

DISAGGREGATING THE EFFECTS OF POSTTRAUMATIC STRESS DISORDER
ON ACADEMIC PERFORMANCE IN A VETERAN SAMPLE

by

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ABSTRACT

Nearly 1,230,000 student veterans received Department of Veteran Affairs college benefits within the United States in 2014, many of them struggling with posttraumatic stress disorder (PTSD). While PTSD has been linked to lower academic performance, the mechanism behind the relationship remains unclear and no research has demonstrably broken it down. Various research studies have found links that suggest that some symptoms of PTSD may have an effect on academic performance; for instance, aggression has been found to affect attention and be associated with poor academic performance, while sleep difficulties negatively impact preparation for exams, memory consolidation, encoding, and stress levels. The present study examined PTSD and academic performance in 348 student veterans enrolled in universities across the country. Results of the study showed 51.3% of participants screened likely for PTSD. After controlling for age, PTSD was not found to be a significant predictor of academic performance. However, higher levels of reexperiencing symptoms (unwanted and upsetting memories, nightmares, flashbacks, cued emotional distress, and cued physical reactivity), as a cluster, were found to be moderate to strong predictors of lower GPA (and were significantly better predictors than any of the other PTSD symptom clusters. These findings have a variety of implications along administrative, educational, and clinical domains.

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INTRODUCTION

In 2014, there were nearly 1,100,000 student veterans who received Department of Veteran Affairs (VA) educational benefits, the majority of whom were enrolled fulltime at universities within the United States. Other veterans utilized vocational rehabilitation services (131,000+), and still more attend without using any federal assistance (Department of Veterans Affairs, 2015). Post-9/11 veterans therefore represent the largest number of veterans attending postsecondary school in history. With the draw-down in Afghanistan continuing into 2016, even more veterans are expected to return to school as they return home to the United States, increasing these numbers even further.

Within the postsecondary education system in the United States, veterans face many unique challenges, including transitioning from a combat/military lifestyle, difficulty separating themselves from their military identity, connecting with other students and professors who have no military experience (and sometimes have disrespectful or antiwar opinions), and strained relationships with family who are adjusting to their spouse or parent having returned home after being gone from their lives for months or years at a time (Elliott, 2015; Ness et al., 2014; Rumann, Rivera, & Hernandez, 2011). Returning veterans often suffer from a variety of physical and mental health problems, including the loss of limbs, traumatic brain injuries, depression, high levels of substance use, and posttraumatic stress disorder (PTSD; Church, 2009). In

addition, those veterans with lower perceived social support and PTSD reported a larger number of academic problems (Grossbard et al., 2014). Helping to accommodate for disability and the transition from military to civilian life has been shown to help veterans succeed in their postsecondary education, as well as decrease the number of negative encounters that they face (Church, 2009; Madaus, Miller, & Vance, 2009).

Rates of PTSD diagnosis in the military vary between 11% for nondeployed veterans and 22% for recent Iraq and Afghanistan combat veterans (Dursa et al., 2014; Seal et al., 2009). The primary traumatic events leading to PTSD in this population are, for men, combat exposure during deployments and, for women, military sexual trauma (MST). More than 15% of the U.S. military is comprised of women. One study found that 28% of female veterans had experienced rape or an attempted rape, with 71% of these women seeking help for PTSD for a sexual assault or rape while in the military (Diramio, Jarvis, Iverson, Seher, & Anderson, 2015). However, MST is not limited to just women. A report released in May 2013 by the Pentagon stated that 1.2% of active duty male service members have been sexually traumatized, which averages to 38 male service members per day. Sexual trauma poses a risk for PTSD that is as high, or higher, than combat exposure (Williams & Bernstein, 2011).

Sexual assault has been found to have a significant association with dropping out of school and a deleterious impact on grade point average (GPA); this association is present in both those suffering from PTSD symptoms prior to entering college, as well as those who are assaulted or raped during their college career. Specifically, women who have been raped have higher rates of GPAs under a 2.5 as compared to those who suffered other forms of sexual assault (Jordan, Combs, & Smith, 2014).

PTSD persists as veterans transition from the military to an academic environment, with studies finding that 45% of student veterans screen positive for likely PTSD (Bryan, Bryan, Hinkson, Bichrest, & Ahern, 2014; Rudd, Goulding, & Bryan, 2011). Veteran students suffering from PTSD have been found to be more dissatisfied with their college education and have more negative educational experiences than veterans without PTSD (Elliott, 2015). Additionally, they have been observed to be more likely to attribute their success (or failure) to forces outside of their control so they tend to put less work or effort into challenges to achieve their goals (Boyraz et al., 2015). Neurocognitive problems have been associated with veterans suffering from PTSD and have been attributed to neurobiological changes stemming from the trauma (Southwick et al., 2010; Stricker, Keller, Castillo, & Haaland, 2015). These same findings were documented fairly early in development as well, with children who are experiencing PTSD symptoms tending to have comparatively poor cognitive skills, more aggression problems, and lower academic achievement than their nontraumatized counterparts (Park et al., 2014; Scott, Lapré, Marsee, & Weems, 2004).

PTSD has been linked to lower academic performance (as measured by GPA and a variety of other factors like difficulty studying, turning in assignments on time, etc.) in both nonveteran and veteran students (Baker et al., 2016; Belknap & Erez, 1995; Boyraz et al., 2015; Bryan et al., 2014; Jordan, Combs, & Smith, 2014); however, it remains unclear which mechanisms or symptoms specifically contribute to the lower academic performance and higher dropout rates. PTSD symptoms are divided into four clusters of criteria as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; APA, 2013): intrusive symptoms like dreams, nightmares, unwanted

thoughts, and flashbacks; avoidance symptoms such as avoiding thoughts, feelings, places, and people that remind him or her of the event; negative alterations in cognitions and moods such as feeling isolated from others, having negative thoughts or beliefs, memory problems associated with the event, and intense emotions of horror, shame or sadness; and hyperarousal symptoms like difficulty concentrating, sleeping difficulties, irritability or anger, and hypervigilance. Each of these symptoms could adversely impact academic performance individually, or in combination as a cluster.

While there is no research that demonstrably breaks down PTSD and identifies which individual symptoms are related to academic performance, there is some research that links individual hyperarousal symptoms of PTSD (with and without the PTSD diagnosis) to a variety of undesired academic measures and effects. For instance, aggression and social rejection have both been found to have an association with lower academic performance in children, and aggression has been shown to affect attention and academic performance in college students (Khanekheshi & Basavarajappa, 2011; Wilson, Petaja, & Mancil, 2011).

Students who struggle with sleep performed worse in their university studies than those students who did not have sleep difficulties. Poor sleep quality limited cognitive processes like memory consolidation and encoding, which are essential for college students. Poor sleep has also been found to lead to higher levels of anxiety and stress during testing, and improper preparation for exams. Conversely, treatment and management of sleep difficulties were shown to increase academic performance measures like GPA (Ahrberg, Dresler, Niedermaier, Steiger, & Genzel, 2012; Ness, Rocke, Harrist, & Vroman, 2014).

Physiological hyperarousal tends to increase daytime alertness in those suffering from insomnia, but is associated with higher error rates on tasks requiring focus and attention (Edinger, Means, & Krystal, 2013). Difficulty with concentration and staying focused has also been found to have significant impacts on academic performance (Wammes, Seli, Cheyne, Boucher, & Smilek, 2016). In particular, math and calculations (skills in particular demand in Science Technology Engineering & Mathematics, or STEM majors) have particularly strong, negative relationships with the ability to focus, attend, and concentrate on the subject matter (Commodari & Di Blasi, 2014; Lee, 2015; Schwanz, Palm, & Brallier, 2007).

Among college students, a history of trauma and PTSD symptoms have been found to be a good predictor of past mental health treatment (Elhai & Simons, 2007). Currently, if a student with PTSD is struggling academically, there is no research that shows any “fixes” or accommodations that are likely to help them before they fail out of courses due to a lack of empirically supported treatments (EST) being used in university counseling centers. One study recently found that students with PTSD can be successfully treated using cognitive processing therapy (CPT; Wilkinson, von Linden, Wacha-Montes, Bryan, & O’Leary); however, this treatment takes 12 weeks of treatment, which means that the semester will be over and done prior to finishing the treatment course. For a variety of reasons, including lack of familiarity with mental health disorders and lack of evidence of the efficacy of accommodations for mental health disorders, many faculty are unwilling to be flexible with mental health problems in students (Backels & Wheeler, 2001). However, while faculty feel that speaking with the disability and accessibility office on campus is personally helpful as they try to assist a struggling

student with PTSD, the process can be arduous and unhelpful to students due to a lack of useful accommodations to assist them before they fail their courses (Backels & Wheeler, 2001; Brockelman & Scheyett, 2015).

There simply is not time to treat PTSD in its entirety in the middle of a semester, even if proven ESTs such as prolonged exposure (PE) or CPT are used. Thus, universities and students need more specific recommendations to counter academic problems that might save these veterans from having to fail out of an entire semester and potentially leave the college system altogether. Although we know that PTSD is associated with lower academic performance, it is unclear how or why this relationship is occurring. This study sought to examine the specific relationships between the different clusters of PTSD symptoms and several variables of academic performance. We hypothesized that hyperarousal symptoms (Criterion E), as a cluster, would be more strongly associated (negatively) with academic performance in student veterans than the other symptom clusters. Additionally, it was hypothesized that the association between hyperarousal symptoms and GPA would be moderated by the student's field of study (STEM major vs. non-STEM major), but that field of study would not moderate the relationship between hyperarousal symptoms and the six academic problems.

METHOD

Participants

Participants included 487 veterans attending colleges and universities within the United States, ranging in age from 20 to 61 years of age ($M = 30.43$, $SD = 6.48$). The gender breakdown was 99 females (20.3%) and 388 males (79.7%), with no participants identifying themselves as transgender or “not male, female, or transgender.” All of the branches of the service were represented with 60.4% of respondents having served in the Army, 18.9% in the Air Force, 10.7% in the Navy, 7% in the Marine Corps, and 2.9% in the Coast Guard. The racial distribution was 91.1% Caucasian, 7.6% African American, 2.3% Native American, 0.4% Asian, and 0.2% Pacific Islander, with 40.6% of respondents identifying as having Hispanic/Latino ethnicity.

Measures

Posttraumatic stress

Posttraumatic stress symptoms were measured with the PTSD Checklist 5 (PCL5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013), which uses the symptoms of PTSD found in the DSM-5. The PCL-5 is a 20-item measure (self-report) that measures the four symptom clusters of PTSD (Criterion B through Criterion E) using a scale that assesses how severely the respondent has been impacted by symptoms of PTSD during the last month. It is considered a highly reliable and valid measure of PTSD. Cronbach's

alpha score has been found to be high (0.90-0.94). PCL-5 subscale intercorrelations have been found to range between 0.45 and 0.76, demonstrating that they play into a similar construct, but are not interchangeable (Blevins, Weathers, Davis, Witte, & Domino, 2015; Sveen, Bondjers, & Willebrand, 2016).

Depression

Depression symptoms were measured with the Patient Health Questionnaire-9 (PHQ-9). This is a 9-item, self-report measure that assesses how frequently the individual has experienced symptoms of depression during the last 2 weeks. It is considered a highly reliable and valid measure of depression, with Cronbach's alpha varying between 0.86 and 0.89 (Kroenke, Spitzer, & Williams, 2001).

Grade point average (GPA)

GPA was assessed by asking "What is your current grade point average at your institution?" Self-reported GPA has been found to correlate very highly with the true GPA obtained from school records. Discrepancies between self-reported GPA and true GPA have been found to be insignificant and generally do not affect research outcomes (Cole, Rocconi, & Gonyea, 2012; Kuncel, Crede, & Thomas, 2005).

Other academic measures

Participants answered six questions related to academic problems in the last semester. These included "how often did you" (1) turn in an assignment or paper late (or not at all), (2) receive a lower grade on a quiz or exam than you expected (while still

passing the quiz or exam), (3) fail an exam or quiz, (4) skip or choose not to attend class, (5) fail to prepare adequately for class (e.g., read the assigned readings for that day), or (6) find yourself unable to focus and/or participate in the discussion and/or lecture.

Possible answers to these six questions were “Never,” “1 to 3 times,” “4 to 6 times,” “7 to 9 times,” or “10+ times.” While this is a new way of looking at academic performance, four out of six of these questions have been used previously in another study (Bryan et al., 2015) and were found to moderately correlate with GPA. They are expected to identify non-GPA areas of potential struggle in academic performance.

Procedures

Participants were recruited from a variety of sources, including university administrators, veteran support counselors, national veteran and student veteran organizations, and through social media groups of student veterans. Study information containing a hyperlink to the survey was sent to the administrators and organizers, asking them to please forward to student veterans they serve.

Potential participants were asked to review the informed consent documents on the study website and, after agreeing to participate, could begin the survey. The first two questions of the survey asked if they were a military veteran and if they had attended at least one college or university class within the last 8 months. Individuals who did not answer affirmatively to both were not allowed to complete the survey. Once a participant completed the survey, they were asked to fill in their email address (which was not linked to their survey results) to receive a \$10 amazon gift card via email. Finally, they were asked to forward to the hyperlink of the study to other student veterans that they may

know. The Institutional Review Board at the University of Utah provided the approval for the study.

Of the 594 individuals to access the study website, 487 (82%) answered affirmatively to the screener questions and completed the survey. Among those who completed the survey, 139 (28.54%) were in their first semester of school or did not know their GPA, leaving 348 (71.46%) participants for analysis. It is unknown how many student veterans who received the hyperlink chose not to participate in the study.

Statistical Analyses

Results of the surveys were analyzed for descriptive statistics. Distributional properties were checked to assure that they meet assumptions of regression; no adjustments were deemed necessary. Each of the PTSD symptom clusters were correlated with GPA academic problems, while using statistical corrections for the number of tests being run (using Bonferoni). Zero-order correlations were run first, followed by multiple regressions to examine the unique contribution each symptom cluster has on academic performance.

RESULTS

Calculations for the means, standard deviations, and intercorrelations of the pertinent variables were performed (see Table 1). Using the optimally efficient PCL-5 cut score of 33 for screening for a probable PTSD diagnosis (Bovin et al., 2016), estimations of rates of PTSD among the participants were made. Results using these cutoffs showed 51.3% of participants screened positive for probable PTSD.

Self-reported GPA ranged from 0.58 to 4.0 ($M = 3.36$, $SD = .51$). Although female student GPAs ($M = 3.45$, $SD = .55$) were higher than male student GPAs ($M = 3.35$, $SD = .47$), this difference was not statistically significant ($t(346) = 1.667$, $p = .096$). There also was no significant difference in the GPAs of Caucasian vs. non-Caucasian students ($t(346) = .774$, $p = .439$). There was a difference in the mean GPAs between those who had screened positive for probable PTSD ($M = 3.30$, $SD = .44$) and those who did not ($M = 3.43$, $SD = .54$; $t(346) = -2.305$, $p = .022$). The GPAs of those meeting Criterion B ($M = 3.32$, $SD = .52$) were significantly lower than those who did not ($M = 3.53$, $SD = .33$; $t(346) = 3.207$, $p = .001$); similarly, those meeting Criterion C ($M = 3.33$, $SD = .53$) had lower GPAs than those who did not ($M = 3.47$, $SD = .38$; $t(346) = 2.269$, $p = .024$), and the GPAs of those meeting Criterion E ($M = 3.34$, $SD = .52$) were lower than those who did not ($M = 3.51$, $SD = .35$; $t(346) = 2.405$, $p = .017$). However, the GPAs of those meeting Criterion D ($M = 3.34$, $SD = .52$) were not significantly lower than those who did not ($M = 3.48$, $SD = .36$; $t(346) = 1.928$, $p = .055$).

In regards to the other academic measures, participants reported that on at least one occasion, 36.5% had turned in an assignment or paper late, 43.1% said that they received a lower grade than expected (while still passing) on an exam or quiz, 29.6% stated that they had failed an exam or quiz, 43.5% noted that they had skipped or chosen not to attend class, 40.5% stated that they failed to prepare adequately for class, and 43.4% shared that they have found themselves unable to focus on the discussion or lecture. Table 2 shows a complete breakdown of the frequency of these academic problems. Not surprisingly, they were moderately correlated with GPA, as has been found in the past (Bryan et al., 2014).

Associations of PTSD Severity With GPA and Academic Problems

The associations of PTSD with GPA and the six academic problems were tested using linear regression (see Table 3). Age was entered into the models because of its significant correlations with GPA and the six academic problems. After controlling for age, PTSD was not statistically associated with GPA ($\beta = .074$, $t = 1.404$, $p = .161$). This model accounted for 11.3% of the variance in GPA and was statistically significant ($F(2, 330) = 22.066$, $p < .001$). PTSD was also associated with significantly higher frequency of turning in an assignment or paper late ($\beta = .152$, $t = 3.715$, $p < .001$), failing an exam or quiz ($\beta = .146$, $t = 3.654$, $p < .001$), skipping or choosing to not attend class ($\beta = .186$, $t = 4.664$, $p < .001$), and being unable to focus on the discussion or lecture ($\beta = .093$, $t = 2.072$, $p = .039$).

Disaggregating PTSD's Association With GPA and Academic Problems

Individual severity scores for Criterion B, C, D, and E were calculated by summing the scores of each symptom that falls within the corresponding clusters. These variables of severity were then used as predictors in linear regression to test association between individual clusters of PTSD and academic performance. Age was again entered into the models as a covariate. Results indicated that Criterion B symptoms were significantly associated with lower GPA ($\beta = -.222, t = -2.256, p = .025$), higher frequency of late assignments ($\beta = .302, t = 4.672, p < .001$), receiving a lower grade than expected ($\beta = .208, t = 2.854, p = .005$), failing an exam or quiz ($\beta = .354, t = 5.711, p < .001$), skipping class ($\beta = .338, t = 5.458, p < .001$), and failing to prepare for class ($\beta = .203, t = 2.824, p = .005$). More severe Criterion C symptoms were associated with lower frequency of late assignments ($\beta = -.194, t = -4.390, p < .001$), failing exams ($\beta = -.194, t = -4.390, p < .001$), skipping class ($\beta = -.194, t = -4.390, p < .001$), and greater frequency of being unable to focus on the discussion or lecture ($\beta = .125, t = 2.169, p = .031$). Higher severity of Criterion D symptoms was associated with more frequent late assignments ($\beta = .253, t = 6.122, p = .002$). Finally, higher severity levels of Criterion E symptoms was associated with less frequent receipt of lower grades than expected ($\beta = -.180, t = -2.315, p = .021$) and more frequently skipping class ($\beta = .283, t = 4.298, p < .001$).

Is the Association Moderated by Field of Study (STEM vs. non-STEM)?

To test the original hypothesis that field of study would moderate the relationship between GPA and hyperarousal symptoms as a cluster, a generalized linear regression

was first run using GPA as the outcome, with field of study, age, and hyperarousal symptoms as predictors. This was then run again, adding in the interaction of field of study and hyperarousal symptoms to the model. This same test for moderation was conducted for the remaining six academic performances as outcomes. In each of the seven tests of moderation, the results failed to meet significance using Benjamini-Hochberg false discovery rate (FDR) corrections to account for running a large number of regressions (Benjamin & Hochberg, 1995).

Due to the contrasting findings that intrusion symptoms had stronger relationships with academic performance than the hyperarousal symptoms hypothesized, these seven tests of moderation were again run using intrusions symptoms as a substitution for hyperarousal symptoms; the covariates remained the same throughout the second set of seven tests, except for the use of intrusions by field of study as the interaction term. Once again, all seven results failed to meet significance after correcting for false discovery rate.

Table 1

Means, standard deviations, and intercorrelations of all variables

	1.	2.	3.	4.	5.	6.	7.
1. GPA	--						
2. Late paper	-.50***	--					
3. Low grade	-.48***	.71***	--				
4. Fail exam	-.48***	.82***	.71***	--			
5. Skip class	-.47***	.80***	.61***	.84***	--		
6. Preparation	-.37***	.74***	.66***	.75***	.80***	--	
7. Focus	-.34***	.54***	.69***	.50***	.53***	.75***	--
8. Gender	-.10	.31***	.23***	.31***	.26***	.233**	.20***
9. Age	.35***	-.48***	-.47***	-.49***	-.51***	-.44***	-.28***
10. PTSD	-.14*	.16**	-.074	.15*	.19***	.07	-.09
11. Criterion B	-.20***	.55***	.33***	.57***	.43***	.43***	.22***
12. Criterion C	-.11*	.18***	.18***	.12*	.08	.14*	.15***
13. Criterion D	-.12*	.48***	.26***	.45***	.42***	.35***	.16***
14. Criterion E	-.05	.46***	.20***	.48***	.50***	.38***	.14***
<i>M</i>	3.36	1.96†	1.80†	1.84†	2.22†	2.02†	1.89†
<i>SD</i>	.50	1.02	.85	.99	1.27	1.07	1.02

All calculations for significance were Bonferoni corrected.

* Significant at $p > .05$ ** Significant at $p > .01$ *** Significant at $p > .001$

† Scale is 1 = "Never", 2 = "1-3 times", 3 = "4-6 times", 4 = "7-9 times", 5 = "10+ times"

Table 1

Continued

	8.	9.	10.	11.	12.	13.	14.
8. Gender	--						
9. Age	-.18***	--					
10. PTSD	-.01	.00	--				
11. Criterion B	.18***	-.28***	.64***	--			
12. Criterion C	-.00	-.04	.50***	.45**	--		
13. Criterion D	.19***	-.17***	.73***	.80**	.61**	--	
14. Criterion E	.18***	-.19***	.74***	.77**	.46**	.83**	--
<i>M</i>		30.48	34.69	7.50	3.34	11.33	9.21
<i>SD</i>		6.49	15.11	3.93	1.94	5.84	4.89

All calculations for significance were Bonferoni corrected.

* Significant at $p > .05$ ** Significant at $p > .01$ *** Significant at $p > .001$

Table 2

Frequency of academic problems (self-report)

	1 “Never”	2 “1 to 3 times”	3 “4 to 6 times”	4 “7 to 9 times”	5 “10+ times”
Turned in an assignment or paper late	221 (63.5%)	43 (12.4%)	70 (20.1%)	12 (3.4%)	2 (0.6%)
Received a lower grade than expected (but still passing)	198 (56.9%)	64 (18.4%)	75 (21.6%)	11 (3.2%)	0 (0%)
Failed an exam or quiz	245 (70.4%)	31 (8.9%)	67 (19.3%)	4 (1.1%)	1 (0.3%)
Skipped or chose not to attend class	196 (56.3%)	62 (17.8%)	75 (21.6%)	8 (2.3%)	6 (1.7%)
Failed to prepare adequately for class	207 (59.5%)	50 (14.4%)	71 (20.4%)	11 (3.2%)	9 (2.5%)
Was unable to focus on discussion or lecture	197 (56.6%)	47 (13.5%)	80 (23.0%)	7 (2.0%)	17 (4.9%)

Table 3

Linear regression on measures of academic performance

GPA	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.344	.119	Age	.325	6.182	< .001
			PTSD	.074	1.404	.161
Late assignment	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.530	.281	Age	-.507	-12.423	< .001
			PTSD	.152	3.715	< .001
Low grade	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.509	.259	Age	-.504	-12.149	< .001
			PTSD	-.078	-1.874	.062
Failed exam	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.556	.309	Age	-.536	-13.363	< .001
			PTSD	.146	3.654	< .001
Skipped class	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.566	.320	Age	-.533	-13.376	< .001
			PTSD	.186	4.4664	< .001
Failed to prepare	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.487	.234	Age	-.482	-11.441	< .001
			PTSD	.071	1.683	.093
Unable to focus	<i>R</i>	<i>R</i> ²	Predictor	β	<i>t</i>	<i>p</i>
	.288	.083	Age	-.347	-7.712	< .001
			PTSD	.093	2.072	.039

DISCUSSION

The present study aimed to disaggregate the effects of PTSD on academic performance by breaking down PTSD into its four symptom clusters and looking at them individually. Overall, the average GPA of student veterans in this sample (3.36) was similar to those found in other studies, with Lemos and Lumandue (2013) finding an average of 3.43 and Bryan et al. (2014) finding an average of 3.45. The number of student veterans screening positive for probable PTSD (51.3%) was likewise similar to those found in other studies, with Bryan et al. (2014) reporting 48.5% and Rudd et al. (2011) reporting 45.6%.

While PTSD was found to only be weakly associated with GPA and one academic problem in this sample, the moderate to strong relationship found between intrusion symptoms (Criterion B) and all seven measures of academic performance used in this study is suggestive of a systemic, negative influence on the academic performance of student veterans struggling with PTSD; the overall relationship between PTSD and academic performance may be largely attributable to intrusion symptoms. In comparison to intrusion symptoms, the number of academic performance measures significantly associated with the other symptom clusters was substantially less. Thus, intrusive symptoms as a cluster appear to be more strongly associated with academic performance than the other symptom clusters.

Conversely, it is interesting to note that those students in the current study with high avoidance symptoms (Criterion C) were less likely to turn in assignments late, fail exams, or skip class. One possible explanation is that they used school and homework as distractions to avoid thoughts and memories of the trauma. Another hypothesis is that students with higher avoidance symptoms are more likely to be taking online classes, wherein the idea of turning in assignments and skipping class looks different from on-campus classes; however, while there was a weak correlation between avoidance symptoms and enrollment in online classes ($r = .170, p = .002$), after accounting for avoidance symptoms, being enrolled in online classes was not significantly associated with turning in assignments late ($\beta = .013, t = .235, p = .814$), failing exams ($\beta = .064, t = 1.165, p = .245$), or skipping classes ($\beta = .013, t = .232, p = .817$).

This significant relationship of intrusion symptoms and academic performance has important implications for school administrators, counselors, clinicians, and researchers. Both CPT and PE are commonly used with veteran because clinical trials show them to be effective in working with comorbid PTSD and depression (Resick et al., 2013). However, CPT and PE have been shown to occasionally increase symptoms of PTSD (including intrusion and reexperiencing symptoms) temporarily, between session 2 and session 9, for approximately 21% of participants in one analysis (Larsen, Stirman, Smith, & Resick, 2016); it should be noted that numerous studies have found that among those who experienced symptom exacerbation, significant improvements were seen by the end of treatment and they did not experience significantly worse outcomes at higher rates than those who had not experienced a temporary increase in symptoms (Foa, Zoellner, Feeny, Hembree, & Alvarez-Conrad, 2002, Nishith, Resick, & Griffin, 2002).

Thus, the timing of major school events (for instance, midterm and final exams) may want to be explored by clinicians and patients when discussing the beginning of treatment; however, any such exploration should be subsequently balanced against the potential short-term and long-term impacts of delaying the intervention or not enrolling in college for a semester to accommodate treatment. One area for future research considerations that can be drawn from these findings would be to explore if any evidence-based treatments for PTSD produce quicker declines in intrusion symptoms than the others.

Because of the difficulty of quickly treating PTSD and the possibility of exacerbated symptoms, administrators and school counselors have a foundational reason to grant extenuating circumstances to students suffering from PTSD for the purposes of incompletes and administrative withdrawals after the normal deadline, thereby limiting the potential academic and financial harm to the student while they seek treatment for a serious mental health disorder.

While a number of studies suggested that fields of study with higher concentrations of math and science courses may have more reasons to suspect a deleterious effect from PTSD symptoms (specifically, symptoms corresponding to difficulties with cognition, stress, and sleep), no significant interactions were found between field of study, and hyperarousal or intrusion symptoms. Thus, based off of this study, there is no reason to suspect that STEM programs should see higher academic performance issues among those suffering from PTSD than non-STEM fields.

While findings of the current study in the area of average GPA, proportions of PTSD, and frequency of self-reported academic problems among student veterans are

similar to those found before (Bryan et al., 2014), other results are in need of replication and should be considered preliminary until such time. Although the participants in the current study are gathered from a nationwide sample of colleges and universities in the United States, they are not necessarily representative of all student veterans. Another vulnerability of the study is response bias, due to the use of self-report measures in capturing symptoms of PTSD. However, even with these limitations, the current study is the first to examine the relationship between disaggregated PTSD and academic performance, providing key insights into how to assist student veterans both scholastically and clinically. Further, these findings may extend beyond academic performance into other areas of daily functioning and are a prime area for further research.

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