ORIGINAL ARTICLE

The Effects of Interpersonal Support on Treatment Outcomes Using Cognitive Processing Therapy

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Abstract

Background Although there has been research connecting PTSD and social support, there has been little research on effects of treatment, especially in military samples. The current study examined the relationship between these variables over the course of PTSD treatment and assessed differences based on treatment modality (i.e. group versus individual).

Methods Participants were 322 active duty service members in a randomized controlled trial comparing the effectiveness of group and individual Cognitive Processing Therapy (CPT) treatment modalities and were assessed for PTSD symptoms and social support both prior to and upon completion treatment. Cross-lagged regression models were used to examine stability and lagged effects between PTSD severity and dimensions of social support from pre- to post-treatment.

Results Lower levels of pre-treatment PTSD severity were associated with higher levels of post-treatment social support across all three subscales (all b 's at least -.15, p < .02). The only significant difference based on treatment modality was a stronger relationship between pre- and post-treatment PTSD severity for those who received group CPT compared to participants who received individual CPT, consistent with previous findings.

Conclusions Recommendations for improving social support during PTSD treatment through modalities, such as family-centered models or social skills training, are discussed.

Keywords Posttraumatic stress disorder · Social support · Military · Treatment outcomes · Treatment modality

Introduction

It is well established that among service members deployed to combat zones over the past two decades, rates of posttraumatic stress disorder (PTSD) are high. Although prevalence estimates vary across studies, approximately 10–15% of service members who have deployed to Afghanistan and/or Iraq meet diagnostic criteria for PTSD (e.g. Vasterling et al. 2006). As a result, researchers have sought to identify risk or resiliency factors related to the experience of PTSD

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symptoms following trauma exposure (Maguen et al. 2008; Peterson et al. 2009). One of these factors is social support, which previous research has demonstrated is bidirectionally related to symptoms of PTSD (e.g. Campbell and Renshaw 2013; Dickstein et al. 2010; Freedman et al., 2015; Zang et al. 2017).

The perceived quality of a service member's relationships with nonmilitary social supports (e.g., spouses, family members, nonveteran friends) has been shown to affect the severity of PTSD symptoms in a variety of ways. First, more severe PTSD symptoms are longitudinally associated with decreased relationship satisfaction (Campbell and Renshaw 2013; Kaniasty and Norris 2008; Laffaye et al. 2008) while perceptions of social disapproval are associated with increased PTSD symptoms (Freedman et al. 2015; Schumm et al. 2014). Second, better social support is correlated with fewer PTSD symptoms and increased coping (Pietrzak et al. 2009; Smith et al. 2013). Third, PTSD has been shown to moderate the relationship between social support and psychological distress such that the presence of PTSD reduces the buffering effect of social support on symptoms of general psychological distress (Brancu et al. 2014).

Theoretical Models of Social Support and Psychopathology

Two primary models have been used to explain the relationship between PTSD symptoms and social support: the social erosion and social causation models (Shallcross et al. 2016). The social erosion model posits that as levels of psychological functioning decrease, an individual's social relationships also deteriorate (Kaniasty and Norris 2008; Shallcross et al. 2016). This model would posit that service members with higher levels of PTSD symptoms at baseline would experience greater decreases in scores related to social support over time. In contrast, the social causation model hypothesizes that increased social resources are predictive of psychological well–being and serve as a protective factor that decreases the likelihood of mental health symptoms (Kaniasty and Norris 2008; Shallcross et al. 2016). The social causation model would predict that higher levels of social support at baseline would be associated with larger improvements in PTSD symptoms over the course of treatment. It should be noted that the social erosion and social causation models are not mutually exclusive and that both could be relevant to understanding the relationship between PTSD and social support. Both models have demonstrated good empirical support (e.g. Dohrenwend 2000; King et al. 2006); however, researchers have not yet applied these theoretical frameworks to examine the relationship of PTSD and social support during treatment.

Social Support and PTSD Treatment

Although research has found that social support does not affect the likelihood that an individual will seek treatment for PTSD (Sripada et al. 2016), existing data indicate a positive relationship between improvements in PTSD symptoms and social support. Specifically, treatments targeting PTSD, such as Cognitive Processing Therapy (CPT), also improve social support (Resick et al. 2002). Conversely, among veterans participating in Prolonged Exposure (PE), veterans who reported more emotional support (e.g., empathy) experienced more rapid and greater overall reductions in PTSD symptoms than those reporting less emotional support (Price et al. 2013). Although research has yet to examine the relationship between PTSD symptoms and social support in the context of group treatment, group interventions have been used successfully to target interpersonal treatment targets in depression and anxiety disorders (e.g., de Ornelas et al. 2017; Mesa et al. 2015). Thus, it is possible that individuals engaged in group treatment for PTSD also will have opportunities to improve social skills in the context of group treatment.

Current Study

Given the relationship between social support and PTSD symptom severity, researchers have called for research examining the causal relationship between these variables and the underlying mechanisms accounting for change in these variables over the course of treatment (Guay et al. 2006; Tsai et al. 2012). In this study, we sought to extend the existing literature in two key ways. First, the vast majority of research on social support and PTSD has been cross–sectional. The current study used longitudinal data to follow a sample of treatment–seeking, active duty service members as they completed CPT. Additionally, researchers have not yet examined the extent to which treatment modality might affect the relationship between PTSD symptoms and social support. The current study was able to compare this relationship among participants who received CPT in a group format with those who received CPT in an individual format. Additionally, the current study examined the unique effects of three types of social support: appraisal (i.e. the perceived ability to get advice and/or guidance from others), belonging (i.e. perceived receipt of empathy, concern, and acceptance from others), and tangible (i.e., perceived access to material or financial support from others). Based on the existing literature, we formed three hypotheses: (1) social support and PTSD severity would be correlated both within and

across assessments; (2) pre-treatment PTSD severity and all social support subscales would predict their respective post-treatment values; (3) PTSD severity and social support would be bidirectionally related such that baseline levels of PTSD would negatively predict later levels of social support, controlling for early levels of social support, and vice versa. In addition, due to the lack of research examining differences in social support pre- to post-treatment with two different modalities, we included an additional exploratory research question: "Are there differences in the relationships between PTSD and social support for those receiving group vs. individual treatment?".

Methods

Participants

This is a secondary analysis of data drawn from two randomized clinical trials that examined the effectiveness of CPT in active duty service members ($N = 322$) who were deployed after 9/11/2001 in and around Iraq and Afghanistan. The sample, methods, and procedures of the parent trials are described in detail elsewhere (Resick et al. 2015, 2017). All participants included in this study received CPT in either an individual ($n = 133$) or group ($n = 189$) format. Participants were included if they met the following criteria: (1) active duty, activated reservists, or activated National Guard members; (2) age 18 or older; (3) had experienced a Criterion A traumatic event (as defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*; *DSM–IV–TR*; American Psychiatric Association 2000) during a deployment; and (4) met criteria for PTSD diagnosis using the Posttraumatic Symptom Scale–Interview Version (PSS–I; Foa et al. 1993). Computerized block randomization into group or individual therapy formats occurred after eligibility was determined. Participants on any psychotropic medications were required to remain stable on medication for 6 weeks prior to study entry and were asked to remain on a stable dose of medication throughout treatment. Participants were excluded if they reported current suicidal or homicidal risk meriting crisis intervention, active psychosis, a moderate to severe traumatic brain injury, or active, severe alcohol dependence.

The mean age of the participants was 33.05 years ($SD = 7.40$, $range = 20$–53). Participants were primarily male (92%) and white non-Hispanic (44%), with the majority having served in the U.S. Army (98%) as members of the enlisted ranks (97%). Patient demographics for the total sample and each subsample are shown in Table 1. The subsamples only differed in terms of education; the proportion of individuals who received group format treatment who had a high school diploma or less was significantly higher

compared to those who received individual CPT, whereas the converse was true for those with at least some college or an associate degree. Subsequent analyses controlled for this variable.

Procedures

Institutional Review Boards at Brooke Army Medical Center, University of Texas Health Science Center at San Antonio, VA Boston Healthcare System, and Duke University Medical Center approved both parent studies. Participants provided informed consent in person with trained study staff and then completed a comprehensive baseline clinical battery. These assessments were administered by trained master's- and doctoral–level independent evaluators who were blind to treatment condition. Eligible participants meeting *DSM–IV* criteria for PTSD (American Psychiatric Association 2000) were randomized into the trials. CPT consisted of 12 sessions, conducted by master's- and doctoral–level clinicians, twice weekly for 6 weeks (individual sessions were 60 min and group sessions were 90 min). Participants were assessed at baseline, post-treatment, and 6 months after treatment. The current study used data from the baseline and posttreatment assessments primarily because of our desire to examine these relationships over the course of the active phase of treatment, but also due to concerns about missing data at the 6-month assessment on one of the study measures. Please see Resick et al. 2015, 2017, for the CONSORT flow charts of participants.

Measures

PTSD Symptom Scale—Interview Version (PSS–I)

The PSS–I (Foa et al., 1993) is a 17-item clinical interview that evaluates the severity and diagnostic criteria for the *DSM–IV*. Symptoms are rated on a 4-point scale ranging from 0 (*not at all*) to 3 (*very much*). The sum of items represents the severity score, and a diagnosis of PTSD is made if at least one re-experiencing, three avoidance, and two arousal symptoms are present, as indicated by endorsing a score of at least 1 (bothered "Once per week or less/a little") over the previous two weeks on any given item. The PSS–I was used at baseline to determine inclusion into the study.

PTSD Checklist—Stressor Specific Version (PC–LS)

The PCL–S (Weathers, et al., 1993) was given at baseline and at both the post-treatment and six-month follow ups. It is a 17-item self–report measure that assesses how much an individual is bothered by arousal, avoidance, or re-experiencing symptoms on a scale from 1 (*not at all*) to 5 (*extremely*). Higher scores reflect greater PTSD symptom

Table 1 Demographic characteristics

Characteristic	Total Sample ($N=322$)	Individual CPT ($n=133$)	Group CPT ($n=189$)	t, χ^2	p
Age	33.05 (7.40)	32.60 (7.07)	33.37 (7.64)	−0.9	.36
Male	294 (91.30%)	119 (89.50%)	175 (92.60%)	0.96	.33
Married/cohabitating	235 (73.00%)	97 (72.90%)	138 (73.00%)	0.00	0.99
Ethnicity/race				0.75	0.86
Black	86 (26.70%)	36 (27.10%)	50 (26.50)		
Hispanic	66 (20.50%)	30 (22.60%)	36 (19.00%)		
White	143 (44.40%)	56 (42.10%)	87 (46.00%)		
Other	27 (8.4%)	11 (8.30%)	16 (8.50%)		
Education				6.74	.03
High school or less	85 (26.40%)	25 (18.80%)	60 (31.70%)		
Some college/AA degree	213 (66.10%)	97 (72.90%)	116 (61.40%)		
College/graduate degree	24 (7.5%)	11 (8.30%)	13 (8.30%)		
Army	317 (98.40%)	130 (97.70%)	187 (98.90%)	0.73	.39
Enlisted grade	312 (96.90%)	128 (96.20%)	184 (97.90%)	0.76	.38
Months in military	128.45 (75.46)	127.71 (80.23)	128.97 (72.19)	−0.15	.88
Typical duty				0.67	.71
Combat Arms	119 (37.00%)	47 (35.30%)	72 (38.10%)		
Combat Support	76 (23.60%)	30 (22.60%)	46 (24.30%)		
Combat Service Support	127 (39.40%)	56 (42.10%)	71 (37.60%)		
Number of deployments				5.14	.16
1	93 (28.90%)	46 (34.60%)	47 (24.90%)		
2	112 (34.80%)	38 (28.60%)	74 (39.20%)		
3	66 (20.50%)	27 (20.30%)	39 (20.60%)		
4 +	51 (15.80%)	22 (16.50%)	29 (15.30%)		

Note. *CPT* cognitive processing therapy, *AA* = associate degree. Tests for all categorical variables (those with a % in the parentheses) are with $df=1$–3. Tests for variables presented with means and standard deviations are with $df=320$

severity. Coefficient alpha was acceptable at both baseline ($\alpha=0.85$) and post-treatment follow–up ($\alpha=0.94$).

### Interpersonal Support Evaluation List—Short Form (ISEL)

The ISEL (Cohen and Hoberman 1983) was given at baseline, post-treatment, and six-month follow ups. Prior studies have demonstrated that this measure exhibits good internal consistency, with alpha levels ranging from 0.88 to 0.90 in the general population (Cohen et al. 1985). The short form is a 12-item measure that asks participants about their relationships with other people in their lives. It covers three subscales that were used in analyses reported hereafter: Appraisal (perceived availability of advice and/or guidance), Belonging (perceived availability of empathy, concern, and acceptance from others), and Tangible (perceived availability of material or financial assistance from others). Responses are on a 4-point scale with anchors, ranging from 1 (*definitely false*) to 4 (*definitely true*). Higher scores indicate more perceived social support within each domain. Coefficient alpha was acceptable at both baseline and the post-treatment follow–up for the Appraisal ($\alpha=0.71$, 0.74),

Belonging ($\alpha=0.75$, 0.77), and Tangible ($\alpha=0.77$, 0.71) subscales.

Data Analytic Strategy

To examine Hypothesis 1, we examined bivariate correlations between the main study variables both within and across assessments. To examine Hypotheses 2 and 3, we tested a series of competing models of the PTSD and social support relationship for the entire sample using the hypothesized cross–lagged regression model depicted in Fig. 1. Across all models, synchronous correlations at both baseline and post-treatment (labeled "a" and "b," respectively) were estimated. Model 1 included the synchronous correlations and the autoregressive effects (labeled "c") for each of the outcome variables. This can be considered a "parallel process" model; it suggests that there are significant concurrent associations between the various forms of social support and PTSD severity, but that neither construct predicts the other over the course of treatment (with the implication being that some third variable not included in the model is responsible for their shared relation). Model 2 iteratively added the three

Fig. 1 Hypothesized cross–lagged regression model
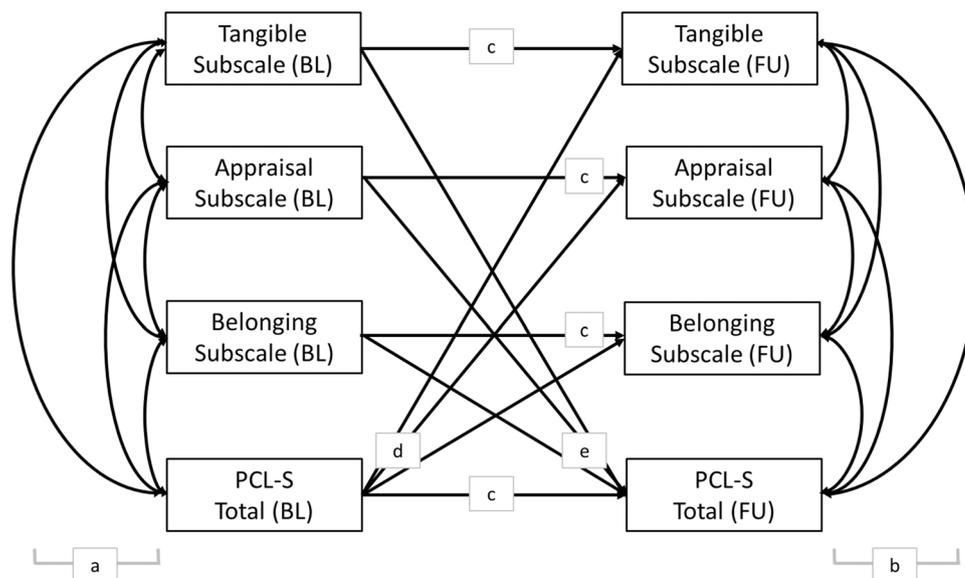
Note. Covariates removed for clarity. BL = baseline; FU = follow-up; PCL-S = PTSD Checklist–Stressor-Specific Version.

cross–lagged paths from pre-treatment PTSD severity to post-treatment social support (labeled "d") sequentially and tested whether each separate path improved model fit. These paths tested whether early levels of PTSD predicted later levels of each type of social support, controlling for their respective baseline values. Model 3 retained all significant paths from Model 2 and sequentially added the paths from the various types of social support at pre-treatment to post-treatment PTSD severity (labeled "e"). These paths tested whether early levels of social support predict post-treatment PTSD severity, controlling for baseline PTSD severity.

All analyses were conducted using MPlus version 7.2 software (Muthén and Muthén 2014) using the Maximum Likelihood Robust (MLR) estimator to correct for non-normality in the data and full information maximum likelihood (FIML) to account for missingness (Enders 2001). Because the aforementioned models are nested, we examined whether the addition of each successive individual parameter within each model significantly improved model fit using Santorra–Bentler rescaled χ^2 difference tests due to the usage of the MLR estimator. The fit of each respective model was evaluated as acceptable using the following criteria: (a) Comparative Fit Index (CFI) value greater than 0.95, and (b) Root Mean Squared Error of Approximation (RMSEA) value lower than 0.06 (Hu and Bentler 1999). After determining the best fitting model for the entire sample, we examined Research Question 1 by estimating a multiple–groups model in which all parameters were first constrained to be equal across treatment modalities. We then examined moderation of each of the retained autoregressive and cross–lagged paths by freeing individual paths one at a time across modalities to test whether allowing them to be

estimated separately significantly enhanced model fit relative to the model in which the path was constrained across modalities. Each individual unconstrained path was tested using a χ^2 difference test; moderation was considered present if the -2LL difference test was significant.

Results

Preliminary Analyses

An attrition analysis was conducted to determine whether treatment completers and noncompleters differed on the demographic variables presented in Table 1 as well as main study variables. Of the 322 participants assessed at baseline, 227 (70%) were also assessed at post-treatment. Results indicated that, compared to participants who dropped out of treatment prior to the post-treatment assessment, those who completed treatment were significantly older ($M_{age} = 31.53$ vs. 33.69, $t (319) = 2.41$, $p = 0.016$), but they did not differ on any other demographic variables. Consequently, we controlled for age (in addition to education, which was dropped from the final model as it was not a predictor of any outcome variable) in all subsequent analyses. With respect to the main outcome variables, completers and noncompleters did not differ in terms of PCL–S total scores or on any of the ISEL subscales at baseline.

Hypothesis 1: Bivariate Correlations

Table 2 presents the correlations and descriptive statistics for the main outcome variables at both baseline and

Table 2 Correlations between main study variables

	PCL–S (T1)	Appraisal (T1)	Belonging (T1)	Tangible (T1)	PCL–S (T2)	Appraisal (T2)	Belonging (T2)	Tangible (T2)
PCL–S (T1)								
Appraisal (T1)	−0.28							
Belonging (T1)	−0.21	0.56						
Tangible (T1)	−0.17	0.58	0.71					
PCL–S (T2)	0.50	−0.17	−0.14	−0.16				
Appraisal (T2)	−0.26	0.55	0.41	0.46	−0.41			
Belonging (T2)	−0.25	0.45	0.57	0.55	−0.37	0.64		
Tangible (T2)	−0.28	0.47	0.53	0.57	−0.35	0.72	0.77	
Mean	55.93	11.23	11.12	11.40	46.24	11.55	11.34	11.52
SD	10.41	3.10	3.19	2.96	15.67	3.10	3.19	2.98

Note. *PCL–S* PTSD Checklist–Stressor–Specific Version, *T1* baseline, *T2* follow–up. $N = 322$. All correlations are significant at .05 level; those larger than ±.17 are significant at .001 level

post-treatment assessments. All variables were significantly correlated within and across assessments, consistent with Hypothesis 1. The ISEL subscales exhibited large positive correlations with one another based on standard conventions at both assessments, and they were all negatively related to PTSD severity at both time points.

Hypotheses 2 and 3: Cross–Lagged Regression Models

As indicated earlier, we tested an iterative series of models, beginning with a model that contained both baseline and post-treatment synchronous correlations, all autoregressive effects, and age as a covariate in the model of each outcome variable. As predicted by Hypothesis 2, all of the autoregressive effects were significant (all p's < 0.01). Cross–lagged parameters were subsequently estimated to examine the bidirectional relationships proposed in Hypothesis 3, first from baseline PTSD severity to each of the social support variables at post-treatment, and vice versa afterwards. For the combined sample, results indicated that PTSD severity and social support were unidirectionally related such that the addition of each successive parameter predicting post-treatment social support scores from baseline PTSD severity significantly improved model fit, as predicted. However, none of the paths predicting post-treatment PTSD from baseline social support improved model fit. As such, Hypothesis 3 was partially supported. Prior to estimating the multiple–groups model to examine Research Question 1, all nonsignificant paths and covariances were dropped and the model was re-estimated to ensure stability of the observed pattern of effects.

With respect to Research Question 1, the final multiple–groups model fit the data satisfactorily (CFI $= 0.93$, RMSEA $= 0.06$ [90% CI: 0.04, 0.08]) and is depicted in Fig. 2. It shows that only one of the estimated paths

differed across treatment modalities (robust $\Delta\chi^2$ (1) $= 12.21$, $p < 0.001$). Baseline PTSD severity predicted post-treatment PTSD severity more strongly for those who received group CPT ($\beta = 0.54$, $t = 7.81$, $p < 0.001$) compared to those who received individual CPT ($\beta = 0.47$, $t = 4.876$, $p < 0.001$), consistent with findings reported from the parent study (Resick et al. 2017). Overall, even when controlling for their baseline values, higher levels of baseline PTSD were associated with lower levels of post-treatment social support for the Tangible ($\beta = -0.23$, $t = 3.95$, $p < 0.001$), Appraisal ($\beta = -0.15$, $t = 2.33$, $p = 0.02$), and Belonging ($\beta = -0.16$, $t = 2.83$, $p = 0.005$) subscales (consistent with Hypothesis 3). Being older was associated with lower social support for the Tangible ($\beta = -0.21$, $t = 3.62$, $p < 0.001$), Appraisal ($\beta = -0.15$, $t = 2.33$, $p = 0.02$), and Belonging ($\beta = -0.21$, $t = 4.08$, $p = 0.005$) subscales and higher levels of PTSD severity ($\beta = 0.21$, $t = 3.63$, $p < 0.001$) at post-treatment. The final model accounted for 34%, 28% and 33% of the variability in the Tangible, Appraisal, and Belonging subscales of the ISEL, respectively, and 33% of the variability of PCL–S scores for those who received group treatment and analogously accounted for 32%, 28%, 31% and 33% of the variability in those same scores for those who received individual CPT.

Discussion

To address this study's three hypotheses and one research question, we iteratively tested a series of cross–lagged regression models to examine relationships between social support and PTSD severity over the course of treatment. Consistent with our first hypothesis, correlational analyses found that social support and PTSD scores were significantly related to each other at each assessment time point, such that individuals who reported higher PTSD scores also

Fig. 2 Final multiple groups
model with standardized
estimates
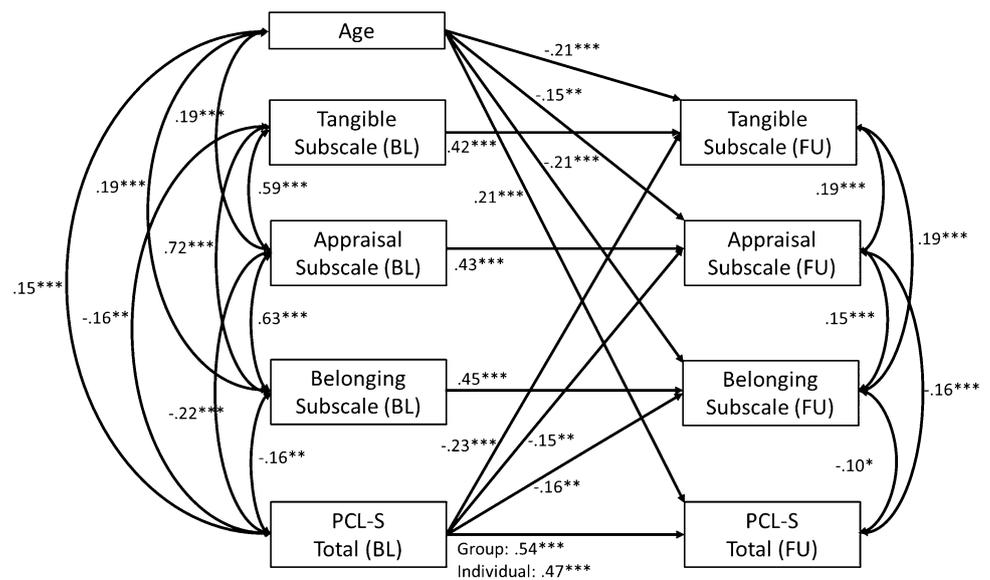
Note. BL = baseline; FU = follow-up; PCL-S = PTSD Checklist–Stressor-Specific Version.

reported lower levels of social support. This finding also is consistent with previous cross–sectional and longitudinal research that has demonstrated a significant relationship between PTSD and social support (e.g., Freedman et al. 2015; Shallcross et al. 2016). Similarly, consistent with our second hypothesis, baseline scores on PTSD and social support measures were positively related to their scores at post-treatment. These autoregressive relationships persisted even when lagged relationships were modeled, indicating that these constructs are not redundant. Our final model for the combined sample found that higher levels of baseline PTSD were associated with lower post-treatment social support. In contrast, baseline social support scores were not predictive of post-treatment PTSD scores. This finding indicates a unidirectional relationship between baseline PTSD and post-treatment social support and partially supported our third hypothesis. Specifically, this finding suggests that individuals with higher levels of PTSD prior to beginning treatment do not experience improvements in social support upon completion of treatment. Conversely, social support at baseline does not predict PTSD symptoms following treatment. Although the social causation and social erosion models posit a bidirectional relationship between social support and psychopathology, the current findings do not support the existence of a bidirectional relationship at the end of treatment but are consistent with elements of the social erosion model. One important note is that these models were developed to explain the relationship between social support and psychopathology with regard to the development of symptoms rather than the interactions between these constructs over the course of therapy. Since not all individuals with PTSD seek treatment, it is possible that there are important

limitations to the explanatory power of these theories with regard to the treatment seeking sample included in the current study. Finally, age emerged as a significant covariate and indicated that older individuals reported lower social support and higher levels of PTSD severity at post-treatment than younger individuals. Again, this finding is consistent with previous research that has found older age to be associated with weakened social networks (Due et al. 1999) and more severe PTSD symptoms (Kessler et al. 1995). In the military context, these findings suggest that older military personnel, such as senior officers and noncommissioned officers, may have less social support because they are more likely to serve in leadership positions, with large numbers of military personnel working for them but only a limited number of peers who might provide social support.

Our research question involved testing differences related to treatment modality, and the resulting findings identified only one pathway that significantly differed between individuals receiving group and individual CPT. This model demonstrated that the path between baseline and follow–up PTSD severity was significantly stronger for those in group CPT, indicating that participants who received individual CPT experienced a larger decrease in PTSD symptoms over the course of treatment than individuals who received group CPT. This finding is consistent with the findings of the parent trial (Resick et al. 2017) and meta–analytic work comparing the effectiveness of group–based and individual therapies for PTSD (Haagen et al. 2015). None of the paths linking baseline PTSD to post-treatment social support were different across groups. Although the opportunities to work on social skills in the context of group therapy has been shown to be beneficial for some psychological disorders,

such as social anxiety disorder (Herbert et al. 2005), it does not appear that group therapy for PTSD provides added benefit with regard to increasing social support. These results also suggest that service members, who may experience uniquely different combat- or deployment–related traumas compared to civilians, may benefit more from focusing on the individual aspects of their traumas. Given prior research on PTSD and social support during treatment in civilian populations (Price et al. 2013; Resick et al. 2002) recommendations for prioritizing individual treatment over group interventions for PTSD among military populations may be warranted.

Limitations

There were several limitations in the current study that future research might address. First, the chronicity of PTSD symptoms in the current sample was not assessed. Given the explanations for the relationship between PTSD and social support put forth by the social erosion and social causation models, duration of symptoms might have a moderating effect on these two variables. Second, participants in the current study were all active duty in the U.S. Army and were predominately men. This study's findings might not generalize to other branches of the U.S. military or to female service members. Previous research has consistently demonstrated that female military personnel experience less social support than male service members (Frayne et al. 2006); thus, future research should examine how treatment modality might affect PTSD symptoms and social support among women. For example, it is possible that a group format would provide a meaningful source of social support that could be more beneficial for women than it was for a primarily male sample of active duty service members. Similarly, while there are approximately four times the number of enlisted service members as compared to officers in the United States, military, enlisted service members are overrepresented in the current sample. There may be important differences in perceptions of social support based on military rank; however, this was unable to be explored in the current study given the small number of officers who participated. Finally, the current study used a single measure of social support that did not require participants to identify the sources of social support they experience. In particular, relationships within the military (with either peers or leaders) are likely an important variable among active duty service members because previous research has demonstrated that unit cohesion is negatively associated with PTSD symptoms (i.e., more cohesion is related to lower symptoms; Armistead-Jehle et al. 2011; Dickstein et al. 2010). Future research should more explicitly seek to understand the role that different types of relationships (e.g., work, family, or community) might play in symptom presentation and treatment.

Clinical Implications

The findings of the current study also lead to a number of suggestions for clinicians and clinical researchers to consider in their work. For patients with chronic or severe problems associated with both PTSD and social support, clinicians might consider family–centered models of care. A majority of veterans with PTSD report both that PTSD has increased levels of stress in their relationships and that they would be interested in a treatment model that includes family members (Batten et al. 2009). A number of recent studies are beginning to examine the effectiveness of providing PTSD treatment to individuals with their significant other or family. For example, cognitive–behavioral conjoint therapy for PTSD, a manualized treatment designed to target both PTSD symptoms and relationship distress, has shown promising results in recent clinical trials (Fredman et al. 2020; Macdonald et al. 2016; Monson et al. 2012).

Additionally, PTSD treatment outcomes might be improved by including supplemental treatment or skills for strengthening and improving social support. Recent research has found that including interpersonal skills training prior to, alongside, or following treatment for PTSD may be beneficial to patients with histories of trauma (Cloitre et al. 2002, 2016). In a sample of women with a history of childhood trauma, women who received Prolonged Exposure therapy with interpersonal skills training demonstrated improvements in both interpersonal relationships and PTSD symptoms (Cloitre et al. 2002). Given these promising findings, research should continue to examine the comparable effectiveness and benefits of these approaches, particularly for individuals with high levels of PTSD who might not experience improvements in their social support utilizing traditional models of individual therapy.

Data Availability The datasets generated during and/or analyzed during the current study are available upon request from the STRONG STAR Repository. E-mail repository@strongstar.org.

Compliance with Ethical Standards

Conflict of Interest Patricia Resick receives royalties from Guilford publishing for a CPT manual subsequent to the one used in this study. Erica E. Nason, Elisa V. Borah, Willie J. Hale, Jennifer Schuster Wachen, Katherine A. Dondanville, Jim Mintz, Brett T. Litz, Jeffrey Yarvis, Stacey Young-McCaughan, and Alan L. Peterson have no known conflicts of interest associated with this publication. There has been no significant financial support for this work that could have influenced its outcome.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Institutional Review Boards at Brooke Army Medical Center, University of Texas Health Science Center at San Antonio, VA Boston Healthcare System, and Duke University Medical Center approved both parent studies.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Animal Rights No animal studies were carried out by the authors for this article.

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