Published in final edited form as:

Mil Behav Health. 2014 January 1; 2(2): 217–223. doi:10.1080/21635781.2014.891433.

Impact of Combat and Social Support on PTSD and Alcohol Consumption in OEF/OIF Veterans

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Abstract

We tested buffering and direct effect theories of social support to determine if combat exposure level moderated relationships between two aspects of social support (unit cohesion and postdeployment support) and two outcomes (PTSD and alcohol consumption) in 69 hazardous-drinking OEF/OIF veterans (65% Caucasian, 91% male). Combat exposure moderated the relationship between unit cohesion and PTSD. Unit cohesion was related to lower PTSD severity only for veterans with less severe combat exposure. Higher postdeployment support was related to less severe PTSD for all veterans. Alcohol consumption results were not significant.

Keywords

combat; PTSD; social support; alcohol use; unit cohesion; postdeployment support; veterans; buffering theory; direct effect theory; moderation

An extensive amount of research has examined the aftermath of combat exposure, often focusing on posttraumatic stress disorder (PTSD; e.g. Dohrenwend et al., 2006) and alcohol misuse (e.g. Wilk et al., 2010). Given the negative impact PTSD and alcohol misuse have on quality of life, interpersonal relationships, employment, and health (Karney et al., 2008; Mattiko et al., 2011), it is essential to investigate factors that may prevent these outcomes. Social support may be an important buffer against PTSD and hazardous alcohol consumption. There are two competing theories concerning the process by which social support is related to mental health outcomes. The buffering theory posits that social support protects against adverse mental health outcomes following a stressful event (Cohen & Wills, 1985). After a stressful or traumatic event, an individual's resources and ability to cope become strained, and social support provides needed resources and reduces the stress reaction. The buffering theory suggests that an interaction between social support and stress exists, with social support showing a stronger relationship to mental health outcomes when stress is high, compared to when stress is low. The direct effect theory states that social support is beneficial regardless of stress levels. At any stress level, social support promotes psychological health while protecting against negative psychological outcomes. These

competing theories of social support have been widely tested, with research continuing to support both theoretical models.

In the literature on combat trauma, researchers have examined specific types of social support that seem to play a role in preventing the development of PTSD, highlighting the importance of unit cohesion and postdeployment support (Fontana et al., 1997). Unit cohesion is defined as assistance and encouragement during combat from fellow unit members, leaders of the unit, and the military in general (King et al., 2006). An inverse relationship between unit cohesion and PTSD has been found in samples of Operation Enduring Freedom/ Operation Iraqi Freedom (OEF/OIF) veterans (Pietrzak et al., 2010) and British veterans of the Iraq War (Rona et al., 2009). In a sample of Vietnam veterans, an interaction between combat exposure and unit cohesion on PTSD diagnosis probability was found (Fontana et al., 1997). Among veterans reporting low combat exposure, there was an inverse relationship between unit cohesion and probability of PTSD diagnosis, suggesting that unit cohesion buffered the development of PTSD. Among veterans reporting high combat exposure, there was a positive relationship between unit cohesion and PTSD diagnosis probability. High unit cohesion may accentuate feelings of loss and survivor guilt when members of one's unit are wounded or killed (Milgram and Hobfoll, 1986), which may in turn increase posttrauma symptoms.

Postdeployment support refers to the amount of emotional and instrumental assistance family, friends, coworkers, employers, and the community provide to a veteran upon return from deployment (King et al., 2006). Higher postdeployment support has been associated with lower PTSD severity in Vietnam veterans (Boscarino, 1995) and OEF/OIF veterans (Pietrzak et al., 2010). In a sample of Vietnam veterans, Fontana and colleagues (1997) found a main effect for postdeployment support and an interaction between combat exposure and postdeployment support in predicting PTSD diagnosis. Veterans reporting high postdeployment support were less likely to have a PTSD diagnosis than those reporting low postdeployment support, but this relationship was stronger among veterans experiencing high combat exposure compared to those with low combat exposure (Fontana et al., 1997), supporting the buffering theory.

Little research has focused on the associations between combat-related social support and alcohol use. In a sample of British Iraq War veterans there was a positive relationship between unit cohesion and alcohol misuse (Browne et al., 2008). To date only one study has investigated the association of postdeployment support and alcohol use. In a sample of Vietnam veterans, those with higher postdeployment support reported a lower rate of alcohol abuse than those with lower postdeployment support (Boscarino, 1995). This suggests that once a veteran returns from deployment, social support may be protective against continuing or developing hazardous drinking patterns. Given the possible interactions between trauma exposure, support, and alcohol use, combat exposure may be moderating the relationships between these supportive factors and alcohol consumption.

This study tested the buffering and direct effect theories of social support in hazardous drinking OEF/OIF veterans, investigating combat exposure as a moderator of the relationships between both unit cohesion and postdeployment support and PTSD and the

relationships between unit cohesion and postdeployment support and alcohol consumption. Although the interactions between combat exposure and both aspects of social support have been examined in samples of Vietnam veterans, these relationships have not been investigated in OEF/OIF veterans. When considering similar interactions that may be present in OEF/OIF veterans, it was important to take into account differences between these two populations. OEF/OIF veterans were exposed to longer deployments with fewer breaks (Hosek et al., 2006), faced different types of threats (e.g. improvised explosive devices; Tanielian et al., 2008), and were more likely to be deployed as a unit (Henning, 2009), compared to veterans of previous wars. It is possible that combat exposure influences the relationship between unit cohesion and PTSD and the relationship between postdeployment support and PTSD for OEF/OIF veterans; however, given these differences, the results in the Fontana et al. (1997) study may not be reflective of OEF/OIF veterans. We hypothesized that combat exposure would moderate the relationship between unit cohesion and PTSD severity and the relationship between postdeployment support and PTSD. We predicted that for all veterans, unit cohesion would be inversely correlated with PTSD severity and that this relationship would be stronger for those reporting higher combat exposure than for those reporting lower combat exposure. We hypothesized a similar pattern for postdeployment support. To date, no studies have investigated the impact of unit cohesion or postdeployment support on alcohol use in OEF/OIF veterans, and no studies have applied buffering and direct effect theoretical models of social support with regard to alcohol use. Given theoretical and preliminary research evidence suggesting a moderation effect of combat exposure on the relationships between supportive factors and alcohol use, we tested these relationships.

Method

Participants and Procedure

Participants were 69 OEF/OIF combat veterans recruited from Memphis Veterans' Affairs Medical Center (VAMC) clinics. Participants were predominantly male ($n = 63$, 91.3%), and ranged in age from 20 to 53 ($M = 32.23$, $SD = 8.80$). The sample was ethnically diverse, with 65.2% identifying as Caucasian ($n = 45$), 27.5% as African American ($n = 19$), 5.8% as multiethnic ($n = 4$), and 1.4% as Asian ($n = 1$).

Data for the present analyses came from a longitudinal study examining the efficacy of brief interventions for alcohol misuse among veterans. Participants were approached in numerous medical clinics (e.g., primary care, OEF/OIF) at the VAMC and given a brief oral description of the study. Advertisements were posted in the VAMC to reach any OEF/OIF veterans who were not encountered in the clinics. Interested participants provided informed consent, and completed screening questionnaires. Participants were eligible if a score of 8 or higher was obtained on the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993). During a baseline appointment, participants were administered structured interviews and completed additional self-report measures. Following the baseline appointment, participants received a brief intervention followed by several post intervention assessments. Data for this investigation were collected during the baseline (pre-intervention)

appointment. Procedures were approved by the Institutional Review Boards of The University of Memphis and the Memphis VAMC.

Measures

Combat exposure and social support constructs were measured with the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006), a 201-item self-report measure that assesses 14 factors related to deployment. The Combat Experiences subscale is a 15-item scale used to assess level of combat exposure. The Unit Support subscale is a 12-item scale used to assess perceived levels of unit cohesion while deployed. Scores range from 12 to 60, with higher scores indicating higher levels of unit cohesion. The Postdeployment Support subscale is a 15-item scale was used to assess perceptions of postdeployment support. Scores range from 15 to 70, with higher scores indicating higher levels of perceived support. These scales demonstrated excellent internal consistency in this sample ($\alpha = .89, .91, .80$, respectively).

The Clinician Administered PTSD Scale (CAPS; Blake et al., 1990) was used to assess current combat-related PTSD severity. The CAPS is a structured interview that assesses the frequency and intensity of each PTSD symptom in the past month. Items are summed for a continuous score of PTSD symptom severity that ranges from 0 to 136, with higher scores indicating more severe PTSD. The CAPS demonstrated good internal consistency in this sample ($\alpha = .76$). A randomly selected subset (20%) of recorded CAPS interviews were subjected to inter-rater reliability analyses, and we found near perfect agreement with an intraclass correlation for PTSD total severity of .99.

The Timeline Follow-Back (TLFB; Sobell & Sobell, 1992) was used to assess participants' alcohol consumption over the past month. The TLFB is a calendar-based interview that asks participants to report the number and type of standard drinks consumed for each day of the past month. Average number of drinks per week, average drinking days per week, and number of binge drinking episodes (5 or more drinks for men, 4 or more drinks for women) in the past month were obtained from the TLFB.

Results

Data Analysis Plan

Predictive and Analytic Software (PASW) version 18 was used to conduct analyses. Prior to conducting analyses, data were corrected for violations of distributional assumptions and outliers using procedures recommended by Tabachnick and Fidell (2007). We conducted Pearson correlations to examine zero-order relations among the variables of interest. Prior to testing moderation hypotheses, variables were mean-centered. To test our hypothesis that combat exposure would moderate the relationship between unit cohesion and PTSD, we conducted a hierarchical regression, regressing CAPS scores onto Unit Support scores, Combat Experiences scores (both entered in Step 1), and the interaction of Unit Support and Combat Experiences (Step 2). To test our hypothesis that combat exposure would moderate the relationship between postdeployment support and PTSD, a similar regression was conducted with Postdeployment Support scores. Drinks per Week, Drinking Days per Week,

and Binge Episodes were highly correlated ($r = .78$ to $.98$, p 's $< .001$), so we converted them into z scores and combined them into a composite variable (Alcohol Consumption). In order to explore combat exposure as a moderator of the relationship between unit cohesion and alcohol consumption, we regressed Alcohol Consumption onto Unit Support scores, Combat Experiences scores (Step 1), and the interaction of Unit Support and Combat Experiences (Step 2). To explore combat exposure as a moderator of the relationship between postdeployment support and alcohol consumption, a similar regression was conducted with Postdeployment Support scores. Simple slopes analyses, as described by Aiken and West (1991), were conducted to determine the nature of the moderation effects. Pairwise deletion was utilized, resulting in varied n 's.

Descriptive Statistics and Correlations

Participants reported having been deployed an average of 1.48 times ($SD = .70$), spending an average of 14.82 months ($SD = 8.56$) in deployments. Participants were assessed an average of 2.38 years ($SD = 1.69$) after returning from deployment. The average overall CAPS severity score was 51.59 ($SD = 26.66$), with 58.0% ($n = 40$) of participants meeting DSM-IV-TR criteria for PTSD. Participants reported drinking an average of 18.72 drinks per week ($SD = 24.51$), consumed over an average of 2.79 drinking occasions per week ($SD = 2.25$) in the past month, and participants reported an average of 5.62 ($SD = 7.49$) binge drinking episodes in the past month. Pearson correlations revealed a positive relationship between combat exposure and PTSD symptom severity ($r = .43$, $p = .001$). An inverse relationship was found for postdeployment support and PTSD symptom severity ($r = -.61$, $p < .001$). No TLFB variables were significantly correlated with combat exposure, unit cohesion or postdeployment social support. Means, standard deviations, and correlations are presented in Table 1.

Combat Exposure as a Moderator of the Relationship between Unit Cohesion and PTSD

A main effect was observed for combat exposure ($B = 2.52$, $\beta = .43$, $p = .001$) in Step 1, $R^2 = .18$, $F(2, 57) = 6.43$, $p = .003$, such that higher levels of combat exposure were related to more severe PTSD (see Table 2). A main effect was not observed for unit cohesion, but an interaction between unit cohesion and combat exposure ($B = .16$, $\beta = .29$, $p = .02$) was observed in Step 2, $R^2 = .26$, $F(3, 56) = 6.52$, $p = .001$. The addition of the interaction explained an additional 7.5% of the variance $F(1, 56) = 5.65$, $p = .02$. Simple slopes analyses indicated that there was an inverse relationship between unit cohesion and PTSD for individuals endorsing lower levels of combat exposure ($p = .04$), such that higher levels of unit cohesion were associated with less severe PTSD. Unit cohesion was not related to PTSD symptom severity among participants with higher levels of combat exposure. See Figure 1 for a graph of these results.

Combat Exposure as a Moderator of the Relationship between Postdeployment Support and PTSD

Main effects were observed for postdeployment support ($B = -1.59$, $\beta = -.59$, $p < .001$) and combat exposure ($B = 2.44$, $\beta = .41$, $p < .001$) in Step 1, $R^2 = .54$, $F(2, 55) = 32.34$, $p < .001$ (see Table 2). Postdeployment support was inversely related to PTSD whereas combat

exposure was directly related to PTSD. The interaction between postdeployment support and combat exposure on PTSD was not significant.

Combat Exposure as a Moderator of the Relationships between Social Support Factors and Alcohol Consumption

There were no significant main effects for combat exposure or unit cohesion, and the interaction between unit cohesion and combat exposure on alcohol consumption was not significant. There were no significant main effects for combat exposure or post deployment support, and the interaction between postdeployment support and combat exposure on alcohol consumption was not significant.

Discussion

This paper investigated two aspects of social support that may serve as protective factors against negative mental health outcomes in a sample of OEF/OIF veterans who were hazardous drinkers. We tested the buffering and direct effect theories of social support, examining level of combat exposure as a moderator of the relationships between supportive factors (unit cohesion and postdeployment support) and mental health outcomes, including PTSD symptom severity and alcohol consumption, as measured by drinks per week, drinking days per week, and frequency of binge episodes in the past month.

There was a relationship between combat exposure and PTSD symptom severity, such that higher levels of combat exposure were associated with more severe PTSD, consistent with many prior findings (e.g. Dohrenwend et al., 2006). While there was no direct effect of unit cohesion on PTSD symptom severity, an interaction between combat exposure and unit cohesion was observed. Among individuals who reported lower levels of combat exposure, higher levels of unit cohesion were associated with lower levels of PTSD symptoms, suggesting it served as a protective factor. At higher levels of combat exposure, PTSD appeared to be unrelated to unit cohesion. These findings do not support the direct effect theory or the buffering theory of social support; however, the relationship between unit cohesion and PTSD symptom severity for lower combat exposure is consistent with some previous work (Fontana et al., 1997). It is possible that a threshold effect may be preventing unit cohesion from exerting a protective effect. Unit cohesion may be helpful for lower levels of combat exposure; however, once combat exposure reaches a higher level, even positive supportive relationships among unit members are not sufficient to prevent PTSD. It is possible that unit cohesion functions differently than general social support. Unit cohesion is experienced during trauma exposure, possibly affecting the support that is received. Unit cohesion is measured retrospectively, whereas when asked about general social support, individuals usually report on their current social support. Given these differences between general social support and unit cohesion, it is possible that the buffering and direct effect theories do not accurately predict the role of unit cohesion.

Postdeployment support was related to PTSD, such that lower levels of postdeployment support were associated with more severe PTSD, and there was not a significant interaction between postdeployment support and combat exposure. While this finding contrasts with some prior findings from Vietnam veterans (Fontana et al., 1997), it is consistent with other

research from both Vietnam (Boscarino, 1995) and OEF/OIF veterans (Pietrzak et al., 2010). This finding offers support for the direct effect theory of social support, suggesting that regardless of the degree of combat exposure, emotional and instrumental assistance provided by postdeployment support networks may prevent veterans from developing severe PTSD. This support may also help veterans cope with existing symptoms, reducing the severity of PTSD. Given previous evidence of a bidirectional relationship between social support and PTSD (Benotsch et al., 2000), it is also possible that PTSD symptom severity influenced perceptions of postdeployment support in this sample. Those who struggle with more severe PTSD may not view their network as supportive or understanding and may be less likely to seek support from others, compared to individuals who have less severe PTSD. It is also possible that PTSD symptoms such as detachment from others, restricted range of affect, irritability and anger, and anhedonia result in interpersonal difficulties and social withdrawal (American Psychiatric Association, 2000), distancing veterans from their support network and resulting in lower perceptions of available support. Future studies could address the direction of the relationship between postdeployment support and PTSD with a prospective design.

Combat exposure did not moderate the relationships between supportive factors and alcohol consumption, and no relationships were observed between combat exposure, unit cohesion, or postdeployment support and alcohol use variables. These findings contradict other studies that reported relationships between alcohol use and combat exposure, unit cohesion, and postdeployment support. It is possible that combat exposure, unit cohesion, and postdeployment support do not impact variability in alcohol use among hazardous drinkers. It is also possible that since all participants were hazardous drinkers, this sample had a truncated range of levels of alcohol consumption, obscuring detection of relationships between these variables. It would be informative for future studies to look at these relationships in all OEF/OIF/Operation New Dawn veterans, including non-hazardous drinkers and abstainers, to determine any impact unit cohesion and postdeployment support have on alcohol consumption, and the potential moderation effect of combat exposure.

There were several limitations to this study that should be considered while interpreting these results. The data are cross-sectional in nature, which does not allow for causal inferences. Additionally the sample size was underpowered. The findings from this study shed some light on these relationships and may be helpful for generating hypotheses that could be tested in a prospective design; however, prospective designs are difficult to implement given the nature of the target stressor, combat exposure. The cross-sectional nature of the data also may have resulted in biased regression coefficients due to random measurement error. The results should only be generalized to veterans receiving services from the Memphis VAMC. This sample was predominantly male, and the small number of females made gender comparisons impossible. Although the majority of military veterans are male, it is of critical importance to understand how these relationships may differ between male and female veterans.

Conclusions

These results underscore the deleterious effect of combat exposure, a significant concern given that most OEF/OIF/OND personnel are expected to serve multiple deployments. These findings suggest that unit cohesion serves an important protective function for deployed service members, and efforts to improve unit cohesion, including peer bonding and supportive leadership, during deployment may help offset the stress of combat. Veterans may also benefit from programs aimed at increasing postdeployment support. Higher levels of homecoming support from significant others and the community may assist readjustment and help veterans cope with posttrauma symptoms.

When combat veterans present for treatment, it may be beneficial for clinicians to assess extent of combat exposure and levels of social support factors (during deployment and after) in PTSD symptoms. Incorporating current social network building skills and interpersonal skills into treatment may lessen the negative consequences of PTSD symptoms. It is possible that reduction of PTSD symptoms will increase perceptions of social support or engagement with supportive others. It may be beneficial to include members of the veteran's social network in therapy to improve PTSD symptoms (McDevitt-Murphy, 2011; Monson et al., 2004).

Acknowledgments

This work was supported by the National Institute on Alcohol Abuse and Alcoholism (Grant #AA016120 to MEM) and by the Department of Veterans Affairs Office of Research and Development.

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Figure 1. Simple slopes depiction of the interaction of combat exposure and unit cohesion on PTSD symptom severity.

Table 1

Means, Standard Deviations, and Correlations among Combat Exposure, Unit Cohesion, Postdeployment Support, PTSD, and Alcohol Consumption

Variable	M	SD	1	2	3	4	5	6	7
1. Combat Exposure	7.57	4.37	-						
2. Unit Cohesion	41.87	10.39	.12	-					
3. Postdeployment Support	52.27	10.05	-.05	.16					
4. PTSD	51.59	26.66	.43***	-.02	-.61***	-			
5. Alcohol Consumption	0	.95	-.06	-.04	.01	.10	-		
6. Drinks/Week	18.72	24.51	-.03	-.03	.02	.11	.98***	-	
7. Drink Days/Week	2.79	2.25	-.24	-.10	-.07	.04	.93***	.89***	-
8. Binge Episodes	5.62	7.49	.11	.01	.07	.13	.95***	.95***	.78***

Note. M = mean. SD = standard deviation. Alcohol Consumption = average of z scores of alcohol-related variables. Drinks/Week = drinks per week. Drink Days/Week = drinking days per week. Binge Episodes = binge episodes in past month. *n* ranges from 58 to 69.

p .001.

Table 2

Regression Analyses of Moderation Models for PTSD

Step	Variable	B	α	t	R ²	R ²	AF
Unit Cohesion, Combat Exposure, and the Interaction on PTSD Symptom Severity ^a							
1					.18**	-	6.43**
	Unit Cohesion	-.24	-.10	-.83			
	Combat Exposure	2.52***	.43	3.56			
2					.26***	.08	5.65*
	Unit X Combat	.16*	.29	2.38			
Postdeployment Support, Combat Exposure, and the Interaction on PTSD Symptom Severity ^b							
1					.54***	-	32.34***
	Postdeployment Support	-1.59***	-.59	-6.43			
	Combat Exposure	2.44***	.41	4.51			
2					.54***	.00	.09
	Postdeployment X Combat	-.02	-.03	-.30			

Note. AR^2 = change in R^2 . $-F$ = change in F .

^a $n = 60$. Unit X Combat = interaction of unit cohesion and combat exposure. Postdeployment X Combat = interaction of postdeployment support and combat exposure.

^b $n = 58$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.