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# Anger and Posttraumatic Stress Disorder Symptom Severity in a Trauma-Exposed Military Population: Differences by Trauma Context and Gender

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Studies have found a stronger association between anger and posttraumatic stress disorder (PTSD) severity in military populations than in nonmilitary populations. Two hypotheses have been proposed to explain this difference: Military populations are more prone to anger than nonmilitary populations, and traumas experienced on deployment create more anger than nondeployment traumas. To examine these hypotheses, we evaluated the association between anger and PTSD severity among never-deployed military service members with nondeployment traumas ( $n = 226$ ) and deployed service members with deployment traumas ( $n = 594$ ) using linear regression. We further examined these associations stratified by gender. Bivariate associations between anger and PTSD severity were similar for nondeployment and deployment events; however, gender modified this association. For men, the association for deployment events was stronger than for nondeployment events ( $\beta = .18, r = .53$  vs.  $\beta = .16, r = .37$ , respectively), whereas the reverse was true for women (deployment:  $\beta = .20, r = .42$  vs. nondeployment:  $\beta = .25, r = .65$ ). Among men, findings supported the hypothesis that deployment traumas produce stronger associations between PTSD and anger and are inconsistent with hypothesized population differences. In women, however, there was not a clear fit with either hypothesis.

Research has found that anger is associated with posttraumatic stress disorder (PTSD) symptom severity in veterans (Elbogen, Wagner, et al., 2010; Novaco & Chemtob, 2002; Taft, Creech, & Kachadourian, 2012) and among nonmilitary adults who experienced trauma (Orth, Cahill, Foa, & Maercker, 2008). In their 2006 meta-analysis of 39 original studies, Orth and Wieland (2006) examined the correlation between anger and PTSD symptom severity in civilian and military populations; 19 of these studies examined populations with military experience. Orth and Wieland reported that the context of the

traumatic event, which they classified as military-related or nonmilitary related, moderated the association between PTSD and anger. In populations with traumas related to military experience, the association between anger and PTSD was stronger (average correlation coefficient  $r = .56$ ) than in civilian populations with traumas related to nonmilitary experiences (average  $r$  for different types of events ranged from .30 for criminal victimization to .43 for civilian war experience).

Orth and Wieland raised the question of whether the observed differences in the association between anger and PTSD in military and civilian populations were due to differences in pretrauma characteristics of those who join military service or due to differences in the nature of deployment-related traumatic events compared to other types of traumatic events. We labeled these hypotheses, respectively, differences in population and differences in trauma.

The differences in population hypothesis would require unequal distribution of factors associated with an increased anger response to PTSD between military and nonmilitary populations. For this hypothesis to be true, people who decided to join the military would, on average, have been more likely to

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have a heightened anger response in the context of PTSD than people who decided not to join the military. It is reasonable to consider that the known differences between military and non-military populations in terms of demographics, lower socioeconomic status and education, and higher past traumas could be explanations for observed differences; however, the data are somewhat limited (Elbogen, Fuller, et al., 2010; United States Government Accountability Office, 2005). On the one hand, recent research has documented a higher prevalence of intermittent explosive disorder (IED) in an Army sample (11.2%) than in a matched civilian sample (1.7%; Kessler et al., 2014), and it is possible that a higher baseline level of anger could lead to a stronger association between anger and PTSD after a traumatic event, although this has not been established. On the other hand, a recent longitudinal study of Dutch soldiers found that soldiers had below-average trait anger levels both before and after deployment compared to the general population (Lommen, Engelhard, van de Schoot, & van den Hout, 2014). An ideal test of this hypothesis would expose a nonmilitary and a volunteer military population to the identical traumas and evaluate whether these groups had different correlations between anger and PTSD symptom severity. A different test, however, can also provide evidence to support or refute this hypothesis: Does an all-military population have a uniform correlation between anger and PTSD when exposed to different types of traumatic events or is there variability in this correlation? If underlying population differences cause the observed higher correlation between anger and PTSD in military populations, we would expect to observe a uniform high correlation within an all-military population regardless of the type of traumatic event experienced.

The differences in trauma hypothesis, on the other hand, emphasizes either the uniqueness of traumas sustained during combat (e.g., killing, witnessing violent deaths) or a difference in the underlying physiology of military service members during deployment to a warzone. The second possibility is elaborated in the information processing explanatory model of anger and PTSD presented by Taft et al. (2012). The information processing model builds upon Chemtob et al.'s (Chemtob, Novaco, Hamada, & Gross, 1997; Chemtob, Novaco, Hamada, Gross, & Smith, 1997) regulatory model of posttraumatic anger, and links heightened anger responses to trauma to adaptive warzone cognitive processing (e.g., increased anger-related arousal, actions, and cognitions that occur when continually under threat of enemy attack).

In the present study, we enrolled participants currently serving in the U. S. Reserve and National Guard. This population included a subset of individuals who had not yet been deployed as of the first two waves of the study, but who had experienced traumas either before joining the military or during service. Within these data, therefore, we had an opportunity to interrogate the two hypotheses put forward by Orth and Wieland (2006) by examining whether in an all-military population, the association between anger and PTSD varied depending on whether the traumatic events that gave rise to the PTSD oc-

curred in the context of a deployment or not. If the association was found to be consistent regardless of whether the trauma occurred in the context of a deployment or not, this would provide evidence to support the differences in population hypothesis. In that case, those who decided to join the military would have a specific pattern of anger response in the context of PTSD, regardless of whether the traumas were sustained as part of a deployment. In contrast, if the association between anger and PTSD were found to be stronger when the trauma occurs in the context of a deployment than when the trauma did not occur during a deployment, we would have evidence to support the differences in trauma hypothesis. In that case, those who experienced traumas during deployment would have a different pattern of anger response in the context of PTSD from those who experienced traumas in a nondeployment context. Because the information-processing model of traumatic anger posits the importance of heightened arousal during combat, we additionally stratified the deployed population by whether the participant experienced combat.

In addition, we wanted to examine whether there were differences in these associations by gender in an all-military population. As women now make up more than 16% of military service members (The Women's Memorial, 2011), understanding any possible gender differences in PTSD and anger is important. The information processing model of traumatic anger was developed with male Vietnam war veterans; examining the relations between anger and PTSD symptom severity in the context of deployment and combat in women is important and has not previously been done. Given the likelihood of gender differences in the types of traumatic events military personnel experience prior to military service and during deployment, we accounted for the types of traumatic events that participants experienced in each context.

This study builds on our prior research on the prevalence of anger problems in Reserve and National Guard service members (Worthen et al., 2014). In that study, we compared the prevalence of anger problems among those with and without symptoms consistent with PTSD diagnosis related to deployment and civilian contexts. Although we found no gender differences, we had limited power due to the low prevalence of PTSD in the study population (prevalence of deployment-related PTSD was 3.9% and 0.8% in men and women, respectively, and 2.4% and 5.5% in men and women, respectively, for civilian-related PTSD). In the prior study, we treated anger categorically, whereas in the present study, we treated anger continuously making use of the full response to a 4-item anger scale. In the present study, we advanced our prior work by evaluating PTSD symptom severity among service members who report experiencing traumatic events, using measures that allow direct comparisons of the association between anger and PTSD symptom severity to the extant psychological literature. PTSD symptom severity captures important and distinct information from PTSD diagnosis (Yehuda & LeDoux, 2007) and research has shown that individuals who do not meet diagnostic criteria for PTSD may experience a similar level of functional

impairment as those who do meet diagnostic criteria (Sher, 2004). In addition, the present study considers the role of the type of traumatic event that participants experienced and whether a participant experienced combat during deployment. These new analyses allowed us to assess the two dominant hypotheses in the literature about why previous research has shown a stronger correlation between anger and PTSD severity in military populations than has been documented for nonmilitary populations.

## Method

### Participants and Procedure

The study sample has been described in detail elsewhere (Worthen et al., 2014). In brief, cohort participants came from a stratified random sample obtained through the Defense Manpower Data Center designed to be representative of National Guard and Reserve soldiers serving in the military as of June 2009. There were 2,003 service personnel who were interviewed by phone at baseline, with an overall cooperation rate of 68.2%, defined as the number of participants who consented regardless of eligibility divided by the number of working numbers we successfully contacted. Consent to participate in the study began in January 2010 and ended July 2010. Participants were compensated for their time with \$25 for an approximately 50-minute interview. A second wave of data collection beginning in January 2011 and ending in November 2011 attempted to reach 1,996 of the Wave 1 participants (seven participants declined further participation after the baseline interview). The cooperation rate for Wave 2 was 91% and the response rate was 74%. Participants who were interviewed at baseline were eligible to be interviewed in the second wave regardless of whether they had retired or separated from the Reserve or National Guard between Waves 1 and 2. Second wave phone interviews averaged 37 minutes and participants received a \$25 stipend. The U.S. Army Medical Command's Congressionally Directed Medical Research Programs Unit, the Human Research Protection Office at the U.S. Army Medical Research & Materiel Command (Fort Detrick, MD), and the institutional review boards at both the Uniformed Services University of the Health Sciences (Bethesda, MD) and Columbia University (New York, NY) approved the study protocol. Verbal informed consent was obtained from all participants.

For the present study, data on gender, race, lifetime traumas, and deployment history were obtained from the baseline survey; all other variables were obtained from the second wave of data, including traumas occurring between the two waves of data collection, PTSD symptoms, anger, age, education, marital status, and recent deployment history. The characteristics of the sample analyzed in the present study are reported in Table 1.

### Measures

Participants were asked whether they experienced any traumatic events in their lifetime and whether that event was deployment-

Table 1  
*Characteristics of Study Sample*

Variable	Total	%	Men	%	Women	%
<b>Age</b>						
18–24 years	147	17.9	115	16.9	32	23.2
25–34 years	296	36.1	251	36.8	45	32.6
35–44 years	210	25.7	174	25.5	36	26.1
45 years or older	167	20.4	142	20.8	25	18.1
<b>Race</b>						
White	601	73.3	515	75.5	86	62.3
Non-White	135	16.5	97	14.2	38	27.5
Decline to state	84	10.2	70	10.3	14	10.1
<b>Education</b>						
High school or less	110	13.4	96	14.1	14	10.1
Some college	270	32.9	231	33.9	39	28.3
College or more	440	53.7	355	52.1	85	61.6
<b>Marital status</b>						
Currently married	458	55.9	403	59.1	55	39.9
Not currently married	362	44.1	279	40.9	83	60.1
<b>Total</b>	<b>820</b>	<b>100</b>	<b>682</b>	<b>83.2</b>	<b>138</b>	<b>16.8</b>

related. These events were compiled from items in the Deployment Risk and Resilience Inventory (DRRI) and a list of Criterion A events developed by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 1989; King, King, Vogt, Knight, & Samper, 2006). Participants could also describe any other event that they identified traumatic. We assessed lifetime traumatic events at baseline and events occurring between baseline and Wave 2 during the Wave 2 interview.

Participants identified their “worst” trauma from the list of traumas that they had experienced. We classified each individual's worst traumatic event into one of five categories based on Breslau et al.'s classification (Breslau, Wilcox, Storr, Lucia, & Anthony, 2004). Although Breslau et al. used four trauma categories, we separated sexual traumas from the larger category of assaultive trauma due to our interest in exploring possible gender differences in traumatic event types. For participants who reported other worst traumas, we reclassified the trauma where sufficient information was provided to categorize the trauma and excluded those whose traumas did not meet the level of a Criterion A stressor.

We classified deployments as combat deployments if the individual reported that he or she participated in combat operations or experienced combat as a member of medical staff, helicopter crew, or corpse detail.

To assess PTSD symptom severity, we used questions from the PTSD Checklist-Civilian (PCL-C; Keen, Kutter, Niles, & Krinsley, 2008; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-C is made up of 17 items scored from 1 = *not at all* to 5 = *extremely*; the range of possible scores is 17 to 85. The PCL-C has been widely used in military populations

and was more appropriate for this study than the military version of the scale because we sought to capture civilian as well as military traumas. The PCL has been found to have high internal consistency, good test-retest reliability, and be highly correlated with other PTSD scales (Keen et al., 2008; Weathers et al., 1993). Although the PCL was constructed to solicit symptoms in the past month, we asked participants to answer with respect to symptoms they experienced within the last 12 months, which allowed us to better map our screening to the definition of PTSD according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994), but making our PCL data not comparable with most other PCL data.

Participants were administered this PTSD scale if they reported any traumatic event. They were administered the scale with respect to what they identified as the worst trauma related to their most recent deployment and their worst trauma not related to a deployment. Thus, respondents had the opportunity to complete the PTSD scale twice, creating separate scores for PTSD symptoms related to a deployment trauma and PTSD symptoms related to a nondeployment trauma. Participants who identified traumas in the context of a deployment were classified with a deployment trauma regardless of whether they additionally experienced traumas not related to a deployment. PTSD symptom severity was calculated using a continuous score of symptoms in Criteria B, C, and D (Keen et al., 2008). The Cronbach's  $\alpha$  for this sample was .94 for PTSD in a nondeployment context and .97 for PTSD in a deployment context.

Anger was measured using a 4-item scale developed from questions in the Dimensions of Anger scale (DAR; Forbes et al., 2004). The full scale has been validated in Operation Enduring Freedom/Operation Iraqi Freedom service members (Novaco, Swanson, Gonzalez, Gahm, & Reger, 2012). The four items used here assessed the frequency, intensity, antagonism, and social impairment involved with the respondent's experience of anger in the past 12 months. Respondents rated how much they disagreed or agreed with each statement on a 5-point Likert scale from *strongly disagree* to *strongly agree*. Anger severity was calculated using a continuous summary score. The Cronbach's  $\alpha$  for the scale was good at .78 with item-test correlations ranging from .76 to .80.

## Data Analysis

Although we collected data in two periods, these analyses were cross sectional, as anger and PTSD symptom severity were only collected in the second wave. First wave covariates were either fixed (e.g., race) or were combined with Wave 2 variables to create composite variables (e.g., lifetime traumas). We addressed missing demographic data as follows: We used mean imputation to assign an age to 8 participants with missing values for age; we created a Decline to State category for 84 participants missing values for race. We used linear regression models to evaluate the association between PTSD symptom severity and anger for two traumatic context groups: (a) among those who had

never deployed and experienced traumatic events not related to a deployment (nondeployment), and (b) among those who reported deployment-related traumas (deployment). Next, for each traumatic event context (nondeployment or deployment), we stratified the linear regression models to assess effect modification by gender. Then, to account for possible confounding for the association between PTSD and anger, we adjusted the four regression models for worst traumatic event type, age, education, marital status, and race. Finally, we stratified the group with deployment traumas by whether the participant experienced combat during the deployment. For each regression, we report the regression coefficient ( $\beta$ ) and the correlation coefficient ( $r$ ) with corresponding 95% confidence intervals. We then tested the correlation coefficients,  $r$ , from the stratified models for homogeneity using the method described by Cox (2008), which is based on Fisher's use of the inverse hyperbolic tangent function. This approach yields a  $p$  value for a  $\chi^2$  test statistic, which we report as " $p_{\text{corr}}$ " to distinguish it from the  $p$  value for the regression model. All analyses were conducted in Stata version 12 (StataCorp, 2011).

## Results

Of the 1,293 study participants, 226 (17.5%) experienced a Criterion A-level trauma and had never deployed and 594 (45.9%) reported a Criterion A-level trauma related to a deployment. The mean nondeployment PTSD symptom severity score was 23.01 ( $SD = 8.81$ , range = 16 to 69). The mean nondeployment PTSD symptom severity score was slightly higher for women (25.61) than for men (21.94; mean comparison  $t$  test  $p = .004$ ). The mean deployment-related PTSD symptom severity score was 25.6 ( $SD = 12.63$ , range = 0 to 85) and no gender differences were found. The mean anger severity score was 8.42 ( $SD = 4.21$ , range = 4 to 20) and there were no gender differences. Those who had deployed had slightly higher mean anger (8.76,  $SD = 4.41$ ) than those who had never deployed (7.53,  $SD = 3.56$ ), mean comparison  $t(818) = -3.7305$ ,  $p < .001$ .

Table 2 describes the types of worst trauma identified in the sample, stratified by gender and trauma context. There were significant differences in the distribution of type of worst trauma identified by those who experienced only traumas in a nondeployment context and those who experienced traumas in the context of deployment (all  $p$  values  $< .001$ ). Within those with nondeployment traumas, the only statistically significant difference in the distribution of the type of worst trauma by gender was in the prevalence of sexual trauma ( $p = .016$ ). This was also the case for those with deployment traumas ( $p < .001$ ).

Among military service members who reported experiencing traumas, there was evidence of an association between PTSD symptom severity and anger for traumatic events in the context of a deployment ( $\beta = .18$ ,  $r = .52$ ,  $p < .001$ ). There was also evidence of an association between PTSD severity and anger for traumatic events in the nondeployment context ( $\beta = .20$ ,

Gender Differences in Anger and PTSD

Table 2  
Type of Worst Trauma in Nondeployment and Deployment Context by Gender<sup>a</sup>

Worst trauma type <sup>b</sup>	Nondeployment				Deployment			
	Men	%	Women	%	Men	%	Women	%
Nonsexual assault	7	4.4	5	7.6	245	46.9	31	43.1
Sexual trauma	1	0.6	8	12.1	0	0	5	6.9
Shocking event or injury	49	30.6	17	25.8	215	41.4	27	37.5
Learning of traumas	41	25.6	12	18.2	15	2.9	2	2.8
Sudden death loved one	62	38.7	24	36.4	46	8.8	7	9.7
Total	160	100	66	100	522	100	72	100

<sup>a</sup>Participants may have experienced multiple traumas in either nondeployment or deployment context. <sup>b</sup>Examples of traumatic events within each category: (1) Being shot at or stabbed, (2) Being raped, (3) Being in a fire or explosion, (4) Learning that a close friend or relative was seriously physically attacked, (5) Sudden death of a loved one.

$r = .49, p < .001$ ). These two correlations were similar ( $p$  for the correlation coefficient test of homogeneity:  $p_{\text{corr}} = .61$ ; Table 3).

When we examined the association between PTSD symptom severity and anger stratified by gender and trauma context, we found heterogeneity in the regression and correlation coefficients (Table 3). In multivariable linear regressions adjusting for worst traumatic event category, age, education, marital status, and race, these differences were strengthened (Table 4). Although men and women with traumatic events in the deployment context had similar correlations between PTSD symptom severity and anger to one another ( $p_{\text{corr}} = .22$ ), this was not the case for traumatic events in the nondeployment context ( $p_{\text{corr}} = .01$ ). The correlation between PTSD symptom severity and anger among women with traumatic events in the nondeployment context was stronger than the correlation for men with nondeployment traumatic events. Among men, the correlation for traumatic events in the context of deployment was significantly stronger than for traumatic events in the nondeployment context ( $p_{\text{corr}} = .02$ ). Among women, the reverse was found: The correlation for traumatic events in the nondeployment context was significantly stronger than for traumatic events in the context of a deployment ( $p_{\text{corr}} = .04$ ).

To understand the contribution of combat exposure to the association between anger and PTSD symptom severity for those with traumatic events in the context of deployment, we stratified the adjusted analyses by whether the participant was exposed

to combat during the deployment (Table 5). We found no statistically significant gender differences within the combat and noncombat groups ( $p$  for the correlation coefficient test of homogeneity between men and women exposed to combat during deployment:  $p_{\text{corr}} = .85$ ;  $p$  for the correlation coefficient test of homogeneity between men and women not exposed to combat during deployment:  $p_{\text{corr}} = .96$ ). Among men, the correlation for traumatic events in the context of a noncombat deployment was similar to the correlation for traumatic events in the nondeployment context ( $p_{\text{corr}} = .92$ ), but different from the correlation for traumatic events in the context of a combat deployment ( $p_{\text{corr}} = .01$ ). Among women, the correlations in three groups (nondeployment, deployment with combat exposure and deployment without combat exposure) were statistically similar to one another, likely due to small sample sizes.

Discussion

The bivariate association between PTSD symptom severity and anger was similar for traumatic events in the nondeployment and deployment context, initially suggesting support for the differences in population hypothesis. When we stratified by gender, however, differences in the association between PTSD and anger became apparent, though in opposite directions for men and women. For men, the association between PTSD and anger was stronger in the context of a deployment (adjusted  $r = .54$ ), and specifically during combat deployments (adjusted

Table 3  
Regression Coefficient and Correlation Between Anger and PTSD Symptoms by Event Context and Gender

Context	Total					Men					Women				
	<i>n</i>	$\beta$	95% CI	<i>r</i>	95% CI	<i>n</i>	$\beta$	95% CI	<i>r</i>	95% CI	<i>n</i>	$\beta$	95% CI	<i>r</i>	95% CI
Nondeployment	226	.20	[.15, .24]	.49	[.38, .58]	160	.16	[.09, .22]	.37	[.22, .49]	66	.25	[.17, .32]	.65	[.47, .76]
Deployment	594	.18	[.16, .21]	.52	[.46, .57]	522	.18	[.16, .21]	.53	[.46, .58]	72	.20	[.09, .30]	.42	[.20, .59]

Note. PTSD = posttraumatic stress disorder.

Table 4  
Adjusted<sup>a</sup> Correlation Between Anger and PTSD Symptom Severity by Event Context

Context	Total					Men					Women				
	<i>n</i>	<i>a β</i> <sup>b</sup>	95% CI	<i>a r</i> <sup>c</sup>	95% CI	<i>n</i>	<i>a β</i>	95% CI	<i>a r</i>	95% CI	<i>n</i>	<i>a β</i>	95% CI	<i>a r</i>	95% CI
Nondeployment	226	.19	[.14, .24]	.49	[.38, .58]	160	.14	[.07, .21]	.38	[.23, .50]	66	.24	[.17, .32]	.66	[.48, .77]
Deployment	594	.18	[.15, .20]	.53	[.47, .58]	522	.18	[.15, .20]	.54	[.47, .60]	72	.19	[.09, .29]	.42	[.20, .59]

Note. PTSD = posttraumatic stress disorder.

<sup>a</sup>Correlation adjusted for traumatic event type, age, education, marital status, and race. <sup>b</sup>*a β* = adjusted  $\beta$ . <sup>c</sup>*a r* = adjusted *r*.

*r* = .57), than for traumatic events in the nondeployment context (adjusted *r* = .38). The estimates for the correlation for each of these traumatic event contexts in men were similar to correlations reported by Orth and Wieland (2006) in their meta-analysis, and lend support to the differences in trauma hypothesis. These findings support the regulatory model of post-traumatic anger (Chemtob, Novaco, Hamada, & Gross, 1997; Chemtob, Novaco, Hamada, Gross, & Smith, 1997), hypothesizing that the state of arousal during a combat deployment is different than during either a noncombat deployment or a non-deployment context and that this physiologic state influences the way that anger co-occurs with traumatic stress.

In contrast, the association between PTSD and anger among women was strongest for traumas that occurred in a nondeployment context (adjusted *r* = .66), and this correlation was stronger than any correlation reported in the 39 studies examined by Orth and Wieland (2006) for any type of trauma. There were no gender differences in the association between PTSD and anger for traumatic events in the context of a deployment (adjusted *r* = .42), nor was there a statistical difference between men and women when we considered just those who experienced combat during their deployment (adjusted *r* = .55). These findings did not support the differences in population hypothesis, as differences were apparent in the association between PTSD and anger by trauma context (nondeployment vs. deployment). Although the differences in trauma hypothesis proposes that deployment-related traumas had a stronger association between PTSD and anger, the results in women were the opposite, establishing a stronger association between PTSD and anger for traumas that occurred in a nondeployment context

than traumas that occurred during deployment. As these results defy current hypotheses, further research should examine these relations in other female military populations and, if consistent, explanatory frameworks should be developed.

In this study, we found that the types of traumatic events that participants identified as their worst trauma in a nondeployment context (either as civilians or during training) differed from the types of traumatic events identified while on deployment. Apart from sexual traumas, men and women were equally likely to identify each category of trauma as their worst trauma within each trauma context. This is largely consistent with Tolin and Foa's (2006) meta-analysis of 290 studies, which reported that the only trauma type that women are more likely to experience than men is sexual assault or abuse.

Previous research has not suggested that gender should be considered when evaluating the association between PTSD symptom severity and anger. Orth and Wieland (2006) found that the proportion of female participants in a study did not significantly predict the association between PTSD symptom severity and anger; however, a lack of gender-stratified results in the studies being summarized likely reduced their ability to consider the role of gender. Our stratified results suggested gender is an important modifier of the association between PTSD symptom severity and anger.

Our prior study (Worthen et al., 2014) examined gender as an effect modifier in the association between symptoms consistent with a PTSD diagnosis and anger. Although we found no evidence that gender modified that association, we had limited statistical power to detect an interaction. In some samples of mixed gender, gender has been included as a control

Table 5  
Adjusted<sup>a</sup> Correlation Between Anger and PTSD Symptom Severity Among Persons Deployed With and Without Combat

Deployment	Total					Men					Women				
	<i>n</i>	<i>a β</i> <sup>b</sup>	95% CI	<i>a r</i> <sup>c</sup>	95% CI	<i>n</i>	<i>a β</i>	95% CI	<i>a r</i>	95% CI	<i>n</i>	<i>a β</i>	95% CI	<i>a r</i>	95% CI
Noncombat	143	.15	[.09, .20]	.36	[.20, .49]	118	.15	[.08, .21]	.37	[.20, .51]	25	.22	[.03, .41]	.36	[-.07, .64]
Combat	451	.18	[.15, .21]	.57	[.50, .63]	404	.18	[.15, .21]	.57	[.50, .63]	47	.24	[.10, .39]	.55	[.29, .71]

Note. PTSD = posttraumatic stress disorder.

<sup>a</sup>Correlation adjusted for traumatic event type, age, education, marital status, and race. <sup>b</sup>*a β* = adjusted  $\beta$ . <sup>c</sup>*a r* = adjusted *r*.

covariate in the association between PTSD symptom severity or diagnosis and anger. The present study suggested that gender should not be controlled, but rather examined as a modifier. Future research evaluating the interrelation between PTSD diagnosis or symptom severity and anger should provide stratified results so that comparisons can be made across study populations.

One potential explanation for the differences in results by gender is that women and men have different experiences of traumatic events and this has an implication for the co-occurrence of anger. Although we attempted to account for this by adjusting for types of traumatic events and stratifying by combat, gendered differences are likely to persist within trauma categories, thus an adjustment for trauma category will only partially account for differences in trauma type (Tolin & Foa, 2006). There is no empirical evidence, however, that we are aware of to support this notion. Indeed, previous research with nonmilitary women found no difference in the association between PTSD and anger when comparing women whose index traumatic event was rape and women whose index traumatic event was a nonsexual assault (Riggs, Dancu, Gershuny, Greenberg, & Foa, 1992). Our dichotomous measure of combat exposure, rather than a measure that accounted for severity of combat, may also have failed to sufficiently capture gendered differences in traumatic event exposure.

Some limitations of this study are worth noting. The prevalence of PTSD was low for traumatic events occurring in both the deployment and nondeployment contexts. Although the present study considered PTSD symptom severity, not diagnosis, we do not know whether these results would be replicable in a population with a high prevalence of PTSD diagnosis. In addition, we used a short scale to assess anger that has not been previously validated. This reduced scale, however, has an excellent Cronbach's  $\alpha$  and factor loadings for the reduced scale are consistent with what others have reported with the full scale (Novaco et al., 2012). We are therefore confident that the scale captures anger frequency, intensity, antagonism, and social impairment well. Other facets of anger, like duration, have been shown to vary by gender and may be important to consider in future research (Dittmann, 2003). We recommend that future research use a fuller anger measure to expand our understanding of gender and trauma context in anger and to inform appropriate interventions.

Our treatment of traumatic events did not account for prior PTSD or the number of traumatic events a participant may have experienced in their lifetime. Indeed, 95% of women and 93% of men in the group who experienced trauma in the context of a deployment also reported experiencing non-deployment traumas. Although prior PTSD may increase the likelihood of developing PTSD related to a subsequent traumatic event (Breslau, Peterson, & Schultz, 2008), to our knowledge, the effect of prior PTSD or number of lifetime traumatic events on relations between anger and PTSD symptom severity is unknown. This would be a fruitful avenue for future research.

This was the first study we are aware of to find evidence of a stronger correlation between anger and PTSD symptom severity in military women who experience trauma in a nondeployment context than in men or women who experience traumatic events in the context of a deployment. We were also the first to identify a weaker correlation between anger and PTSD symptom severity for men with traumas in the nondeployment context compared to men or women with traumatic events in the deployment context as far as we know. Further research should examine these associations in other study populations to see whether these patterns persist, particularly in samples with a larger number of women. As a whole, these findings did not fully support either the differences in population hypothesis or the differences in trauma hypothesis though in men these data did support the differences in trauma hypothesis.

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