

# Traumatic Combat Experiences as Predictors of Posttraumatic Stress Disorder and Depression Symptom Trajectories

Kelber MS, Liu X, Workman DE, Morgan MA, Garvey Wilson AL, Campbell MS, Evatt DP, Belsher BE

Psychological Health Center of Excellence, Defense Health Agency, Silver Spring, Maryland



## Background

- Combat exposure has been identified as an important predictor of post-deployment PTSD and depression (Hoge et al., 2004; Hoge, Auchterlonie, & Milliken, 2006; Porter et al., 2018; Prigerson, Maciejewski, & Rosenheck, 2002; Wells et al., 2010).
- Combat exposure is responsible for persistence of PTSD symptoms over time (Armenta et al., 2018; Bray et al., 2016).
- The studies on the effects of different types of combat exposure (e.g., killing or exposure to dead bodies) on PTSD and depression report mixed findings and usually employ cross-sectional design.
- This study examines the effects of types of combat exposure on longitudinal symptom trajectories of PTSD and depression.

## Study Objectives

- The study had three objectives: 1) to identify distinct types of combat experience by conducting a factor analysis on the Combat Exposure Scale (CES), 2) to identify the type of combat most predictive of PTSD and depression symptoms at 12 months, and 3) to investigate its effects on longitudinal symptom trajectories of PTSD and depression in US military Service members exposed to combat.

## Method

- The participants were 551 U.S. military Service members (predominantly Army) who screened positive for possible PTSD or depression based on the *Diagnostic and Statistical Manual of Mental Disorders* (4<sup>th</sup> ed. text rev.; DSM-IV-TR; American Psychiatric Association, 2000) criteria.
- Most of the participants were male (84%), White (51%), and either junior enlisted (38%) or non-commissioned officer (49%).
- We used the Posttraumatic Diagnostic Scale (PDS) to assess PTSD symptom severity at four time points (Foa, 1995).
- The Hopkins Symptom Checklist Depression Scale – 20 Item Version (HSCL-20) was used to assess depression symptom severity at four time points (Williams, Stellato, Cornell, & Barrett, 2004).
- The CES was used to assess combat experiences. The scale consists of 17 items adapted from the Deployment Risk and Resilience Inventory (King, King, & Vogt, 2003) and the Land Combat Study (Hoge et al., 2004).
- The Lifetime Trauma Burden Scale, adapted from the PDS (Foa, 1995) and National Comorbidity Study Replication (Kessler, Chiu, Demler, & Walters, 2005), was used to measure exposure to traumatic experiences.
- Participants' gender, race (categorized as White vs. other), rank (categorized as junior enlisted vs. other), number of times deployed since 2001, and the treatment arm to which they were assigned during the trial were also used in the analyses.

### Data Analysis

- An exploratory factor analysis was conducted on the CES measure to empirically derive types of combat experiences. A multivariate linear regression was used to evaluate the effects of the CES factor scores on PTSD and depression symptom scores at 12 months controlling for baseline symptom scores. Based on these preliminary analyses, *exposure to dead bodies and cruelty* factor was used as the main predictor in the longitudinal analyses. *Exposure to dead bodies and cruelty* was measured using raw (sum) scores and dichotomized. Based on ROC curves comparing *exposure to dead bodies and cruelty* with PTSD screening scores, a cutoff of six was used such that values below the cutoff were classified as low exposure and values equal to or greater than six were classified as high exposure.

Table 1. Oblique Rotated Factor Pattern (Loadings  $\geq 0.50$ ) in CES Variables

Item	Factor Loading
<b>Exposure to Danger</b>	
I was sent outside the wire on combat patrols, convoys, or sorties	0.53
I, or members of my unit, received incoming fire from small arms, artillery, rockets, or mortars	0.57
I, or members of my unit, encountered mines, booby traps, or IEDs	0.87
My unit fired on the enemy	0.68
My unit suffered casualties	0.67
Someone I knew well was killed in combat	0.56
<b>Exposure to Dead Bodies and Cruelty</b>	
I witnessed members of my unit or an ally unit being seriously wounded or killed	0.52
I saw dead bodies or human remains	0.65
I handled, uncovered, or removed dead bodies or human remains	0.87
I took care of injured or dying people	0.76
I interacted with enemy prisoners of war	0.50
<b>Active Attempts to Harm Enemy</b>	
I personally fired my weapon at the enemy	0.80
I was responsible for the death or serious injury of an enemy	0.78

Figure 1. PTSD Symptom Trajectories Associated with Levels of Exposure to Dead Bodies and Cruelty, Controlling for Other Types of Combat Exposure

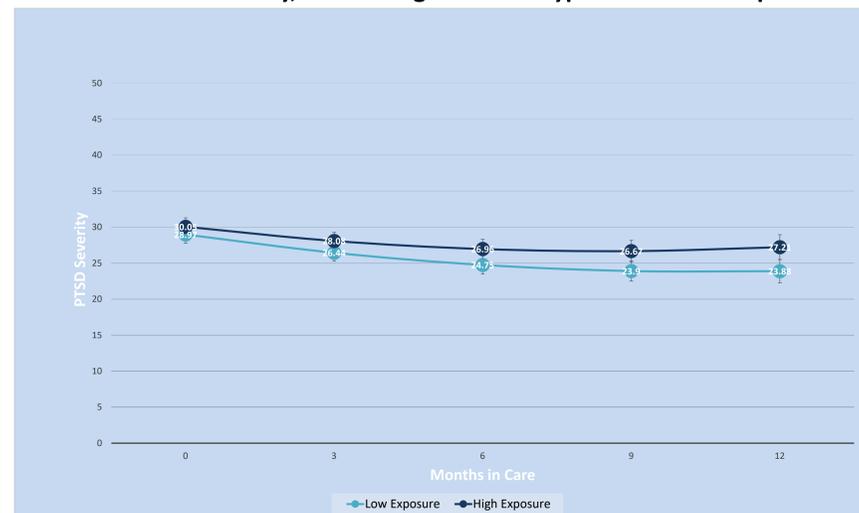
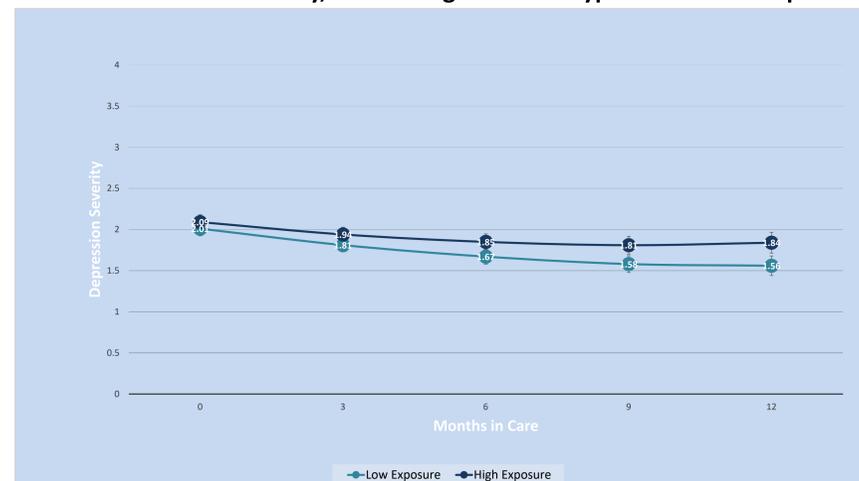


Figure 2. Depression Symptom Trajectories Associated with Levels of Exposure to Dead Bodies and Cruelty, Controlling for Other Types of Combat Exposure



## Results

- Exploratory factor analysis yielded three factors: *exposure to danger*, *exposure to dead bodies and cruelty*, and *active attempts to harm enemy* (Table 1).
- Preliminary regression analyses indicated that only *exposure to dead bodies and cruelty* independently predicted PTSD ( $b = 1.51$ , 95% CI [.15, 2.88]) and depression scores ( $b = .12$ , 95% CI [.02, .23]) at 12 months while controlling for baseline symptom scores, *exposure to danger*, *active attempts to harm enemy*, lifetime trauma burden, gender, race, treatment arm, number of deployments, and rank.
- Linear mixed model detected a significant interaction between time and *exposure to dead bodies and cruelty* on PTSD ( $b = .19$ , 95% CI [.02, .35]) and depression ( $b = .02$ , 95% CI [.004, .03]), controlling for the potential confounding effects of other variables. This analysis demonstrated that high *exposure to dead bodies and cruelty* was associated with worse PTSD and depression symptom trajectories (see Figures 1 and 2).

## Conclusion

- Among treatment-seeking Service members with PTSD and/or depression, *exposure to dead bodies and cruelty* had the strongest association with PTSD and depression symptoms over time.
- Our results describe the varied combat experiences Service members often experience, and illustrate the significant effect of *exposure to dead bodies and cruelty* on persistence of mental health symptoms.
- These findings are consistent with previous research and highlight the importance of taking into account this type of combat exposure in clinical and research settings.

## References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*. Washington, DC: American Psychiatric Association.
- Armenta, R. F., Rush, T., LeardMann, C. A., Millegan, J., Cooper, A., & Hoge, C. W. (2018). Factors associated with persistent posttraumatic stress disorder among US military service members and veterans. *BMC psychiatry*, 18, 48-58.
- Foa, E. (1995). *The posttraumatic diagnostic scale (PDS) manual*. Minneapolis, MN: National Computer Systems.
- Hoge, C. W., Auchterlonie, J. L., Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA*, 295, 1023-1032.
- Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine*, 351, 13-22.
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 617-627.
- King, D. W., King, L. A., & Vogt, D. S. (2003). *Manual for the Deployment Risk and Resilience Inventory (DRRI): A collection of measures for studying deployment-related experiences in military veterans*. Boston, MA: National Center for PTSD.
- Porter, B., Hoge, C. W., Tobin, L. E., Donoho, C. J., Castro, C. A., Luxton, D. D., & Faix, D. (2018). Measuring aggregated and specific combat exposures: Associations between combat exposure measures and posttraumatic stress disorder, depression, and alcohol-related problems. *Journal of Traumatic Stress*, 31, 296-306.
- Prigerson, H. G., Maciejewski, P. K., & Rosenheck, R. A. (2002). Population attributable fractions of psychiatric disorders and behavioral outcomes associated with combat exposure among US men. *American Journal of Public Health*, 92, 59-63.
- Wells, T. S., LeardMann, C. A., Fortuna, S. O., Smith, B., Smith, T. C., Ryan, M. A., ... & Millennium Cohort Study Team. (2010). A prospective study of depression following combat deployment in support of the wars in Iraq and Afghanistan. *American Journal of Public Health*, 100, 90-99.
- Williams, R. T., Heinemann, A. W., Neumann, H. D., Fann, J. R., Forchheimer, M., Richardson, E. J., ... & PRISMS Investigators. (2016). Evaluating the psychometric properties and responsiveness to change of 3 depression measures in a sample of persons with traumatic spinal cord injury and major depressive disorder. *Archives of Physical Medicine and Rehabilitation*, 97, 929-937.