



Editor's Choice

Gender, Position of Authority, and the Risk of Depression and Posttraumatic Stress Disorder among a National Sample of U.S. Reserve Component Personnel



Gregory H. Cohen, MPhil, MSW^{a,b,*}, Laura A. Sampson, BA^b, David S. Fink, MPH^a, Jing Wang, PhD^c, Dale Russell, PhD^c, Robert Gifford, PhD^c, Carol Fullerton, PhD^c, Robert Ursano, MD^c, Sandro Galea, MD, DrPH^{a,b}

^a Department of Epidemiology, Columbia University, Mailman School of Public Health, New York, New York

^b Department of Epidemiology, Boston University School of Public Health, Boston, Massachusetts

^c Center for the Study of Traumatic Stress, Hebert School of Medicine, Uniformed Services University of the Health Sciences, Department of Psychiatry Bethesda, MD

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ABSTRACT

Background: Recent U.S. military operations in Iraq and Afghanistan have seen dramatic increases in the proportion of women serving and the breadth of their occupational roles. General population studies suggest that women, compared with men, and persons with lower, as compared with higher, social position may be at greater risk of posttraumatic stress disorder (PTSD) and depression. However, these relations remain unclear in military populations. Accordingly, we aimed to estimate the effects of 1) gender, 2) military authority (i.e., rank), and 3) the interaction of gender and military authority on a) risk of most recent deployment-related PTSD and b) risk of depression since most recent deployment.

Methods: Using a nationally representative sample of 1,024 previously deployed Reserve Component personnel surveyed in 2010, we constructed multivariable logistic regression models to estimate effects of interest.

Results: Weighted multivariable logistic regression models demonstrated no statistically significant associations between gender or authority, and either PTSD or depression. Interaction models demonstrated multiplicative statistical interaction between gender and authority for PTSD ($\beta = -2.37$; $p = .01$), and depression ($\beta = -1.21$; $p = .057$). Predicted probabilities of PTSD and depression, respectively, were lowest in male officers (0.06, 0.09), followed by male enlisted (0.07, 0.14), female enlisted (0.07, 0.15), and female officers (0.30, 0.25).

Conclusions: Female officers in the Reserve Component may be at greatest risk for PTSD and depression after deployment, relative to their male and enlisted counterparts, and this relation is not explained by deployment trauma exposure. Future studies may fruitfully examine whether social support, family responsibilities peri-deployment, or contradictory class status may explain these findings.

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Women constituted approximately 12% of forces deployed in support of Operations Enduring Freedom, Iraqi Freedom, and New Dawn (OEF/OIF/OND) as of 2010 (Institute of Medicine, 2013). This represents an increase from 2% in Vietnam and is comparable to the 11% of forces deployed in the Gulf War (Murdoch et al., 2006). The scope of occupational roles available to women in the military has broadened substantially to include

combat duties. However, there remains a paucity of literature about the effect of combat on the mental health of female service members.

In addition, the OEF/OIF/OND conflicts have seen a greater reliance, relative to prior conflicts, on Reserve Component (RC) forces including the National Guard and Reserves (Department of Defense, 2008). Members of the RC may be described as "citizen soldiers," who generally serve 1 weekend a month and lead civilian lives, but may be deployed on short notice. Reservists face distinct challenges, including deployment without one's own unit, balancing family and civilian employment with military duty, and the expectation of rapid role resumption

* Correspondence to: Gregory H. Cohen, MPhil, MSW, Department of Epidemiology, Boston University School of Public Health, 715 Albany St, T417E, Boston, MA. Phone: 617-638-8092; fax: 617-638-4458.

E-mail address: ghcohen@bu.edu (G.H. Cohen).

after return from deployment (Castaneda et al., 2009; Griffith, 2011).

General population studies consistently demonstrate that women have a two-fold increased risk of lifetime posttraumatic stress disorder (PTSD; Breslau et al., 1998; Tolin & Foa, 2006) and depression (Kuehner, 2003; Parker & Brotchie, 2010) compared with men. Potential explanations for these findings include 1) differential exposure to trauma associated with a high likelihood of psychiatric morbidity, such as sexual assault (Street, Vogt, & Dutra, 2009; Tolin & Foa, 2006), 2) differential response to trauma (Tolin & Foa, 2006), 3) differential symptom response styles, which may affect symptom course and severity (Nolen-Hoeksema, 1987), and 4) lower social position among women, which may confer greater cumulative exposure to traumas and stressors and lesser control over external circumstances relative to men (Van de Velde, Bracke, & Levecque, 2010). Although gender differences in PTSD have been found among prior cohorts of combat veterans (Tolin & Foa, 2006), studies of gender differences among OEF/OIF/OND service members and veterans have yielded conflicting results, with many finding increased risk among women for depression (Wells et al., 2010), PTSD (Crum-Cianflone & Jacobson, 2014; Polusny et al., 2014; Smith et al., 2008), or both (Luxton, Skopp, & Maguen, 2010; Tanielian & Jaycox, 2008), and some demonstrating no gender differences (Vogt et al., 2011).

Military rank is another indicator of mental health risk, and studies have consistently demonstrated a lesser risk of PTSD and depression, among officers, relative to enlisted service members (Smith et al., 2008; Tanielian & Jaycox, 2008; Wells et al., 2010), a relationship that persists even after adjusting for job strain and job demands (Fear et al., 2009). Rank may also embed heterogeneity in responsibilities, stressors, and traumas. In the context of military service and deployment, officer status is generally associated with lower trauma exposure and greater responsibility/control relative to enlisted service members. Rank is a proxy for socioeconomic position (SEP), and accordingly the broader literature concerning SEP and mental health should be considered. Low SEP is related to greater risk of depression (Lorant et al., 2003; Muntaner, Eaton, Diala, Kessler, & Sorlie, 1998; Muntaner, Borrell, Benach, Pasarín, & Fernandez, 2003), and gender differences exist in the relationship between SEP and health. In particular, socioeconomic differences in health may be less pronounced among women than men (Macintyre & Hunt, 1997), with a flatter slope for the health by SEP function among women relative to men. One potential explanation for this pattern is that women may face more stress and strain in attaining occupational status (Hunt & Emslie, 1998). In the military, a particularly male-dominated environment, the challenge of attaining high occupational status may be exacerbated, and female officers may have less organizational control relative to their male officer counterparts. Given this milieu, it would be surprising if gender and military authority did not interact in explaining mental health.

The relation between gender and mental health is clearly complicated, and even more so when considered in concert with the role of military authority. We are not aware of any work that has considered explicitly the concomitant role of gender and military authority on mental health among military populations. Such work has clear import given the growing and changing role of women in the military. Accordingly, the present investigation examined the role of gender, military authority, and their interaction on risk for PTSD and depression.

Materials and Methods

Data Source and Study Sample

Our study target population and sampling universe was all RC service members enlisted nationally as of June 2009, the time of baseline sampling. The study sample was drawn in a two-stage process. First, a random sample of 10,000 National Guard and 10,000 Reserve soldiers was provided by the Defense Manpower Database Center. Second, we contacted a simple random sample of 9,751 to participate through an opt-out letter, which alerted them to the purpose of the study; of these, 1,097 (11.3%) returned the opt-out letter, and 2,866 (29.4%) had incorrect or nonworking numbers. We then called the remaining 6,885, of which 385 (3%) were ineligible, and 3,386 (35%) were not contacted before the close of the baseline cohort upon attainment of our enrollment goal. Our only screening criteria were a) English proficiency, to allow for consent and survey completion, and b) current RC service. The overall cooperation rate was 68.2%, calculated as the number of participants who consented regardless of eligibility (2,003 + 385 = 2,388) divided by the number of working numbers we successfully contacted (6,885 – 3,386 = 3,499). The overall response rate was 34.1% (2,327/6,824), calculated as the number of participants who completed a survey and consented but were ineligible, divided by the number of working numbers minus the number disqualified (2,003 + 324/6,885 – 61).

Our final baseline cohort sample consisted of 2,003 service personnel and survey data were collected between January and July 2010. With the exception of the Marine Corps Reserves, our sampling strategy selected participants with a probability reflecting their proportional representation by branch in the national RC population. To increase statistical power for subgroup analyses, Marine Corps Reserves were selected with a probability double their branch representation in the RC.

Informed consent was obtained before each interview, and participants were compensated \$25 for their time. The study protocol was approved by the U.S. Army Medical Command's Congressionally Directed Medical Research Programs unit, the U.S. Army Medical Research & Materiel Command's Human Research Protection Office, and the Institutional Review Boards at both the Uniformed Services University of the Health Sciences and Columbia University.

Study Variables

Participants completed a 60-minute telephone interview, performed by bachelors-level lay interviewers using computer-assisted telephone interviewing techniques. Interviewers were trained and managed by professional survey firm Abt SRBI, which has more than 25 years of experience interviewing military personnel. Interviewers received extensive training on working with military service members and conducting psychiatric symptom interviews. Calls were placed from Abt SRBI's standardized and fully supervised computer-assisted telephone interviewing call centers in New York City and Huntington, West Virginia. The interview assessed demographic characteristics, military history, and mental health status. Race was categorized as White, Black, and other. Age was categorized into four groups: 17 to 24, 25 to 34, 35 to 44, and 45 years or older. Income was dichotomized as pretax household income of less than or equal to \$60,000 versus greater than \$60,000. Marital status was coded as married, divorced or separated, and never

married. Military component was defined as Reserves (including Air Force, Army, Marines Corps, and Navy) and National Guard (including Air Force and Army). Participants reporting military ranks of commissioned or warrant officer class were combined into a single officer category, whereas participants reporting enlisted rank were categorized as enlisted. Participants were classed by number of years of military service into the following categories: 5 or fewer, 6 to 10, and 11 or more years. We categorized participants' most recent deployment location into: OEF (principally Afghanistan), OIF (principally Iraq), and other deployment (e.g., Gulf War, domestic deployments). Conflict areas including OEF, OIF, and Gulf War are defined in [Appendix 1](#).

We assessed the lifetime presence and timing of 25 potentially traumatic events (PTEs) not related to most recent deployment, drawn from the life events checklist ([Breslau et al., 1998](#); [Gray, Litz, Hsu, & Lombardo, 2004](#)), and 28 PTEs related to most recent deployment, including the 25 events from the life events checklist asked in the context of deployment, and 3 additional deployment related traumatic events from the Deployment Risk and Resilience Inventory ([Vogt, Proctor, King, King, & Vasterling, 2008](#)). Participants were also allowed to volunteer "other" traumatic events not covered in our PTE list. Number of traumas related to most recent deployment was classed into categories of 1 or 2, 3 to 5, and 6 or more. Traumatic events in most recent deployment were additionally classed into the following categories: assaultive traumas, nonsexual; sexual trauma; shocking event or injury; learning of traumas; sudden death of a loved one; and "other" traumas reported ([Appendix 2](#) lists traumas included in each category).

PTSD symptoms were assessed using the 17-item PTSD Checklist ([Blanchard, Jones-Alexander, Buckley, & Forneris, 1996](#); [Weathers, Litz, Herman, Huska, & Keane, 1993](#)), and symptoms were measured in relation to the self-selected worst PTE occurring during their most recent deployment and outside of this deployment. Participants were designated as having PTSD from index PTEs, according to the DSM-IV ([American Psychiatric Association, 2000](#)) criteria if they reported at least one symptom of intense fear or hopelessness (criterion A2), at least one symptom of intrusion (criterion B), at least three of avoidance (criterion C), at least two of hyperarousal (criterion D), and they had to report having these symptoms for at least 1 month (criterion D), and that these symptoms were moderately distressing or made normal life functioning at least very difficult (criterion F). This algorithm was validated against the Clinician Administered PTSD Scale in a parallel study of RC service members ([Prescott et al., 2014](#)) and maximized sensitivity and specificity, respectively, for non-deployment-related (0.47, 0.94) and deployment-related PTSD (0.50, 0.93).

Depression was assessed using the Patient Health Questionnaire-9 ([Kroenke, Spitzer, & Williams, 2001](#)), and cases were defined as those who reported having been bothered by two or more of the nine items for more than one-half the days during a period of at least 2 weeks, and reported that their symptoms occurred together. Additionally, we measured timing of symptoms and classified depression as either current year or lifetime. This scoring algorithm was validated against Major Depressive Disorder as assessed using the Structured Clinical Interview for DSM Disorders (SCID), and maximized sensitivity (0.51) and specificity (0.83) in the mentioned clinical validation study ([Prescott et al., 2014](#)).

Statistical Analysis

Weights were constructed to account for sampling design, demographic factors associated with nonresponse, and post-stratification adjustments based on the characteristics of the entire population of RC service members nationally at time of sampling in 2009, according to Defense Manpower Database Center. All bivariate and multivariable associations were estimated using weighted logistic regression models, and all analyses were conducted in SAS-callable SUDAAN ([Research Triangle International, 2012](#)).

First, descriptive statistics were examined by gender among 1,024 previously deployed service members who experienced at least one most recent deployment-related PTE. Unweighted frequencies were examined alongside weighted proportions, and Wald χ^2 statistics were calculated to test differences in the distribution of demographic and military characteristics by gender. Second, weighted bivariate associations of demographic and military experience characteristics with PTSD and depression were examined by gender. Third, weighted associations of gender and military authority with PTSD and depression were estimated in multivariable logistic models. Fourth, weighted multiplicative statistical interactions of gender and military authority in their association with PTSD and depression were assessed in nested multivariable logistic models, accounting sequentially for trauma load and type. Variables were selected a priori based on extant literature and entered into multivariable models in the order of their appearance, from top to bottom, in the far left column of [Tables 3 and 4](#). Statistical significance was evaluated using a 2-sided α level of less than 0.05.

Results

[Table 1](#) provides a description of participant characteristics for the full sample, and stratified by gender. Most participants were male (89.73%), White (80.40%), 34 years old or younger (54.38%), had an annual income of less than \$60,000 (56.19%), and were married (54.96%). The majority of participants served in the National Guard (52.97%), was enlisted (85.13%), served in the military for more than 5 years (81.24%), and was deployed to OIF (61.92%). Most participants experienced three or more traumas related to their most recent deployment (58.39%), and have experienced at least one of the following types of events in their most recent deployment: nonsexual assaultive traumas (81.19%) or shocking event or injury (69.36%). A minority of participants experienced, in their last deployment, sexual trauma (0.67%), learning of traumas (14.84%), sudden death of a loved one (17.78%), and an "other" self-reported trauma (24.72%).

Comparing the distribution of sociodemographic characteristics by gender, a number of differences appear. Women were less likely to be White (66.12% vs. 82.04%) and married (38.79% vs. 56.81%), and more likely to be divorced/separated (25.06% vs. 12.19%) relative to men. Women were more likely to be in the Reserves (65.69% vs. 44.89%), to be officers (20.77% vs. 14.2%), and to have deployed to missions other than OIF or OEF (46.39% vs. 24.33%) relative to men. Regarding trauma characteristics, women were more likely to be in the lowest category of lifetime deployment traumas (57.61% vs. 39.78%), and to have experienced sexual trauma (6.56% vs. 0%) than men, and less likely to have reported nonsexual assaultive trauma (67.44% vs. 82.77%), and shocking event or injury (58.93% vs. 70.55%) relative to men.

[Table 2](#) shows gender-stratified bivariate associations between participant characteristics and deployment-related

Table 1
Participant Sociodemographic, Military, and Trauma Characteristics by Gender

Variable	Total Sample (N = 1,024)		Women (n = 124; 10.27%)		Men (n = 900; 89.73%)		χ^2 Value	p Value
	n	%	n	%	n	%		
Sociodemographic and military characteristics								
Branch								
Reserves	502	47.03	85	65.69	417	44.89	14.89	<.001
National Guard	522	52.97	39	34.31	483	55.11		
Race								
White	795	80.4	79	66.12	716	82.04	5.15	.01
Black	119	15.26	28	27.28	91	13.88		
Other	110	4.34	17	6.6	93	4.08		
Age (y)								
17–24	146	18.82	11	14.45	135	19.32	0.77	.51
25–34	365	35.56	39	33.52	326	35.79		
35–44	313	28.31	43	30.86	270	28.02		
≥45	200	17.31	31	21.17	169	16.87		
Income (\$U.S.)								
≤60,000	499	56.19	50	54.01	449	56.43	0.21	.65
>60,000	501	43.81	70	45.99	431	43.57		
Marital status								
Married	588	54.96	55	38.79	533	56.81	6.34	<.001
Divorced/ separated	140	13.52	28	25.06	112	12.19		
Never married	296	31.52	41	36.15	255	30.99		
Military authority								
Officer	258	14.87	47	20.77	211	14.2	4.27	.04
Enlisted	764	85.13	77	79.23	687	85.8		
No. of years of military service								
≤5	158	18.76	14	15.8	144	19.1	1.46	.23
6–10	317	32.35	31	27.15	286	32.94		
≥11	549	48.89	79	57.04	470	47.96		
Most recent deployment location								
OIF	614	61.92	53	47.76	561	63.56	9.23	<.001
OEF	117	11.47	8	5.86	109	12.12		
Other	278	26.62	62	46.39	216	24.33		
Trauma load and type								
No. of lifetime deployment traumas								
1–2	437	41.61	76	57.61	361	39.78	5.48	<.001
3–5	354	34.88	31	26.41	323	35.85		
≥6	233	23.51	17	15.97	216	24.37		
Assaultive traumas, nonsexual								
Yes	822	81.19	81	67.44	741	82.77		
No	202	18.81	43	32.56	159	17.23	9.68	<.001
Sexual trauma								
Yes	7	0.67	7	6.56	0	0		
No	1,015	99.33	116	93.44	899	100	5.89	.02
Shocking event or injury								
Yes	709	69.36	73	58.93	636	70.55		
No	314	30.64	50	41.07	264	29.45	4.72	.03
Learning of traumas								
Yes	146	14.84	14	13.92	132	14.95		
No	877	85.16	109	86.08	768	85.05	0.07	.79
Sudden death of a loved one								
Yes	171	17.78	15	11.72	156	18.46		
No	849	82.22	107	88.28	742	81.54	3.53	.06
"Other" traumas reported								
Yes	249	24.72	38	30.49	211	24.05		
No	775	75.28	86	69.51	689	75.95	1.68	.19

Abbreviations: OEF, Operation Enduring Freedom; OIF, Operation Iraqi Freedom

PTSD and depression since last deployment. Among women, the prevalence of PTSD was 8.47% and the prevalence of depression was 12.15%. Among men, the prevalence of PTSD was 7.52% and the prevalence of depression was 13.73%. Among women, officers (21.17%) were about five times more likely to have PTSD relative to enlisted (5.27%), and there was a positive dose-response relationship between years of military service and PTSD (≤5 years, 0%; 6–10 years, 6.67%; ≥11 years,

10.88%). In men, prior PTSD was positively associated with PTSD related to the most recent deployment, and low income was positively associated with depression. Among men, for both PTSD and depression, number of deployment related traumas was positively associated in a dose-response fashion, and positive associations were found for each trauma type with the exception of sexual trauma (none of the men reported sexual trauma).

Table 3 shows sequential multivariable models of risk of PTSD related to most recent deployment. Model 1 demonstrates that neither gender nor military authority predicted PTSD related to most recent deployment, adjusting for history of PTSD, which was a predictor. Including a term for the interaction between gender and military authority in model 2, both the terms for gender (beta = 1.50; $p = .006$) and the interaction between gender and military authority (beta = -1.94; $p = .01$) were associated with PTSD, although the main term for military authority (beta = 0.43; $p = .25$) was not. In model 3, adding number of deployment related traumas, a strong positive predictor, the beta estimates increased for gender (2.35) and the interaction term (-2.42). The addition of trauma types in model 4 did not appreciably change the estimates for gender or the interaction term. As shown in Figure 1, model 2, the adjusted marginal predicted probability of having had PTSD related to most recent deployment was highest for female officers, followed by male enlisted, female enlisted, and male officers. Figure 1, models 3 and 4, further demonstrates that estimates for PTSD risk change with the addition of number of traumatic events, but do not further change after adding trauma types. The final estimates from model 4 show that risk among female officers (0.30; 95% confidence interval [CI], 0.17–0.48) clearly separates from that of male officers (0.06; 95% CI, 0.03–0.10) and male enlisted (0.07; 95% CI, 0.06–0.10), and overlaps with that of female enlisted (0.07; 95% CI, 0.03–0.19).

Table 4 shows sequential multivariable models of risk of depression since most recent deployment. In model 1, we found no association between gender or military authority and depression. When adding a term for the interaction between gender and military authority in model 2, we found significant associations for gender (beta = 0.89; $p = .05$) and military authority (beta = 0.58; $p = .04$), but not the interaction term, with depression. In model 3, adding number of deployment related traumas, a positive predictor, the beta estimates increased for gender (1.26) and became nonsignificant for military authority, whereas the interaction term increased (-1.21) and became marginally significant ($p = .05$). The addition of trauma types in model 4 did not alter substantially the estimates for gender or the interaction term.

As shown in Figure 1, model 2, the adjusted marginal predicted probability of having had depression since most recent deployment was greatest for female officers, followed by male enlisted, female enlisted, and male officers. Figure 1, models 3 and 4, demonstrates that estimates of depression risk change with the addition of number of traumatic events, but do not further change after adding trauma types. The final estimates from model 4 show that risk for depression is greatest among female officers (0.25; 95% CI, 0.14–0.41). Although the point estimate for female officers is higher than all other interaction cells, there is a slight overlap with the range for male officers (0.09; 95% CI, 0.06–0.15), and considerable overlap for the ranges of female enlisted (0.15; 95% CI, 0.08–0.26) and male enlisted (0.14; 95% CI, 0.12–0.17).

Table 2
Gender-Stratified Sociodemographic, Military, and Trauma Characteristics by PTSD and Depression

Variable	Value	Women				Men			
		PTSD Related to Most Recent Deployment (n = 953) Recent Deployment		Depression Since Most Recent Deployment		PTSD Related to Most Recent Deployment		Depression Since Most Recent Deployment	
		n	%	n	%	n	%	n	%
		11	8.47	15	12.15	58	7.52	114	13.73
Sociodemographic and military characteristics									
Branch	Reserves	6	7.42	9	9.51	31	8.71	51	13.15
	National Guard	5	10.3	6	16.99	27	6.52	63	14.19
		$\chi^2(df = 1) = 0.24; p = .63$		$\chi^2(df = 1) = 0.93; p = .34$		$\chi^2(df = 1) = 1.1; p = .30$		$\chi^2(df = 1) = 0.16; p = .69$	
Race	White	7	7.49	10	13.58	45	7.83	91	13.88
	Black	3	10.27	3	9.33	3	4.17	10	12.36
	Other	1	10.58	2	10.06	10	11.59	13	14.99
		$\chi^2(df = 2) = 0.11; p = .89$		$\chi^2(df = 2) = 0.2; p = .82$		$\chi^2(df = 2) = 1.67; p = .19$		$\chi^2(df = 2) = 0.12; p = .88$	
Age	17–24	0	0	2	16.61	9	6.32	20	14.68
	25–34	2	3.21	4	6.76	23	9.16	45	16.03
	35–44	7	20.82	4	8.54	13	5.63	33	12.28
	≥45	2	5.94	5	22.05	13	8.34	16	10
		$\chi^2(df = 3) = 2.31; p = .07$		$\chi^2(df = 3) = 0.91; p = .43$		$\chi^2(df = 3) = 0.78; p = .50$		$\chi^2(df = 3) = 1.15; p = .33$	
Income	≤60,000	4	6.86	6	11.34	28	6.41	75	16.95
	>60,000	7	11.83	9	14.57	29	9.09	37	9.55
		$\chi^2(df = 1) = 0.71; p = .39$		$\chi^2(df = 1) = 0.22; p = .94$		$\chi^2(df = 1) = 1.54; p = .22$		$\chi^2(df = 1) = 8.74; p < .001$	
Marital status	Married	4	9.09	4	6.82	35	8.14	63	13.14
	Divorced/ separated	2	7.48	5	17.47	9	8.99	18	17.91
	Never married	5	8.64	6	13.76	14	5.84	33	13.17
		$\chi^2(df = 2) = 0.03; p = .98$		$\chi^2(df = 2) = 0.98; p = .38$		$\chi^2(df = 2) = 0.7; p = .50$		$\chi^2(df = 2) = 0.63; p = .53$	
Military authority	Officer	7	21.17	7	16.77	10	4.92	17	8.15
	Enlisted	4	5.27	8	10.97	48	7.94	97	14.66
		$\chi^2(df = 1) = 3.89; p = .05$		$\chi^2(df = 1) = 0.65; p = .42$		$\chi^2(df = 1) = 2.36; p = .12$		$\chi^2(df = 1) = 6.92; p = .53$	
Years of military service	≤5	0	0	2	15.19	6	4.85	22	15.83
	6–10	2	6.67	4	9.69	23	8.75	45	15.89
	≥11	9	10.88	13	16.11	29	7.36	49	11.56
		$\chi^2(df = 2) = 3.35; p = .04$		$\chi^2(df = 2) = 0.42; p = .66$		$\chi^2(df = 2) = 1; p = .37$		$\chi^2(df = 2) = 1.46; p = .23$	
Most recent deployment location	OIF	5	5.62	10	18.55	45	8.78	78	15.37
	OEF	2	16.06	1	12.27	5	5.22	14	13.59
	Other	4	8.81	8	10.16	7	4.24	24	10.57
		$\chi^2(df = 2) = 0.56; p = .57$		$\chi^2(df = 2) = 0.7; p = .5$		$\chi^2(df = 2) = 2.45; p = .09$		$\chi^2(df = 2) = 1.46; p = .23$	
No. of deployment-related traumas	1–2	5	6.21	7	6.3	4	1.12	20	6.04
	3–5	4	13.12	5	20.62	22	7.49	43	14.17
	6+	2	9.42	3	16.84	32	18.63	51	25.59
		$\chi^2(df = 2) = 0.46; p = .63$		$\chi^2(df = 2) = 1.67; p = .19$		$\chi^2(df = 2) = 18.52; p < .001$		$\chi^2(df = 2) = 16.25; p < .001$	
Assaultive traumas, nonsexual	Yes	10	10.5	10	13.17	55	8.66	105	15.15
	No	1	2.78	9	16.41	3	1.4	11	7.3
		$\chi^2(df = 1) = 2.89; p = .09$		$\chi^2(df = 1) = 0.21; p = .65$		$\chi^2(df = 1) = 20.51; p < .001$		$\chi^2(df = 1) = 7.97; p < .001$	
Sexual trauma	Yes	1	12.85	0	0	0	0	0	0
	No	10	7.53	19	15.37	58	7.55	116	13.82
		$\chi^2(df = 1) = 0.18; p = .67$		-		-		-	
Shocking event or injury	Yes	7	8.07	12	15.7	56	10.24	99	16.45
	No	4	7.76	7	12.44	2	0.88	17	7.47
		$\chi^2(df = 1) = 0; p = .95$		$\chi^2(df = 1) = 0.23; p = .63$		$\chi^2(df = 1) = 33.92; p < .001$		$\chi^2(df = 1) = 12.96; p < .001$	
Learning of traumas	Yes	2	11.14	3	21.7	16	11.98	30	24.42
	No	9	7.44	16	13.18	42	6.55	86	11.95
		$\chi^2(df = 1) = 0.19; p = .66$		$\chi^2(df = 1) = 0.5; p = .48$		$\chi^2(df = 1) = 2.78; p = .1$		$\chi^2(df = 1) = 8.08; p < .001$	
Sudden death of a loved one	Yes	3	16.06	4	23.52	21	14.8	39	25.37
	No	8	6.96	15	13.47	37	5.66	77	11.25
		$\chi^2(df = 1) = 0.89; p = .35$		$\chi^2(df = 1) = 0.64; p = .42$		$\chi^2(df = 1) = 7.19; p = .01$		$\chi^2(df = 1) = 11.8; p < .001$	
"Other" Traumas reported	Yes	1	7.14	9	22.13	18	14.9	38	20.53
	No	10	8.02	10	10.75	40	5.89	78	11.68
		$\chi^2(df = 1) = 0.01; p = .91$		$\chi^2(df = 1) = 1.84; p = .18$		$\chi^2(df = 1) = 6.06; p = .01$		$\chi^2(df = 1) = 6.62; p = .01$	
PTSD before most recent deployment	No	9	7.17			50	6.60		
	Yes	2	43.11			8	25.07		
		$\chi^2(df = 1) = 1.47; p = .23$		-		$\chi^2(df = 1) = 4.61; p = .03$		-	

Abbreviations: OEF, Operation Enduring Freedom; OIF, Operation Iraqi Freedom; PTSD, posttraumatic stress disorder.

Discussion

We found that, although neither enlisted status nor female gender alone are positively and significantly associated with

PTSD related to most recent deployment or depression, they jointly help to explain the risk of both disorders, with female officers at greatest risk in both cases. We found no main effect between either gender or military authority and mental health.

Table 3
Risk of Most Recent Deployment Related PTSD among Participants Who Experienced One or More Potentially Traumatic Events Related to Their Most Recent Deployment (N = 914)

Variable	Value	Model 1				Model 2				Model 3				Model 4			
		Beta	OR	95% CI	p Value	Beta	OR	95% CI	p Value	Beta	OR	95% CI	p Value	Beta	OR	95% CI	p Value
Gender	Male	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	0.12	1.12	0.54–2.32	.76	1.50	Not shown	Not shown	.006	2.35	Not shown	Not shown	.0002	2.38	Not shown	Not shown	.0003
Military authority	Officer	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Enlisted	0.04	1.04	0.58–1.87	.89	0.43	Not shown	Not shown	.25	0.28	Not shown	Not shown	.46	0.32	Not shown	Not shown	.43
PTSD before most recent deployment	No	–	1	–	–	–	1	–	–	–	1	–	–	–	1	–	–
	Yes	0.88	5.16	2.28–11.67	.0001	–	5.02	2.20–11.46	–	–	6.22	2.56–15.08	–	–	5.76	2.41–13.79	–
Gender × military authority (interaction term)						–1.94	Not shown	Not shown	.01	–2.42	–	–	.007	–2.37	–	–	.01
No. of deployment-related traumas	1–2									–	1	–	–	–	1	–	–
	3–5									–	7.22	2.96–17.58	–	–	3.78	0.97–14.79	–
	6+									–	21.02	8.77–50.40	–	–	8.66	1.83–40.89	–
Assaultive traumas, nonsexual	No														1	–	–
	Yes														2.41	0.69–8.37	–
Sexual trauma	No														1	–	–
	Yes														0.85	0.05–14.03	–
Shocking event or injury	No														1	–	–
	Yes														1.82	0.46–7.23	–
Learning of traumas	No														1	–	–
	Yes														0.80	0.37–1.73	–
Sudden death of a loved one	No														1	–	–
	Yes														1.51	0.78–2.93	–
“Other” traumas	No														1	–	–
	Yes														1.70	0.87–3.34	–
-2LL				470.47				466.21				403.83				397.77	

Abbreviations: OR, odds ratio; PTSD, posttraumatic stress disorder.

Note: PTSD related to most recent deployment refers to reporting PTSD criteria consistent with a PTSD diagnosis in relation to an event related to a participant's most-recent deployment; officers include both commissioned and warrant officers. -2LL refers to the -2 log likelihood, a relative measure of model fit; lower values indicate better model fit.

Table 4
Risk of Depression Since Most Recent Deployment among Participants Who Experienced One or More Potentially Traumatic Events Related to Their Most Recent Deployment (N = 1,016)

Variable	Value	Beta	Model 1 (n = 1,016)			Model 2 (n = 1,016)				Model 3 (n = 1,016)				Model 4 (n = 1,012)			
			OR	95% CI	p Value	Beta	OR	95% CI	p Value	Beta	OR	95% CI	p Value	Beta	OR	95% CI	p Value
Gender	Male		1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	0.06	1.06	0.59–1.91	.85	0.89	Not shown	Not shown	.05	1.26	Not shown	Not shown	.01	1.24	Not shown	Not shown	.01
Military authority	Officer		1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Enlisted	0.40	1.49	0.93–2.38	.10	0.58	Not shown	Not shown	.04	0.52	Not shown	Not shown	.07	0.50	Not shown	Not shown	.09
Gender × military authority (interaction term)						–1.04	Not shown	Not shown	.08	–1.21	–	–	.05	–1.21	–	–	.057
No. of deployment-related traumas	1–2									–	1	–	–	–	1	–	–
	3–5									–	2.79	1.63–4.75	–	–	2.31	1.02–5.24	–
	6+									–	4.99	2.93–8.52	–	–	3.16	1.14–8.75	–
Assaultive traumas, nonsexual	No													1	–	–	–
	Yes													0.99	0.44–2.24	–	–
Sexual trauma	No																
	Yes																
Shocking event or injury	No													1	–	–	–
	Yes													1.11	0.56–2.21	–	–
Learning of traumas	No													1	–	–	–
	Yes													1.30	0.77–2.22	–	–
Sudden death of a loved one	No													1	–	–	–
	Yes													1.66	1.01–2.72	–	–
“Other” traumas	No													1	–	–	–
	Yes													1.57	0.95–2.59	–	–
-2LL			815.39			813.42				767.66				755.89			

Abbreviations: OR, odds ratio.

Depression since most recent deployment refers to reporting new-onset symptoms of depression after most recent deployment; officers include both commissioned and warrant officers. -2LL refers to the -2 log likelihood, a relative measure of model fit; lower values indicate better model fit.

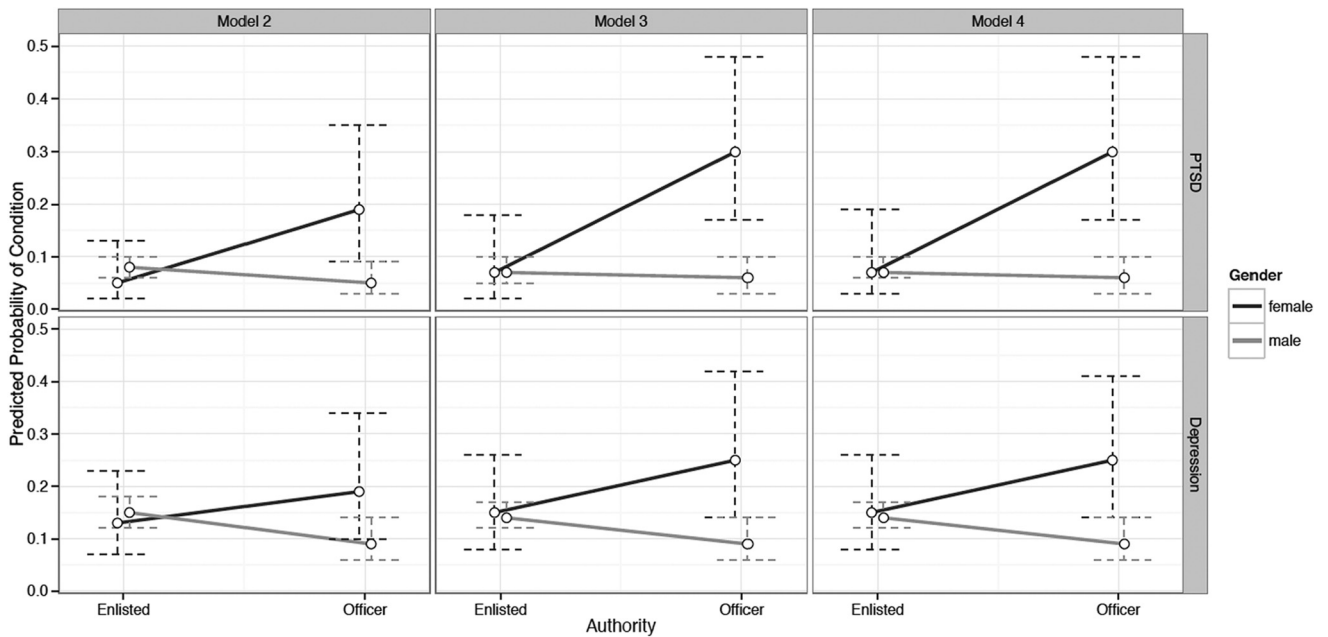


Figure 1. Predicted probabilities of posttraumatic stress disorder (PTSD) and depression, based on models 2, 3, and 4 from Tables 3 and 4, respectively, are displayed with 95% confidence intervals for each combination of gender and authority.

That the risk estimates for female officers increased appreciably after adjusting for traumatic event load but not type (Figure 1, models 3 and 4), suggests that female officers may be more sensitive to trauma load but not type relative to their male and enlisted counterparts. However, because differences in risk between female officers and male officers only diverge further in the final models, differences in trauma load or type do not explain these key findings.

These findings differ from those previously reported by the RAND Invisible Wounds study (Tanielian & Jaycox, 2008), in which women were about twice as likely to qualify for both PTSD and depression, and officers had about 60% lower odds of PTSD and about 85% lower odds of depression, adjusting for most covariates controlled for in the present study. This study also differs from findings on new-onset PTSD in the Millennium Cohort Study (Smith et al., 2008), in which there was a main effect for gender, with women across all branches except the Marine Corps having a 1.70 to 2.00 times greater odds of developing new-onset PTSD, and enlisted service members across all branches except for the Marine Corps having a 2.14 to 2.31 greater odds of new-onset PTSD. Although the Millennium Cohort Study of new-onset depression (Wells et al., 2010) considered men and women in separate models, the unadjusted marginal probabilities of new onset depression among deployed women with combat exposures (15.7%) and deployed men with combat exposures (5.7%) suggest that gender predicts case status. In addition, the unadjusted marginal probabilities of case status among those with combat exposures—male enlisted (7.1%), male officers (2.2%), female enlisted (18.3%), female officers (9.1%)—suggest that there is a main effect of military authority for new onset depression, in contrast with the interaction effect observed in the present study. Critically, however, these samples are quite different from the one examined in the present study. They are both nationally representative of the entire military force, rather than the RC component. The other RC

study that has comparable estimates is the RINGS study, which identified a main effect for gender and PTSD, but did not report the effect of rank or the interaction between gender and rank (Polusny et al., 2014). Additionally, the RINGS study was conducted with a sample of Brigade Combat Teams from Minnesota, as compared with our nationally representative sample. The findings of the present study also differ from the results of community studies, which have found women to be at a two-fold greater risk of PTSD (Breslau et al., 1998; Tolin & Foa, 2006) and depression (Kuehner, 2003; Parker & Brotchie, 2010) relative to men. Overall, our study differs from prior studies in that we aimed to consider and model the joint influence of gender and military authority on risk of PTSD and depression.

There are a number of potential explanations for the observed interaction between gender and military authority in risk of PTSD and depression after most recent deployment. First, female officers may have differing social support structures relative to their male counterparts—possibly within and/or outside of the military context, before, during, and/or after deployment. Second, it is possible that there is differential symptom reporting by men and women on psychiatric symptoms, although this seems unlikely given that in the validation of a similar study there were no gender differences in case classification for either PTSD or depression, using the Clinician Administered PTSD Scale and SCID, respectively (Prescott et al., 2014). Third, it is possible these findings are explained by a contradictory class status that female officers are positioned in—with greater responsibility than female and male enlisted service members, but less additional organizational control (i.e., influence over company policy and sanctioning of authority) relative to male officers (Muntaner et al., 1998; Muntaner, Eaton, Miech, & O'Campo, 2004; Wright, 1997). Fourth, it is possible that the challenges inherent in RC service are particularly great among female officers, including concerns about life and family disruptions during deployment, which are associated with higher risk of PTSD symptoms among

female reservists, relative to their male counterparts (Polusny et al., 2014).

In addition to our main findings, we also observed that the cumulative number of deployment related traumatic events was related positively to both depression and PTSD in a dose-response fashion. Finally, a prior history of PTSD not related to most recent deployment was strongly and positively associated with PTSD related to most recent deployment. These findings are consistent with prior studies in finding a positive dose-response relationship between cumulative trauma load and PTSD (Kang, Natelson, Mahan, Lee, & Murphy, 2003; Tanielian & Jaycox, 2008) and between cumulative trauma load and depression (Tanielian & Jaycox, 2008); prior studies have also found a strong positive association between prior PTSD and new-onset PTSD since most recent deployment (Luxton et al., 2010).

There were six principal limitations to this work. First, as with any voluntary survey, self-selection processes may create bias. However, we were able to adjust for probability of selection owing to known demographic variables in our complex survey weights, and are confident that we accounted for most of the bias. Second, this study includes the use of telephone-based assessment of depression and PTSD rather than in-person clinical diagnostic interviews. Despite this limitation, the instruments used in this study have been validated in a very similar population (Prescott et al., 2014) and have been shown to be highly specific, without any gender differences in their operation. Although these assessments have low sensitivity, any inherent bias should lead to an underestimate of the key associations of interest. Third, although the trauma exposure variables in this analysis profile quantity and quality of trauma exposure, they are summary variables and cannot provide the level of resolution inherent in an analysis of the full complement of individual trauma questions. Fourth, this study lacked administrative data to confirm deployment exposure characteristics, which are known to be misreported to varying degrees per a prior military study (Dohrenwend et al., 2006). Nonetheless, any misclassification of deployment exposure is unlikely to differ by gender or military authority, and thus would not affect the main results of our study. Fifth, our use of a RC sample limits our inferences to service members in the RC. Sixth, and finally, the small number of female cases in our interaction cells (PTSD: 7 female officers, 4 female enlisted; depression: 7 female officers, 8 female enlisted) is a notable limitation that renders these results preliminary.

Implications for Practice and/or Policy

Notwithstanding these limitations, this preliminary study suggests that, among RC service members, female officers may be at greatest risk for depression and PTSD after deployment; female enlisted service members have risks similar to those of male enlisted service members, and male officers have the lowest risks. Critically, it will be important to replicate this finding and determine causes of this disparity, and opportunities for its mitigation. It may be that women in the military face more difficulty in reaching positions of power, and also have less social support and organizational control upon attaining such authority relative to their male counterparts. Finally, it is possible that this finding is specific to RC service members and rooted in the complex balancing of their military and civilian lives (Castaneda et al., 2009), a challenge that is exacerbated during deployment and may be particularly formidable for female service members with military authority. By extension, the challenges of reintegration from military to civilian life (Ahern et al., 2015; Sayer

et al., 2010) after deployment may be greater for female officers, relative to their male and enlisted counterparts. Clear implications await replication and identification of causes of these observed differences in risk.

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Supplementary Data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.whi.2016.01.001>.

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Author Descriptions

Gregory H. Cohen, MPhil, MSW, is a doctoral student in the Department of Epidemiology at Columbia University and a data analyst at Boston University School of Public Health. He is interested in the epidemiology of psychiatric and substance use disorders.

Laura A. Sampson, BA, is affiliated with Boston University School of Public Health, Department of Epidemiology, as both a PhD student and data analyst. Her research interests include mental health after trauma, mental health in the military, and urban health.

David S. Fink, MPH, is interested in the influence of social arrangements and interactions on the health and well-being of trauma-exposed populations. He is currently pursuing his PhD in Epidemiology at Mailman School of Public Health at Columbia University.

Jing Wang, PhD, is a research assistant professor of the Department of Psychiatry at the Uniformed Services University of the Health Sciences. Her area of expertise is application of various latent variable models in psychological and health science.

Dale Russell, PhD, is an Army Pentagon staff officer whose research focuses on prevention sciences, resiliency and health communications, with a focus on at-risk military populations.

Robert Gifford, PhD, is Associate Director for National Security Studies, Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University of the Health Sciences. Areas of expertise include combat and operational stress, traumatic stress, and social psychology.

Carol Fullerton, PhD, is Research Professor at the Uniformed Services University, and Scientific Director, Center for the Study of Traumatic Stress. With extensive experience in epidemiological studies of trauma, she is an expert on acute and long-term effects of posttraumatic stress disorder.

Robert Ursano, MD, is Professor and Chair of the Department of Psychiatry, Uniformed Services University of the Health Sciences. His research interests include stress and behavior, posttraumatic stress disorder, and military psychiatry.

Sandro Galea, MD, DrPH, a physician and epidemiologist, is the Dean of the Boston University School of Public Health. His work focuses on causes of brain disorders, particularly mood-anxiety and substance use disorders, and he has an interest in consequences of trauma.