual assessment that occurred 1 year after baseline. A missingness variable was created to determine whether completers differed from noncompleters on baseline PTSD symptoms and social support. Independent samples t-tests comparing completers versus noncompleters on baseline PDSS [t(253) = -.43, p = .67], PCL-M [t(254) = .11, p = .91], and CAPS [t(27.69) = -.42, p = .68] total scores found no significant group differences, indicating data were likely missing at random and that maximum likelihood was an

appropriate estimation method to use in structural equation modeling analyses.

Bivariate correlations along with means and standard deviations for total scores on the CAPS, PCL, and PDSS at both time points are presented in Table 2. Examination of bivariate correlations showed significant associations between all of these variables in the expected direction ($r \geq .42$). In particular, there was a significant negative bivariate relationship between the baseline PDSS with the PCL-M ($r = -.47$, $p < .001$) and CAPS total score ($r = -.46$, $p < .001$) at annual, along with a significant negative bivariate association between the PCL-M and CAPS total scores at baseline with the PDSS at annual ($r = -.42$, $p < .001$ for PCL-M; $r = -.42$, $p < .001$ for CAPS). Correlations also showed strong associations between CAPS and PCL total scores at baseline ($r = .81$, $p < .001$) and annual ($r = .87$, $p < .001$).

CROSS-LAGGED PANEL MODELS

Results from the self-report model of PTSD symptoms (using standardized coefficients) are presented in Figure 1. Examination of fit indices generally indicated excellent model fit, with RMSEA = .04 (90% C.I. = .01 - .06), CFI = .99, TLI = .99, and SRMR = .03. The only indicator that suggested inadequate model fit was the chi-square statistic, with $\chi^2(42) = 59.53$, $p = .04$. However, as noted by Brown (2006) and Kline (2011), the chi-square statistic is negatively affected by sample size and can be significant even in instances of minor model misfit, particularly with larger samples. All factor loadings for social support and PTSD were significant ($\beta \geq .48$, $p < .001$). None of the control variables were significantly related to PTSD symptoms or social support ($p \geq .11$). Path coefficients revealed that social support at predicted PTSD symptoms at 1-year follow-up ($\beta = -.12$, $p = .04$). Additionally, PTSD symptoms at baseline predicted social support at 1-year follow-up ($\beta = -.15$, $p = .04$).

Results from the clinician-assessed model of PTSD symptoms are presented in Figure 2. Fit indices for

Table 2
Intercorrelations, Means, and Standard Deviations for the PDSS, PCL-M, and CAPS Total Scores at Baseline and Annual Time Points

Measure	1	2	3	4	5	6	M	SD
1. PDSS - Baseline	–						53.1	10.8
2. PDSS - Annual	.63***	–					52.3	11.4
3. PCL-M - Baseline	-.45***	-.42***	–				40.9	18.1
4. PCL-M - Annual	-.47***	-.47***	.77***	–	.		45.3	21.2
5. CAPS - Baseline	-.44***	-.42***	.81***	.68***	–		33.0	27.6
6. CAPS - Annual	-.46***	-.50***	.74***	.87***	.77***	–	38.7	30.9

Note. ***p < .001; PDSS = Post Deployment Social Support Scale; PCL-M = PTSD Checklist – Military Version; CAPS = Clinician Administered PTSD Scale
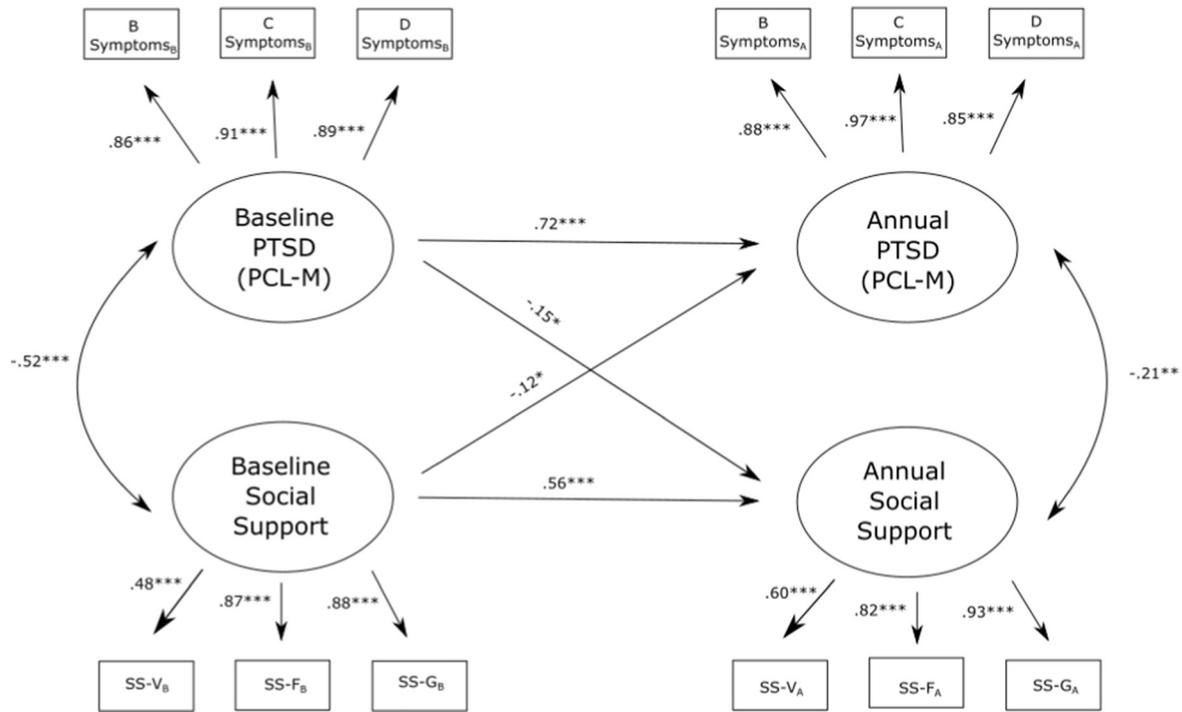
FIGURE 1 Simplified SEM model of self-reported PTSD symptoms and social support from baseline to annual. *Note.* * = *p* < .05. *** = *p* < .001; paths represent standardized coefficients; PCL-M = PTSD Checklist – Military Version; SS-V = Reception as a veteran, SS-F = Support from family and friends, SS-G = General social support, B Symptoms = Reexperiencing symptoms, C Symptoms = Avoidance symptoms, D Symptoms = Hyperarousal symptoms; $_B$ = indicators assessed at baseline; $_A$ = indicators assessed at annual
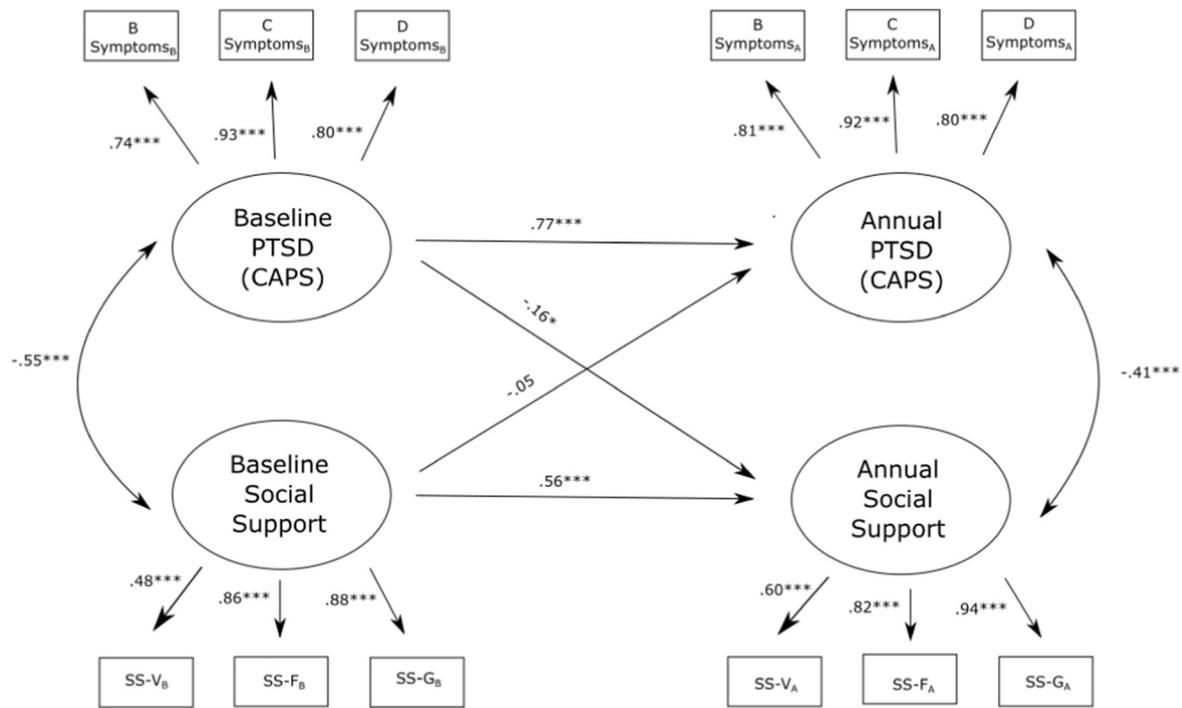

FIGURE 2 Simplified SEM model of clinician assessed PTSD symptoms and self-reported social support from baseline to annual. *Note.* * = *p* < .05. *** = *p* < .001; paths represent standardized coefficients; CAPS = Clinician Administered PTSD Scale; SS-V = Reception as a veteran, SS-F = Support from family and friends, SS-G = General social support, B Symptoms = Reexperiencing symptoms, C Symptoms = Avoidance symptoms, D Symptoms = Hyperarousal symptoms; $_B$ = indicators assessed at baseline; $_A$ = indicators assessed at annual. Not shown is the significant path from number of civilian traumas to annual PTSD.

this model also generally indicated excellent model fit, with RMSEA = .04 (90% C.I. = .01 - .06), CFI = .99, TLI = .99, and SRMR = .05. As in the self-report model, the chi-square statistic was significant, with $\chi^2(52) = 71.38$, $p = .04$. All factor loadings for social support and PTSD were significant ($\beta \geq .48$, $p < .001$). Regarding control variables, only number of civilian traumas was associated with PTSD at the annual time point ($\beta = .12$, $p = .002$).[1] Path coefficients indicated that PTSD symptoms at baseline predicted social support at 1-year follow-up ($\beta = -.16$, $p = .03$); however, social support at baseline did not predict PTSD symptoms at one-year follow-up ($\beta = -.05$, $p = .46$).[2]

Discussion

The current study explored the directionality of the association between social support and PTSD symptoms within a 1-year interval in a sample of Iraq and Afghanistan veterans, examining differences between self-reported and clinician-assessed symptoms of PTSD. Analyses indicated good model fit for both the self-report and clinician-assessed model of PTSD. When using a self-report measure of PTSD symptoms, results indicated a bi-directional relationship between PTSD symptoms and social support. However, when a clinician-assessed measure of PTSD symptoms was used, PTSD symptoms at baseline predicted social support at 1-year follow-up, but not vice versa.

When examined together, results indicated consistent support for Hypothesis One, in that both the self-report and clinician-assessed models found PTSD symptoms to be a predictor of subsequent social support. These findings are consistent with previous literature using similar designs (e.g., Carter et al., 2016; Kaniasty & Norris, 2008). Notably, all of the previous studies using cross-lagged panel models found evidence for social selection processes in their models, despite a number of differences in study characteristics, including the trauma sample, elapsed time since the trauma, and the time intervals between assessment points. Findings from the current study further indicate that this pathway was also robust to differences in assessment modality.

Results indicated mixed support for Hypothesis Two, which hypothesized that social support would not predict subsequent PTSD symptoms. These results mirror inconsistent findings for this pathway

in the cross-lagged panel literature. Findings suggest that this pathway may be more susceptible to differences in methodology, including different approaches to assessment. The notion that assessment modality can influence this association is salient in light of previous literature, as studies have varied in the type of measurement they have used. For example, King et al. (2006) used self-report measures of social support and PTSD, whereas Kaniasty and Norris (2008) used a self-report measure of social support and a clinician-based measure of PTSD symptoms. Results suggest that this may be one methodological factor accounting for the different findings within cross-lagged panel studies.

Although related studies have found inconsistencies when self-report and clinician-based measures of PTSD symptoms are compared (Cody et al., 2015; Monson et al., 2008; Woodward et al., 2013), no studies have attempted to explicitly identify what drives these differences. Although speculative, clinicians may be better at parsing out various PTSD symptoms, as they may be more likely to account for symptom overlap and identify whether symptoms are trauma related or tied to another disorder (e.g., depression). Relatedly, the CAPS assesses more objective markers of symptoms (e.g., the frequency of nightmares and number of hours of sleep interruption resulting from nightmares) to measure severity of symptoms, whereas the PCL asks participants "how bothered you have been" by symptoms. Thus, self-report measures of PTSD symptoms may be more likely to capture subjective distress and other complaints when compared to clinician assessment (Cody et al., 2015). Moreover, clinicians are likely more attuned to tying symptoms to the traumatic stressor rather than to general life stress. A prior report indicated that, compared to clinician-rated PTSD symptoms, self-reported PTSD symptoms are more strongly related to recent, nontraumatic stressful life events (Meyer, Morissette, Kimbrel, Kruse, & Gulliver, 2013).

Regardless of the objectivity of patient self-report, patients' perspectives are still clinically relevant. For example, Clements, Murphy, Eisen, and Normand (2006) examined the ability of self-report and clinician-assessed measures of patient functioning in predicting hospital readmission 1 year later in 1,034 patients admitted to an inpatient unit. Results showed that self-report measures of functioning were better at predicting hospital readmission than clinician measures of functioning. The authors concluded that because hospital readmission is largely driven by patients' subjective level of distress, patients' report of their functioning was likely a more salient indicator of readmission, regardless of objective functioning. Notably, results found that the

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[1] Inclusion of this control variable did not change the pattern of results in the model.

[2] Additional models were run examining the three symptom clusters of PTSD across self-report and clinician assessment. However, these models did not produce a consistent pattern of results and some indices of model fit (e.g., the RMSEA) in some models fell outside of acceptable boundaries. As these models did not provide additional insight in explaining differences between the initial models in the manuscript, they were not included.

predictive ability of both measures combined was better than either measure alone, suggesting that the combined perspectives of patient and clinician may be more valuable than either alone. Incorporating both patients' and clinicians' perspectives into the study of social support and PTSD may allow for a greater insight into where these two perspectives converge and diverge, furthering our understanding of this complex relationship. Although it may require more resources, the results of this study echo previous literature comparing self-report and clinician-based measures of PTSD symptoms and other forms of psychopathology in recommending researchers incorporate both types of assessment modalities within their studies (Cuijpers, Li, Hofmann, & Andersson, 2010; Monson et al., 2008).

The results of this study are salient in light of numerous theories concerning the relationship between interpersonal processes and PTSD symptoms. Findings provide support for both social causation and social selection theories, although findings supporting social selection processes were more consistent within this study. This finding is not surprising given that participants' trauma occurred an average of 6 years prior to the baseline assessment, indicating that most individuals were experiencing chronic PTSD symptoms, which likely produced considerable strain on a trauma victim's interpersonal resources over time. However, the consistency of this finding in the current and previous studies is noteworthy given that the majority of literature exploring interpersonal processes in PTSD has focused on and emphasized social causation processes in PTSD. Notably, far fewer studies have devoted attention to exploring how PTSD symptoms may erode interpersonal resources and relationships over time. The results of this study and previous literature highlight that this is a neglected but important pathway that is in need of more research. What is driving the association in this study between PTSD symptoms and poorer social support, such as caregiver burden (Zarit et al., 1986), secondary traumatization (Figley, 1989), experiential avoidance (Kelly et al., 2016), or other factors emphasized in social selection theories of PTSD (Monson et al., 2005) is unknown, and more work is needed to understand this pathway.

In addition to supporting proposed theory, findings have clinical relevance. Results from both the self-report and clinician-assessed models suggest that PTSD symptoms may erode a trauma survivor's social support and interpersonal resources over time. These findings are consistent with previous research finding elevated levels of relationship discord as well as higher rates of divorce for individuals with PTSD (Kessler et al., 1995; Whisman, Sheldon, & Goering,

2000). One possible explanation for these findings is that deficits in interpersonal functioning as a consequence of symptoms of PTSD (e.g., emotional numbing, irritability, detachment or estrangement, avoidance of social contact) may push away individuals within a trauma survivor's support network. This suggests that PTSD and trauma-focused interventions may be enhanced by incorporating elements focused on improving trauma survivors' interpersonal functioning. Thus, findings from the current study are consistent with an accumulating body of evidence (Steenkamp, Litz, Hoge, & Marmar, 2015) suggesting that placing greater emphasis on improving trauma survivors' functioning and quality of life may be beneficial, potentially by targeting social support. Novel interventions for PTSD, such as cognitive-behavioral conjoint therapy (Monson et al., 2011), may hold promise in this regard, although direct comparisons between this intervention and effective mainstream treatments for PTSD are lacking.

Findings from this study shed additional light on the complex relationship between social support and PTSD symptoms; however, limitations should be noted. First, only two time points were examined. Additional time points would have provided a more complete picture of the association between social support and PTSD symptoms and highlighted how these associations may change over time. Another limitation within the current study is that the time elapsed since participants experienced their index trauma was relatively protracted (M = 72.7 months, range = 10–120, SD = 30.1). Although time since the deployment-related trauma did not have a significant impact on either of the cross-lagged models in this study, findings suggest that many individuals reporting symptoms within this study were likely suffering from chronic PTSD symptoms. Prolonged levels of PTSD symptoms may put a significant amount of strain on those within a trauma survivor's support network, resulting in a dynamic between social support and PTSD symptoms that may be distinct when compared to individuals who have only recently experienced a trauma. Consequently, this sample was not ideal for examining social support as a predictor of PTSD symptoms. Thus, there is a need for more research examining these models within recently traumatized samples, a time period that has been understudied within this literature. There is a particular need for longitudinal studies that examine whether factors assessed prior to trauma exposure, such as social support, protect against the initial development of PTSD symptoms and trauma-related psychopathology. A final limitation is that although the standard administration instructions were used for both the PCL-M and CAPS, these measures differed slightly in their instructions. The

PCL-M did not specify that participants' rate symptoms only with regard to the single index military event identified in the CAPS. Instead, symptoms were rated related to "stressful military experiences", as these are the standard instructions for this measure. Despite large correlations found between the PCL-M and CAPS at each time point, this incongruity in instructions could also contribute to differences between the self-report and clinician-assessed models in this study. This difference in instructions reflects an issue in the larger literature that may contribute to discrepancies between studies using clinician assessment and self-report discussed above. As such, future studies incorporating both self-report and clinician assessment of PTSD symptoms should consider these differences in administration instructions, particularly when working with samples that have likely experienced multiple severe traumas that could independently drive various symptoms. Thus, it may be important in future studies to assess the number of severe traumatic events that trauma victims have experienced to examine its impact.

When examined within the context of previous studies, findings indicate that the relationship between social support and PTSD symptoms is likely influenced by, and dependent upon, a number of variables, including the trauma sample studied, how long ago the trauma occurred, and the time interval between points of assessment. Results from this study also demonstrate that another important factor that should be considered is assessment modality. Studies utilizing cross-lagged panel designs to explore the relationship between PTSD symptoms and social support are becoming more frequent in the literature, but additional studies are needed to delve deeper into this important area. When the literature is examined as a whole, findings indicate that the relationship between social support and PTSD symptoms is more complex than simply asking *whether* social support and PTSD symptoms influence one another. Instead, the more appropriate question would appear to be *when* do these variables influence one another. In answering this question, more work is needed.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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