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The Role of Social Support in Exposure Therapy for Operation Iraqi Freedom/Operation Enduring Freedom Veterans: A Preliminary Investigation

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Abstract

The lack of social support has consistently been identified as a relevant factor in the development, maintenance, and treatment of posttraumatic stress disorder (PTSD). Prospective studies with combat veterans have supported the erosion model of social support in the development of PTSD. This model posits that increased PTSD symptoms lead to diminished social support over time. Additional epidemiological work that has investigated mental health and functional impairment in recently returning Operation Iraqi Freedom and Operation Enduring Freedom (OIF/OEF) veterans has suggested that interpersonal problems coincide with the onset of PTSD. Despite research that suggests OIF/OEF veterans experience high rates of PTSD and associated interpersonal problems, no studies have examined social support in relation to treatment response in this group. The current study examined the role of four theorized functional aspects of social support— emotional/informational support, positive social interactions, affectionate support, and tangible support— on pretreatment PTSD symptom severity and treatment response in a sample of OIF/OEF veterans receiving exposure-based psychotherapy. Findings showed that positive social interactions were negatively correlated with pretreatment symptom severity, and emotional/informational support was positively related to increased treatment response. Together, these findings suggest that specific types of social support may have an important influence on the course of exposure treatment.

Keywords

PTSD; OEF/OIF; Veterans; social support; exposure therapy

Posttraumatic stress disorder (PTSD) is a chronic condition characterized by the reexperiencing of a traumatic event, avoidance of reminders of this event, and hyperarousal. A number of studies have examined potential risk and protective factors for PTSD with social support emerging as a key construct (Kilpatrick et al., 2007; Pietrzak, Goldstein, Malley, Rivers, & Southwick, 2010; Whealin, Ruzek, & Southwick, 2008; Wilcox, 2010; Zoellner, Foa, & Brigidi, 1999). A meta-analysis demonstrating that reduced social support was strongly associated with increased chronic PTSD symptoms, especially in high risk populations (Brewin, Andrews, & Valentine, 2000). Furthermore, theorists have identified social support as a key mechanism in the prevention and treatment of the disorder (Whealin et al., 2008). However, much of the research on social support and PTSD has focused on

disaster-affected samples, which may limit the generalizability of these findings to other high risk groups, such as combat veterans. Social support may be a particularly relevant construct in the study of combat veterans because the deployment cycle is characterized by considerable social upheaval. Young men and women deployed to the war zone experience considerable displacement as they adjust to military culture abroad. Further, they may feel alienated from loved ones with whom they have less direct contact. At postdeployment, soldiers must make a substantial transition, reintegrating with their families, friends, peers, and coworkers after having experienced life-changing traumas (Milliken, Auchterlonie, & Hoge, 2007).

The *erosion model* provides a theoretical framework for the association between PTSD and social support in combat veterans (King, Taft, King, Hammond, & Stone, 2006). This model posits that prolonged PTSD symptoms lead to a reduction in social support due to interpersonal difficulties, feelings of detachment, increased irritability, and increased avoidance of social stimuli. The erosion model is consistent with leading cognitive models of PTSD that suggest that those with the disorder adopt a perspective in which others are viewed as dangerous and the world is viewed as unsafe (Ehlers & Clark, 2000; Resick & Schnicke, 1992). Support networks are viewed with frustration, potential support members are perceived as threatening, and social interactions are thought to increase the risk for additional trauma exposure (Kaniasty & Norris, 1993; Keane, Scott, Chavoya, Lamparski, & Fairbank, 1985). Over time, those with PTSD avoid members of their support network in an effort to reduce perceived threat and increase perceived safety. Indeed, a recent study demonstrated that viewing support as inappropriate, useless, or dangerous, mediated the association between PTSD symptoms and reduced social support (Clapp & Beck, 2009).

Several longitudinal empirical studies provide support for the erosion model in combat veterans. One of the first examined a large sample of male Gulf War veterans assessed within 7 years of their deployment and then reassessed 5 years later (King et al., 2006). Findings suggested that initial PTSD symptoms predicted lower social support at 5-year follow-up; however, initial social support did not predict baseline PTSD symptoms. Similar findings were obtained in another study using Vietnam and Gulf War veterans (Laffaye, Cavella, Drescher, & Rosen, 2008), in which PTSD symptoms were predictive of lower levels of interpersonal support from nonveteran peers and partially associated with poorer support from veteran peers over a 6-month period. A third study demonstrated that Vietnam and Gulf War veterans with poorer social support had increased PTSD symptoms and were more likely to utilize Veterans Affairs (VA) PTSD treatment services than those with higher ratings of support (Fontana & Rosenheck, 2010). Furthermore, those who accessed treatment more than once demonstrated reduced social functioning over time. Additional support for the erosion hypothesis comes from longitudinal research with disaster victims. Kaniasty and Norris (2008) examined the association between PTSD and social support over the course of 2 years in survivors of a natural disaster. Increased PTSD symptoms at 1 year were highly predictive of reduced social support at 18-month follow-up. Similarly, increased PTSD symptoms at 18-month follow-up was associated with reduced social support at 2-year follow-up. Furthermore, social support at the 18-month follow-up did not predict PTSD symptoms at 2-year follow-up. These findings suggest that pervasive PTSD symptoms eroded social support over time.

The negative effect of PTSD on social support several months after exposure to a traumatic event is especially relevant to combat veterans. There is often a significant amount of time between exposure to a traumatic event and reconnection with the home social network. Evidence for a negative relation between PTSD and social support comes from research demonstrating that Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) veterans have prevalence estimates of PTSD ranging from 17% to 21% (Hoge et al., 2004;

Seal et al., 2009), and a fourfold increase in rates of self-reported interpersonal conflict in veterans within 6 months of returning from deployment (Laffaye, Cavella, Drescher, & Rosen, 2008). Only two studies have directly examined the association between social support and PTSD symptoms in this population. Pietrzak, Johnson et al. (2010) demonstrated that OIF/OEF Veterans with PTSD reported lower postdeployment social support than those without a diagnosis. A second study examined the relation between PTSD symptoms and social support from different sources (e.g., family members, peers, military peers; Wilcox, 2010). Results demonstrated that reduced overall social support was associated with increased PTSD symptom severity. Lack of support from significant others, family, and military peers was specifically associated with increased PTSD symptom severity, whereas support from nonmilitary peers was unrelated.

Interestingly, there have not been any studies evaluating the effects of social support during the treatment of PTSD in veterans. Exposure-based psychotherapies are successful at reducing symptoms of PTSD across a wide range of traumatized samples, including combat veterans (Institute of Medicine, 2007; Gros et al., 2010; Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Tuerk et al., 2011). Exposure therapy is theorized to reduce PTSD symptoms through stimulus habituation that is secondary to emotional processing of fear memories. Emotional processing occurs through prolonged, controlled, and sustained exposure to a feared stimulus. In the treatment of PTSD, the feared stimuli include in vivo situations, as well as memories associated with the trauma that are typically avoided. Due to the nature of these exercises, exposure treatment components may also be interpreted as aversive and frequently avoided. Social support may facilitate engagement with these treatment practices, and thus, improve overall outcomes. For example, veterans with higher degrees of social support may bring support members to an in vivo exposure and/or discuss the content of an imaginal exposure with a support member. The support member would serve as a source of additional feedback about the safety of the situation, which would facilitate the development of extinction learning.

Given the emphasis placed on social support as a protective factor in the empirical and theoretical literature, further research on this construct in the treatment of PTSD in veterans is warranted. The majority of the research on this topic has been conducted with veterans from prior conflicts, and there is little data examining the association between social support and PTSD symptoms in veterans of the most recent OIF/OEF conflicts. Furthermore, few studies have examined the relation between perceived social support and response to exposure therapy among veterans with PTSD.

The current study attempts to build on this research in several ways. First, it assessed social support as a multidimensional construct as defined by its functional components (Cohen & Wills, 1985; House & Kahn, 1985; Vaux, 1988). The most commonly endorsed functions of social support include the following: (a) emotional support, which involves caring and empathy; (b) tangible support, which involves assistance in completing tasks; (c) affectionate support, which involves specific expression of positive emotions; and (d) social interaction, which involves a sense of social companionship or integration (Sherbourne & Stewart, 1991). It was predicted that lower levels of social support across all of the assessed domains would be associated with increased PTSD symptom severity. Second, the current study evaluated social support as a predictor of treatment response for exposure therapy, one of the most empirically supported methods of treating PTSD symptoms (Fontana & Rosenheck, 2010; King et al., 2006). The only study to demonstrate that self-reported social support was associated with improved PTSD treatment response was conducted with a civilian sample (Thrasher, Power, Morant, Marks, & Dagleish, 2010). Although members of the social support network are not directly involved in treatment, it is expected that

increased support outside of treatment will enhance response due to the protective effect of social support on PTSD symptoms (Barrett & Mizes, 1988; Whealin et al., 2008).

Methods

Participants

Participants were 69 OIF/OEF veterans diagnosed with PTSD ($n=43$) or subthreshold PTSD ($n=26$) according to the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). Participants were treatment-seeking veterans who were referred to the study through a PTSD clinic in a large Southeastern VA Medical Center (VAMC). Upon consent, they were administered an assessment battery designed specifically for the study. Diagnoses were made by trained research staff who were supervised by a licensed clinical psychologist. Subthreshold PTSD was defined as meeting full criteria for Criteria A (history of PTE) and B (reexperiencing symptoms of the trauma) for PTSD, and either Criterion C (avoidance symptoms) or D (arousal symptoms), as defined by the *Diagnostic and Statistical Manual, Fourth Edition (DSM-IV)*; American Psychiatric Association, 1996; Blanchard, Hickling, Taylor, & Loos, 1994; Grubaugh et al., 2005). Veterans with actively psychotic or demented symptoms, including both suicidal ideation and clear intent, or substance dependence were excluded from the study. Participants on active medications were required to maintain current dosages for the duration of treatment. After completing an initial assessment, participants were randomized to either receive treatment via in-person exposure therapy ($n=36$) or via telehealth-based exposure therapy ($n=33$) as part of a larger study (Gros et al., 2010).

The sample was primarily male ($n=58$; 91%), employed ($n=40$; 58%), and married ($n=33$; 52%). The mean age was 31.66 ($SD=8.37$; Range = 21–56). The majority of the sample self-identified as either Caucasian ($n=32$; 46%) or African American ($n=28$; 41%).

Intervention and Assessment Procedures

The treatment involved eight weekly 1.5-hour individual sessions of exposure therapy. The pretreatment assessments involved a series of clinician-rated and self-reported measures, including the CAPS and Medical Outcomes Study Social Support Survey (MOSSS; Sherbourne & Stewart, 1991). The PTSD Checklist—Military (PCL—M; Weathers, Litz, Herman, Huska, & Keane, 1993) was administered by the treating clinicians at pretreatment and treatment Sessions 2, 4, 6, and 8. A final posttreatment assessment was scheduled for all participants, including those who did not complete treatment, in order to obtain endpoint data.

Exposure Therapy

The treatment provided was most consistent with the model described by Foa, Hembree, and Rothbaum (2007). Thus, the primary treatment components were in vivo and imaginal exposure trials. Exposure trials were completed in-session, as well as scheduled between session periods. A daily planner was used for scheduling to maximize treatment participation and homework completion. As a secondary component, patients were also asked to schedule and track the completion of personal values-based (i.e., meaningful), positive activities in their daily planner throughout treatment, following the overarching guidelines of behavioral activation (Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011). This planning of reinforcing activities did not interfere with frequent exposure practice, and therefore, served to complement the exposure and fill the patient's weekly schedule. Social support was not explicitly addressed as part of the treatment protocol. All participants received eight 90-minute sessions administered by masters-level therapists. Therapists completed a week-long training program and were required to shadow a senior level

clinician throughout a complete course of treatment before administering the treatment independently. Therapists met weekly with the principal investigator (Ron Acierno, Ph.D.) for supervision throughout the duration of the study. Sessions were audio-taped and monitored by an independent rater to ensure treatment fidelity.

Telecommunications Technology

Treatment sessions for the telehealth patients were conducted using in-home videoconferencing technology as part of a larger study. Either an Internet-based instant video service (e.g., “Skype”) or an analogue videophone (Viterion 500) was used at the participant’s discretion. Research has demonstrated that exposure therapy can be delivered effectively to individuals with PTSD via telehealth technologies (Germain, Marchand, Bouchard, Drouin, & Guay, 2009; Gros et al., 2011; Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010).

Measures

Clinician-administered PTSD scale—The CAPS is a clinician-rated scale designed to diagnose current and lifetime PTSD (Blake et al., 1995). The CAPS assesses the intensity and frequency of 17 specific PTSD symptoms on a five-point Likert scale. The CAPS has been shown to have adequate internal consistency (α s ranged from .73 to .95), interrater reliability on the same interview (r s ranged from .92 to .99), and test–retest reliability over a 2 to 3 day period across different interviewers (r s ranged from .77 to .98; for review, see Orsillo, Batten, & Hammond, 2001). In addition, the CAPS has demonstrated adequate convergent validity to alternative measures of PTSD (r s ranged from .77 to .91) and adequate discriminant validity to measures of depression (r s ranged from .69 to .74) and anxiety (r s ranged from .65 to .76). Finally, the diagnosis established by the CAPS has been found to be comparable to alternative structured interviews (Weathers, Ruscio, & Keane, 1999), including the Structured Clinical Interview for the *DSM-IV* (American Psychiatric Association, 2000; First, Spitzer, Gibbon, & Williams, 1996).

PTSD Checklist—Military—The PCL–M is a 17-item measure designed to assess PTSD symptom severity. Respondents are presented with 17 specific symptoms of PTSD and asked to rate “how much you have been bothered by that problem in the last month” on a five-point Likert scale, ranging from 1 (*not at all*) to 5 (*extremely*). The PCL has been shown to have excellent internal consistency in veterans, victims of motor vehicle accidents, and sexual assault survivors (α s > .94) and excellent test–retest reliability in veterans ($r = .96$; for review, see Orsillo et al., 2001). In addition, the PCL has demonstrated excellent convergent validity with alternative measures of PTSD (r s range from .77 to .93; Orsillo et al., 2001). Cronbach’s alphas for the current study were consistently in the excellent range (α s > .93).

Medical Outcomes Study Social Support Survey Form (MOSSS)—The MOSSS is a widely used 19-item, self-report measure designed to assess social support across four domains: emotional/information support (8 items; range: 8 – 48; e.g., “Someone you can count on to listen to you when you need to talk”), tangible support (4 items; range: 4–24; e.g., “Someone to help with daily chores if you were sick”), affectionate support (3 items; range: 3–18; e.g., “Someone who shows you love and affection”), positive social interaction (3 items; range: 3–18; e.g., “Someone to do something enjoyable with”), and an additional item that does not load on any other factor (1 item; range 1– 6; e.g. “Someone to do things with to help you get your mind off things.”). Responses are given on a 6-point Likert scale ranging from 1– 6 with greater scores indicating less support in the given domain. The measure was originally developed to examine the function and types of interpersonal support in chronically ill patients (Sherbourne & Stewart, 1991). A factor-analytic study

with a large clinical sample validated the subscales of the MOSSS (Sherbourne & Stewart, 1991), and additional work has validated the measure in mental health samples (Gjesfjeld, Greeno, & Kim, 2008). The MOSSS has been shown to be an accurate measure of social support in veteran samples with mental health issues (Cotten, Skinner, & Sullivan, 2000; Hart, 2002; Jakupcak et al., 2011; Kilbourne, McCarthy, Post, Welsh, & Blow, 2007). Internal consistency for the MOSSS subscales at pretreatment and posttreatment were consistently in the excellent range ($\alpha_s > .95$). For the current study, only the primary subscales (emotional information support, tangible support, affectionate support, and positive social interactions) were included in the analysis.

Data Analyses

Hypotheses were assessed with multilevel modeling (MLM). MLM is considered a stronger method for analyzing longitudinal data than ordinary least squares regression approaches such as because of its improved mechanism for handling missing data and its reliance on fewer assumptions, such as a need for measurements to be independent (Singer & Willett, 2003). MLM divides variance across two levels. Level 1 contains variance attributed to intraindividual changes (i.e., change associated with treatment), and Level 2 contains variance attributed to interindividual differences (i.e., differences in social support). Linear change models were fitted to the data that included a Level 1 fixed effect for intercept (β_{00}), representing pretreatment severity, and slope (β_{10}), representing the rate of change during treatment. A Level 2 model was fitted to the data that included measures of social support as predictors of intercept (β_{01-4}) and slope (β_{11-4}). Of the 69 participants that were enrolled in the study, posttreatment data was available for 45 of them. Restricted Maximum Likelihood (RML) was used with all available information included in the analyses. RML has shown to provide more accurate estimates for smaller samples (Singer & Willett, 2003).

Results

Preliminary Analyses

Descriptive statistics for all variables are presented (see Table 1). Preliminary analyses were conducted to assess potential differences across demographic variables on the PCL–M, as well across the MOSSS subscales. The results consistently suggested that there were no differences across these variables in terms of ethnicity, employment status, or branch of the military. Furthermore, PCL–M and MOSSS subscales were unrelated to age or education. Participants who were married, $M = 5.18$, $SD = 2.57$, reported significantly greater support on the affection subscale than those who were not married, $M = 8.52$, $SD = 6.07$; $F(2, 60) = 4.29$, $p < .01$. This variable (married or not married) was included in the analysis as a covariate. There were no significant differences in the primary variables of interest between treatment modality (in-person or telehealth). Additionally, a series of repeated measures t tests were conducted to determine if social support changed during the course of treatment. There were no significant differences for any measure, suggesting that emotional/information support, $t(68) = -0.97$, $p = .34$; tangible support, $t(68) = -0.33$, $p = .75$; affectionate support, $t(68) = 1.16$, $p = .27$; and positive social interactions, $t(68) = -0.15$, $p = .88$, did not change during the course of treatment. Finally, dropout status was not predictive of initial PTSD symptom severity and was unrelated to all social support subscales.

Social Support as a Predictor of Symptom Severity

An MLM was fitted to the data that included Level 1 fixed effects for pretreatment severity (intercept) and the rate of change (slope) and Level 2 fixed effects for emotional/informational support, tangible support, affectionate support, and positive social interactions for both slope intercept and slope. For symptoms of PTSD (PCL–M), the relation between

positive social support and pretreatment severity was significant such that decreased support was associated with greater symptom severity, $\beta_{01} = 0.45, p < .05$ (see Table 2). Emotional/information support, tangible support, and affectionate support were not related to pretreatment PTSD symptoms. The social support subscales accounted for 8% of the variance in PTSD symptom severity.

Social Support as a Predictor of Treatment Response

For treatment response, the findings suggested that PTSD symptoms, $\beta_{11} = -2.26, p < .01$, declined as a result of treatment. Emotional/information support was significantly related to the rate of change in PTSD symptoms such that increased emotional support was associated with better treatment response, $\beta_{14} = 0.11, p < .05$ (see Figure 1). However, affectionate support, tangible support, and positive social interaction were not associated with the rate of change in PTSD symptoms. The social support sub-scales explained 11% of the variance in treatment response.

Discussion

The present study examined the relation between the functional aspects of social support and PTSD symptom severity and treatment response in a sample of OIF/OEF veterans. The findings suggested that reduced positive social interactions were associated with increased PTSD symptoms at the start of treatment and increased emotional/informational support is associated with stronger treatment response. In contrast, affectionate and tangible support were unrelated to both symptom severity and treatment response. These associations were maintained after controlling for marital status.

The association between pretreatment PTSD symptom severity and positive social interactions is likely to be reciprocal in nature in OIF/OEF Veterans. That is, PTSD is defined by avoidance of cues related to the traumatic event, and these cues are often social in nature; the avoidance of these cues then reduces the opportunity for future social interactions. Consistent with prior work, increased isolation (Brewin et al., 2000; Herman, 1992) and reduced support from family, loved ones, and military peers (Wilcox, 2010) often maintains and can exacerbate symptoms of PTSD. The association between symptoms and the positive social interaction scale, which assesses level of companionship, provides added support for this hypothesis. Building upon the findings of Kaniasty and Norris (2008) and using the framework of the erosion model (King et al., 2006), this relation may be indicative of patients who have been struggling with PTSD for longer periods. The current study was unable to test this hypothesis due to the unavailability of data on the duration of symptoms and time since deployment. Additional longitudinal and prospective studies are needed to fully evaluate the likely complicated association between social support and PTSD symptom severity.

These findings are the first to suggest that increased emotional/informational support is associated with improved PTSD treatment response in exposure treatment. Cognitive models suggest that those with PTSD perceive the world as dangerous or threatening and view their social support network as a source of risk (Ehlers & Clark, 2000; Keane et al., 1985; King, King, Foy, Keane, & Fairbank, 1999; Resick & Schnicke, 1992). Sources of emotional/informational support express positive and empathetic affect, encourage expression of feelings and emotion, and offer advice, guidance, and feedback, which promote a sense of safety (Kessler, Price, & Wortman, 1985; Sherbourne & Stewart, 1991). Indeed, theorists have suggested that increased social support may increase feelings of safety for those with PTSD, which have also been highlighted as a critical component for conducting successful exposure therapy (Charuvastra & Cloitre, 2008). The perceived safety that comes from these sources of support is theorized to facilitate treatment response.

There are several potential mechanisms to explain how increased perceived safety enhances treatment response. First, those with greater emotional support may be more compliant with treatment, and thus, willing to engage in more exposures or more difficult exposures. Increased emotional support also may further reinforce treatment gains as successful exposures are met with positive, empathic, and supportive responses. These responses would strengthen the extinction learning that takes place during exposures. Alternatively, the perceived safety from sources of emotional support may improve the participant's inherent coping mechanisms, which may then facilitate greater extinction learning.

Prior research suggests that increased social support is associated with improved coping strategies (Besser, Neria, & Haynes, 2009). Emotional support may help one overcome the emotional numbing that is associated with PTSD such that the veteran would receive a positive empathic response when expressing emotions to others. This may be related to an improved therapeutic alliance as prior work has demonstrated that increased social support at the start of treatment is associated with more rapid acquisition of a therapeutic alliance in victims of child sexual abuse (Keller, Zoellner, & Feeny, 2010).

Finally, there has been evidence to suggest that increased social support helps to facilitate the natural recovery process in those that have experienced a trauma (Dunmore, Clark, & Ehlers, 2001). Theorists suggest that increased support helps to buffer against the pervasiveness of negative world views that are associated with PTSD (Charuvastra & Cloitre, 2008; Horowitz, 1986). It is therefore plausible that increased positive social support will facilitate the recovery process in combat veterans enrolled in exposure therapy by providing additional corrective experiences. Future research is needed to better understand the mechanism by which increased emotional support enhances PTSD treatment response for exposure-based interventions. Such research should also focus on examining the impact of social support across different symptoms clusters of PTSD in order to more fully examine the influence of social support on treatment response (King, Leskin, King, & Weathers, 1998; Simms, Watson, & Doebbell, 2002).

Tangible support (e.g., having others who assist with or complete tasks), positive social interactions (e.g., having others to engage in pleasurable activities with), and affectionate support (e.g., receiving physical affection from others) were unrelated to treatment response for PTSD symptoms. Tangible support may be unrelated to treatment response to the extent that it reduces the therapeutic efficacy of in vivo exposures. More specifically, veterans who have high levels of tangible support may be less motivated to enter perceived dangerous situations because members of their support network complete tasks for them. For example, a veteran may be less willing to complete in vivo exposures associated with daily living activities, such as going to the grocery store, if they have members of their network who will complete such tasks for them. Future work should determine if higher levels of tangible support are associated with an increased sense of disability such that patients are less likely to engage in exposures that are paired with functional activities. Due to the preliminary nature of these findings, the lack of an association between such types of support and treatment response should be interpreted with caution until they are replicated in larger samples of veterans.

The current study had several limitations. First, the sample of veterans was relatively small as compared to other studies that have examined social support and PTSD (Forbes et al., 2008; Pietrzak, Johnson, et al., 2010; Wilcox, 2010). The findings of the current study should be replicated with larger military samples. The current sample consisted entirely of treatment-seeking veterans and may not generalize to veterans who do not seek treatment. Also, the sample was predominately male (91%), and so the findings may not generalize to female combat veterans. Additional research should be conducted to explore the associations

between support and PTSD symptoms in female combat veterans, especially victims of military sexual trauma. Third, the study relied exclusively on self-report measures of social support. Social support has been defined as a complex construct that may not be fully assessed with self-report measures (Cohen & Wills, 1985). Future work should replicate these findings using mixed method approaches that assess social support through responses from members of the veteran's social network, behavioral observations, and ecological assessments of support. Furthermore, the sources of social support were not considered. Prior work has demonstrated the association between social support and PTSD symptoms can vary across different sources, including family and friends (Wilcox, 2010). Additional research is needed to determine if the source of support moderates the association between the type of social support and treatment response. Furthermore, the current study was not sufficiently powered to fully assess potential moderators of the association between social support and treatment response including current living situation, family characteristics, and length of time since deployment. Length of time since deployment should be considered in future studies as this will provide an estimate of the duration of time since a traumatic event. Prior work with disaster victims has shown that the relation between PTSD and social support changes as time from the traumatic event increases (Kaniasty & Norris, 2008).

The findings of the current study are the first to demonstrate that social support is associated with treatment response for PTSD in returning combat veterans, and these results replicate findings that social support is associated with PTSD symptom severity. Furthermore, the functional components of social support have different roles in that social interactions are most strongly associated with pretreatment severity, and emotional/informational support was found to be the strongest predictor of treatment response. This suggests that incorporating sources of emotional support into the treatment process may enhance exposure-based interventions. Additional work is needed to more fully explore how this type of support results in more positive outcomes. Specifically, research should examine if social support is more strongly associated with certain components of treatment, such as in vivo and imaginal exposures.

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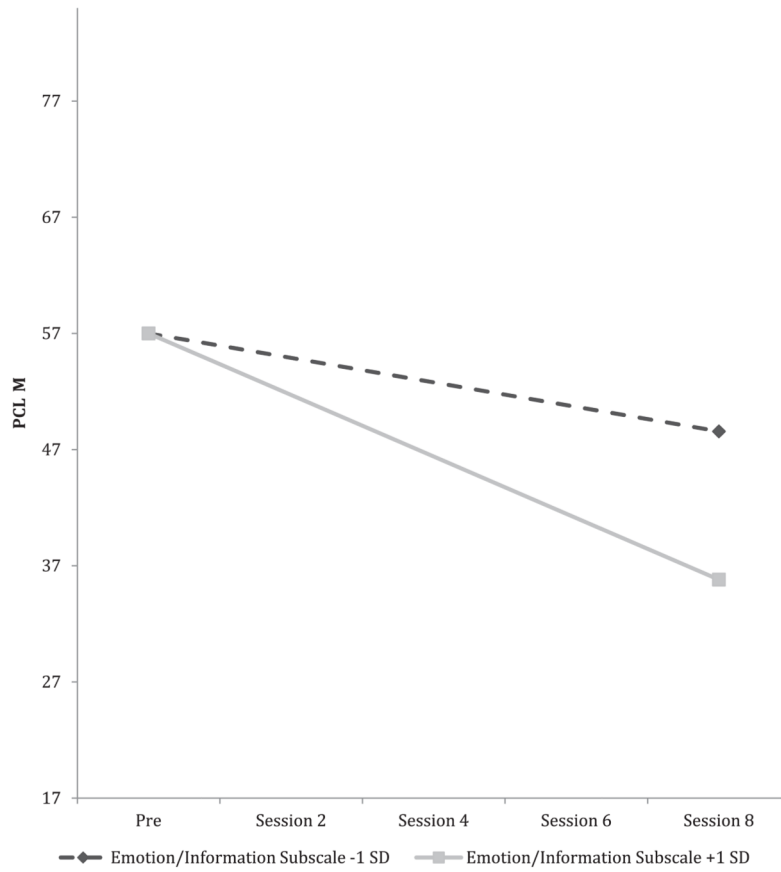


Figure 1. Outcome trajectories on PCL–M for ± 1 *SD* on the MOSSS Emotional/Informational Support subscale. Interaction probed at ± 1 *SD* according to the guidelines of Aiken and West (1991). The lowest possible score on the PCL–M is a 17.

Table 1
 Descriptive Statistics for PCL-M and Medical Outcomes Social Support Subscales Across Treatment

Variables	Pretreatment	Session 2	Session 4	Session 6	Session 8
PCL-M	56.70 (15.21)	55.21 (14.88)	49.54 (16.53)	45.47 (17.17)	44.64 (17.55)
Subscales of MOSSS					
Positive social interactions	2.76 (1.65)	—	—	—	2.54 (1.59)
Emotional/informational support	2.98 (1.43)	—	—	—	2.67 (1.45)
Tangible support	2.32 (1.36)	—	—	—	2.24 (1.52)
Affectionate support	2.23 (1.58)	—	—	—	2.17 (1.51)

Note. PCL-M = Posttraumatic Checklist—Military; MOSSS = Medical Outcomes Social Support scale. Scores on the MOSSS reflect the mean item score. Higher scores on MOSSS subscales indicate lack of support. Values in parentheses are standard deviations.

Table 2

Fixed Effects for MOSSS Subscales as a Predictor of Treatment Response

Fixed Effect	Coefficient	PCL-M
Pretreatment severity (intercept)	β_{00}	57.47 ^{**} (1.87)
Positive social interactions	β_{01}	0.45 [*] (0.21)
Emotional/informational support	β_{02}	-0.33 (0.46)
Tangible support	β_{03}	0.03 (0.59)
Affectionate support	β_{04}	-0.33 (0.60)
Married or not married	β_{05}	-0.42 (4.00)
Rate of change (slope)	β_{10}	-2.26 ^{**} (0.47)
Positive social interactions	β_{11}	<0.01 (0.03)
Emotional/informational support	β_{12}	0.11 [*] (0.06)
Tangible support	β_{13}	0.10 (0.13)
Affectionate support	β_{14}	-0.21 (0.13)
Married or not married	β_{15}	0.83 (0.60)

Note. PCL-M = Posttraumatic Checklist—Military. Values in parentheses are standard errors.

*
 $p < .05$.

**
 $p < .01$.