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The Effects of Inattentiveness and Hyperactivity on Posttraumatic Stress Symptoms: Does a Diagnosis of Posttraumatic Stress Disorder Matter?

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Abstract

Objective: To address the nature of associations between ADHD symptoms and posttraumatic stress disorder (PTSD) psychopathology in adult military veterans. **Method:** Ninety-five combat veterans, with PTSD (n = 63) and without PTSD (n = 32), were recruited for this study. PTSD was assessed with the Clinician-Administered PTSD Scale (CAPS) and ADHD was assessed with Connors' Adult ADHD Rating Scale−Self-Report: Short Version (CAARS-S:S). **Results:** PTSD participants endorsed greater hyperactivity or restlessness, inattention or memory problems, and impulsivity or emotional lability scores than participants without PTSD. Among PTSD participants, inattention or memory problems and impulsivity or emotional lability were significant predictors of total PTSD symptoms, but only inattention or memory problems significantly predicted PTSD symptoms when other ADHD symptom clusters were considered simultaneously. **Conclusion:** Our data suggest that inattention may serve as a risk factor for posttraumatic stress symptoms following combat exposure. *(J. of Att. Dis. 2020; 24(9) 1246-1254)*

Keywords

adult ADHD, inattention, PTSD, cognitive functioning

Introduction

Posttraumatic stress disorder (PTSD) is a disabling condition that often develops following exposure to life-threatening events, such as combat exposure. Classic symptoms include reexperiencing the trauma through intrusive thoughts, nightmares, or flashbacks; persistent avoidance of associated stimuli; and increased physiological arousal manifested as insomnia and exaggerated startle. Beyond these core features, PTSD is also associated with high rates of comorbidity with other psychiatric disorders. Rates of lifetime comorbidity of any psychiatric disorder with PTSD have been found at as high as 88% (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Whereas PTSD most commonly co-occurs with affective disorders (e.g., depression), substance use disorders, and anxiety disorders, less has been reported for other prevalent psychiatric problems such as ADHD. Relatively little is known about the nature of the associations between ADHD and PTSD.

Available epidemiological studies on the associations between PTSD and ADHD suggest substantial overlap between the two disorders. For example, one study reported that 36% of male veterans diagnosed with PTSD likely met criteria for ADHD in childhood and 28% likely met current criteria for ADHD (Adler, Kunz, Chua, Rotrosen, & Resnick, 2004). These estimates suggest that ADHD is markedly more common among PTSD-diagnosed veterans than in the general population (4%-12% childhood ADHD; Biederman & Faraone, 2005, and 1%-4% adult ADHD; Faraone, Biederman, & Mick, 2006; Kessler et al., 2006) or other clinical populations, such as panic disorder patients (9% childhood ADHD and 5% adult ADHD; Adler et al., 2004). Similarly, Antshel and colleagues (2013) reported that the prevalence of PTSD was more than 6 times higher among adults diagnosed with ADHD (10%) compared with healthy controls (1.6%).

It is possible that ADHD symptoms confer vulnerability for later PTSD following stressful events (e.g., Lee, Falk, &

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Aguirre, 2012). Alternatively, associations between ADHD and PTSD may be due to the shared causal factors (e.g., neurocognitive deficits) between these disorders. Individuals diagnosed with PTSD evince deficits in a variety of cognitive functions such as attention, memory, and global intellectual functioning (e.g., Beers & De Bellis, 2002; Bremner et al., 1993; Gilbertson, Gurvits, Lasko, Orr, & Pitman, 2001; Golier et al., 2002; Jenkins, Langlais, Delis, & Cohen, 2000; Vasterling et al., 2002; Yehuda et al., 1995). There are clear neurotoxic effects of trauma that may be responsible for poor neurocognitive performance (Bremner, 1999; Buckley, Blanchard, & Neill, 2000). However, some neurocognitive deficits predate trauma exposure (Kessler et al., 1995; Kulka et al., 1990; Pitman et al., 2006). Deficits in attentional control and response inhibition predict posttraumatic stress severity among trauma exposed individuals and may even predate trauma exposure (Aupperle, Melrose, Stein, & Paulus, 2012). If neurocognitive deficits in attention and memory deficits represent a common factor underlying the ADHD-PTSD comorbidity, then one might predict ADHD inattention symptoms to be most strongly associated with PTSD symptoms involving concentration problems (i.e., hyperarousal).

Although some studies have tested the relations between diagnostic status or overall symptoms of ADHD and PTSD, it remains unclear whether core symptom clusters of ADHD (i.e., inattention, hyperactivity, and impulsivity) are related to PTSD symptoms. Only four studies have examined this question, only two of which involved adult samples. Ford et al. (2000) reported that youth with ADHD demonstrated higher levels of PTSD reexperiencing and hyperarousal—but not avoidance—symptoms than youth with adjustment disorder. The relation between ADHD and PTSD hyperarousal symptoms was accounted for by ADHD inattentive symptoms but not hyperactive-impulsive symptoms. Husain, Allwood, & Bell (2008) found that ADHD inattention symptoms were related to all PTSD symptom clusters in a sample of war-exposed youth, with the strongest observed association between ADHD inattentive symptoms and PTSD hyperarousal symptoms. Thus, in line with the hypothesis described above, findings from pediatric samples indicate a consistent pattern linking ADHD inattention to PTSD hyperarousal symptoms.

Results of the two studies of ADHD and PTSD symptom clusters in adults were less consistent. Hanson et al. (2012) examined the relations between ADHD and PTSD symptoms in deploying soldiers and did not observe significant associations between ADHD inattentive symptoms and any of the PTSD symptom clusters. Rather, ADHD hyperactive or impulsive symptoms were related to total PTSD severity and avoidance symptoms. Notably, in that study, PTSD symptoms were measured using a well-validated self-report measure, that is, the PTSD Checklist–Military Version (PCL-M; Weathers, Huska, & Keane, 1991). ADHD symptoms, however, were measured using a very brief screening measure (the World Health Organization Adult ADHD Self-Report Scale [ASRS] Screener; Kessler et al., 2007). Although the ASRS has strong psychometric properties for reliably identifying positive ADHD cases, it may not be appropriate for assessing the constituent symptom clusters. In contrast, Harrington et al. (2012) tested structural associations among ADHD and PTSD symptom clusters in a large sample of military veterans using semistructured diagnostic interviews. Among veterans who met PTSD criteria, 11.5% also met ADHD criteria (mostly predominantly inattentive subtype). Inattentive symptoms were significantly and positively associated with PTSD hyperarousal, avoidance, and numbing symptoms; hyperactivity and impulsivity symptoms were associated with hyperarousal and numbing. The links between PTSD hyperarousal symptoms and all measured ADHD symptom clusters led the authors to conclude that problems with modulating arousal levels might underlie ADHD-PTSD comorbidity. With only two studies in adults, each with unique approaches to measurement of ADHD and PTSD, and none of them examining a comprehensive range of core ADHD symptoms—including inattention, hyperactivity, and impulsivity—via a standardized assessment tool, a clear picture of the nature of the comorbidity has yet to emerge. Further research is needed to clarify the pattern of relations between ADHD and PTSD symptoms to guide etiological theory building. From an applied perspective, this work is needed to inform the development of targeted treatment models that address the common and unique elements that drive or maintain the overlap between ADHD and PTSD.

The present study seeks to clarify inconsistencies in this budding literature by examining associations between ADHD and PTSD symptom clusters using well-validated measures of both disorders in a sample of military veterans. Specifically, patterns of associations between core symptoms of ADHD—inattention or memory problems, hyperactivity or restlessness, and impulsivity or emotional lability—and PTSD symptoms were examined among combat-exposed veterans with and without a diagnosis of PTSD. In light of prior findings, we predicted that participants diagnosed with PTSD would evince higher levels of overall ADHD symptoms across inattention or memory problems, hyperactivity or restlessness, and impulsivity or emotional lability symptom clusters. We also predicted that inattention or memory problems would be more strongly associated with PTSD symptoms, particularly hyperarousal symptoms, than other ADHD symptom clusters.

Method

Participants

All participants ($N = 95$) enrolled in this study were combat veterans of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) missions, recruited through a large VA

Medical Center in the southeastern United States. Of the 95 participants in the study, 66% (n = 63) met the criteria for PTSD. Among participants with PTSD, 59% (n = 37) met the criteria for ADHD; among participants without PTSD, 16% (n = 5) met the criteria for ADHD. Nearly all (96%) were men, and the proportion of women did not significantly differ between groups of participants who did and did not meet diagnostic criteria for PTSD, $\chi^2 = 2.12$, $p = .30$. The majority (68%) of the participants self-identified as Caucasian (n = 65), 19 participants were African-American, 3 were Latino, 2 were Asian-American, and 6 were of an "Other" racial background. The proportion of Caucasian relative to minority participants did not significantly differ between the two diagnostic groups, $\chi^2(6) = 8.85$, $p = .18$. Average participant age was 32.87 (SD = 7.46). There was no significant between-groups difference in participant age, $F(1, 93) = 2.15$, $p = .15$.

The study protocol was approved by the Institutional Review Board (IRB) of the academic institution where this research was conducted. Participants were recruited through referrals from clinicians working in a specialty PTSD outpatient clinic and a primary care clinic, both at the VA. A brief description of the study, including explanation of the voluntary nature of participation, was given to the potential participants by a trained research assistant. People who expressed interest in participation were screened to determine eligibility for study involvement using the inclusion and exclusion criteria described below. Institutionally approved informed consent was obtained from all participants before the protocol began.

Inclusion and exclusion criteria. To be eligible for this study, participating veterans were required to have a history of combat exposure, as evidenced by formal release or discharge paperwork (i.e., DD Form 214), a report of combat exposure during the interview with a psychiatrist (ZW), and a minimum score of 10 on the Combat Exposure Scale (CES; Lund, Foy, Sipprelle, & Strachan, 1984). Veterans were not required to meet diagnostic criteria for PTSD to participate. Combat veterans with major depression, ADHD, and anxiety disorders other than PTSD were included. Participants with other Axis I psychiatric disorders were excluded from this study; this included current or lifetime *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) schizophrenia, other psychotic disorders, bipolar disorder, and active substance abuse or dependence in the past 6 months. Individuals with a past history of substance abuse and dependence were included if the last use of the substance was more than 6 months prior to the enrollment. There were no inclusion or exclusion criteria based on sociodemographic characteristics.

Procedure

After collecting demographic and deployment information, participants were assessed by a trained research assistant for the presence of psychiatric disorders with the *Mini-International Neuropsychiatric Interview* (MINI). PTSD symptoms were assessed with the Clinician-Administered PTSD Scale (CAPS). A board-certified psychiatrist (ZW) interviewed participants for combat exposure history and to confirm PTSD status per *DSM-IV* criteria, as well as other major psychiatric illnesses that would be exclusionary. Participants who met eligibility criteria were allowed to proceed with further assessments, including the Connors' Adult ADHD Rating Scales (CAARS) and a psychiatric clinical interview to determine ADHD diagnostic status. All measures were completed during a single visit to the clinical laboratory.

Materials

ADHD symptoms: Connors' Adult ADHD Rating Scales–Self-Report: Short Version (CAARS-S:S). The CAARS-S:S (Conners et al., 1999) contains 26 items measuring symptoms of ADHD. For the present study, we focused on the three CAARS-S:S subscales that tap the core symptomatology of ADHD, namely, the Inattention or Memory problems, Hyperactivity or Restlessness, and Impulsivity or Emotional Lability subscales. Raw scale scores in the subscales are transformed into a standard T scores with a mean of 50 and a standard deviation of 10. T score normative information is available for each gender and different age groups of 18 to 29 years, 30 to 39 years, 40 to 49 years, and 50 years or older. A T score above 65 indicates clinically significant symptoms. T scores allow one to compare subscale results within a single CAARS form, and to compare subscale results across various CAARS forms.

PTSD symptoms: CAPS. The CAPS (Blake et al., 1995) is a gold standard diagnostic interview for current and lifetime PTSD. The CAPS has been used in more than 200 studies and has excellent psychometric properties. Across samples, the CAPS demonstrates high interrater reliability (i.e., above .86) and internal consistency on each of the three PTSD symptom clusters (range = .63-.89), and correlates strongly (i.e., above .61) with other measures of PTSD. When tested in conjunction with the Structured Clinical Interview for *DSM* Disorders (SCID), the CAPS provided a PTSD diagnosis with specificity ranging from 94% to 95% and sensitivity ranging from 84% to 90% (Hyer, Summers, Boyd, Litaker, & Boudewyns, 1996; Radnitz et al., 1998). Furthermore, each of the core 17 items on the CAPS, with the exception of amnesia, discriminates individuals with PTSD from those without PTSD, which suggests adequate discriminant validity. Developed by researchers at the National Center of PTSD, this structured interview assesses all 17 symptoms of PTSD for frequency (scored on a 0 [*never*] to 4 [*daily or almost every day*]) and intensity (0 [*none*] to 4 [*extreme, incapacitating distress*]). These 17 symptoms can be totaled for a measure of posttraumatic

Table 1. Means, Standard Deviations, and Zero-Order Correlations Among Key Variables as a Function of PTSD Among Combat Veterans With a Diagnosis of ADHD.

	PTSD (n = 37)	No PTSD (n = 5)								
	M (SD)	*M (SD)*	1	2	3	4	5	6	7	8
Age	32.14 (6.84)	41.2 (6.87)								
% Caucasian	68%	80%								
1. Combat Exposure Severity	24.30 (10.15)	17.40 (7.02)	—	.85	.74	.74	.36	−.02	−.13	.21
2. PTSD Severity	76.49 (16.97)	27.80 (6.87)	.30	—	.86	.81	.48	.24	.28	.58
3. PTSD Reexperiencing	18.40 (7.31)	6.40 (2.88)	.30	.86**	—	.94*	.01	−.24	.49	.25
4. PTSD Avoidance	31.35 (8.65)	5.00 (3.24)	.30	.84**	.53**	—	−.11	−.29	.55	.32
5. PTSD Hyperarousal	26.73 (4.82)	16.40 (3.64)	.24	.71**	.56**	.36*	—	.89*	−.34	.61
6. Inattention or memory problems	65.19 (12.18)	56.00 (7.55)	.01	.36*	.44**	.18	.29	—	−.12	.75
7. Hyperactivity or restlessness	61.27 (7.76)	61.00 (5.66)	.21	.22	.32	.13	.07	.25	—	.45
8. Impulsivity or emotional lability	63.16 (8.88)	57.80 (17.25)	.04	.32	.21	.21	.42**	.33*	−.03	—

Note. PTSD-diagnosed participants on the lower diagonal and participants without a PTSD diagnosis on the upper diagonal. PTSD = posttraumatic stress disorder; Combat Exposure Severity = CES total score; PTSD Severity = CAPS total score; PTSD Reexperiencing = CAPS-B; PTSD Avoidance = CAPS-C; PTSD Hyperarousal = CAPS-D; Inattention or memory problems = CAARS-S:S Inattention or memory problems *T* score; Hyperactivity or restlessness = CAARS-S:S Hyperactivity or restlessness *T* score; Impulsivity or emotional lability = CAARS-S:S Impulsivity or emotional lability *T* score; CES = Combat Exposure Scale; CAPS = Clinician Administered PTSD Scale; CAARS-S:S = Connors' Adult ADHD Rating Scale−Self-Report: Short Version.
*$p < .05$. **$p < .01$.

stress severity or separate item clusters can be summed to derive measures of reexperiencing (CAPS-B), avoidance (CAPS-C), and arousal (CAPS-D).

Psychiatric diagnoses: The MINI. The MINI (Sheehan et al., 1998) is a brief, valid, and reliable structured diagnostic interview for *DSM-IV* and the International Classification of Diseases–Fifth Revision (ICD-10) psychiatric disorders. A majority of participants met diagnostic criteria for at least one psychiatric condition. The most common psychiatric conditions were dysthymic disorder and generalized anxiety disorder (GAD). Dysthymic disorder was more common among participants with a diagnosis of PTSD (54%; 34 out of 63) than participants without a PTSD diagnosis (9%; 3 out of 32), $\chi^2(1) = 17.75$, $p < .01$. Similarly, GAD was more common among participants with a diagnosis of PTSD (51%; 32 out of 63) than participants without a PTSD diagnosis (22%; 7 out of 32), $\chi^2(1) = 7.33$, $p < .01$.

Combat exposure: CES. The CES (Lund et al., 1984) is a seven-item self-report measure, used to obtain information regarding exposure to wartime stressor events. The measure yields total scores ranging from 1 to 41, where higher scores indicate greater severity of combat exposure.

Results

Descriptive statistics (group means and standard deviations) and zero-order correlations among key variables, stratified by ADHD and PTSD diagnostic status, are reported in Tables 1 and 2. One-way ANOVAs revealed that, in the full sample, PTSD-diagnosed participants endorsed more combat exposure than participants without a PTSD diagnosis, $F(1, 93) = 4.52$, $p = .04$. There were no differences in combat exposure severity between participants with and without an ADHD diagnosis, $F(1, 93) = 1.62$, $p = .21$. The PTSD groups did not differ on age, $F(1, 93) = 2.15$, $p = .15$, or race (% Caucasian), $\chi^2(6, N = 95) = 8.85$, $p = .18$. Regarding ADHD symptoms, one-way ANOVAs revealed that participants diagnosed with PTSD endorsed greater symptoms of inattention or memory problems, $F(1, 93) = 14.59$, $p < .01$; hyperactivity or restlessness, $F(1, 93) = 3.89$, $p = .05$; and impulsivity or emotional lability $F(1, 93) = 10.13$, $p < .01$, compared with participants without a PTSD diagnosis.

Regression analysis indicated that in the full sample, CAPS-Total scores were significantly predicted by symptoms of inattention or memory problems, $\beta = .32$, $t(90) = 2.95$, $p < .01$, and impulsivity or emotional lability, $\beta = .23$, $t(90) = 2.10$, $p < .05$, but not by hyperactivity or restlessness, $\beta = -.01$, $t(90) = -.10$, $p = .92$, after controlling for combat exposure. Similar analyses were conducted for each PTSD symptom cluster, whereby CAPS subscales were designated as dependent variables and the three CAARS-S:S scales were entered simultaneously with combat exposure as predictors. In the full sample, inattention or memory problems significantly predicted CAPS-B (reexperiencing; $\beta = .31$, $t(90) = 2.65$, $p < .01$), CAPS-C (avoidance; $\beta = .29$, $t(90) = 2.53$, $p < .05$), and CAPS-D (hyperarousal; $\beta = .29$, $t(90) = 2.51$, $p < .01$) scores. Hyperactivity or restlessness

Table 2. Means, Standard Deviations, and Zero-Order Correlations Among Key Variables as a Function of PTSD Among Combat Veterans Without a Diagnosis of ADHD.

	PTSD (n = 26)	No PTSD (n = 27)								
	M (SD)	M (SD)	1	2	3	4	5	6	7	8
Age	32.00 (7.10)	33.19 (8.11)								
% Caucasian	62%	74%								
1. Combat Exposure Severity	22.46 (9.41)	19.37 (9.94)	—	.10	−.16	.13	.16	−.15	.13	.00
2. PTSD Severity	64.35 (13.72)	28.96 (14.70)	.10	—	.67**	.86**	.82**	−.18	.13	.14
3. PTSD Reexperiencing	17.31 (6.06)	5.70 (4.12)	.21	.70**	—	.44*	.35	−.21	.12	−.06
4. PTSD Avoidance	23.62 (7.63)	9.15 (7.38)	.10	.89**	.44*	—	.49**	−.26	−.02	.09
5. PTSD Hyperarousal	23.42 (4.52)	14.11 (6.91)	−.15	.59**	.05	.43*	—	.02	.23	.24
6. Inattention or memory problems	47.46 (8.16)	46.04 (8.40)	.13	.16	.02	.21	.09	—	.46*	.24
7. Hyperactivity or restlessness	54.00 (8.99)	52.89 (11.08)	.59**	.26	.23	.26	.03	.33	—	.50**
8. Impulsivity or emotional lability	50.69 (7.75)	49.19 (10.18)	.08	.15	.06	.29	−.11	.26	.39*	—

Note. PTSD-diagnosed participants on the lower diagonal and participants without a PTSD diagnosis on the upper diagonal. PTSD = posttraumatic stress disorder; Combat Exposure Severity = CES total score; PTSD Severity = CAPS total score; PTSD Reexperiencing = CAPS-B; PTSD Avoidance = CAPS-C; PTSD Hyperarousal = CAPS-D; Inattention or memory problems = CAARS-S:S inattention or memory problems T score; Hyperactivity or restlessness = CAARS-S:S hyperactivity or restlessness T score; Impulsivity or emotional lability = CAARS-S:S impulsivity or emotional lability T score; CES = Combat Exposure Scale; CAPS = Clinician Administered PTSD Scale; CAARS-S:S = Connors' Adult ADHD Rating Scale−Self-Report: Short Version.
*p < .05. **p < .01.

scores did not significantly predict scores for any CAPS subscales (ps = .47-.93). Impulsivity or emotional lability scores significantly predicted CAPS-C, avoidance, β = .25, $t(90) = 2.29$, $p < .05$, and CAPS-D, hyperarousal, β = .27, $t(90) = 2.44$, $p < .05$.

Inspection of correlational matrices separated by PTSD diagnostic status revealed that after controlling for combat exposure, inattention or cognitive problems ($r = .44$, $p < .001$), hyperactivity or restlessness ($r = .27$, $p < .05$), and impulsivity or emotional lability symptoms ($r = .40$, $p < .001$) were significantly and positively associated with CAPS-Total scores among participants diagnosed with PTSD but not among participants without a diagnosis of PTSD (ps > .40). Therefore, the sample was split by PTSD diagnosis, and inattention or memory problems, hyperactivity or restlessness symptoms, and impulsivity or emotional lability symptoms were simultaneously regressed onto total PTSD symptoms while controlling for combat exposure. Among the PTSD-diagnosed participants ($n = 63$), the overall model fit was significant ($R^2 = .29$, $p < .001$), but only inattentive symptoms predicted CAPS-Total scores, $b = .28$, $t(58) = 1.98$, $p = .05$. CAARS-S:S scores together accounted for significant proportions of variance in CAPS-B (reexperiencing, $R^2 = .16$, $p < .05$), CAPS-C (avoidance, $R^2 = .26$, $p < .01$), and CAPS-D (hyperarousal, $R^2 = .19$, $p < .05$) among participants with PTSD. However, specific CAARS subscale scores were not significant predictors of CAPS-B, CAPS-C, or CAPS-D scores among participants with PTSD (ps > .10), and there were no significant CAARS and CAPS scores when these analyses were performed among participants without PTSD (ps > .10). Taken as a whole, this series of regressions reinforce the notion that ADHD and PTSD symptoms are related among people with PTSD and suggest that inattentive or memory problem symptoms are especially important predicators of overall PTSD symptoms among veterans who meet diagnostic criteria for PTSD.

Finally, given the distinct pattern of associations observed between ADHD and PTSD symptoms for participants with a PTSD diagnosis versus without a PTSD diagnosis, follow-up analyses were performed to test for an interaction. Specifically, the methods outlined by Holmbeck (2002) were used to test and probe for the presence of significant interaction effects between PTSD diagnosis and symptoms of inattention or memory problems on total posttraumatic stress symptoms, controlling for combat exposure. The categorical PTSD diagnosis, centered CAARS-S:S inattention or memory problems score, the interaction term, and combat exposure were all simultaneously regressed onto total CAPS PTSD symptom scores. As expected, PTSD diagnosis was a robust predictor of posttraumatic stress symptoms (β = 43.68 [$SE = 4.61$], $R^2 = .30$, $p < .01$) and the interaction term was a significant predictor of posttraumatic stress symptoms (β = .70 [$SE = .32$], $R^2 = .02$, $p = .03$). A post hoc probing test for the specific effects of inattention or cognitive problems on posttraumatic stress symptoms among participants without a PTSD diagnosis revealed that inattention or cognitive problems were not significantly predictive of PTSD severity (β = −.17 [$SE = .29$], $R^2 = .00$, $p = .55$). Conversely, a separate post hoc probing test showed that inattention or cognitive problems were a robust positive predictor of posttraumatic stress symptoms among participants diagnosed with PTSD (β = .52 [$SE = .13$], R^2 =

.05, $p < .01$). Inspection of regression slopes shows that PTSD symptoms increase as inattention or memory problems increase among those diagnosed with PTSD, but not among those without PTSD.

Discussion

Previous research has shown a clear link between PTSD and ADHD, but the specific relations between the core symptoms of these disorders have yet to be established. Shared neurocognitive dysfunctions in PTSD and ADHD suggest that associations between PTSD and ADHD might be due in part to shared deficits in attention and other cognitive processes. The present study tested the relations between posttraumatic stress symptoms, inattention or memory problems, hyperactivity or restlessness, and impulsivity or emotional lability among a sample of combat-exposed male veterans using well-validated measures of ADHD and PTSD symptoms.

No associations between symptoms of ADHD and PTSD were observed among combat veterans without a diagnosis of PTSD. Conversely, inattention or memory problems were both significant predictors of overall posttraumatic stress symptoms among combat veterans diagnosed with PTSD. When the three core ADHD symptom cluster scores were simultaneously regressed onto posttraumatic stress symptoms in the full sample of veterans, inattention or memory problems and impulsivity or emotional lability emerged as robust predictors. Notably, inattention or memory problems were the only ADHD symptoms to be significantly associated with PTSD reexperiencing symptoms in the full sample, and zero-order correlations indicated that inattention or memory problems were significantly related to PTSD-reexperiencing symptoms—but no other PTSD symptom cluster—among people with both PTSD and ADHD diagnoses. Follow-up analyses confirmed that a diagnosis of PTSD was a significant moderator of the relation between inattentiveness or memory problems and posttraumatic stress symptoms. In other words, greater symptoms of inattention were associated with more severe posttraumatic stress symptoms among participants diagnosed with PTSD. This pattern of findings is consistent with prior clinical and empirical descriptions, wherein inattention in PTSD is posted to result from individuals being distracted by reexperiencing symptoms (e.g., Szymanski, Sapanski, & Conway, 2011). Overall, these results highlight the importance of inattention symptoms in predicting overall PTSD symptoms (Harrington et al., 2012; Husain et al., 2008), and underscore the importance of also considering the role of impulsivity and emotional lability in accounting for shared symptoms between the disorders.

It is particularly interesting that the effect of inattention processes on posttraumatic stress symptoms was only present among veterans diagnosed with both PTSD and ADHD. This suggests that having ADHD—and elevated symptoms of inattentiveness and impulsivity, in particular—is not a risk factor for all who are exposed to trauma. Rather, an underlying marker or risk factor associated with both disorders allows for ADHD symptoms to express their effects on posttraumatic stress symptoms following combat (or other trauma) exposure. If neurocognitive deficits are an endophenotype for PTSD, then other underlying factors may also be responsible for simultaneous expression of inattention, impulsivity, and particular posttraumatic stress symptoms following trauma. One recent investigation suggests that the combination of ADHD diagnosis and prenatal exposure to maternal smoking substantially increases the risk for PTSD among young adults (Biederman et al., 2014), perhaps owing to heightened disruption to frontal-amygdala neurocircuitry. Although we were not able to test that specific mechanism in this investigation, future research should attempt to reveal what mechanisms moderate the effects of ADHD on PTSD symptoms.

Consistent with previous studies, our findings documented a significantly higher rate of ADHD among veterans with PTSD (59%) than those without PTSD (16%). Comorbidity is a common clinical issue. Co-occurrence of multiple psychiatric disorders often complicates treatment of each disorder and often leads to worse prognosis than when the disorders occurred in isolation. For instance, in the case of PTSD, as many as 50% of individuals with PTSD do not fully respond to the standard interventions, possibly owing to comorbidity. Results of this study suggest that treatment of inattention among people with PTSD, as well as treatment of ADHD in the context of PTSD, are two closely related issues that both warrant further attention. In the past few decades, extensive psychological and pharmacological treatments have been developed for PTSD and ADHD. Treatments designed to reduce ADHD symptoms are not necessarily well-suited to address mechanisms underlying PTSD symptoms, and it may be difficult to determine whether interventions are effective due to similarities in phenotypic presentations of possibly disparate neurocognitive deficits. Moreover, many of the standard PTSD treatments were developed predominantly to address reexperiencing, avoidance symptoms, and mood symptoms, but not neurocognitive impairments, such as those associated with ADHD, which may manifest or be conceptualized as PTSD symptoms. Therefore, future studies should involve careful assessment of PTSD and ADHD symptoms and include therapies that enhance neurocognitive function, such as those that have been tested among people with ADHD. Integrated treatments designed to address both disorders should also be evaluated rigorously.

The present study is not without limitations. Most importantly, the present data are cross sectional. It is possible that increases in inattentiveness, hyperactivity, and impulsivity arise following a trauma exposure or after a failure to

recover from symptoms of posttraumatic stress. Longitudinal research will be required to determine whether symptoms of inattentiveness are prospective predictors or simply a consequence of posttraumatic stress symptoms. The present findings may also be limited to veteran or male populations. Future research with community samples will be required to determine whether the present findings apply to PTSD, in general, or PTSD among military veterans. Although the use of both self-report and clinician interview data are the strength of the present study, the measures used are not objective in nature. The use of neuropsychological assessment, for example, will help to determine whether subjective deficits in attention and other cognitive functions have similar effects of posttraumatic stress symptoms as objective measures of said deficits.

The present findings have clear implications for the etiology and maintenance of PTSD. Certain individuals with attentional difficulties and/or deficits in other basic cognitive functions may ultimately fail to recover following traumatic exposure. It will be important for future research to determine what moderating factors allow attentional problems to exert effects on posttraumatic stress symptoms. With regard to PTSD symptom maintenance, it may be that once individuals reach a severity threshold, then failures of attention and other cognitive processes interfere with natural recovery. Prospective longitudinal research will be necessary to test the aforementioned hypothesis, but previously published data would, nonetheless, support such a process.

Conclusion

The present findings are consistent with previous research and highlight the importance of ADHD symptoms—particularly inattention and memory problems, and impulsivity—in PTSD. Veterans diagnosed with PTSD evidenced more inattention and memory problems, increased hyperactivity and restlessness, and elevated impulsivity and emotional lability relative to veterans without PTSD. Increased severity of inattention and impulsivity symptoms were related to increased symptoms of posttraumatic stress among those diagnosed with PTSD. Treatment of neurocognitive symptoms, such as ADHD symptoms, should be included in PTSD therapy options, which ultimately may enhance both PTSD and ADHD treatment response and facilitate functional recovery.

Authors' Note

Zachary Adams and Thomas Adams contributed equally to this work and are co-first authors.

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