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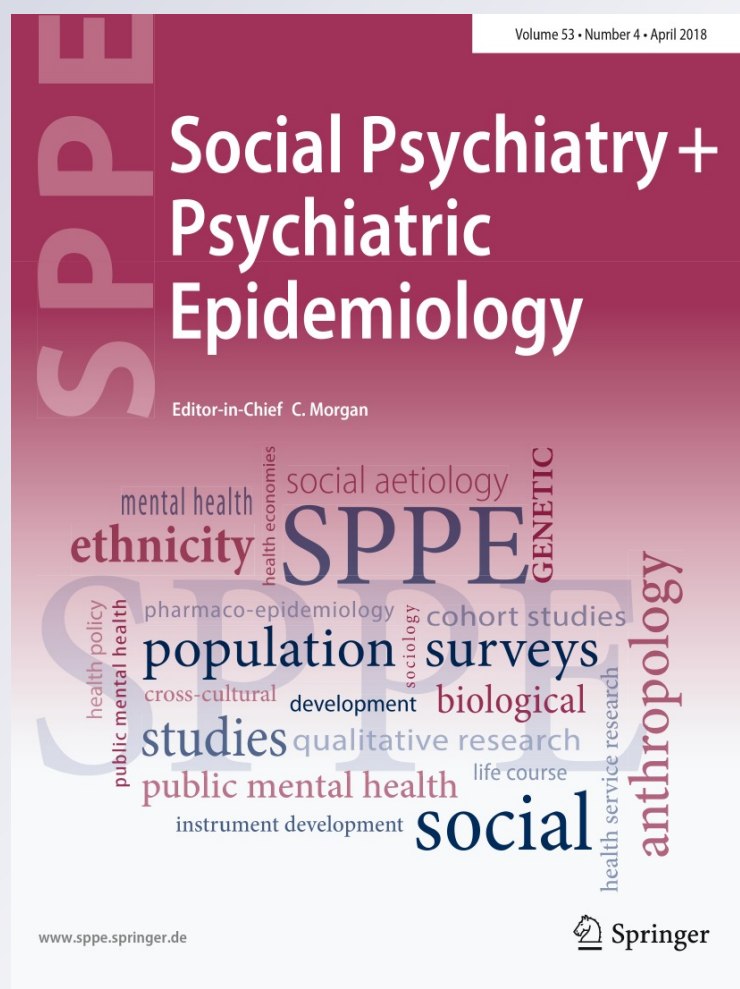
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What drives the relationship between combat and alcohol problems in soldiers? The roles of perception and marriage

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Abstract

Background While the relationship between combat exposure and alcohol problems is well-established, the role of perceptions of trauma is less understood. The goal of this study was to explore associations between National Guard (NG) and reserve soldiers' perceptions of combat experiences as traumatic and alcohol problems, and to examine marital satisfaction as a possible protective factor.

Methods The Operation: SAFETY study recruited US Army Reserve and NG soldiers and their partners to complete a questionnaire covering many physical and mental health, military service, and substance use topics. Negative binomial regression models examined the impact of perceived trauma of combat experiences on alcohol problems ($N = 198$). The potential role of marital satisfaction as a resiliency factor was also examined.

Results The perception of combat experiences as traumatic was associated with increased risk of alcohol problems (risk ratio [RR] = 1.06, 95% confidence interval [CI] 1.01, 1.12; $p = 0.024$). Combat exposure itself showed no relationship. Marital satisfaction had a significant interaction with perceived combat trauma on alcohol problems (RR = 0.90, 95% CI 0.81, 0.99, $p = 0.046$), such that soldiers who perceived combat exposure as moderately-highly traumatic were less likely to have alcohol problems when they rated their marital satisfaction highly.

Conclusions Our results demonstrate that the *perception* of combat experiences as traumatic may be a greater contributor to adverse outcomes, such as alcohol problems, than mere combat exposure. They also demonstrate the importance of marital satisfaction as a resiliency factor, particularly at the highest levels of trauma.

Keywords Reserve soldiers · Combat exposure · Alcohol problems · Marital satisfaction · Trauma perceptions

Introduction

The association between deployment and/or combat exposure and alcohol misuse is well-established in literature on military populations [1–8]. Although rates of alcohol use in the military are generally high, particularly for binge and heavy drinking [9], there is evidence that the experience of deployment and combat puts individuals at greater risk, possibly as a means of self-medicating for internalizing factors, such as post-traumatic stress disorder (PTSD)

and depression [5]. In addition, reserve and National Guard soldiers have been found to be at greater risk of alcohol problems specifically [6], and post-deployment problems generally [4] than their active duty counterparts.

Combat exposure and alcohol problems in the military

A growing body of research acknowledges that all deployment and combat exposures cannot necessarily be treated as equal or as binary (i.e., experienced combat vs did not experience) and researchers have called for studies that explore the relationship between combat exposure and alcohol misuse in greater detail [1, 10]. Several recent studies are beginning to examine these issues, particularly as they pertain to amounts and types of combat exposures. For example, one study found that veterans deployed to Operation Iraqi Freedom experienced significantly worse outcomes, including

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alcohol use, than veterans deployed to Operation Enduring Freedom (Afghanistan) [11]. Another demonstrated that among active duty soldiers from all branches of service, compared to deployment with no combat and low to moderate levels of combat exposure, higher levels of combat exposure were found to be significantly related to binge drinking, heavy drinking and alcohol problems [9]. Among US Army active duty infantry brigade combat teams surveyed 3–4 months post-deployment, 25% (225/1080) screened positive for alcohol misuse [10]. Those who screened positive had significantly more combat experiences and alcohol misuse was more likely in soldiers who experienced direct threat of death or injury to themselves [10].

Perception of trauma

Researchers recognize that it is not only the experience of a potentially traumatic event that may lead to adverse outcomes, but also the individual's perceptions of that event. The place of a severe event within the full context of an individual's life, combined with a resulting negative self-rating, is correlated with higher likelihood of difficulties [12]. Research around predictors of PTSD has emphasized that it is not necessarily the traumatic experience itself, but the individual's perception of direct threat to their life resulting from the experience, that is associated with the development of PTSD [13]. One meta-analysis concluded, "the in-the-moment appraisal and meaning of the traumatic stressor may have as much to do with explaining who develops PTSD as do the more static factors" [13]. Among police officers, researchers have found that a strong sense of vulnerability or threat to physical integrity was associated with PTSD, above and beyond other factors, such as emotional reactivity and moral responsibility which did not demonstrate significant associations [14]. Research in military populations has likewise demonstrated the importance of perception of threat for determining PTSD outcomes, providing evidence that inaccurate threat appraisals lead to worse outcomes [15, 16]. This indicates that it is important to consider not only exposure to combat, but the individual soldier's perception of that combat experience as traumatic. To our knowledge, this has only been examined in military populations in relation to PTSD, and work is needed to examine these associations as they relate to other outcomes, such as alcohol use.

Marriage as a protective factor

Marital status is often found to be related to alcohol use, and marriage in civilian populations has been shown as an event that leads to a decline in overall alcohol consumption and particularly in excessive drinking [17]. Similarly, in military populations total drinking, binge drinking and alcohol

misuse have been shown to be more likely in unmarried male soldiers [7, 10, 18].

Beyond marital status alone, higher levels of satisfaction in the intimate partner relationship are an important protective factor against mental health and substance use outcomes. For example, in civilian populations research has demonstrated that over the first 4 years of marriage, higher levels of marital satisfaction were protective against subsequent alcohol problems for both husbands and wives [19]. Other studies have demonstrated that marital dissatisfaction and intimate partner violence both are associated with a greater frequency of problematic alcohol consumption [19]. The importance of the marital relationship has long been acknowledged in the treatment setting, and Alcohol-focused Behavioral Couple Therapy (ABCT) has been used to successfully treat alcohol use disorders [20, 21]. Furthermore, baseline marital satisfaction at treatment initiation has also been associated with better outcomes [22], indicating couples in greater distress may need longer treatment [21]. Researchers have also demonstrated that marital closeness predicts more favorable outcomes related to substance abuse treatment for cocaine and heroin users, such that closer and more personal relationships are associated with better treatment outcomes [23].

In our previous work in the military population, specifically among National Guard and reserve soldiers, we found that marital satisfaction was a resiliency factor associated with decreased levels of anxiety, depression, PTSD, and anger among male soldiers who experienced combat [24]. Other work in military populations has demonstrated that poor marital satisfaction and family stress are associated with greater PTSD severity [25, 26] and that reservists with stronger relationships were better able to cope with the stresses of deployment [27]. To our knowledge, no one has yet examined the role of marital satisfaction as a possible protective factor in the association between trauma exposure and drinking outcomes in military populations, active or reserve.

Given the gaps identified in current research, the goal of this study was to go beyond simply assessing combat exposure, and explore associations between individual soldiers' perceptions of combat experiences as traumatic and alcohol problems in a sample of National Guard and reserve soldiers. We also sought to explore the interactions between marital satisfaction and perceptions of trauma with alcohol problems.

Methods

This work is a part of an ongoing longitudinal study, Operation: SAFETY (Soldiers and Families Excelling Through the Years), that is broadly focused on the health

of National Guard and reserve soldiers and their spouses. The purpose of the overall study is to explore how reserve soldiers and their partners impact each other's physical and mental well-being.

Data collection

Recruitment

Detailed methods have been described elsewhere [24, 28, 29], but briefly, the Operation: SAFETY study recruited US Army Reserve and Army National Guard soldiers and their partners during drill sessions over a 15-month period (Summer 2014–Fall 2015). The State University of New York at Buffalo's Institutional Review Board as well as the Army Human Research Protections Office, Office of the Chief, Army Reserve as well as the Adjutant General of the National Guard approved the study protocol. Participants were informed at time of recruitment that the study would involve the completion of three online surveys (baseline with 2 yearly follow-ups), covering a variety of general health topics such as nutrition, physical and mental health, caffeine intake, sleep, substance use, romantic relationship, social network information, and deployment information and events. Baseline surveys would take approximately 2½ h to complete, while the follow-ups would last 90 min. For their time, soldiers and partners each would receive a \$60 check for baseline and \$70 for each of the follow-ups (\$200 per person/\$400 couple over the study period).

Soldiers were screened on six inclusion criteria: (1) the couple is married or living as if married; (2) one member of the dyad is a current Army Reserve or National Guard soldier; (3) the soldier is between the ages of 18 and 45; (4) both partners are able to speak and understand English; (5) both partners are willing and agree to participate in the study; and (6) both partners have had at least one alcoholic beverage in the past year. Following this in-person screening, all soldiers were contacted within 1 week regarding their eligibility status.

We met with 47 units across New York State. This resulted in 731 soldiers and partners eligible for the study. Of those, 572 (78%) agreed to participate and 83% of couples ($N=472$) completed some part of the survey. Given that the nature of the main study was to examine spousal influence, only surveys where both partners completed the entire survey were included for follow-up ($N=418$). We examined the differences between those that passed and enrolled vs those who passed and did not enroll based upon the screening form. Couples where a civilian partner screened for the study ($n=11$) were less likely to enroll ($p<0.001$). No differences existed between those who enrolled and completed vs those who enrolled and did not complete.

Survey administration

The surveys were administered through a secure HIPAA-compliant online survey programming software, StudyT-rax™ which allowed for data encryption. Soldiers and partners who lived in the Western New York area were invited to the State University of New York at Buffalo Center for Health Research (UBCHR) to complete their online surveys. For soldiers and partners outside of the Western New York area, separate login information was sent to each partners' email. All participants provided informed consent to participate in the study.

Participants

The present work focuses on a cross-sectional subsample from the overall parent study comprising male and female soldiers (current or previous military service) who: (1) have been deployed, and (2) have experienced wartime traumatic events as indicated on the Traumatic Events Questionnaire (TEQ), ($N=198$). The majority of combat exposed soldiers in this subsample were male (88.9%; 176 male soldiers; 22 female soldiers). The average age of participants was 33.9 (standard deviation [SD]=5.9). The majority of the sample was non-Hispanic White (80.8%), with 5.6% non-Hispanic Black, 10.6% Hispanic and 2.0% other. Most had at least some college education (58.1%) or a college degree (30.8%). The average household income bracket was \$60,000–79,000. Most soldiers were married (77.3%), with the remainder living as if married. Soldiers served an average of 12.7 (SD=5.8) years.

Measures

Alcohol problems

Alcohol use and associated problems were assessed with the Alcohol Use Disorders Identification Test (AUDIT) [30]. The AUDIT consists of 10 items rated on a 4-point scale from 0 (Never) to 4 (Daily or almost daily), with scores ranging from 0 to 40 (alpha: 0.78). Items include things such as, "How often do you have a drink containing alcohol?", "Have you or someone else been injured because of your drinking?", and "How often during the last year have you had a feeling of guilt or remorse after drinking?".

Marital satisfaction

Relationship functioning was assessed with the Marital Adjustment Test (MAT) [31]. This 15-item instrument measures overall marital satisfaction and adjustment of husbands and wives to each other (range 2–158; alpha=0.77). Marital satisfaction was dichotomized into low (values under 100)

and high (100–158) as scores under 100 indicate moderately to severely distressed relationships [31].

Combat exposure

Combat exposure was assessed with the Combat Experiences Scale from the Deployment Risk and Resilience Inventory-2 (DRRI-2; [32]). Participants reported on the frequency with which they encountered 17 objective events and circumstances occurring in their most recent warzone experience, ranging from 1 (Never) to 6 (Daily or almost daily). Items include things such as, “I personally witnessed enemy combatants being seriously wounded or killed”, “I was exposed to hostile incoming fire”, and “I fired my weapon at enemy combatants”. Scores range from 17 to 102 with higher scores indicating greater combat exposure ($\alpha = 0.94$).

Perceived trauma of combat exposure

Perceived traumatic combat exposure was assessed with the three military related items of the Traumatic Events Questionnaire (TEQ) [33]. The questions assessed the following items for the soldier's most recent deployment: (1) receiving friendly or hostile fire, (2) being a Prisoner of War, and (3) witnessing an atrocity. The perception of each of these events as traumatic was reported on a 7-point scale (1 “not at all” to 7 “extremely”). The TEQ has been shown to have high test–retest reliability [33].

Time in military service

Participants were asked to report length of time in the US Army Reserve, National Guard, and other service branches. A cumulative sum was created across all service branches.

Sex

Participants reported whether they were male or female.

Analysis

Descriptive statistics were used to characterize the sample. Unadjusted negative binomial regression models examined the relationship between perceptions of trauma and alcohol problems. Adjusted models included combat exposure, marital satisfaction, time in military service, and sex. Importantly, the goal of this work was to explore if perceptions of trauma, and not simply combat exposure, were related to alcohol problems; thus, adjusted models controlled for combat exposure. Given that more time involved in the military allows for a greater opportunity for exposure to deployment and combat, a cumulative

number of years served in all military branches was used as a covariate in the regression models. Additionally, we controlled for sex because of differences in experiences with combat exposure. As more women engage in combat military roles, it is increasingly important to examine sex within models. To examine marital satisfaction as a potential resiliency factor against alcohol problems among soldiers, an interaction term for the perceived trauma of combat and marital satisfaction was added to the adjusted regression model.

Results

Descriptive results

Twenty-one percent of the sample had an AUDIT score ≥ 8 indicative of hazardous drinking [30]. Mean AUDIT scores were 5.1 ($SD = 3.9$). The mean rating of perceived trauma of combat experience was 4.0 ($SD = 1.9$) and the mean combat exposure score was 34.72 ($SD = 15.9$). Marital satisfaction mean scores were 111.3 ($SD = 27.2$).

Main effects

Perceived trauma of combat exposure was positively associated with alcohol problems in the unadjusted model (risk ratio [RR] = 1.06, 95% confidence interval [CI] 1.01, 1.12; $p = 0.024$). This association persisted even after controlling for combat exposure, marital satisfaction, time in military, and sex (RR = 1.06, 95% CI 1.01, 1.12; $p = 0.024$; Table 1). Combat exposure was not related to alcohol problems. Being female was protective against alcohol problems (RR = 0.65, 95% CI 0.46, 0.91; $p = 0.012$). Interestingly, greater time in military service was also protective against alcohol problems (RR = 0.98, 95% CI: 0.97, 0.99; $p = 0.036$).

Table 1 Effects of perceived trauma of combat experience, combat exposure, marital satisfaction, military service, and sex on alcohol problems

	Alcohol problems
	Risk ratio [95% confidence interval]
Perceived trauma (TEQ Score)	1.06* [1.01, 1.12]
Combat exposure score	0.99 [0.99, 1.01]
Marital satisfaction	0.83 [0.67, 1.03]
Time in military service	0.98* [0.97, 0.99]
Sex	0.65* [0.46, 0.91]

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Interaction effects

A potential buffering effect of marital satisfaction on the relationship between perceived trauma of combat exposure and alcohol problems was examined. To examine the potential effects of an interaction between perceived trauma of combat exposure and marital satisfaction on alcohol problems while controlling for sex and time in military service, an interaction term was added to the adjusted regression model. Predictive margins were also calculated to determine the stratum-specific interactions between perceived trauma of combat exposure and marital satisfaction on alcohol problems.

Marital satisfaction had a significant interaction with perceived trauma of combat exposure on alcohol problems ($RR = 0.90$, 95% CI 0.81, 0.99, $p = 0.046$; Table 2). Predictive margins showed that soldiers who perceived the combat exposure in their most recent deployment as moderately to highly traumatic were less likely to have alcohol problems when they also rated their marital satisfaction as high (Fig. 1). Consistent with the first model, years of service

was protective ($RR = 0.98$; 95% CI 0.97, 0.99; $p = 0.044$) as was being female ($RR = 0.65$; 95% CI 0.46, 0.90; $p = 0.011$).

Discussion

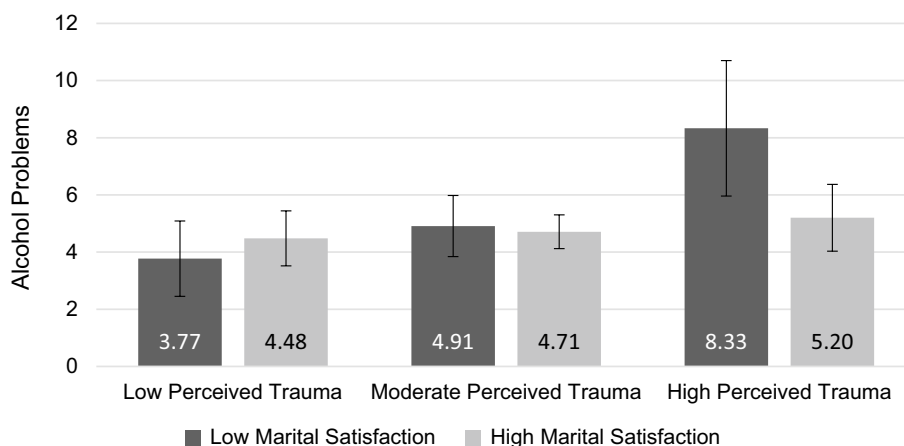
Overall, our results demonstrate that among National Guard/reserve soldiers who experienced direct combat, the *perception* of these events as traumatic, and not simply the combat exposure, was associated with an increased risk of alcohol problems. Previous work has clearly demonstrated that combat exposure and trauma are related to alcohol problems [1–7]. However, our results significantly expand the current evidence, by demonstrating the importance of perceptions of combat as traumatic. This indicates that the amount of combat exposure may be less important than the perceptions of that exposure. Thus, though two soldiers can experience the same levels of combat exposure, it is the soldier's individual perceptions of these events as highly traumatic that is associated with negative outcomes, in this case, alcohol problems. This is similar to findings around PTSD which have demonstrated that perceptions of experiences are important, and perhaps even more so, than the experience itself [13, 15, 16]. Specifically, research has reported that National Guard soldiers who reported low perceived levels of preparation for their deployment experienced higher perceived levels of threat related to combat exposure and higher levels of PTSD than soldiers who felt more prepared and had a more realistic appraisal of the threat of combat [15]. Similarly, another study demonstrated that among Armed Forces personnel in the United Kingdom, the perception of experiences as a direct threat to one's own life, and a sense that combat experiences were outside of one's preparation and job duties, were strongly associated with PTSD symptoms [16]. To our knowledge, no other studies have demonstrated this association as it relates to alcohol problems among military populations, particularly reserve and National Guard members. While combat exposure is a non-modifiable condition

Table 2 Interaction effects of perceived trauma of combat exposure and marital satisfaction on alcohol problems, controlling for combat exposure, years of military service, and sex

	Alcohol Problems
	Risk ratio [95% confidence interval]
Perceived trauma of combat exposure \times marital satisfaction	0.90* [0.81, 0.99]
Perceived trauma (TEQ Score)	1.14** [1.05, 1.25]
Combat exposure	1.00 [0.99, 1.01]
Marital satisfaction	1.32 [0.80, 2.17]
Time in military service	0.98* [0.97, 0.99]
Sex	0.65* [0.46, 0.90]

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Fig. 1 Predictive margins of alcohol problems by perceived trauma of combat exposure (TEQ Score) and marital satisfaction (MAT Score) (Low Marital Satisfaction: MAT Score < 100 ; High Marital Satisfaction: MAT Score ≥ 100 ; Low Perceived Trauma: TEQ Score = 1; Moderate Perceived Trauma: TEQ Score = 4; High Perceived Trauma TEQ Score = 7)



of military service, perceptions of combat can be adapted. This indicates that pre-deployment preparation, specifically focused around cognitive behavioral approaches that help individuals to accurately appraise threat, may be important to consider, as one way of promoting resiliency against the adverse sequelae of combat experience, such as PTSD and substance use.

A second significant contribution of this work is the demonstration that marital satisfaction is protective against alcohol problems, particularly at the highest levels of trauma. To our knowledge, this is the first study to examine the role of marital satisfaction as a resiliency factor for alcohol use in military populations. Given the findings of the importance of marital satisfaction as protective factor for a variety of substance use outcomes in different populations [19, 23, 34], and for other outcomes in military populations [24–26], it is logical that it would function in a similar manner in these circumstances. Previous studies in military populations have demonstrated that post-deployment social-ecological factors seem to be more strongly associated with outcomes than military experience factors [35, 36] and marital and family support are primary factors in a soldier's social environment. Pre- and post-deployment preparation should include interventions to strengthen marital relationships to help protect against alcohol problems. There has been some recognition of the importance of supporting the military couple as a unit [37–39]. For example, Mission Reconnect—a partner-based, self-directed program of integrative therapies demonstrated significant improvements in PTSD, depression and stress [38]. Another study reported on an intensive retreat for military couples, noting a significant decrease in veterans' trauma symptoms and partners' distress [40]. Lewis et al. recently reviewed ten articles reporting on the results of interventions for military couples, most of which demonstrated some positive results, but they note a need for not only more recognition of couple-based interventions, but also a lack of work that takes into account marital satisfaction [39]. To our knowledge, none of these have specifically looked at the impact of military couples' based interventions on substance use outcomes, including alcohol use.

Limitations

The data presented here are subject to a few limitations. First, all data are self-reported by participants and alcohol problems were not clinically verified. However, this method is standard for collecting this type of information, and all data were collected using validated tools. Second, these results represent baseline data from an ongoing longitudinal study; additional years of data may shed new light on baseline trends or reveal additional findings. Longitudinal data collected in future phases of this project will allow us to monitor trends over time in alcohol use outcomes and

compare pre- and post-deployment use for soldiers who deploy during the study period. Third, data from Army National Guard and reserve soldiers may not be generalizable to active duty soldiers or those from other branches.

Future directions

Our results provide important evidence supporting a notion that it is the perception of combat experiences as traumatic above the actual combat exposure per se, which contributes to adverse outcomes, such as alcohol problems. They also demonstrate the importance of marital satisfaction as a resiliency factor, particularly at the highest levels of trauma. Future work should consider perceptions of trauma related to a more diverse range of health outcomes over a longitudinal period.

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Compliance with ethical standards

Ethical standards The State University of New York at Buffalo's Institutional Review Board as well as the Army Human Research Protections Office, Office of the Chief, Army Reserve as well as the Adjutant General of the National Guard approved the study protocol. All participants provided informed consent.

Conflict of interest The authors declare that they have no conflict of interest.

References

1. Green KT, Beckham JC, Youssef N, Elbogen EB (2014) Alcohol misuse and psychological resilience among US Iraq and Afghanistan era veterans. *Addict Behav* 39(2):406–413. <https://doi.org/10.1016/j.addbeh.2013.08.024>
2. Hoge CW, Auchterlonie JL, Milliken CS (2006) Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA* 295(9):1023–1032. <https://doi.org/10.1001/jama.295.9.1023>
3. Bray RM, Hourani LL (2007) Substance use trends among active duty military personnel: findings from the United States Department of Defense Health Related Behavior Surveys, 1980–2005. *Addiction* 102(7):1092–1101. <https://doi.org/10.1111/j.1360-0443.2007.01841.x>
4. Milliken CS, Auchterlonie JL, Hoge CW (2007) Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *J Am Med Assoc* 298(18):2141–2148. <https://doi.org/10.1001/jama.298.18.2141>

5. Wright KM, Foran HM, Wood MD, Eckford RD, McGurk D (2012) Alcohol problems, aggression, and other externalizing behaviors after return from deployment: understanding the role of combat exposure, internalizing symptoms, and social environment. *J Clin Psychol* 68(7):782–800. <https://doi.org/10.1002/jclp.21864>
6. Jacobson IG, Ryan MA, Hooper TI, Smith TC, Amoroso PJ, Boyko EJ, Gackstetter GD, Wells TS, Bell NS (2008) Alcohol use and alcohol-related problems before and after military combat deployment. *J Am Med Assoc* 300(6):663–675. <https://doi.org/10.1001/jama.300.6.663>
7. Seal KH, Cohen G, Waldrop A, Cohen BE, Maguen S, Ren L (2011) Substance use disorders in Iraq and Afghanistan veterans in VA healthcare, 2001–2010: Implications for screening, diagnosis and treatment. *Drug Alcohol Depend* 116(1–3):93–101
8. Homish GG, Homish DL, Cummings KJ, Heavey SC (2015) Military Deployments, Combat Exposure and Partner Drinking Paper presented at the Research Society on Alcoholism San Antonio, Texas, June 2015
9. Bray RM, Brown JM, Williams J (2013) Trends in binge and heavy drinking, alcohol-related problems, and combat exposure in the US military. *Subst Use Misuse* 48(10):799–810. <https://doi.org/10.3109/10826084.2013.796990>
10. Wilk JE, Bliese PD, Kim PY, Thomas JL, McGurk D, Hoge CW (2010) Relationship of combat experiences to alcohol misuse among US soldiers returning from the Iraq war. *Drug Alcohol Depend* 108(1–2):115–121. <https://doi.org/10.1016/j.drugalcdep.2009.12.003>
11. Eisen SV, Schultz MR, Vogt D, Glickman ME, Elwy AR, Drainoni ML, Osei-Bonsu PE, Martin J (2012) Mental and physical health status and alcohol and drug use following return from deployment to Iraq or Afghanistan. *Am J Public Health* 102 Suppl 1:S66–S73. <https://doi.org/10.2105/AJPH.2011.300609>
12. Brown GW, Bifulco A, Harris TO (1987) Life events, vulnerability and onset of depression: some refinements. *Br J Psychiatry* 150:30–42
13. Ozer EJ, Best SR, Lipsey TL, Weiss DS (2003) Predictors of post-traumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull* 129(1):52–73
14. Carlier IVE, Lamberts RD, Gersons BPR (2000) The dimensionality of trauma: a multidimensional scaling comparison of police officers with and without posttraumatic stress disorder. *Psychiatry Res* 97(1):29–39. [https://doi.org/10.1016/S0165-1781\(00\)00211-0](https://doi.org/10.1016/S0165-1781(00)00211-0)
15. Renshaw KD (2011) An integrated model of risk and protective factors for post-deployment PTSD symptoms in OEF/OIF era combat veterans. *J Affect Disord* 128(3):321–326. <https://doi.org/10.1016/j.jad.2010.07.022>
16. Iversen AC, Fear NT, Ehlers A, Hughes JH, Hull L, Earnshaw M, Greenberg N, Rona R, Wessely S, Hotopf M (2008) Risk factors for post-traumatic stress disorder among UK Armed Forces personnel. *Psychol Med* 38(04):511–522
17. Leonard KE, Eiden RD (2007) Marital and family processes in the context of alcohol use and alcohol disorders. *Annu Rev Clin Psychol* 3:285–310. <https://doi.org/10.1146/annurev.clinpsy.3.022806.091424>
18. Ferrier-Auerbach AG, Kehle SM, Erbes CR, Arbisi PA, Thuras P, Polusny MA (2009) Predictors of alcohol use prior to deployment in National Guard Soldiers. *Addict Behav* 34(8):625–631. <https://doi.org/10.1016/j.addbeh.2009.03.027>
19. Leonard KE, Homish GG (2008) Predictors of heavy drinking and drinking problems over the first 4 years of marriage. *Psychol Addict Behav* 22(1):25–35. <https://doi.org/10.1037/0893-164X.22.1.25>
20. Epstein EE, McCrady BS (1998) Behavioral couples treatment of alcohol and drug use disorders: current status and innovations. *Clin Psychol Rev* 18(6):689–711
21. McCrady BS, Wilson AD, Munoz RE, Fink BC, Fokas K, Borders A (2016) Alcohol-focused behavioral couple therapy. *Fam Process* 55(3):443–459. <https://doi.org/10.1111/famp.12231>
22. McCrady BS, Epstein EE, Cook S, Jensen N, Hildebrandt T (2009) A randomized trial of individual and couple behavioral alcohol treatment for women. *J Consult Clin Psychol* 77(2):243–256. <https://doi.org/10.1037/a0014686>
23. Heinz AJ, Wu J, Witkiewitz K, Epstein DH, Preston KL (2009) Marriage and relationship closeness as predictors of cocaine and heroin use. *Addict Behav* 34(3):258–263. <https://doi.org/10.1016/j.addbeh.2008.10.020>
24. Vest BM, Cerceone Heavey S, Homish DL, Homish GG (2017) Marital satisfaction, family support, and pre-deployment resiliency factors related to mental health outcomes for reserve and national guard soldiers. *Mil Behav Health* 5(4): 313–323. <https://doi.org/10.1080/21635781.2017.1343694>
25. Tracie Shea M, Reddy MK, Tyrka AR, Sevin E (2013) Risk factors for post-deployment posttraumatic stress disorder in national guard/reserve service members. *Psychiatry Res* 210(3):1042–1048. <https://doi.org/10.1016/j.psychres.2013.08.039>
26. Tsai J, Harpaz-Rotem I, Pietrzak RH, Southwick SM (2012) The role of coping, resilience, and social support in mediating the relation between PTSD and social functioning in veterans returning from Iraq and Afghanistan. *Psychiatry-Interpers Biol Process* 75(2):135–149
27. Castaneda LW, Harrell MC, Varda DM, Curry Hall K, Beckett MK, Stern S (2008) Deployment experiences of guard and reserve families: implications for support and retention. RAND Corporation, Santa Monica, CA.
28. Devonish JA, Homish DL, Vest BM, Daws RC, Hoopsick RA, Homish GG (2017) The impact of military service and traumatic brain injury on the substance use norms of Army Reserve and National Guard Soldiers and their spouses. *Addict Behav* 72:51–56. <https://doi.org/10.1016/j.addbeh.2017.03.012>
29. Heavey SC, Homish DL, Goodell EA, Homish GG (2017) US reserve soldiers' combat exposure and intimate partner violence: not more common but it is more violent. *Stress Health: J Int Soc Investig Stress*. 33(5): 617–623. <https://doi.org/10.1002/smi.2748>
30. Babor TF, Del Boca FK (1992) Just the facts: enhancing measurement of alcohol consumption using self-report methods. In: Litten RZ, Allen JP (eds) *Measuring alcohol consumption: psychosocial and biochemical methods*. Humana Press, Totowa, pp 3–20
31. Locke HJ, Wallace KM (1959) Short marital-adjustment and prediction tests: their reliability and validity. *Marriage Fam Living* 21(3):251–255
32. Vogt D, Smith BN, King DW, King LA (2012) Manual for the deployment risk and resilience inventory-2 (DRRI-2): a collection of measures for studying deployment-related experiences of military veterans. National Center for PTSD, Boston, MA
33. Vrana S, Lauterbach D (1994) Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *J Trauma Stress* 7(2):289–302. <https://doi.org/10.1002/jts.2490070209>
34. Homish GG, Leonard KE, Cornelius JR (2010) Individual, partner, and relationship factors associated with the nonmedical use of prescription drugs. *Addiction* 105(8):1457–1465
35. Goldmann E, Calabrese JR, Prescott MR, Tamburrino M, Liberzon I, Slembariski R, Shirley E, Fine T, Goto T, Wilson K, Ganocy S, Chan P, Serrano MB, Sizemore J, Galea S (2012) Potentially modifiable pre-, peri-, and postdeployment characteristics associated with deployment-related posttraumatic stress disorder among Ohio army national guard soldiers. *Ann Epidemiol* 22(2):71–78. <https://doi.org/10.1016/j.annepidem.2011.11.003>
36. Polusny MA, Erbes CR, Murdoch M, Arbisi PA, Thuras P, Rath MB (2011) Prospective risk factors for new-onset post-traumatic stress disorder in National Guard soldiers deployed

- to Iraq. Psychol Med 41(4):687–698. <https://doi.org/10.1017/S0033291710002047>
- 37 Fischer EP, Sherman MD, McSweeney JC, Pyne JM, Owen RR, Dixon LB (2015) Perspectives of family and veterans on family programs to support reintegration of returning veterans with post-traumatic stress disorder. Psychological services 12(3):187–198. <https://doi.org/10.1037/ser0000033>
- 38 Collinge W, Kahn J, Soltysik R (2012) Promoting reintegration of National Guard veterans and their partners using a self-directed program of integrative therapies: a pilot study. Mil Med 177(12):1477–1485
- 39 Lewis M, Lamson A, White M (2016) The state of dyadic methodology: an analysis of the literature on interventions for military couples. J Couple Relatsh Ther 15(2):135–157. <https://doi.org/10.1080/15332691.2015.1106998>
- 40 Monk JK, Ogolsky BG, Bruner V (2016) Veteran couples integrative intensive retreat model: an intervention for military veterans and their relational partners. J Couple Relatsh Ther 15(2):158–176