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Implications of Posttraumatic Stress Among Military-Affiliated and Civilian Students

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Abstract

Objectives—Determine whether posttraumatic stress symptoms (PTS) are associated with problem drinking and alcohol-related consequences, as well as academic correlates among military-affiliated and civilian students.

Participants—Final sample (n = 248) included 78 combat exposed student service members/veterans, 53 non-combat exposed student service members/veterans, 38 ROTC students, and 79 civilian students.

Method—Self-report data was collected spring 2011 via a web-based survey measuring PTS, problem drinking, alcohol-related consequences, GPA, educational self-efficacy, academic amotivation and persistence.

Results—Military students exposed to combat-related trauma reported significantly greater PTS symptoms than other military and civilian groups. PTS symptoms were associated with problem drinking and alcohol-related consequences for all groups, yet unrelated to academic correlates among those exposed to combat-related trauma.

Conclusions—This study adds to the scant literature base exploring the unique characteristics of student service members/veterans in higher education.

Keywords

Alcohol; Combat; Higher Education; Posttraumatic Stress; Service Member; Veteran

The Post-9/11 Veterans Education Assistance Act of 2008 (i.e. “new” G.I. bill) provides monetary assistance for the educational and housing needs of military personnel (active and veteran) to pursue a post-secondary degree.[1] While the new G.I. bill removes appreciable obstacles, such as tuition and fees, that could prevent military personnel/veterans from continuing their education, there are other, less noticeable, burdens that may impede success after (re)entry into higher education. Specifically, Tanielian and Jaycox[2] contend that “invisible wounds” [i.e., psychological and cognitive injuries such as posttraumatic stress disorder (PTSD) and depression] associated with deployment to Afghanistan (Operation Enduring Freedom - OEF) and Iraq (Operation Iraqi Freedom - OIF) may be disproportionately common relative to the physical injuries more often attributed to war.

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Therefore, the overall goal of this investigation was two-fold: (1) to determine whether the unique experiences of student service members/veterans (e.g., deployment-related experiences) result in "invisible wounds" (i.e., posttraumatic stress symptoms) above and beyond those experienced by their civilian counterparts, and (2) determine the degree to which posttraumatic stress symptoms among military affiliated students are associated with: (a) rates of problem drinking and alcohol-related consequences, and (b) academic performance (grade point average) and associated correlates (academic motivation and educational self-efficacy).

Deployment-Related Experiences and Their Impact on Health

Combat exposure during deployment represents a significant risk factor, specifically associated with poorer health status and shorter lifespan for returning veterans in the aftermath of prior conflicts.[3] Exposure to combat-related trauma has been shown to lead to new-onset alcohol-related problems such as hazardous drinking,[4] as well as maladaptive coping measures such as cigarette smoking[5] and excessive alcohol use.[6] Combat-deployed men and women also exhibit increased risk for new-onset depression compared with non-deployed service men and women.[7] In addition to increased rates of alcohol use, prospective data also indicate a three-fold increase in onset of newly self-reported post-traumatic stress (PTS) symptoms or diagnoses among deployed military personnel who report combat exposures.[8] Approximately one in three military personnel deployed for OEF and OIF will experience either PTSD, depression, or traumatic brain injury.[2] Each of these three mental health conditions increases the likelihood of alcohol consumption as well as health morbidity and mortality.[2]

Student Service Members/Veterans in Higher Education

Upon return from deployment, OEF/OIF veterans (re)enter higher education with unique characteristics and experiences that have the potential to obstruct their collegiate success.[9] Yet, to date, very little is known about the health status of military personnel (regardless of combat-exposure) enrolled in institutions of higher education.[9–11] This deficiency becomes glaring considering the passage of the new G.I. bill provided more than 2 million military personnel affordable access to a post-secondary degree.[12]

Among the few studies examining student service members (i.e., those still associated with the military, usually in the Reserve component) and veterans (i.e., those who have completed military service) enrolled in higher education, alcohol abuse appears to be a salient concern. Specifically, one study has shown that student service members/veterans' drinking behaviors were more strongly linked to coping than social motives, in contrast to their civilian peers in the sample.[13] Additionally, the binge-drinking behaviors of student service members/veterans has been linked to both indicators of problem drinking (CAGE), as well as psycho-somatic symptoms such as PTS symptoms and depression.[14] What is conspicuously absent from these accounts is an examination of the impact of combat-related exposure on the health and transition of military personnel entering higher education. Moreover, the predictive role of the lingering mental health symptoms associated with combat exposure, such as PTS, also remains unexplored among student service members/veterans.

Current Study

The present study builds upon the limited research on student service members/veterans while also filling a void in the current literature base by detailing how the varied experiences (i.e., exposure to combat) of military personnel may be linked their mental health (i.e., PTS) during their subsequent college enrollment. Furthermore, we explored whether the

associations between PTS and alcohol-related behaviors as well as PTS and academic functioning varied as a function of military status (i.e., student service member/veteran vs. civilian student) and experiences (i.e., exposure to combat). Examination of these links represents a logical progression since mental health symptoms have the potential to impact "human capital accumulation" (i.e., the amount of education one attains, as well as their relative academic success).[15] Considering "human capital accumulation" is associated with more than mere academic performance (e.g., retention), the current study expanded our academic indicators beyond grade point average to include a broader range of correlates. Additional academic indices include perceived academic capabilities (self-efficacy), intrinsic and extrinsic contextual factors (academic motivations), and the likelihood of remaining enrolled in school (academic persistence).

METHODS

Participants

Data were drawn from a brief longitudinal study (conducted over three consecutive academic semesters) examining student adjustment and engagement among military and civilian students attending institutions of higher education. The data reported here focus exclusively on the final wave, collected in the spring of 2011, which contained the data of interest regarding combat exposure. In wave 3, the final sample ($n = 250$) included 78 (64 male, 14 female) student service members/veterans who had been exposed to combat, 53 (40 male, 13 female) student service members/veterans who had not been exposed to combat, 38 (30 male, 8 female) students enrolled in ROTC programs, and 79 (19 male, 60 female) civilian students. Although previous investigations[13,14] have examined group differences between student service members and civilian students in higher education, to the best of our knowledge, this is the first examination to include ROTC students as a comparison group. Although previous investigations have examined group differences between student service members and civilian students in higher education, the inclusion of ROTC students provides a novel comparison group and helps address potential confounds related to participants self-selection into military service. Moreover, ROTC students assist in controlling from confounds related to participants' age and self-selection into the military.

Participants were recruited from both private and public institutions, with varying enrollment sizes (4,000 – 40,000 students) and classifications (e.g., two-year or four-year, residential and commuter) within one Midwestern state. Institutions had to meet the following inclusion criteria to be eligible to participate: (a) qualified to administer VA education benefits, per the state approving agency, (b) administrative headquarters located in the state in which this study took place, and (c) academic credits awarded at the institution were accepted for credit at other in-state institutions. In total, 24 institutions met the aforementioned criteria. Of those qualifying institutions, 16 were represented in the final sample (67% institutional response rate).

Respondents were mostly White and non-Hispanic (92%), similar to the college population in the state. Combat-exposed ($M = 29.57$, $SD = 7.20$ years) and non-combat-exposed student service members/veterans were older ($M = 29.42$, $SD = 7.52$ years) than ROTC ($M = 21.00$, $SD = 1.31$ years) and civilian students ($M = 26.97$, $SD = 8.95$ years). All branches of the military were represented in the sample, with relatively equal distribution among the Air Force (16%), Army (27%), Marine Corps (14%), Navy (14%), and Air/Army National Guard (23%); a small proportion of the sample served in the Coast Guard (1%) or the Reserves (5%). Overall, these distributions mirror those of the active duty numbers across service branches (DOD, 2008). On average, veterans who were no longer in the military ($n = 82$; 63%) had been separated from the military for 6.49 years ($SD = 6.22$).

Procedure

Prior to data collection, all procedures were reviewed by the appropriate Institutional Review Boards (IRB). Students from each participating institution received an electronic recruitment letter inviting their participation. By replying to the recruitment invitation, students were indicating their interest in participating. These individuals were subsequently sent a secure link to a web-based survey lasting approximately 45 to 60 minutes. Prior to beginning the web-based survey, participants had to first agree to the informed consent procedures. Responses were anonymous, with all personal information being kept in a separate secured survey. Given that administrative officials distributed recruitment materials to students at their respective institution, we cannot accurately calculate how many students received the initial invitation. Of all participants who replied to the invitation, however, 70% completed the survey. Participants received an honorarium of $50 for their participation.

Measures

Background and demographic information—Participants provided a variety of background information including age, sex, marital status, and ethnic minority group membership. Additionally, veteran and student service member participants reported their military branch, pay grade, and current status (i.e., active duty, Reserves, National Guard).

Combat-related trauma exposure—Military affiliated participants were asked to identify whether they had personally been exposed to 8 different traumatic situations associated with warzone experience within the past ten years. Example situations included witnessing (a) a person's death due to war, disaster or tragic event, (b) dead or decomposing bodies, (c) maimed soldiers or civilians, and (d) physical abuse such as torture, beating or rape. Those witnessing any of the provided examples were categorized as having experienced combat-related trauma (60% of military personnel in the sample). Among those exposed to combat, 91% reported witnessing two or more events, and 73% reported 5 or more. Previous Millennium Cohort Study[16] investigations examining functional health and vulnerability to PTS after combat deployment have used these measures to categorize/identify combat-related trauma exposure.[17]

Post traumatic stress (PTS)—Participants' reports of symptoms of Post Traumatic Stress were assessed using Weathers, Litz, Herman, Huska, and Keans's[18] PTSD Checklist – Civilian version. (The civilian version was used so that all members of the sample could respond to the same set of questions.) This measure is compatible with DSM standards, allowing for measurement of gradations in PTSD symptomatology. Using a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*), student service members/veterans and civilians students reported on 17 items covering the presence of intrusive thoughts, avoidance/numbing, and arousal. Total scores were summed across all items with higher scores indicating the presence of more PTSD symptoms ($M = 28.78$, $SD = 12.38$; $\alpha = .94$). For descriptive purposes, approximately 5% of civilian students, 5% of ROTC students, 6% of non-combat exposed student service members/veterans, and 9% of combat exposed student service members/veterans met the clinical cutoff score of 50[18] for this scale.

Problem drinking—To assess problem drinking, participants completed the 4-item CAGE questionnaire.[19] Specifically, participants were asked to respond *yes* (1) or *no* (0) to whether they had ever been (a) told by others they should cut down on their drinking, (b) been annoyed by others for criticizing their drinking, (c) ever felt bad or guilty about their drinking, and (d) ever had a drink first thing in the morning to steady your nerves or get rid of a hangover. Scores were summed across the four items with higher scores denoting more problematic drinking ($M = .60$, $SD = 1.01$; $\alpha = .70$). On this scale, a cutoff score of 2 or more on the CAGE is generally considered indicative of problem drinking,[20] however,

Ewing[21] contends a cutoff score of 1 or more can be used. In our sample, approximately 31% of the overall sample reported at least one aspect of problem drinking (i.e., a CAGE score of 1 or greater; 31% of civilians, 35% of ROTC students, 20% of non-combat exposed student service members/veterans, and 35% of combat exposed student service members/veterans) and 20% reported 2 or more alcohol-related issues (13% of civilians, 22% of ROTC students, 15% of non-combat exposed student service members/veterans, and 31% of combat exposed student service members/veterans).

Consequences of alcohol use—Participants also completed the 24-item Young Adult Alcohol Consequences Questionnaire (YAACQ).[22] Similarly to the CAGE, participants responded *yes* (1) or *no* (0) to whether they experienced a series of potential consequences from drinking alcohol in the previous year. Sample items include: "I have had a hangover (headache, sick stomach) the morning after I had been drinking;" "My drinking has gotten me into sexual situations I later regretted;" and, "I have driven a car when I knew I had too much to drive a car safely." Scores were summed across all items with higher scores indicate greater negative consequences after drinking ($M = 5.11$, $SD = 5.25$; $\alpha = .91$). A score of 10 (out of 24 possible items) is associated with "at least some potentially psychosocial consequences."[22(p. 1188)] Approximately 15% of the overall sample (16% of civilians, 11% of ROTC students, 11% of non-combat exposed student service members/veterans, and 17% of combat exposed student service members/veterans) met this criterion.

Grade point average (GPA)—Participants' GPAs were indexed by one question in which participants were asked "On a four point scale, what was your GPA as of last semester?" Students' GPAs ranged from 1.5 – 4.0, with a mean of 3.38 ($SD = .47$).

Educational self-efficacy—Students' educational self-efficacy was measured using a modified version of the Educational Degree Behaviors Self-Efficacy Scale.[23,24] Specifically, on a scale that ranged from 1 (*not at all*) to 7 (*extremely*) participants rated their confidence with 28 statements about their performance in college. Example items included "How confident are you that you could write course papers?", and "How confident are you that you could obtain a job in your chosen field after graduation?" Scores were averaged across the 28 items with higher scores indicative of greater self-efficacy ($M = 6.04$, $SD = .85$; $\alpha = .96$).

Academic motivations—To assess students' academic motivations, participants completed Vallerand et al.'s 28-item Academic Motivation Scale.[25] On a scale ranging from 1 (*not at all*) to 5 (*exactly*), students' rated the extent to which items presently corresponded to reasons for why they attend college. Seven different subscales, each consisting of 4 items, were assessed: (a) intrinsic motivation to know (e.g., "Because I experience pleasure and satisfaction while learning new things." $M = 5.15$, $SD = 1.29$; $\alpha = .90$); (b) intrinsic motivation toward accomplishment (e.g., "For the satisfaction I feel when I am in the process of accomplishing difficult academic activities." $M = 4.49$, $SD = 1.48$; $\alpha = .90$); (c) intrinsic motivation to experience stimulation (e.g., "For the intense feelings I experience when I am communicating my own ideas to others." $M = 3.84$, $SD = 1.50$; $\alpha = .89$); (d) extrinsic motivation identified (e.g., "Because I think that a college education will help me better prepare for the career I have chosen." $M = 5.57$, $SD = 1.06$; $\alpha = .75$); (e) extrinsic motivation introjected (e.g., "To prove to myself that I am capable of completing my college degree." $M = 4.73$, $SD = 1.50$; $\alpha = .88$); (f) extrinsic motivation external regulation ("In order to have a better salary later on." $M = 4.99$, $SD = 1.14$; $\alpha = .84$); and (g) amotivation (e.g., "I once had good reasons for going to college; however, now I wonder whether I should continue." $M = 1.72$, $SD = 1.08$; $\alpha = .87$). Total scores were averaged across the 4

items for each subscale, such that, with the exception of amotivation (in which higher scores indicate less motivation towards academics), higher scores denote greater motivation.

Academic persistence—Academic persistence decisions were measured by the Persistence/Voluntary Drop-out Scale (P/VDDS).[26] Using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) students rated their agreement with 30 items assessing their satisfaction with the college experience and perceptions of the likelihood that they would remain in school. Example items include "I am satisfied with the opportunities to me to interact informally with faculty", and "I am confident that I made the right decision in choosing to attend this university." Scores were summed across the 30 items with higher scores reflect positive persistence decisions ($M = 107.90$, $SD = 15.80$; $\alpha = .91$).

RESULTS

To examine whether student service members/veterans who were exposed to combat-related trauma reported more PTS symptoms, we conducted an ANOVA, with service history (combat exposed, no combat exposure, ROTC, or civilian student) serving as the between-subjects factor. Consistent with expectations, a significant effect for service history emerged, $F(3, 249) = 5.13$, $p < .001$. Waller-Duncan follow-up tests revealed that student service members/veterans exposed to combat-related trauma reported significantly greater PTS symptoms ($M = 32.95$, $SD = 13.95$) than student service members/veterans without exposure to combat-related trauma ($M = 25.68$, $SD = 10.93$), ROTC students ($M = 25.80$, $SD = 11.37$), or civilian students ($M = 28.33$, $SD = 11.19$); no differences emerged between the latter three groups of students.

To examine whether the associations between PTS symptoms and problematic alcohol use and academic correlates varied as a function of group status and combat exposure, a series of hierarchical OLS multiple regressions were performed. For each dependent variable, two models were estimated. Model 1 included main effects for PTS symptoms (centered at its mean) and service history (dummy coded, with student service members/veterans exposed to combat-related trauma serving as the reference group) in addition to control variables--age (centered at its mean) and sex (effect coded with males = −1, females = 1). In Model 2, to test whether the links between PTS symptoms and outcomes differed as a function of service history, interactions between PTS symptoms and each of the three dummy codes denoting service history were included. Significant interactions were probed following the procedures outlined by Aiken and West.[27]

Models examining the association between PTS and problem drinking as well as the consequences of alcohol use revealed that PTS was positively associated with symptoms of problem drinking ($b = .02$, $SE = .01$, $p < .001$; $\beta = .26$,) as well as more consequences of alcohol use ($b = .13$, $SE = .03$, $p < .001$; $\beta = .31$) above and beyond control variables. These associations, however, were not moderated by service history (i.e., PTS symptoms were related to problem drinking similarly for all groups).

With respect to academic correlates, PTS symptoms were negatively associated with GPA ($b = -.007$, $SE = .002$, $p < .01$; $\beta = -.18$) and this association was similar for all students regardless of service history. As can be seen in Table 1, in Model 1, PTS was also negatively associated with educational self-efficacy ($b = -.02$, $SE = .01$, $p < .01$; $\beta = -.22$,); however, this association was moderated by service history. Tests of the simple slopes revealed that PTS was generally unrelated to educational self-efficacy for student service members/veterans who were exposed to combat-related trauma ($b = -.01$, $SE = .01$, *ns*) as well as ROTC students ($b = .01$, $SE = .01$, *ns*), but negatively related for student service

members/veterans without combat experience ($b = -.04$, $SE = .01$, $p < .001$; $\beta = -.59$) and civilian students ($b = -.02$, $SE = .01$, $p < .05$; $\beta = -.32$).

Post traumatic stress was also associated with greater academic amotivation among all students ($b = .02$, $SE = .01$, $p < .001$; $\beta = .25$). Differences, however, emerged in the associations between PTS and other academic motivations (see Tables 2 and 3). Analysis of the simple slopes revealed that PTS symptoms were unrelated to student service members'/veterans' with exposure to combat-related trauma ($b = .01$, $SE = .01$, *ns*) as well as ROTC students' ($b = .02$, $SE = .02$, *ns*) intrinsic motivation – to know, but PTS was negatively related to these same motivations for student service members/veterans with no history of combat-related trauma exposure ($b = -.04$, $SE = .01$, $p < .05$; $\beta = -.34$) and civilian students ($b = -.03$, $SE = .01$, $p < .06$; $\beta = -.25$) (see Figure 2). Similarly, there was a negative association between PTS and intrinsic motivation towards accomplishment among civilian students ($b = -.04$, $SE = .02$, $p < .05$; $\beta = -.30$), but no associations among student service members/veterans exposed to combat-related trauma ($b = .01$, $SE = .01$, *ns*), non-combat exposed student service members/veterans ($b = -.03$, $SE = .02$, *ns*), and ROTC students ($b = .03$, $SE = .02$, *ns*). Post traumatic stress symptoms were unrelated to intrinsic motivations towards stimulation for all groups.

With respect to extrinsic motivations, significant interactions between PTS and service history emerged between students exposed to combat-related trauma and other student groups for introjected motivations (see Table 4). Specifically, there were positive associations for PTS symptoms among student service members/veterans with exposure to combat-related trauma ($b = .04$, $SE = .01$, $p < .001$; $\beta = .28$). In contrast, PTS symptoms were unrelated for civilian ($b = -.01$, $SE = .02$, *ns*), non-combat exposed student service members/veterans ($b = -.02$, $SE = .02$, *ns*), and ROTC students ($b = .03$, $SE = .02$, *ns*) (see Figure 3). Finally, PTS symptoms were unrelated to identified and external regulation subtypes of extrinsic motivation for all groups.

Lastly, post traumatic stress was negatively associated with students' reports of academic persistence ($b = -.40$, $SE = .09$, $p < .001$; $\beta = -.31$). This association was not moderated by service history.

COMMENT

PTSD distinguishes itself from other psychiatric diagnoses because of the importance placed on an inceptive external stressor itself (threatening death, injury or physical integrity), instead of primarily focusing on the resulting manifest symptoms.[28,29] In other words, unless an individual has actually experienced a traumatic historical event, a PTSD diagnosis cannot be made.[28] The National Center for Post-Traumatic Stress Disorder contends that military personnel who served in OEF/OIF encountered the following war-zone experiences: being attacked/ambushed (60%), receiving incoming fire (86%), seeing dead bodies or remains (63%), and knowing someone seriously injured or killed (79%).[30] Considering these external stressors, it is not surprising combat exposure represents a salient factor in the manifestation of PTS symptoms.[2,3,31]

Echoing the findings of previous investigations which strictly examine (non-student) military personnel, the current sample of combat exposed student service members/veterans reported significantly greater PTS symptoms than both non-combat exposed military-affiliated students/veterans and civilians. As a result of deployment-related trauma, military personnel experience many different physical (trouble sleeping, eating, headaches, rapid heartbeat/breathing), mental/emotional (nightmares, flashback, anger, fear, nervousness, hopelessness) and behavioral reactions (trouble concentrating, being jumpy, using alcohol,

tobacco or other drugs).[30] While these conditions, in and of themselves, are not indicative of PTSD, they do highlight the difficulties associated with the unique student service member/veteran experience. These findings hold clear implications for administrators and student health centers. For example, it is important to recognize that combat-exposed student service members/veterans have experienced events that (a) set them apart from both non-combat exposed service members and their civilian counterparts, and as we discuss next (b) are likely to be related their health behaviors and academic functioning.

Across all groups of the current investigation, PTS was positively associated with both problem drinking and alcohol-related consequences. Although the cross-sectional nature of our data precludes the interpretation of directional effects, previous researchers examining the causal association between PTS and alcohol abuse assert "there is sufficient evidence to argue that alcohol abuse is a predictable consequence of PTSD."[32(p823)] One of the leading theories driving this paradigm is that of self-medication.[33,34] In other words, individuals achieve an alternate mental state by using alcohol, providing reprieve from the hyper-vigilance of PTSD and resulting symptoms.[32] Others, however, simply acknowledge the comorbidity of PTSD and problematic alcohol use.[35] Findings from this investigation highlight the co-occurrence of PTS symptoms and problem drinking and alcohol-related consequences, regardless of military affiliation or prior exposure to combat-related trauma. While we cannot assert that combat-exposure leads to alcohol misuse, it is important to note that PTS symptoms and problem drinking have been shown to co-occur.[35] When considered in the context of the current investigation, and the fact that our sample of combat-exposed student service members experienced a significantly higher level of PTS than any other group, it becomes paramount for college health professionals to ensure that combat-exposed student service members are both screened and monitored for alcohol misuse and associated consequences. Campus-based counselors should be aware of the comorbidity of PTS and alcohol use/misuse and ensure that such behavior also receives proper attention.

Posttraumatic stress was also linked to lower academic performance (GPA), greater academic amotivation, and lower academic persistence among all groups included in this investigation. Considering posttraumatic stress is a psychological health injury, it is no surprise there exist a strong association between academic function and the presence of PTS. Additionally, the aforementioned physical (e.g., trouble sleeping, headaches), mental/emotional (e.g., flashbacks, hopelessness) and behavioral (e.g., trouble concentrating, using licit and illicit substances) reactions[30] to PTS represent obvious barriers to academic performance. Furthermore, individuals suffering from posttraumatic stress exhibit impaired performance on standardized memory tests.[36] Thus, the occurrence of PTS and its resulting effects may lead some students into a vicious, insidious cycle: stress associated with traumatic experiences produces reactions that inhibit academic functioning, inhibited academic performance leads to additional, confounding stress which further inhibits academic functioning.

Although the previous findings highlight some expected relationships (i.e., PTS was negatively associated with health and academic outcomes), some unexpected relationships were also discovered. Specifically, PTS symptoms among student service members exposed to combat-related trauma were unrelated to educational self-efficacy and academic intrinsic motivations (to know, or towards accomplishment). Moreover, there were positive associations between PTS symptoms and extrinsic academic motivations among student service members/veterans with combat-related trauma. Below we provide some conjecture and possible interpretations of these relationships. Specifically, we present two possible pathways that help provide context to these findings: (1) the influence of intelligence on development and severity of PTS, and (2) the "healthy warrior effect."[37] It is important to

note, however, that our investigation did not directly measure intelligent and/or IQ. Thus, the proposed pathways are speculative and not a result of direct measurement or assessment.

Intelligence represents an underlying factor known to have an influence on both the development and severity of PTS.[29, 36,38–40] For instance, even after controlling for extent of combat exposure, lower intelligence increased risk for PTS.[39] Moreover, IQ has been found to be a consistent predictor of resilience to PTS,[40] above and beyond the variance accounted for by combat exposure.[41] In other words, reviews of the empirical literature conclude "IQ is negatively correlated with the development of PTSD symptoms."[36(p1043)] Given that IQ represents a strong predictor of future educational and academic achievement,[42–44] it is plausible that our sample (and subsequent findings) suffer from selection effect. Since lower levels of educational achievement have previously been shown to predict PTS symptoms among military veterans,[45] it could be that student service members/veterans are somewhat protected from PTSD due to their presumed higher intelligence, than military personnel not pursuing a post-secondary degree.

Similar in concept to the "healthy worker effect,"[46,47] the "healthy soldier effect"[48,49] refers to lower mortality and better overall health status among military personnel, in comparison to the general population. Due to (a) initial military service physical screenings, (b) physical health maintenance required for service, and (c) access to medical care while in the service, Kang and Bullman assert "a military cohort almost always has better survival rates than a comparable segment of the general population,"[48(p1503)] Basically, one must be in good health to gain entrance and remain in the military, whereas the general population includes those who are sick and/or disabled. Haley[37] contends similar distinctions also exist between sub-groups within the military. Dubbed the "healthy warrior" effect,[50–52] there is selective withholding of military personnel unfit for deployment and combat. Thus, only the strongest, healthiest of the military are deployed and exposed to combat-related trauma. Previous comparison between combat-deployed Marines and contemporary and historical samples of non-combat-deployed Marines and Navy reveal combat-deployed personnel exhibit much lower incidence rates of diagnosed mental health conditions (e.g., adjustment disorders, personality disorders, mood disorders, psychotic disorders), with the exception for PTSD.[50] Recent studies confirm military personnel with better psychological health are more likely to be deployed, even when controlling for age, rank, sex, service branch, role in parent unit (e.g., combat, combat support, or combat service support), and medical downgrading.[52] Consequently, it is plausible that the students service members/veterans in our sample that were exposed to combat-related trauma are inherently more psychologically robust than their military and civilian peers.

Limitations

To date, the literature specifically examining student service members/veterans is scant. There is even less literature examining the differences between combat-exposed and non combat-exposed student service members/veterans. Taken together, this small literature base highlights an emerging cohort who have distinctly different life experiences and adjustment issues,[9] drinking motives,[13] and mental health correlates to their drinking behaviors[14] from their civilian counterparts. The present study points to a higher prevalence of posttraumatic stress among combat-exposed student service members than non-combat exposed students service members, ROTC, and civilian students. Additionally, PTS symptoms among student service members/veterans exposed to combat-related trauma was unrelated to several academic correlates. While student service members themselves represent a unique group on college campuses, this investigation highlights the fact that combat-exposed student service members may, in fact, be a unique cohort within the student service member/veteran population. That said, this study was not without its limitations. Foremost among these are

the cross-sectional nature of the data, the recruitment method employed, and the lack trauma measurement of non-combat-related trauma experiences.

In addition to our cross-sectional analysis, there are compounding factors that inhibit our ability to discuss any temporal relationships between posttraumatic stress, alcohol use/abuse, and academic correlates. For example, military personnel often report greater mental health distress several months after returning from service than when they first return.[53] As a result, rates of mental health concerns upon immediate return from service greatly under-represent rates reported several months later.[31] Therefore, responses to our PTS measure could be a function of the length of time that had elapsed between returning from deployment and taking the survey. To account for these limitations, future research must utilize longitudinal designs that clearly establish mental health symptoms, such as PTSD, and clear military service record at baseline.

Given the recruitment method employed, self-selection bias may have resulted in a less-than-representative sample across the 16 participating universities. Respondents may not truly represent the full spectrum of military-affiliated students in terms of service, combat exposure or mental/behavioral outcomes. Moreover, our reliance on a web-based assessment could have also limited sample representativeness. While web-based assessments have been shown to be promising data collection methods among samples accustomed to e-mail and internet access[54] it is possible these methods inhibited less "plugged in" groups from participating. Some investigations highlight inherent ethnic bias in web-based assessments, with Whites more likely to respond than Blacks and Hispanics.[55] This may be one explanation for our predominantly White sample. Conversely, other studies indicate comparable psychometric properties and sample representativeness (sex and ethnicity) across web-based and paper surveys,[56] as well as comparable proficiency in measuring alcohol use as telephone interview and traditional paper and pencil methods.[57–60] Future research should consider employing different data collection methods (e.g., mailings, random digit dialing) that may yield more representative samples.

Lastly, it is important to note that we did not assess non-combat-related trauma across any of the included groups. Our focus upon combat-related trauma was driven by the military-affiliation of our primary group of interest; however, such a focus does overlook non-combat-related and non-military-related traumas that could influence the manifestation of PTS. Moreover, it is possible that traumatic experiences (e.g., sexual assault or serious accident) among civilian students may have been one of the factors leading to our observation of PTS being negatively related to a number of academic outcomes and correlates across all groups.

Conclusion

Measures such as the "new GI Bill" have made it possible for military personnel to attend institutions of higher education in greatly increased numbers relative to several years ago. Both anecdotal and empirical evidence suggest that military students face unique challenges. Therefore, additional investigations must flesh out the health status of student service members, particularly those who experience combat, in order to provide researchers and practitioners with a research base to inform campus initiatives and services. Currently, higher education is ill-equipped to begin developing strategies to ensure successful transition of student service members/veterans. Research is needed which targets this emerging cohort and highlights their unique risk and protective factors. This study begins to reveal evidence regarding the actual characteristics and experiences of student service members/veterans.

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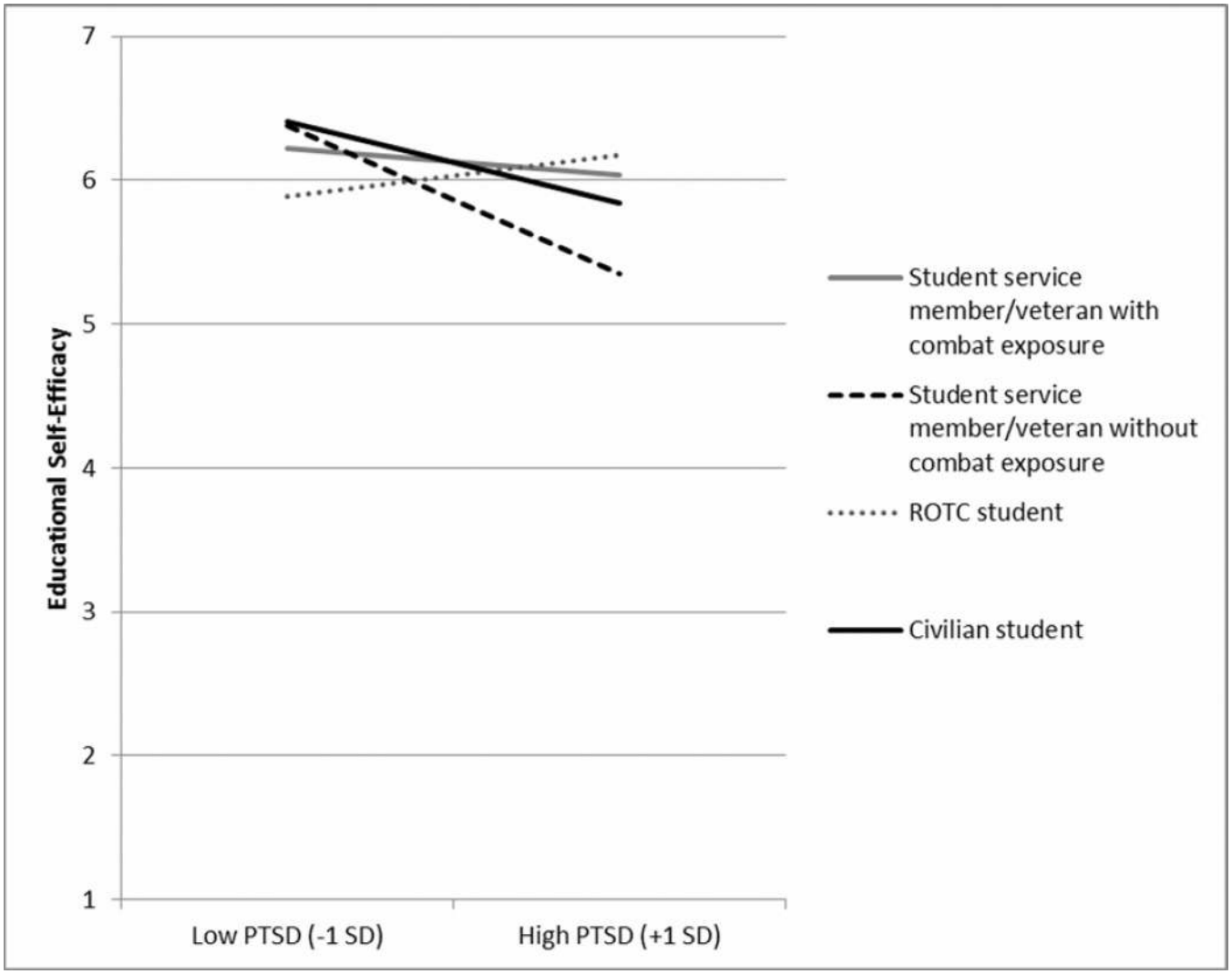

Figure 1.
Educational self-efficacy as a function of PTSD and service history.

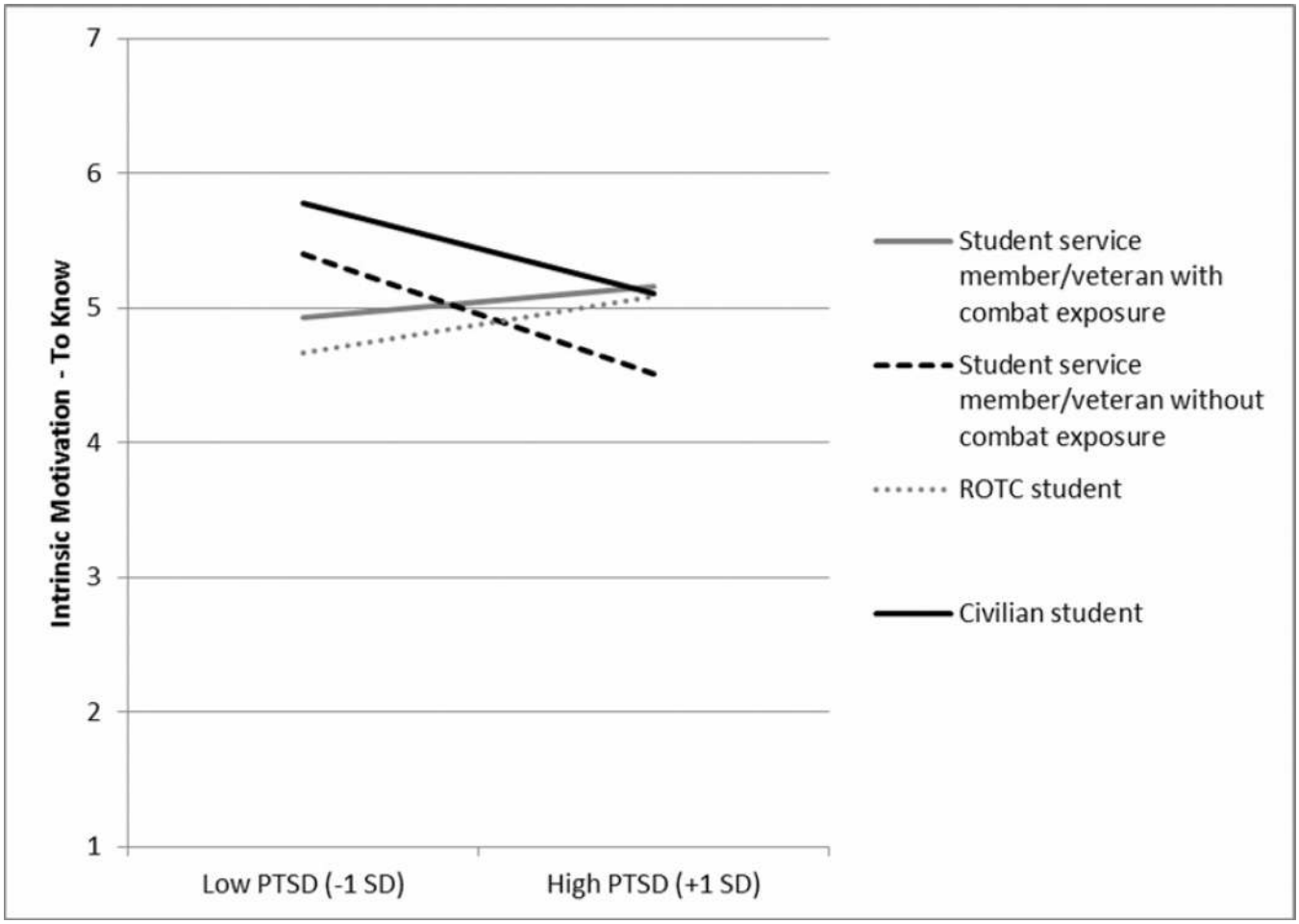

Figure 2.
Intrinsic motivation – to know as a function of PTSD and service history

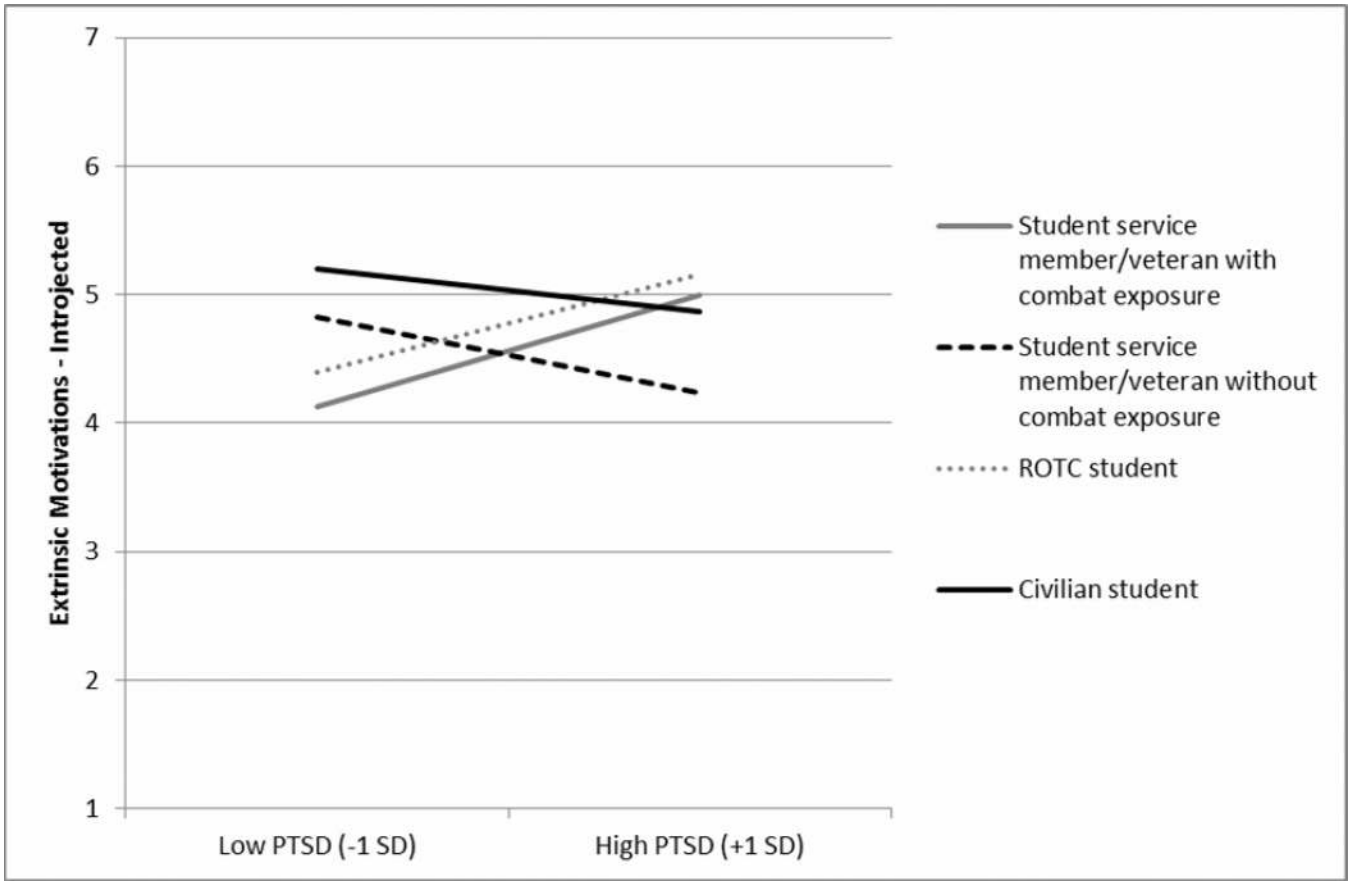

Figure 3.
Extrinsic motivation – introjected as a function of PTSD and service history.

Table 1

Students' educational self-efficacy as a function of PTSD, service history, and their interaction.

	Model 1			Model 2		
Variable	***b***	***SE***	**β**	***b***	***SE***	**β**
Intercept	6.16**	.13		6.13**	.13	
Age	.01	.01	.04	.01	.01	.04
Sex	.03	.08	.04	.03	.08	.03
Dummy1 – Civilian (D1)	−.04	.19	−.02	−.01	.19	−.00
Dummy2 – ROTC (D2)	−.24	.20	−.11	−.10	.20	−.04
Dummy3 – No combat (D3)	−.25	.18	−.12	−.26	.18	−.12
PTSD	−.02**	.01	−.22	−.01	.01	−.11
PTSD X D1				−.02	.01	−.11
PTSD X D2				.02	.02	.11
PTSD X D3				−.03*	.01	−.21
Δ R^2		.06			.06	
$F\Delta$		1.85†			3.63*	

Note: Age and PTSD were centered at their means. Sex was effect coded (males = −1, females = 1). Service history was dummy coded such that student service members/veterans with combat history were the reference group.

† $p < .01$.

* $p < .05$.

** $p < .01$.

Table 2

Students' intrinsic motivation – to know as a function of PTSD, service history, and their interaction.

	Model 1			Model 2		
Variable	***b***	***SE***	**β**	***b***	***SE***	**β**
Intercept	5.12**	.19		5.05**	.19	
Age	.01	.01	.04	.01	.01	.04
Sex	−.08	.11	−.06	−.08	.11	−.05
Dummy1 – Civilian (D1)	.32	.28	.12	.39	.28	.14
Dummy2 – ROTC (D2)	−.34	.30	−.10	−.17	.30	−.05
Dummy3 – No combat (D3)	−.11	.27	−.03	−.09	.27	−.03
PTSD	−.01	.01	−.08	.01	.01	.09
PTSD X D1				−.04*	.02	−.18
PTSD X D2				.01	.02	.03
PTSD X D3				−.05*	.02	−.18
Δ R^2		.03			.04	
$F\Delta$		1.17			2.62*	

Note: Age and PTSD were centered at their means. Sex was effect coded (males = −1, females = 1). Service history was dummy coded such that student service members/veterans with combat history were the reference group.

† $p < .01$.

* $p < .05$.

** $p < .01$.

Table 3

Students' intrinsic motivation – toward accomplishment as a function of PTSD, service history, and their interaction.

	Model 1			Model 2		
Variable	***b***	***SE***	**β**	***b***	***SE***	**β**
Intercept	4.21**	.22		4.15**	.22	
Age	.01	.01	.05	.01	.01	.06
Sex	−.01	.13	−.01	−.02	.13	−.01
Dummy1 – Civilian (D1)	.63*	.32	.20	.68*	.32	.22
Dummy2 – ROTC (D2)	.22	.34	.06	.44	.35	.11
Dummy3 – No combat (D3)	.21	.31	.06	.21	.31	.06
PTSD	−.01	.01	−.07	.01	.01	.05
PTSD X D1				−.04*	.02	−.18
PTSD X D2				.02	.03	.07
PTSD X D3				−.04	.03	−.13
Δ R^2		.04			.04	
$F\Delta$		1.26			2.66*	

Note: Age and PTSD were centered at their means. Sex was effect coded (males = −1, females = 1). Service history was dummy coded such that student service members/veterans with combat history were the reference group.

† $p < .01$.

* $p < .05$.

** $p < .01$.

Table 4

Students' extrinsic motivation – introjected as a function of PTSD, service history, and their interaction.

	Model 1			Model 2		
Variable	***b***	***SE***	**β**	***b***	***SE***	**β**
Intercept	4.67**	.22		4.56**	.22	
Age	−.01	.01	−.05	−.01	.01	−.05
Sex	.24†	.13	.16	.25†	.13	.16
Dummy1 – Civilian (D1)	.37	.32	.12	.47	.31	.15
Dummy2 – ROTC (D2)	.02	.34	.01	.21	.35	.05
Dummy3 – No combat (D3)	−.07	.30	−.02	.03	.30	−.01
PTSD	.01	.01	.08	.04*	.01	.28
PTSD X D1				−.05*	.02	−.20
PTSD X D2				−.01	.02	−.01
PTSD X D3				−.06*	.03	−.20
Δ R^2		.07			.04	
$F\Delta$		2.47*			3.06*	

Note: Age and PTSD were centered at their means. Sex was effect coded (males = −1, females = 1). Service history was dummy coded such that student service members/veterans with combat history were the reference group.

† $p < .01$.

* $p < .05$.

** $p < .01$.