

# Posttraumatic Stress and Depression Symptoms in Soldiers Returning from Combat Operations in Iraq and Afghanistan

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*The purpose of the present research was to identify rates of posttraumatic stress and depressive symptoms in soldiers returning from war. During reintegration training, U.S. Army soldiers, who recently returned from a 12-month deployment to either Iraq (Operation Iraqi Freedom,  $n = 2,275$ ) or Afghanistan (Operation Enduring Freedom,  $n = 1,814$ ), completed study materials. Surveys assessed self-reported levels of depression, posttraumatic stress, and life satisfaction. Results indicated that approximately 44% of soldiers who volunteered to participate self-reported clinically significant levels of depressive symptoms, posttraumatic stress symptoms, or both. Although assessing symptoms and not disorders, these results suggest a potentially high rate of mental health concerns in soldiers immediately after returning from a combat zone. Further research should examine the utility of broad scale interventions.*

Recent military deployments have renewed research interest on the psychological well being of soldiers. Given ongoing, large-scale deployment of U.S. Army forces to Iraq and Afghanistan, the present research aims to identify posttraumatic stress and depressive symptoms in returning soldiers with sufficient sensitivity to help develop intervention programs for troops serving in these and similar situations.

Research reveals variability in posttraumatic stress disorder (PTSD) diagnosis after combat. Approximately 30% of Vietnam veterans manifested psychological symptoms related to combat over their lifetime (Schlenger et al., 1992). Recently, PTSD rates range from 8% for those deployed to Somalia (Litz, Orsillo, Friedman, Ehlich, & Batres, 1997) to 8–16% for soldiers deployed during the Gulf

War (Wolfe, Erickson, Sharkansky, King, & King, 1999). Hoge, Castro, Messer, McGurk, Cotting, and Koffman (2004) found rates of PTSD in U.S. soldiers of 11% after duty in Afghanistan supporting Operation Enduring Freedom (OEF) and 15–17% after duty in Iraq supporting Operation Iraqi Freedom (OIF).

Some variability across samples may be due to the manner in which PTSD is operationalized and subsequently measured. Traditionally, PTSD is linked to exposure to one traumatic stressor (American Psychiatric Association [APA], 2000, p. 463). However, recent research suggests that limiting PTSD symptoms to only one traumatic event may be overly restrictive and unnecessary (Carlson, 2001). Consistent with this reasoning, we assumed that soldiers

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exposed to combat for extended periods were likely to experience multiple traumatic events (Hoge et al., 2004). Therefore, we used a posttraumatic stress symptom screener appropriate for those who had experienced multiple traumas, a single trauma, or no trauma (Carlson, 2001).

Additionally, variability in the prevalence rates of symptoms may be due to factors unique to each conflict, such as length of deployment. Castro, Adler, and Huffman (1999) reported that as the length of deployment of peacekeepers serving in Bosnia increased from 1 or 2 months to 9 months or more, rates of PTSD rose from 3% to 6%, and rates of depression increased from 7% to 12%. These findings support the assertion that the likelihood of developing PTSD is greater with longer duration of exposure to the stressor (APA, 2000, p. 466). Given that U.S. soldiers are currently deployed for 15-month rotations, exposure to potentially traumatic events is lengthy, and traumatic stress symptoms may be particularly likely.

Early intervention may inhibit progression of symptoms, reducing the likelihood of a subsequent diagnosis of PTSD; however, research evidence is scarce, and results are mixed (Bisson, 2003; Foa, Keane, & Friedman, 2000; McNally, Bryant, & Ehlers, 2003). Nonetheless, PTSD is difficult to treat once chronic (Foa et al., 2000). Thus, identification of those needing assistance and early intervention may be fruitful. One intervention attempt was a reintegration training program targeting soldiers upon their return from combat. Training spanned several days, covering topics such as preventing suicide, recognizing posttraumatic stress symptoms, learning relaxation techniques, and communicating with families. Prior to training, the present research assessed the number of soldiers who self-reported symptoms of posttraumatic stress and depression. This assessment was intended to identify personal and social variables associated with increased mental health concerns. Consistent with existing research, we expected enlisted soldiers to be more likely to report symptoms than officers (Wolfe et al., 1999), women to report higher rates of symptoms than men (Stein, Walker, & Forde, 2000; Wolfe et al., 1999), and few soldiers to report seeking mental health assistance despite high levels of symptom reporting (Hoge et al., 2004).

## METHOD

### Participants and Procedure

From February through July 2005, approximately 12,000 active duty, U.S. Army soldiers participated in a 2-week, Army-sponsored, reintegration training program after returning from Iraq or Afghanistan 5 to 8 weeks prior. In a classroom setting, civilian instructors made participation in the present research available to soldiers during this training. Completing research questionnaires required 10 minutes and assessed demographic information, posttraumatic stress, and depressive symptoms, and satisfaction with life (see below). Soldiers were informed both verbally and in writing that participation in this research was strictly voluntary, and they could withdraw at any time without adverse consequences. The Institutional Review Board of Tarleton State University approved all materials and procedures.

Volunteers included 5,796 soldiers serving in combat arms, combat support, and combat service support branches, approximately a 48% response rate. Deployment location was unknown for 1,707 respondents, and their data were excluded solely for this reason. Data from the remaining 4,089 participants are presented.

Ninety-four percent of the participants serving in Iraq ( $n = 2,275$ ) were men. Their average age was 26.4 ( $SD = 5.4$ ), ranging from 18 to 57. On average, OIF veterans spent 6.1 years ( $SD = 4.6$ ) in the military. Ninety-three percent of the participants serving in Afghanistan ( $n = 1,814$ ) were men. Their average age was 26.6 ( $SD = 5.7$ ), ranging from 18 to 51. On average, OEF veterans spent 6.3 years ( $SD = 4.7$ ) in the military. Additional demographics are given in Table 1.

Power analyses verified that enough soldiers participated to provide a fair assessment of the variables. For the multiple regression analyses, with an alpha level of .05 and desired power of .80, sample sizes of 1,068 participants would have been sufficient to detect a small effect size of .02 (Cohen & Cohen, 1983). Given that 19 predictor variables were used, a medium effect size estimate of .15 is more realistic; thus, 160 participants in each sample would have sufficed.

**Table 1.** Frequency Percentage of Sample in Demographic Category by Deployment Location

Demographic variable	OIF		OEF	
	<i>n</i>	%	<i>n</i>	%
<b>Ethnicity</b>				
White	1188	58	923	55
Black	338	16	272	16
Hispanic	326	15	265	16
Pacific Islander	120	6	75	5
Asian	42	2	55	3
Native American	23	1	13	1
Biracial	23	1	26	2
Other	71	3	54	3
<b>Marital status</b>				
Married	1026	49	856	51
Single	872	42	646	39
Separated	89	4	74	4
Divorced	112	5	89	5
Children in the home	935	43	797	45
No children	1257	57	985	55
<b>Rank</b>				
Junior enlisted	1034	47	818	46
NCO	873	39	711	40
Senior NCO	92	4	102	6
Company officer	106	5	69	4
Field officer	119	5	68	4

*Note.* OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom; NCO = noncommissioned officer.

**Measures**

Participants provided their age, gender (0 = female, 1 = male), ethnicity (White was the reference group), marital status (married was the reference group), military rank (junior enlisted was the reference group), time served in the military, and number of children living at home. Participants also indicated whether they sought counseling (0 = *no*, 1 = *yes*) since returning from deployment, including any assistance perceived as counseling to cope with personal problems (e.g., visiting mental health professionals, chaplains).

On the Screen for Posttraumatic Stress Symptoms (SPTSS; Carlson, 2001) participants rated the frequency that a particular event happened to them, such as “I feel cut off and isolated from other people” (avoidance cluster),

“I am very aware of my surroundings and nervous about what’s going on around me” (arousal cluster), and “I have bad dreams about terrible things that happened to me” (re-experiencing cluster). The 17 items were rated on 11-point, Likert-type scales ranging from 0 (*never*) to 10 (*always*). Using cluster scores for classification as symptomatic, participants had to indicate a score of 5 or more on (a) one or more of the five reexperiencing items, (b) three or more of the seven avoidance items, and (c) two or more of the five arousal items (Carlson, 2001). Using overall scale scores for classification, all items were averaged to create a total score for each sample (Cronbach’s  $\alpha = .92$  for OIF;  $.93$  for OEF).

Because the SPTSS does not reference a specific traumatic event, it is appropriate for individuals who experienced multiple traumas, a single trauma, or no trauma, although it leaves the cause of symptoms unspecified. Thus, deployment or other experiences may underlie symptom reports. Carlson (2001) found a strong positive correlation ( $r = .68$ ) between SPTSS scores and PTSD diagnosis based on the Structured Interview for Posttraumatic Stress Disorder (SI-PTSD; Davidson, Smith, & Kudler, 1989). Further, comparing total SPTSS scores and the SI-PTSD diagnosis indicated that a cutoff score of 4 on the SPTSS maximized sensitivity (.94; correctly identifying those with PTSD) while preserving specificity (.60; correctly identifying those without PTSD). Thus, participants scoring at this value or higher were classified as having clinically significant levels of posttraumatic stress symptoms in the present research.

On the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), participants rated how often 20 symptoms occurred during the past week, including “I was bothered by things that usually don’t bother me,” and “I thought my life had been a failure” on 4-point Likert-type scales, ranging from 0 = *rarely or none of the time (less than 1 day)* to 3 = *most or all of the time (5–7 days)*. Four items were reverse scored, and all items were averaged for each group (Cronbach’s  $\alpha = .89$  for OIF;  $.90$  for OEF). Consistent with previous research, participants whose summed scale scores were  $>16$  (.80 expressed as a scale mean) were classified as reporting clinically significant levels of depressive symptoms (Radloff, 1977).

Participants completed the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), rating five items, including “In most ways my life is close to ideal,” and “The conditions of my life are excellent” on 7-point, bipolar scales ranging from 1 (*strongly disagree*) to 4 (*neither agree nor disagree*) to 7 (*strongly agree*). All items were averaged to form a composite score for each group (Cronbach’s  $\alpha = .87$  for OIF;  $.88$  for OEF).

## Data Analysis

Examination of missing data was performed using Missing Value Analysis for SPSS Version 15. Remaining analyses were conducted using SAS Version 8, except power analyses and incremental proportions of variance between hierarchical regression equations, which were computed by hand (Cohen & Cohen, 1983). Independent samples  $t$  tests compared OIF and OEF data and assessed scale cutoff scores. Pearson product-moment correlation coefficients examined relationships between variables. Multivariate regression analyses predicted symptom scores from demographic variables, and logistic regression analyses predicted presence of symptoms.

## RESULTS

Initial inspection revealed that all variables had less than 5% missing data in each sample except ethnicity (6% for OIF, 7% for OEF) and marital status (8% for OIF, 8% for OEF). Missing value analysis on variables with more than 1% missing data indicated that missing data on categorical variables were distributed relatively evenly across levels of each variable, and missing quantitative data did not differ from a pattern “missing completely at random” (MCAR; Little & Rubin, 1987, p. 14), Little’s MCAR test:  $\chi^2(28) = 37.59$ ,  $ns$  for OIF;  $\chi^2(25) = 27.13$ ,  $ns$  for OEF. Imputing values for missing quantitative data using expectation-maximization (EM) techniques, the filled-in data set was analyzed using the same procedures as the original data. As expected given the MCAR results, we found no differences in our conclusions between the two

**Table 2.** SPTSS Means, Standard Deviations, and Percentage of Sample Meeting Scoring Criteria by Deployment Location

SPTSS scoring method	OIF ( $n = 2,266$ )			OEF ( $n = 1,810$ )		
	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	%
Individual cluster scores						
Reexperiencing	2.06	2.28	41	1.83	2.24	36
Avoidance	2.92	2.15	43	2.84	2.26	42
Arousal	3.91	2.46	60	3.58	2.51	54
Cluster classification						
Symptomatic	5.45	1.31	29	5.50	1.31	26
Nonsymptomatic	1.93	1.33	71	1.80	1.39	74
Total score classification						
Symptomatic	5.53	1.14	31	5.49	1.17	30
Nonsymptomatic	1.81	1.17	69	1.62	1.19	70

*Note.* SPTSS = Screen for Posttraumatic Stress Symptoms; OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom.

sets. We report analyses using the original data (i.e., without imputed values), removing cases with missing values on a variable used in a specific analysis.

Independent samples  $t$  tests indicated that soldiers deployed to Iraq did not differ from those deployed to Afghanistan on age,  $t(4002) < 1$ , time in the military,  $t(4003) = 1.07$ ,  $ns$ , and number of children living at home,  $t(3972) = -1.17$ ,  $ns$ . Chi square tests of independence revealed that deployment location was not associated with ethnicity,  $\chi^2(7, N = 3,814) = 11.64$ ,  $ns$ ; gender,  $\chi^2(1, N = 3,949) = 1.34$ ,  $ns$ ; and marital status,  $\chi^2(3, N = 3,764) = 3.01$ ,  $ns$ . The two groups differed on rank; OIF participants included more field grade officers and fewer senior noncommissioned officers (NCOs) than OEF participants,  $\chi^2(4, N = 3,992) = 12.07$ ,  $p = .02$ .

Independent samples  $t$  tests compared means of those classified as symptomatic with those who were not on each scale. On the SPTSS, classifying participants using cluster criteria versus total scale scores resulted in similar outcomes ( $r = .78$ ,  $p < .01$  for OIF;  $r = .77$ ,  $p < .01$  for OEF; see Table 2). Consistent with previous research, total scores were used in subsequent analyses (Carlson, 2001). On the SPTSS, those scoring above the cutoff reported more posttraumatic stress symptoms than those scoring

below it,  $t(2264) = -70.57$ ,  $p < .01$  for OIF;  $t(1808) = -63.29$ ,  $p < .01$  for OEF (see Table 2). Further, those with posttraumatic stress symptoms reported significantly more depressive symptoms ( $M = 1.19$ ,  $SD = 0.50$  for OIF;  $M = 1.26$ ,  $SD = 0.52$  for OEF) than those without posttraumatic stress symptoms ( $M = 0.49$ ,  $SD = 0.35$  for OIF;  $M = 0.51$ ,  $SD = 0.37$  for OEF),  $t(1004) = -33.60$ ,  $p < .01$  for OIF;  $t(758) = -30.52$ ,  $p < .01$  for OEF. Those with posttraumatic stress symptoms also indicated less satisfaction with life ( $M = 4.04$ ,  $SD = 1.36$  for OIF;  $M = 3.85$ ,  $SD = 1.44$  for OEF) than those without posttraumatic stress symptoms ( $M = 5.07$ ,  $SD = 1.22$  for OIF;  $M = 4.95$ ,  $SD = 1.24$  for OEF),  $t(1216) = 17.15$ ,  $p < .01$  for OIF;  $t(864) = 15.29$ ,  $p < .01$  for OEF.

On the CES-D, participants scoring above the cutoff ( $M = 1.25$ ,  $SD = .40$  for OIF;  $M = 1.30$ ,  $SD = .40$  for OEF) indicated more depressive symptoms than those below it ( $M = .38$ ,  $SD = .21$  for OIF;  $M = .38$ ,  $SD = .22$  for OEF),  $t(1135) = -58.50$ ,  $p < .01$  for OIF;  $t(951) = -54.67$ ,  $p < .01$  for OEF. Participants reporting depressive symptoms also reported significantly more posttraumatic stress symptoms ( $M = 4.72$ ,  $SD = 1.73$  for OIF;  $M = 4.58$ ,  $SD = 1.75$  for OEF) than those without depressive symptoms ( $M = 1.91$ ,  $SD = 1.46$  for OIF;  $M = 1.64$ ,  $SD = 1.45$  for OEF),  $t(1536) = -39.58$ ,  $p < .01$  for OIF;  $t(1255) = -36.85$ ,  $p < .01$  for OEF. Finally, those with depressive symptoms also indicated less satisfaction with life ( $M = 3.92$ ,  $SD = 1.28$  for OIF;  $M = 3.76$ ,  $SD = 1.29$  for OEF) than those without depressive symptoms ( $M = 5.24$ ,  $SD = 1.13$  for OIF;  $M = 5.17$ ,  $SD = 1.16$  for OEF),  $t(1601) = 24.64$ ,  $p < .01$  for OIF;  $t(1335) = 23.20$ ,  $p < .01$  for OEF. Thus, the suggested cutoff scores for each scale indicate meaningful distinctions among groups.

Overall, soldiers indicated relatively high levels of clinically significant posttraumatic stress (31% for OIF; 30% for OEF) and depressive symptoms (37% for OIF; 38% for OEF). When examined by location, depression scores for those supporting OIF ( $M = 0.71$ ,  $SD = 0.52$ ) did not differ from those supporting OEF ( $M = 0.73$ ,  $SD = 0.54$ ),  $t(3,771) = 1.49$ , *ns*. However, OIF soldiers ( $M = 2.96$ ,  $SD = 2.08$ ) reported higher posttraumatic

stress scores than OEF soldiers ( $M = 2.76$ ,  $SD = 2.13$ ),  $t(4074) = -2.95$ ,  $p < .01$ , and OIF soldiers were more likely to seek counseling (10%) than OEF soldiers (7%),  $\chi^2(1, N = 3,925) = 11.27$ ,  $p < .01$ . Satisfaction with life scores for OIF veterans ( $M = 4.75$ ,  $SD = 1.35$ ) were higher than those for OEF veterans ( $M = 4.63$ ,  $SD = 1.39$ ),  $t(4036) = -2.75$ ,  $p < .01$ .

Bivariate correlation coefficients indicated that most demographic variables were related to posttraumatic stress, depression, and life-satisfaction scores (see Table 3). Gender was unrelated to all variables except the number of children living at home for the OEF sample ( $r = .06$ ,  $p < .05$ ) and depression scores for OIF ( $r = -.05$ ,  $p < .05$ ) and OEF ( $r = -.06$ ,  $p < .05$ ) samples. Posttraumatic stress and depression scores were positively related, such that participants reporting more depressive symptoms also indicated more posttraumatic stress symptoms. Participants reporting higher depressive and posttraumatic stress symptoms indicated less satisfaction with life for both groups.

To clarify the relative strength of these relationships, standard multivariate regression analyses examined the unique, direct contribution of each demographic variable to posttraumatic stress and depressive symptom scores while controlling for all variables in the models. Predicting posttraumatic stress symptom scores, all demographic variables were entered into a standard multivariate regression analysis for each sample,  $F(19, 1892) = 10.64$ ,  $p < .01$  for OIF;  $F(19, 1500) = 9.21$ ,  $p < .01$  for OEF (see Table 4). For OIF veterans, four variables emerged as predictors of posttraumatic stress symptom scores. Reporting a Pacific Islander ethnic background (vs. White) and being a senior NCO, company-grade officer, or field-grade officer (vs. junior enlisted) were associated with decreased reports of posttraumatic stress symptoms. Being separated or divorced (vs. married) and seeking counseling since redeployment were related to higher levels of posttraumatic stress symptoms. The full model contributed another .01 in shared variability and accounted for 10% (9% adjusted) of the variability in posttraumatic stress symptom scores.

For OEF veterans, three variables emerged as predictors of posttraumatic stress symptom scores. Being single (vs. married) and being an NCO, company-grade officer, or

**Table 3.** Bivariate Correlations Among Variables

	1	2	3	4	5	6	7	8
1. Age	—	.81***	.50***	-.01	.52***	-.08***	-.10***	.11***
2. Time in military	.82***	—	.50***	-.04	.53***	-.09***	-.12***	.15***
3. Children living at home	.50***	.46***	—	.04	.22***	-.03	-.07**	.07***
4. Counseling seeking	.01	-.01	.06**	—	-.06**	.21***	.22***	-.13***
5. Rank	.54***	.56***	.23***	-.04	—	-.18***	-.22***	.30***
6. Screen for posttraumatic stress symptoms	-.12***	-.14***	-.04	.23***	-.20***	—	.75***	-.43***
7. Center for epidemiological studies–depression	-.13***	-.15***	-.04	.21***	-.21***	.77***	—	-.58***
8. Satisfaction with Life Scale	.12***	.14***	.07**	-.14***	.23***	-.46***	-.60***	—

Note. Above diagonal is Operation Iraqi Freedom; *N*s range from 2,187 to 2,266. Below diagonal is Operation Enduring Freedom; *N*s range from 1,738 to 1,810. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

**Table 4.** Standard Multiple Regression of Demographic Variables on Posttraumatic Stress Symptom Scores by Deployment Location

Variables	OIF ( $n = 1,912$ )				OEF ( $n = 1,520$ )			
	<i>B</i>	<i>SE<sub>B</sub></i>	$\beta$	<i>sr</i> <sup>2</sup>	<i>B</i>	<i>SE<sub>B</sub></i>	$\beta$	<i>sr</i> <sup>2</sup>
Age	.01	.02	.02		.00	.02	.00	
Ethnicity <sup>a</sup>								
Black	-.21	.14	-.04		-.02	.16	-.00	
Hispanic	-.14	.13	-.03		.06	.15	.01	
Pacific Islander	-.64**	.21	-.07	.005	-.20	.27	-.02	
Asian	-.45	.33	-.03		-.20	.30	-.02	
Native American	.10	.44	.01		-.91	.57	-.04	
Biracial	-.39	.42	-.02		.64	.42	.04	
Other	.04	.25	.00		-.03	.30	-.00	
Gender	-.15	.20	-.02		-.21	.21	-.02	
Marital status <sup>b</sup>								
Single	.11	.12	.03		-.40**	.13	-.09	.005
Separated	.60**	.23	.06	.003	.54*	.27	.05	.003
Divorced	.42*	.21	.05	.002	.38	.24	.04	
Time in	.01	.02	.03		-.03	.02	-.07	
Children	.00	.05	.00		-.10	.06	-.05	
Counseling	1.43***	.15	.21	.04	1.74***	.20	.21	.04
Rank <sup>c</sup>								
NCO	-.17	.11	-.04		-.42**	.13	-.10	.006
Senior NCO	-1.00**	.32	-.09	.005	-.48	.33	-.05	
Company officer	-1.09***	.23	-.11	.01	-1.17***	.30	-.10	.01
Field officer	-1.51***	.24	-.17	.02	-1.28***	.31	-.12	.01
Intercept								
				2.93				3.49
<i>R</i> <sup>2</sup>				.10				.10
Adjusted <i>R</i> <sup>2</sup>				.09				.09

Note. OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom; NCO = noncommissioned officer. In *R*<sup>2</sup>, unique variability = .09; shared variability = .01 for OIF; in *R*<sup>2</sup>, unique variability = .07; shared variability = .03 for OEF.

<sup>a</sup>White is reference group. <sup>b</sup>Married is reference group. <sup>c</sup>Junior enlisted is reference group.

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

**Table 5.** Standard Multiple Regression of Demographic Variables on Depression Symptom Scores by Deployment Location

Variables	OIF (n = 1,910)				OEF (n = 1,520)			
	B	SE <sub>B</sub>	β	sr <sup>2</sup>	B	SE <sub>B</sub>	β	sr <sup>2</sup>
Age	.00	.00	.03		.00	.00	.01	
Ethnicity <sup>a</sup>								
Black	-.10**	.03	-.07	.004	-.05	.04	-.04	
Hispanic	-.03	.03	-.02		-.01	.04	-.01	
Pacific Islander	-.12*	.05	-.05	.003	.04	.07	.02	
Asian	-.02	.08	-.01		-.07	.08	-.02	
Native American	.02	.11	.00		-.03	.14	-.01	
Biracial	-.13	.10	-.03		.08	.11	.02	
Other	.07	.06	.03		.06	.08	.02	
Gender	-.09	.05	-.04		-.13*	.05	-.06	.003
Marital status <sup>b</sup>								
Single	.05	.03	.05		.00	.03	.00	
Separated	.25***	.06	.10	.01	.18**	.07	.07	.004
Divorced	.13*	.05	.06	.003	.14*	.06	.06	.003
Time in	.00	.01	.03		-.01	.01	-.07	
Children	-.01	.01	-.02		.00	.02	.00	
Counseling	.37***	.04	.22	.05	.40***	.05	.19	.04
Rank <sup>c</sup>								
NCO	-.10***	.03	-.09	.005	-.11**	.03	-.10	.006
Senior NCO	-.26**	.08	-.10	.005	-.13	.08	-.06	
Company officer	-.36***	.06	-.15	.02	-.31***	.08	-.11	.01
Field officer	-.43***	.06	-.19	.02	-.31***	.08	-.11	.01
Intercept				.73				.91
R <sup>2</sup>				.13				.10
Adjusted R <sup>2</sup>				.12				.09

Note. OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom; NCO = noncommissioned officer. In R<sup>2</sup>, unique variability = .12; shared variability = .01 for OIF; in R<sup>2</sup>, unique variability = .08; shared variability = .02 for OEF.

<sup>a</sup>White is reference group. <sup>b</sup>Married is reference group. <sup>c</sup>Junior enlisted is reference group.

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

field-grade officer (vs. junior enlisted) were associated with lower posttraumatic stress symptom scores. Being separated or having sought counseling since redeployment were related to higher posttraumatic stress symptoms. The full model contributed another .03 in shared variability and accounted for 10% (9% adjusted) of the variability in posttraumatic stress symptom scores.

Predicting depression scores, all demographic variables were entered into a standard multiple regression analysis for each sample,  $F(19, 1890) = 14.38, p < .01$  for OIF;  $F(19, 1500) = 8.41, p < .01$  for OEF (see Table 5). For OIF veterans, four variables emerged as predictors of de-

pression scores. Reporting a Black or a Pacific Islander ethnic background (vs. White) and being an NCO, senior NCO, company-grade officer, or field-grade officer (vs. junior enlisted) were associated with reporting lower depression scores. Being separated or divorced (vs. married) and seeking counseling since redeployment were associated with reporting higher depression scores. The full model contributed another .01 in shared variability and accounted for 13% (12% adjusted) of the variability in depression scores.

For OEF veterans, four variables emerged as predictors of depression scores. Being an NCO, company-grade

**Table 6.** Direct Logistic Regression of Demographic Variables Predicting Symptom Group Membership by Deployment Location

Variables	OIF ( <i>n</i> = 1,909)				OEF ( <i>n</i> = 1,518)			
	<i>B</i>	<i>SE<sub>B</sub></i>	<i>OR</i>	95% CI	<i>B</i>	<i>SE<sub>B</sub></i>	<i>OR</i>	95% CI
Age	.02	.02	1.02	0.98–1.05	.01	.02	1.01	0.97–1.04
Ethnicity <sup>a</sup>								
Black	–.26	.15	0.77	0.58–1.02	–.11	.17	0.90	0.65–1.24
Hispanic	–.04	.14	0.96	0.73–1.26	–.02	.16	0.98	0.72–1.34
Pacific Islander	–.83***	.24	0.44	0.27–0.70	–.19	.29	0.83	0.47–1.45
Asian	–.15	.36	0.86	0.42–1.76	–.18	.32	0.84	0.45–1.56
Native American	.05	.46	0.96	0.39–2.36	–.63	.63	0.51	0.15–1.75
Biracial	–.25	.46	0.78	0.32–1.91	.73	.44	2.08	0.88–4.92
Other	.10	.27	1.11	0.66–1.87	–.12	.30	0.88	0.49–1.60
Gender	–.31	.22	0.73	0.48–1.12	–.44*	.22	0.64	0.42–0.99
Marital status <sup>b</sup>								
Single	.25*	.12	1.29	1.01–1.64	–.21	.14	0.82	0.62–1.07
Separated	.51*	.25	1.67	1.03–2.71	.67*	.28	1.95	1.13–3.37
Divorced	.57**	.22	1.78	1.15–2.73	.26	.25	1.29	0.79–2.10
Time in	.03	.02	1.03	0.99–1.08	–.04	.02	0.96	0.92–1.01
Children	–.03	.06	0.97	0.87–1.08	–.01	.06	0.99	0.87–1.11
Counseling	1.21***	.17	3.36	2.40–4.69	1.55***	.24	4.72	2.95–7.55
Rank <sup>c</sup>								
NCO	–.30*	.12	0.74	0.59–0.94	–.44**	.14	0.64	0.49–0.84
Senior NCO	–1.54***	.37	0.22	0.11–0.44	–.48	.36	0.62	0.31–1.24
Company officer	–1.28***	.27	0.28	0.16–0.47	–.79*	.32	0.46	0.24–0.86
Field officer	–1.89***	.32	0.15	0.08–0.28	–1.05**	.36	0.35	0.17–0.71

Note. OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom; NCO = noncommissioned officer. Symptom group membership was coded *symptoms* = 0, *no symptoms* = 1.

<sup>a</sup>White is reference group. <sup>b</sup>Married is reference group. <sup>c</sup>Junior enlisted is reference group.

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

officer, or field-grade officer (vs. junior enlisted) were associated with reporting lower depression scores. Being a woman, being separated or divorced (vs. married), and having sought counseling since redeployment were associated with reporting higher depression scores. The full model contributed another .02 in shared variability and accounted for 10% (9% adjusted) of the variability in depression scores.

Although depression and posttraumatic stress symptoms were highly correlated, comorbidity of symptoms indicated that some soldiers self-reported one set of symptoms, but not the other. Specifically, 7% of OIF veterans ( $n = 147$ ) and 6% of OEF veterans ( $n = 101$ ) indicated clinically significant posttraumatic stress symptoms with-

out depressive symptoms; 13% of OIF veterans ( $n = 294$ ) and 15% of OEF veterans ( $n = 260$ ) reported clinically significant depressive symptoms, but not posttraumatic stress symptoms. Displaying comorbidity, 24% of OIF participants ( $n = 548$ ) and 24% of OEF participants ( $n = 428$ ) had scores indicating clinically significant levels of both posttraumatic stress and depressive symptoms. Overall, 44% of OIF veterans ( $n = 989$ ) and 44% of OEF veterans ( $n = 789$ ) indicated clinically significant posttraumatic stress symptoms or depressive symptoms, or both.

For each sample, participants were grouped according to symptom reports (0 = *symptoms*, 1 = *no symptoms*). Direct logistic regression predicted symptom group membership from the demographic variables (see Table 6). For

OIF participants, the model including all predictors provided a better fit to the data than the intercept only model,  $\chi^2(19, N = 1,909) = 171.55, p < .01$ . When all variables entered the model simultaneously, four predicted symptom group membership. Participants indicating a Pacific Islander ethnic background were less than half as likely to report symptoms as those indicating a White ethnic background. Compared to married soldiers, single soldiers were somewhat more likely to report symptoms, separated soldiers were  $1\frac{1}{2}$  times more likely to report symptoms, and divorced soldiers were nearly twice as likely to report symptoms. Those who sought counseling since redeployment were over 3 times more likely to report symptoms than those who did not seek counseling. Compared to junior enlisted soldiers, NCOs were somewhat less likely to report symptoms, but senior NCOs, company-grade officers, and field-grade officers were less than half as likely to report symptoms.

For OEF participants, the model predicting symptom group membership including all predictors also provided a better fit to the data than the intercept only model,  $\chi^2(19, N = 1,518) = 117.94, p < .01$ . With all variables controlled, four predicted symptom group membership. Men were almost half as likely as women to report symptoms. Soldiers who were separated were almost twice as likely to report symptoms as married soldiers. Those who sought counseling since redeployment were over 4 times more likely to report symptoms than those who did not seek counseling. Compared to junior enlisted soldiers, NCOs were less likely to report symptoms, and officers were less than half as likely to report symptoms.

## DISCUSSION

Overall, results indicate that shortly after redeployment approximately 44% of study participants reported clinically significant depressive and/or posttraumatic stress symptoms. Similar to existing research (Hoge et al., 2004; Hoge, Auchterlonie, & Milliken, 2006), soldiers returning from Iraq reported somewhat more mental health problems and treatment seeking than soldiers returning from Afghanistan.

To identify those who may be at greatest risk for mental health problems, the present research suggests personal and social variables associated with reports of posttraumatic stress and/or depressive symptoms. Three variables emerged as reliable predictors of posttraumatic stress and depressive symptom scores in both samples. Being separated or divorced (vs. married) were associated with increased reports of posttraumatic stress and depressive symptoms. A parsimonious explanation may be that social support from close relationships protects against symptoms, but the link may not be so straightforward because being single (vs. married) was associated with decreased posttraumatic stress symptoms for OEF veterans. Future research should investigate the potentially complex connection between close relationships and posttraumatic stress symptoms.

Compared to NCOs and officers, junior enlisted soldiers reported more posttraumatic stress and depressive symptoms for both samples. Operationalizing rank based on the Army's levels of responsibility instead of as a dichotomy (i.e., enlisted vs. officer) clarifies that junior enlisted soldiers, not enlisted soldiers overall, experience more symptoms. Potentially, training or access to information reduces problematic subjective reactions. As training is amenable to experimental manipulation, this possibility deserves investigation.

Finally, having sought counseling since redeployment was associated with increased posttraumatic stress and depressive symptoms in both samples. Apparently, soldiers seek help for their symptoms; however, only 16% of OIF participants and 13% of OEF participants with symptoms did so. Future research should explore alternative intervention techniques (Hoge et al., 2004).

Female participants were more likely to report depressive symptoms than male participants for OIF veterans, and the effect approached statistical significance for OEF veterans. Although women comprised only 6% of our samples, these results are consistent with previous research (e.g., Dunmore, Clark, & Ehlers, 2001); however, gender was not a predictor for posttraumatic stress symptoms for either sample. In fact, gender was not reliably correlated with any variable other than depression across both samples. These

findings contrast with reports of higher rates of posttraumatic stress symptoms for women in nonmilitary samples (Dunmore et al., 2001; Stein et al., 2000), but are consistent with research on military samples (Schnurr, Lunney, & Sengupta, 2004). Given these conflicting findings and our low number of female participants, strong conclusions await further investigation.

For OIF veterans, indicating a Black ethnic background (vs. White) was associated with reporting fewer depressive symptoms, and reporting a Pacific Islander ethnic background (vs. White) was associated with fewer posttraumatic stress and depressive symptoms. The reliability of these findings is unclear given that they were obtained in only one of our samples. However, it is interesting that Schnurr et al. (2004) also found a lower likelihood of maintaining posttraumatic stress symptoms for male war veterans with a Native Hawaiian ethnic background (vs. White males). Additional research that explores cultural differences in symptom reporting and reactions to traumatic events may illuminate the reliability and implications of these findings.

Further research is also needed on returning veterans as several factors limit the generalizability of our results. First, it cannot be determined whether posttraumatic stress and depressive symptoms were caused by participants' wartime experiences. Because of the cross-sectional nature of our study, no predeployment data are available, and the SPTSS and CES-D do not specify a referent trauma to contextualize symptom reporting. A second limitation is the necessarily all-volunteer samples used. Consistent with ethical standards, soldiers were not ordered to participate in our research. All participants were volunteers who were free to withdraw at any time, resulting in a response rate in which slightly less than half the soldiers undergoing reintegration training chose to participate. Having no data for soldiers who declined participation is unfortunate, as they may differ from participants in important ways. For example, our research may have attracted more soldiers with mental health concerns than with no such difficulties. This possibility implies that if soldiers with mental health concerns were more likely to participate in research, they may be more willing to seek out ways of exploring and coping

with their problems. However, recent research casts doubt on this optimism (Hoge et al., 2004).

A third study limitation is reliance on self-report screens assessing symptoms, not disorder. Although assessments that are less subject to self-presentation biases may improve identification of soldiers with mental health problems, brief self-report instruments tend to fare well for screening purposes (Brewin, 2005). However, the SPTSS and CES-D do not diagnose psychological disorders. Thus, rates of symptom reporting may be greater than actual functional impairment in soldiers' lives. Additionally, our prevalence rates may be inflated if the SPTSS measures general stress and not posttraumatic stress per se. Future research would benefit by corroboration of screen results with diagnostic assessments that provide information on the severity and functional impairment associated with symptoms. Nonetheless, we agree with Carlson (2001), favoring the inclusion over exclusion of those who may need help.

Research on the efficacy of early intervention for PTSD is mixed (Bisson, 2003; Foa et al., 2000; McNally et al., 2003); however, Hoge et al. (2006) report that of those veterans seeking care for mental health problems, two thirds did so within 2 months of redeployment. Because spontaneous remission of symptoms is not well understood, the utility of providing timely interventions to returning soldiers is certainly a topic for further study (McNally et al., 2003). The present research suggests that reintegration programs addressing depression and posttraumatic stress symptoms may be especially needed shortly after redeployment.

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