

Psychological Symptoms and Marital Satisfaction in Spouses of Operation Iraqi Freedom Veterans: Relationships with Spouses' Perceptions of Veterans' Experiences and Symptoms

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Much research has shown that spouses of combat veterans with posttraumatic stress disorder (PTSD) have higher rates of psychological and marital distress than do spouses of veterans without PTSD; however, very few studies have examined potential mechanisms of this increased vulnerability. The current study examined spouses of National Guard soldiers recently returned from deployments in Iraq. In addition to documenting elevated levels of psychological symptoms in these spouses, the authors found that spouses experienced greater symptom severity when they perceived high levels of symptoms in soldiers but the soldiers endorsed low levels of symptoms. Furthermore, spouses' marital satisfaction was negatively linked to soldiers' self-reported symptom severity only when spouses perceived that soldiers had experienced low levels of combat activity while deployed. When spouses perceived high levels of such activity, soldiers' self-reported symptoms had no relationship with spouses' marital satisfaction. These findings highlight the importance of interpersonal perceptions in intimate relationships and are consistent with the notion that uncontrollable attributions for a relative's mental health problems may provide a buffer against relationship distress.

Keywords: marital relationship, military personnel, posttraumatic stress disorders, depression, war

Numerous studies have demonstrated that spouses of veterans with posttraumatic stress disorder (PTSD) are at increased risk for experiencing psychological and marital distress (e.g., Dekel, Solomon, & Bleich, 2005; Evans, McHugh, Hopwood, & Watt, 2003; Gallagher, Riggs, Byrne, & Weathers, 1998; Hendrix, Erdmann, & Briggs, 1998; Jordan et al., 1992; Lev-Wiesel & Amir, 2001; Riggs, Byrne, Weathers, & Litz, 1998; Solomon, Waysman, Avitzur, & Enoch, 1991; Westerink & Giarratano, 1999). Unfortunately, relatively little is understood about the mechanisms that lead to such elevated distress in these spouses. Most studies are limited to mean comparisons of scores on one measure of psychological distress or relationship satisfaction in spouses of veterans with and without PTSD or to simple bivariate relationships between PTSD symptom severity in veterans and psychological or marital distress in spouses. A few studies have gone beyond this and examined specific types of PTSD symptoms in veterans, finding that

levels of avoidance, emotional numbing, and anger in veterans with PTSD are particularly tied to higher psychological and marital distress in their spouses (Evans et al., 2003; Hendrix et al., 1998; Riggs et al., 1998; Solomon et al., 1991). A recent study also found that dissociative symptoms in combat veterans were connected to greater marital distress in spouses (Nelson Goff, Crow, Reisbig, & Hamilton, 2007), but this result has not yet been replicated. Finally, a handful of researchers have also found that spouses' perceptions of the burden related to living with someone with PTSD at least partially mediated the effects of veterans' PTSD on spouses' marital and psychological distress (Beckham, Lytel, & Feldman, 1996; Calhoun, Beckham, & Bosworth, 2002; Dekel et al., 2005).

Almost all of these investigations have utilized only a singular measure of spouses' relationship satisfaction or general psychological distress. Although such investigations help highlight the vulnerability of spouses of war veterans, this area of research needs to progress toward a more comprehensive understanding of spouses' reactions. What contributes to the psychological distress they experience, and how does this distress interact with other factors to influence the marital relationship?

To date, the most comprehensive attempt to answer such questions has been proposed by Nelson Goff and Smith (2005). Their model, known as the couple adaptation to traumatic stress (CATS) model, integrates the findings that partners of those with PTSD have higher levels of psychological and interpersonal distress with the notion that each

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partner's distress can have reciprocal influences on the other and can also interact with overall relationship functioning. The authors also discussed several possible mechanisms by which partners of those with PTSD might develop similar psychological symptoms themselves, including (a) the partner's attachment needs going unmet, (b) an individual's PTSD symptoms acting as a chronic stressor for the partner, (c) the partner's identification with the trauma survivor leading to "internalization" of that person's trauma symptoms, (d) the partner's "projective identification" with the individual with PTSD, and (e) heightened physiological reactivity in the partner due to increased negative interactions (Nelson Goff & Smith, 2005, p. 153). Despite this extensive list of possibilities, the authors also acknowledged that none of them have empirical support to date.

One possible mechanism that was not discussed is a partner's cognitions regarding the individual with PTSD. Cognitions have been empirically linked to psychological distress in numerous studies of individual psychopathology (see review by Garratt, Ingram, Rand, & Sawalani, 2007), and empirical studies documenting the importance of cognitions in partners and relatives of individuals with psychological disorders have grown in recent years (e.g., Renshaw, Chambless, & Steketee, 2006). The influence of partners' cognitions on their responses to servicemembers' combat deployments, however, has yet to be examined.

One set of cognitions that may be particularly influential is partners' perceptions of servicemembers' combat experiences and postdeployment symptoms. It is likely that spouses' perceptions of combat veterans' symptoms are highly related to their own psychological and marital distress, perhaps even more so than veterans' self-reports or objective measures of such symptoms. Furthermore, the match of spouses' perceptions and veterans' self-reports may be even more important than either of these measures alone. For example, spouses who perceive greater symptoms than veterans are willing to endorse may be particularly vulnerable to distress. Finally, spouses' perceptions of veterans' actual combat exposure might also have an impact on spouses' levels of distress, either by heightening their overall distress via vicarious traumatization or by minimizing the effect of veterans' symptoms by providing a viable explanation for those symptoms. These heretofore unexamined questions were investigated in this cross-sectional study, which focused on spouses of National Guard (NG) soldiers who had recently returned from combat deployments in Iraq.

Method

Participants

The sample consisted of 49 male soldiers from a Utah NG unit that was deployed and operating in Iraq for 12 months from 2005 to 2006 and their wives. Wives and soldiers completed questionnaires approximately 3 months after soldiers returned. Wives' ages ranged from 20 to 56 years ($M = 32.53$, $SD = 8.96$), all but 2 (3.8%) had completed high school (72.2% had at least some college education),

and 98% were non-Hispanic White. Soldiers' ages ranged from 21 to 56 years ($M = 33.54$, $SD = 9.10$), all had completed high school (78.9% had at least some college education), and 95% were non-Hispanic White. These characteristics are fairly representative of the Utah NG (which is 94% male and 95% non-Hispanic White), with the exception of all soldiers being married in our sample (approximately 60% of Utah NG soldiers and 55% of the soldiers in this particular unit were married in 2005), but only somewhat representative of the U.S. NG as a whole, which is 91.6% male and 74.5% non-Hispanic White, with only 46.5% of all soldiers married (Department of the Army, 2006). In this sample, soldiers' average length of service in the NG was 12.50 years ($SD = 8.22$), and the average length of marriage in this sample was just over 9 years ($M = 108.97$ months, $SD = 89.21$).

Measures

PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). This 17-item, Likert-type scale assesses symptoms of PTSD based on the criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994). There are two versions, one specific to the military (PCL-M; completed by soldiers) and one specific to civilians (PCL-C; completed by wives). Wives were directed to respond to event-specific questions on this measure in regard to having heard or thought about their spouses' stressful military experiences. The scale is widely used and has high internal consistency, test-retest reliability, and convergent and discriminant validity (Pratt, Brief, & Keane, 2006). Internal consistency was high for both soldiers (Cronbach's $\alpha = .95$) and wives (Cronbach's $\alpha = .89$) in this sample. Each item reflects a specific *DSM-IV* criterion and is answered on a scale from 1 (*not at all*) to 5 (*extremely*). Item scores of 3 or more are considered to represent endorsement of that item as a symptom, which allows for estimation of diagnosis of PTSD on the basis of symptoms endorsed within each PTSD cluster (i.e., intrusion, avoidance, and hyperarousal). Total score also provides a measure of symptom severity; a score of 44 is recommended as a cutoff for indication of PTSD in civilian populations (Weathers et al., 1993).

Center for Epidemiologic Studies—Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item, self-report measure of the frequency of depressive symptoms that was completed by both soldiers and wives. Its reliability and validity as a screening measure of depression have been supported in a variety of populations, including military peacekeepers (Boisvert, McCreary, Wright, & Asmundson, 2003), and it was deemed "perhaps the best instrument for mass screening" of depression in a report on evidence-based assessment in adults (Joiner, Walker, Pettit, Perez, & Cukrowicz, 2005, p. 274). In our sample, soldiers' (Cronbach's $\alpha = .90$) and wives' (Cronbach's $\alpha = .89$) responses on this measure were also highly internally consistent. Total scores range from 0 to 60, with higher scores indicating higher levels of symptomatology. Development studies with nearly 5,000 participants from community samples yielded a mean

score of 8.65, with a mean score of 24.42 for 70 psychiatric patients (Radloff, 1977). In a sample of 102 male military peacekeepers, Boisvert et al. (2003) obtained a mean score of 12.0. A score of 16 has been recommended as a cutoff indicating the possible presence of depression (Radloff, 1977).

Relationship Assessment Scale (RAS; Hendrick, 1988). This 7-item, Likert-style self-report scale assesses satisfaction in close relationships; it was completed by both soldiers and wives. Scores range from 1 to 5, with higher scores indicating greater satisfaction. This measure has high internal consistency (in the current sample, Cronbach's $\alpha = .85$ for soldiers and $.86$ for wives), and total scores correlate highly with overall satisfaction as assessed by other measures of marital satisfaction like the Dyadic Adjustment Scale ($r = .80$ in Hendrick, 1988; $r = .84$ in Vaughn & Matyastik Baier, 1999). On the basis of the results from a variety of samples, Hendrick, Dicke, and Hendrick (1998) suggested that scores of 4.0 and higher indicate nondistressed partners, whereas scores between 3.0 and 3.5 or lower indicate relationship distress.

Combat Exposure Scale (CES; Keane et al., 1989). This 7-item, Likert-type scale, which measures the extent and severity of exposure to potentially traumatic combat experiences, was completed by soldiers. Keane et al. (1989) found the scale to have good internal consistency, test-retest reliability, and discriminant validity. The overall score is calculated by weighting items according to the seriousness of the type of event. Scores range from 1 to 41, with scores of 1 to 8 reflecting *light exposure*, 9 to 16 reflecting *light to moderate exposure*, 17 to 24 reflecting *moderate exposure*, 25 to 32 reflecting *moderate to heavy exposure*, and 33 to 41 reflecting *heavy exposure*. In this sample, internal consistency for soldiers' responses on this measure was adequate (Cronbach's $\alpha = .70$).

Spouse perception (SP) questionnaires. For the purposes of this study, the PCL-M, CES-D, and CES were modified to ask spouses to respond with their perceptions of soldiers' symptoms and experiences. For instance, instructions on the CES indicated that respondents should provide an answer to each question that "best describes your understanding of your spouse's experience," and the PCL-M instructed respondents to "indicate how much you think your spouse has been bothered" by the various items. This approach has been used in prior studies with various PTSD-

related scales, with indications of good internal consistency and convergent validity (Gallagher et al., 1998; Niles, Herman, Segura-Schultz, Joaquim, & Litz, 1993; Taft, King, King, Leskin, & Riggs, 1999).

In this sample, these adapted questionnaires demonstrated adequate internal consistency, with Cronbach's alphas of $.78$ on the CES, $.91$ on the PCL-M, and $.91$ on the CES-D. In addition, total scores of the SP measures were similar to the total scores on respective measures of soldiers' self-report (SSR; see Table 1), with significant correlations between SP and SSR on each measure: for the CES, $r = .70, p < .001$; for the PCL-M, $r = .50, p < .01$; and for the CES-D, $r = .52, p < .001$. Finally, the intercorrelations among and cross-correlations between SSR and SP on the CES, PCL-M, and CES-D were all similar to each other (see Table 2), with intercorrelations of reports from the same individual generally equal to or greater than cross-correlations of reports from different individuals, as is typical. The only exception to this pattern was the correlation of SP of soldiers' combat exposure and SP of soldiers' depressive symptoms, which was slightly lower than other correlations. Overall, these results offer preliminary evidence for the reliability and validity of the SP measures, albeit in a limited sample.

Procedure

All procedures were approved by the University of Utah institutional review board (IRB), and written consent was obtained from all participants (with the exception of online participants, who documented their consent electronically after reviewing the consent form online). The Utah NG state chaplain and a Utah NG judge advocate general also reviewed the protocol and accepted the University of Utah IRB approval without request for review by military IRB. The Utah NG allowed the research to proceed without further military oversight to preserve servicemembers' sense of confidentiality. David H. Jones was a chaplain candidate at the time of this work and served as the primary liaison between the other researchers and NG personnel. Keith D. Renshaw and Camila S. Rodrigues had no formal connection with the Utah NG.

After demobilization (returning home from deployment), all soldiers in this particular Utah NG unit (approximately 500 total) were offered multiple postdeployment workshops

Table 1
Means and Standard Deviations of Measures Using Soldiers' Self-Reports, Spouses' Perceptions of Soldiers, and Spouses' Self-Reports

Measure	Spouses' self-report		Spouses' perceptions of soldiers		Soldiers' self-report	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CES			15.14	9.32	15.70	8.53
PCL	27.98	9.24	30.69	10.98	31.86	13.19
CES-D	15.32	9.89	13.37	10.68	12.92	9.63

Note. CES = Combat Exposure Scale; PCL = Posttraumatic Stress Disorder Checklist (military version for soldiers' self-reports and spouses' perceptions of soldiers; civilian version for spouses' self-reports); CES-D = Center for Epidemiologic Studies—Depression Scale.

Table 2

Correlations of Measures of Soldiers' Combat Exposure, Posttraumatic Stress Disorder (PTSD) Symptoms, and Depressive Symptoms Among and Between Soldiers' Self-Report (SSR) and Spouses' Perceptions (SP)

Symptom	SSR of combat exposure	SSR of depressive symptoms	SP of combat exposure	SP of depressive symptoms
SSR of depressive symptoms	.49***	—	.42**	—
SSR of PTSD symptoms	.46***	.86***	.38*	.57***
SP of depressive symptoms	.45**	—	.31*	—
SP of PTSD symptoms	.38*	.42**	.40**	.76***

Note. Correlations within soldiers' self-report measures are in the top left quadrant of this table, and correlations within measures of spouses' perceptions of soldiers' symptoms and experiences are in the bottom right quadrant. Cross-correlations of soldiers' self-report measures with spouse perception measures are shown in the top right and bottom left quadrants, respectively.

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

focused on helping with soldiers' reintegration into civilian and family life. Those who were married (approximately 300) were offered workshops that included their spouses. Recruitment for this study occurred during a 1-month span approximately 3 months after demobilization, when 77 couples (representing approximately 26% of the married soldiers in this unit) attended such workshops. All of these attendees were offered the chance to participate in this study either via the Internet or hard copies. Eight soldiers and 7 spouses participated online, and an additional 44 soldiers and 42 spouses completed hard copies of questionnaires (no differences between the online and hard copy respondents were noted on demographic or outcome variables, all $ps > .05$). Data were obtained from both partners in a total of 49 couples. Soldiers and spouses were asked to complete all questionnaires separately, and couples were paid \$10 for their participation.

Analytic Plan

Basic results regarding spouses' psychological and marital functioning were examined via inspection of means and comparison with norm samples. To explore correlates of spouses' psychological functioning, we examined bivariate correlations of spouses' scores on the PCL-C and CES-D with (a) SSR of their own combat exposure (CES) and psychological symptoms (PCL-M and CES-D), and (b) SP of soldiers' combat exposure and psychological symptoms (SP measures). We then compared the magnitudes of these correlations using the formula recommended by Steiger (1980).

To investigate the potential impact of interactions of SSR and SP of soldiers' experiences and symptoms, three sets of regressions were conducted, one with spouses' total PCL-C scores as the dependent variable, a second with spouses' total CES-D scores as the dependent variable, and a third with spouses' total RAS scores as the dependent variable. Each set of regressions consisted of three separate regressions, one with independent variables relevant to combat exposure, a second with independent variables relevant to soldiers' PTSD symptoms, and a third with independent variables relevant to soldiers' depressive symptoms (these were all examined separately due to high correlations and consequent problems with multicollinearity). Thus, in each

regression, the set of independent variables consisted of SSR of the relevant variable (soldiers' combat exposure, PTSD symptoms, or depressive symptoms), SP of the relevant variable, and their interaction. This approach resulted in nine total regressions, which increased the chance of Type I error; however, this risk was balanced against the fact that the limited sample size yielded a power of only 57% to detect medium effect sizes for overall significance of regressions at an alpha of .05 (and consequently, even lower power to detect significant interaction terms within those regressions). This type of exploratory approach was taken due to the extreme dearth of research of this type, and given the limitations, the results are intended to provide preliminary groundwork for future research.

For all regressions, variables were centered before creating interaction terms, and randomness of residuals, multicollinearity, and possible outliers (via inspection of standardized DFBETAs) were examined. Also, prior to running regressions, the following variables were examined for potential confounding effects: age (soldier and spouse), education (soldier and spouse), household income, length of time lived together, length of marriage, hours spent together per week, total number of children, number of children living in household, and total duration of soldiers' enlistment. All variables that demonstrated significant correlations with a variable of interest were included in a regression of that variable of interest; subsequently, all variables that were significant in that regression were retained in further analyses (alpha was set to .10 in both cases to increase the chances of detecting any possible confounding variables). None of the variables listed above met these criteria for inclusion in subsequent analyses. Finally, because depression and marital satisfaction are highly correlated (see review by Whisman, 2001), spouses' depression was included as an independent variable in all regressions of spouses' marital satisfaction.

Results

Basic Levels of Spouses' Psychological and Marital Functioning

Results regarding soldiers' symptoms are discussed in another report (Renshaw, Rodrigues, & Jones, 2008), and

means are reported here solely for comparison with spouses' perceptions, as discussed above. Wives' mean scores on measures of depression and PTSD symptom severity are shown in Table 1. Their mean score on the CES-D was nearly twice that of the norm sample reported by Radloff (1977) but less than the mean of the psychiatric patients in the development sample. Slightly less than half (44.9%) of wives met or exceeded the cutoff score of 16 used to indicate the possible presence of clinical depression, which is substantially greater than the 17% of the norm development sample (Radloff, 1977) who exceeded that cutoff score (but less than the 70% of psychiatric patients who did). On the PCL-C, 6 wives (12.5%) met the proposed cutoff score of 44 for civilian samples, with 5 (10.4%) endorsing enough criteria at the moderate level of severity to warrant a diagnosis of PTSD on the basis of their responses (all 5 also exceeded the proposed cutoff score). These percentages are similar to those reported in Lev-Wiesel and Amir's (2001) analysis of spouses of Holocaust survivors (10% of spouses met criteria for full PTSD). Finally, wives reported high levels of marital satisfaction on average ($M = 4.12$, $SD = 0.62$), but 16.7% of the sample had scores of 3.5 or lower, indicating possible marital distress. Studies of marital satisfaction in community samples have found anywhere from 6.2% to 26% of marriages are in the distressed range (Busby, Christensen, Crane, & Larson, 1995; Crane, Middleton, & Bean, 2000); thus, this sample did not appear to be unusually maritally distressed.

Prediction of Spouses' Psychological Symptoms

Not surprisingly, wives' self-reported PTSD and depressive symptoms were highly correlated ($r = .61$, $p < .001$). The correlations of these symptoms with SSR of combat exposure, PTSD symptoms, and depressive symptoms and SP of these same variables are shown in Table 3. As can be seen, none of the SSR variables correlated significantly with wives' own PTSD or depressive symptoms, and all associated effect sizes (ES) were negligible. In contrast, all relationships between SP of soldiers' symptoms and wives' own psychological symptoms were significant, with the exception of that between SP of soldiers' PTSD symptoms and wives' own depressive symptoms. (This lack of relationship may have been a result of low power due to small sample size, as the magnitude of the correlation is equivalent

to a small ES.) Further analysis of these correlations revealed that the correlation of spouses' depressive symptoms with SP of soldiers' depressive symptoms was significantly stronger than that with SSR of depressive symptoms, $t(43) = 2.15$, $p < .05$. Similarly, the correlation of spouses' PTSD symptoms with SP of soldiers' PTSD symptoms was significantly stronger than that with SSR of PTSD symptoms, $t(44) = 4.55$, $p < .001$. The correlations of SP of combat exposure with spouses' own symptoms were non-significant, although the ES for the relationship with spouses' own PTSD symptoms was small to medium.

The regression of wives' PTSD symptoms on SSR of PTSD symptoms, SP of soldiers' PTSD symptoms, and the interaction of these two variables was significant, $F(3, 43) = 12.31$, $p < .001$. SSR of PTSD symptoms (part $r = -.13$, $p = .25$), SP of soldiers' PTSD symptoms (part $r = .63$, $p < .001$), and their interaction (part $r = -.27$, $p < .05$) accounted for over 40% of the variance in spouses' own symptoms of PTSD ($R^2 = .46$; adjusted $R^2 = .42$). Residuals were randomly and normally distributed with no problems with multicollinearity, but inspection of standardized DFBETAs revealed one potential outlier. When this outlier was removed, the pattern of results was even stronger, with over 50% of the variance accounted for ($R^2 = .57$; adjusted $R^2 = .54$) and with SP of soldiers' PTSD symptoms (part $r = .72$, $p < .001$), SSR of PTSD symptoms (part $r = -.30$, $p < .01$), and the interaction term (part $r = -.21$, $p < .05$) all significant. The significant interaction term was probed as recommended by Aiken and West (1991) with all cases included. Results indicated that when wives perceived high levels of PTSD in soldiers, SSR of their own PTSD symptoms were significantly negatively related to wives' own symptoms of PTSD (part $r = -.34$, $p < .01$). In contrast, when wives perceived low levels of PTSD in soldiers, SSR of their own PTSD symptoms were unrelated to wives' own symptoms of PTSD (part $r = .04$, $p = .73$). (Again, the removal of the potential outlier produced the same pattern of results, only stronger.)

The regressions of wives' PTSD symptoms onto combat exposure variables, $F(3, 34) = 1.13$, $p = .35$, and depressive symptom variables, $F(3, 42) = 1.84$, $p = .15$, were nonsignificant. Similarly, all regressions of wives' depressive symptoms were nonsignificant (all $ps > .25$).

Table 3

Correlations of Spouses' Self-Reported Psychological Symptoms and Marital Satisfaction With Soldiers' Self-Report (SSR) and Spouses' Perceptions (SP) of Soldiers' Combat Exposure and Psychological Symptoms

Symptom	Spouses' posttraumatic stress disorder (PTSD) symptoms	Spouses' depressive symptoms	Spouses' marital satisfaction
SSR of combat exposure	-.02	-.05	-.06
SSR of PTSD symptoms	.04	.04	-.28
SSR of depressive symptoms	.06	.09	-.36*
SP of soldiers' combat exposure	.21	.01	.20
SP of soldiers' PTSD symptoms	.57***	.24	-.33*
SP of soldiers' depressive symptoms	.33*	.38**	-.56***

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

Table 4
Part Correlations From Regressions Predicting Spouses' Marital Satisfaction

	Regression with SSR of PTSD symptoms	Regression with SSR of depressive symptoms
Spouses' depression	-.53***	-.50***
SP of combat exposure	.38**	.38**
SSR of psychological symptoms	-.35**	-.40**
SP of Combat Exposure \times SSR of Symptoms	.34**	.30*

Note. SSR = soldiers' self-reports; PTSD = posttraumatic stress disorder; SP = spouses' perception.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Prediction of Spouses' Marital Satisfaction

As would be expected, wives' self-reported marital satisfaction was highly correlated with SSR of marital satisfaction ($r = .51, p < .001$). The correlations of wives' satisfaction with SSR and SP of soldiers' combat exposure and psychological symptoms are shown in Table 3. Non-significant, negligible correlations were detected with SSR of combat exposure; small but nonsignificant correlations were detected with SSR of PTSD symptoms and SP of combat exposure; and statistically significant, medium to large correlations were detected with SSR of depressive symptoms and SP of soldiers' PTSD and depressive symptoms. There were significant differences between correlations of spouses' RAS scores with SP and with SSR of combat exposure, $t(35) = 2.14, p < .05$, but not between correlations of spouses' RAS scores with SP and SSR of PTSD symptoms, $t(43) = 0.36, p > .50$, or with SP and SSR of depressive symptoms, $t(43) = 1.62, p > .10$. Also, wives' RAS scores were significantly and negatively correlated with their self-report of depressive symptoms ($r = -.47, p = .001$) but not significantly correlated with their self-reported PTSD symptoms ($r = -.11, p = .47$).

With spouses' depression included as an independent variable, all regressions of spouses' marital satisfaction were significant, but the only regression with significant independent variables other than spouses' depression was that involving soldiers' combat exposure. In this regression, $F(4, 32) = 8.56, p < .001$, SSR of combat exposure (part $r = -.35, p < .01$), SP of combat exposure (part $r = .52, p < .001$), and the interaction of SSR and SP (part $r = .26, p < .05$) were all significant (spouses' depression was also significant, part $r = -.44, p = .001$). A probe of the interaction term indicated that when spouses perceived high levels of combat exposure, SSR of combat exposure was not significantly related to spouses' marital satisfaction (part $r = -.07, p = .59$). In contrast, when spouses perceived low levels of combat exposure, SSR of combat exposure was highly negatively related to their marital satisfaction (part $r = -.44, p = .001$).

This latter finding regarding combat exposure was surprising, given that most previous research has revealed no direct links between combat exposure and marital satisfaction in spouses. Thus, we conducted post hoc explorations of the potential interaction of SP of combat exposure with soldiers' psychological symptoms in predicting spouses' marital satisfaction. These post hoc analyses yielded two

significant regressions with significant interactions, one involving SP of combat exposure and SSR of PTSD symptoms, $F(4, 35) = 9.65, p < .001$, and the other involving SP of combat exposure and SSR of depressive symptoms, $F(4, 34) = 10.33, p < .001$. Results of these regressions are shown in Table 4. In both cases, SP of combat exposure was significantly positively related to marital satisfaction. Probing of the interaction yielded the same pattern: When spouses perceived low levels of combat exposure, SSR of symptoms was significantly negatively related to spouses' marital satisfaction (part $r = -.46, p < .001$ for PTSD symptoms; part $r = -.48, p < .001$ for depressive symptoms), but when spouses perceived high levels of exposure, SSR of symptoms was unrelated to satisfaction (part $r = .05, p = .70$ for PTSD symptoms; part $r = -.03, p = .81$ for depressive symptoms).¹

Discussion

In line with prior research (e.g., Dekel et al., 2005; Evans et al., 2003; Solomon et al., 1991), substantial minorities of the spouses of soldiers recently returned from combat evidenced elevated levels of depressive symptoms (44%) and, as detected in prior studies (Bramsen, van der Ploeg, & Twisk, 2002; Dirkzwager, Bramsen, Adèr, & van der Ploeg, 2005; Lev-Wiesel & Amir, 2001), elevated levels of PTSD symptoms (10%) as well. Although over 16% of the sample endorsed possible marital distress, such percentages are in line with prior findings in community samples (Busby et al., 1995; Crane et al., 2000) and do not indicate unusual levels of marital distress, despite the elevations in psychological distress reported by this sample.

This study also revealed that, consistent with prior research (Gallagher et al., 1998; Niles et al., 1993; Taft et al., 1999), spouses' perceptions (SP) of soldiers' combat exposure, PTSD symptoms, and depressive symptoms were able to be reliably assessed, and they were related to combat exposure and psychological symptoms as reported by the soldiers themselves. Furthermore, SP of soldiers' symptoms were more strongly related to spouses' own psychological and marital functioning than were soldiers' self-report (SSR) of symptoms, despite the high correlations between SP and SSR of such symptoms. Although such findings

¹ Full results of all regressions are available from Keith D. Renshaw upon request.

make intuitive sense, to our knowledge, this is the first report to empirically document such a pattern.

Moreover, the degree of severity of PTSD symptoms (mostly subclinical) in spouses was best explained in the context of spouses' perceptions of soldiers' symptoms. First, spouses' own levels of such symptoms were positively related to their perceptions of the severity of soldiers' symptoms of PTSD. Second, when controlling for such perceptions, if spouses perceived low levels of such symptoms in soldiers, SSR of their own symptom severity had no relationship with the degree of spouses' symptoms. In contrast, as spouses perceived greater severity of PTSD symptoms in soldiers, SSR of such symptom severity actually became increasingly negatively related with spouses' own PTSD symptom severity, a relationship that is in stark contrast to the positive, bivariate relationships reported in all prior research. This pattern highlights the importance of spouses' cognitions; furthermore, it argues against a straightforward notion of transmission of trauma symptoms. Instead, spouses in this sample experienced the greatest distress when they perceived substantial problems in soldiers but soldiers failed to endorse such problems. Thus, if soldiers agree with spouses that they are experiencing severe problems, spouses appear to be buffered to some degree against psychological distress themselves, as opposed to simply internalizing the symptoms of the soldier. Given the cross-sectional nature of this study, one cannot rule out the possibility that spouses who are highly distressed simply overestimate the degree to which soldiers are experiencing problems, but these preliminary findings emphasize the need for further research of this type in a greater variety of samples.

Similarly, spouses' perceptions proved to be influential in understanding wives' marital satisfaction as well. Extensive research has established that greater symptom severity in combat veterans is related to lower marital satisfaction in spouses (e.g., Jordan et al., 1992), and some bivariate relationships supporting this idea were detected in the present sample. However, further analyses revealed that the strength of the relationships between SSR of symptoms and spouses' marital satisfaction was dependent on SP of combat exposure. Specifically, such relationships were nonexistent when spouses perceived high levels of combat exposure in their soldier husbands but very strongly negative when spouses perceived low levels of such exposure. Notably, this pattern was detected while controlling for the effect of spouses' own self-reported depressive symptoms, which already accounted for a large proportion of the variance in spouses' marital satisfaction. This pattern may reflect a tendency for the negative impact of soldiers' symptoms on spouses' marital satisfaction to be lessened when spouses can attribute such symptoms to an understandable cause, like excessive combat exposure. Such an interpretation is consistent with emerging literature on controllability attributions, which demonstrates that relatives who view patients' mental health symptoms as controllable exhibit greater hostility and criticism toward those patients than do relatives who view such symptoms as uncontrollable (Barrowclough & Hooley, 2003; Renshaw et al., 2006). In this context, for

spouses whose husbands exhibited significant psychological symptoms, a belief that their partner experienced severe combat-related events may buffer them against marital distress.

These results are clearly preliminary, as they are based on post hoc analyses of a limited sample; however, they emphasize the emerging importance of accounting for the cognitions of relatives of trauma survivors. These cognitions may help explain some of the distress experienced by partners of combat veterans. In the context of Nelson Goff and Smith's (2005) couples adaptation to traumatic stress (CATS) model, spouse perceptions may function both as a mechanism of transmission of symptoms (as demonstrated by the consistently positive relationship between spouse perceptions of soldiers' symptoms and spouses' own distress) and as moderators of the relationships between soldiers' trauma-related symptoms and spouses' own psychological symptoms. More broadly, people's perceptions of their partners may be relevant to understanding the effects of many types of psychological symptoms on partners. Hopefully, these and other emerging results will spur further research on interpersonal perceptions within intimate relationships that takes into account the potential complexity of interactions that can occur in such contexts.

There are several limitations to this study that must be considered. Most immediately, the sample size was modest, yielding low power to detect interactions in this sample. The likeliest effect of this limitation would be the failure to detect interactions that are indeed significant. Although the detection of multiple significant interactions in this context of limited power can be seen as supporting the importance of such interactions in this area of research, the values that were obtained in these analyses have large bands of error (see Kelley & Maxwell, 2003, for a full discussion of this issue), which limits the strength of conclusions that can be drawn. Also, several regressions were run to test the proposed hypotheses, which increased the chances of Type I error. That the pattern of findings was generally similar across the various regressions lends some credence to the overall interpretations; however, these results are clearly preliminary and need to be replicated in future studies. With these limitations in mind, it is our hope not that the results presented here will be taken as firm evidence of the interactions detected but rather that they will spur researchers in this area to test similar hypotheses regarding the interpersonal perceptions of spouses of combat veterans, as well as spouses of individuals with other mental health difficulties.

Other limitations concern the sample composition. First, the sample consisted of spouses of soldiers from the NG, whereas many prior studies have focused on spouses of active component (e.g., Army, Marines) veterans. This difference limits the direct comparability of the current results with those of prior studies; thus, further research in active component samples is needed to address these issues in such samples. Similarly, like much of the research on combat veterans and spouses, this sample consisted solely of male veterans and their wives. Further research is sorely needed in samples of female veterans. In addition, soldiers in our sample had returned fairly recently from combat deploy-

ments, whereas many prior studies of partners of combat veterans took place years to decades after deployments ended. The effects of such a difference in timing are unknown. For example, it may be that as years pass, spouses' perceptions and soldiers' own self-reports become more consistent with each other, particularly in those couples who do not divorce. Longitudinal research on veterans of current military conflicts can help address this issue. Additionally, veterans who participate in studies of combat-related PTSD are often recruited through Veterans Affairs Medical Centers, creating a possible bias toward overrepresentation of veterans who are willing to seek help and endorse psychological and functional difficulties. Most veterans in prior research are also no longer in active service, whereas all of the soldiers in the current sample remained active in the NG. These differences may mean that soldiers in the current sample were more likely to minimize their difficulties, which would, in turn, increase the chances of detecting discrepancies between soldiers' self-reports and spouses' perceptions of soldiers' functioning. Finally, this sample was more educated and less diverse than samples in many other reports of combat veterans and their spouses, and there was also no assessment of prior exposure to psychological trauma in spouses, which may have accounted for some of their psychological symptoms.

These limitations notwithstanding, results from the current study strongly emphasize the need for greater understanding of the reactions of spouses of those who have served in combat. It appears that the cognitions of these individuals regarding their spouses have a strong relationship with their overall psychological and marital functioning. Perceptions of partners' functioning are likely to play a role in psychological and marital functioning of many groups beyond combat veterans and spouses. Thus, further research of this type, both in military couples and in other at-risk couples (e.g., where one partner is depressed, dealing with other types of trauma or stressors, etc.), could help further our understanding of how spouses react to their partners' mental health difficulties.

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