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Correlates of Recent and Lifetime Aggression among Veterans with Co-Occurring PTSD and Substance Use Disorders

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Abstract

Objective—Aggressive behavior is strongly associated with both posttraumatic stress disorder (PTSD) and substance use disorders (SUD) among civilians. However, little research has examined correlates of aggression among Veterans with co-occurring PTSD and SUD.

Methods—This exploratory study examined the prevalence and correlates of recent (i.e., past 30 days) and lifetime aggressive behavior among a sample of U.S. Veterans (N=97) enrolled in a study examining integrated psychosocial treatment of co-occurring PTSD/SUD.

Results—The findings revealed high rates of recent and lifetime aggressive behaviors (39.2% and 57.7%, respectively). Participants who endorsed recent aggressive behaviors were younger, had less education, more severe PTSD numbing and hyperarousal symptoms, were more likely to report recent suicidal ideation, more frequent alcohol and marijuana use, had higher rates of physical and sexual abuse, greater combat exposure, and more severe aftermath of battle experiences. Participants who endorsed lifetime aggression were younger, reported more total PTSD symptom severity, PTSD re-experiencing severity, depression severity, and fewer post-deployment stressors compared to those who did not. Logistic regression analyses indicated that education and number of drinking days were correlated with recent aggression while depression and post-deployment stressors were correlated with lifetime aggression.

Conclusions—The findings demonstrate high rates of aggressive behaviors among Veterans with PTSD/SUD, as well as clinically relevant correlates of aggressive behaviors. Although preliminary, the findings suggest potential targets for improving assessment and treatment of Veterans with PTSD/SUD.

Keywords

Traumatic stress; mental health; substance use; aggression; comorbidity; Veteran

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Declaration of Interest
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Aggression is a highly prevalent behavioral problem among Veterans, and is associated with numerous negative health outcomes including exacerbated mental health problems, suicidality, substance abuse, coronary heart disease, and chronic pain (Beckham, Calhoun, Glenn, & Barefoot, 2002; Chida & Steptoe, 2009; Hellmuth, Stappenbeck, Hoerster, & Jakupcak, 2012; McFall, Fontana, Raskind, & Rosenheck, 1999; Shin, Rosen, Greenbaum, & Jain, 2012). Thus, aggressive behavior is particularly concerning to the VA Healthcare System as well as individual mental health treatment providers who are charged with the challenging task of identifying patients at risk for use of aggression (Elbogen et al., 2010; Elbogen et al., 2014).

Two of the most commonly identified correlates of aggression among Veterans are posttraumatic stress disorder (PTSD) and substance use disorders (SUD) (Hellmuth et al., 2012; Shin et al., 2012; Taft, Monson, Hebenstreit, King, & King, 2009). PTSD and SUD are among the most common mental health diagnoses among Veterans (Hoge, Auchterlonie, & Milliken, 2006), and they commonly co-occur (Mills, Teesson, Ross, & Peters, 2006; Petrakis, Rosenheck, & Desai, 2011). Thus, Veterans dually-diagnosed with PTSD and SUD may be at a particularly high risk for aggression. Little is known, however, about the prevalence or correlates of aggression in this population.

Only one study to our knowledge has explicitly examined the prevalence and correlates of aggression among individuals dually-diagnosed with PTSD and SUD. Barrett and colleagues (2011) examined a sample of treatment-seeking civilians (N=102) with PTSD and SUD. The findings revealed modest rates of recent (i.e. past 30 days) aggression (15.7%) and high rates of lifetime aggression (54.7%), which were associated with more severe PTSD hyperarousal symptoms, greater alcohol and marijuana use, and lower levels of opioid use. The current study aimed to extend this research by examining the prevalence and correlates of aggression in a sample of treatment-seeking Veterans diagnosed with co-occurring PTSD and SUD. Specifically, we examined correlates of aggression in four pertinent domains for Veterans: mental health, substance use, interpersonal abuse history, and deployment experiences.

In the mental health domain, we expanded on the constructs explored by Barrett and colleagues (2011) by examining depression and suicidal ideation in addition to overall PTSD severity and severity of PTSD symptom clusters individually. Re-experiencing, avoidance, numbing, and hyperarousal symptoms have all been directly and indirectly related to aggression (Hellmuth et al., 2012; Taft, Vogt, Marshall, Panuzio, & Niles, 2007). However, hyperarousal symptoms are most strongly, and consistently, related to aggression compared to other PTSD symptom clusters (Hellmuth et al., 2012; Taft, Vogt, et al., 2007). While this association may be due, in part, to the inclusion of anger and irritability as diagnostic criteria for the hyperarousal symptom cluster, this association remains even when analyses are conducted without including those assessment items (Hellmuth et al., 2012). Depression and suicidal ideation also frequently co-occur with PTSD, SUD, and aggression among Veterans (Hellmuth et al., 2012; Jakupcak et al., 2007).

In the substance use domain, we examined the quantity and frequency of alcohol and drug use. While the association between substance use and aggression may differ depending on

the type of substance used and quantity and frequency of use (Chermack & Blow, 2002), alcohol use is a well-established predictor of aggressive behavior. Alcohol myopia theory suggests that chronic alcohol misuse leads to perceptual bias in social cognition (Clements & Schumacher, 2010; Steele & Josephs, 1990), while proximal effects theory suggests that alcohol misuse leads to behavioral disinhibition (Foran & O'Leary, 2008). In turn, both may precipitate aggressive behavior (Clements & Schumacher, 2010; Foran & O'Leary, 2008).

Findings linking other drug use with aggression are less consistent, and less commonly applied to Veteran populations. Literature from civilian populations suggests positive associations between aggression and cocaine, amphetamine, and ecstasy; however, findings in relation to the use of opiates, cannabis, and benzodiazepines are mixed (Moore et al., 2008). A review by Moore and colleagues (2008) found that cocaine and marijuana use had the strongest relationship with aggression. Stuart and colleagues (2008) also found that marijuana and stimulant use were associated with the use of aggression among individuals mandated by courts to enter violence intervention programs. Moore, Glenmullen, & Furberg (2010) found that some prescription drugs (e.g., varenicline, antidepressants, sedatives/hypnotics, and some ADHD medications) may also be related to an increased risk for aggression. The acute effects of intoxication as well as withdrawal are also associated with anger and aggression (Budney, Moore, Vandrey, & Hughes, 2003; Hoaken & Stewart, 2003).

Abuse history is strongly related to the use of aggressive behavior (Clarke, Stein, Sobota, Marisi, & Hanna, 1999; Glenn et al., 2002). Among Veterans and other military personnel, physical and sexual abuse during childhood and adulthood are correlated with use of aggression (Orcutt, King, & King, 2003). Pre-deployment maltreatment is also correlated with post-deployment maladjustment, mental health problems, and substance abuse (Owens et al., 2009; Van Voorhees et al., 2012).

Finally, deployment experiences, including combat exposure, have been shown to be related to the use of aggression among Veterans (Elbogen et al., 2010; Jakupcak et al., 2007; Taft, Vogt, et al., 2007). Both the cycle of violence theory (Clarke et al., 1999; Glenn et al., 2002) and Chemtob and colleagues' (1997) information processing theory assert that deployment experiences may influence aggressive behavior. Abundant research documents strong associations between combat exposure and aggression (Orcutt et al., 2003; Taft, Vogt, et al., 2007), although several studies found that PTSD symptoms mediate the association between combat exposure and aggression (Hoge et al., 2006; Taft, Vogt, et al., 2007). This topic remains unexplored among Veterans with PTSD/SUD. Further, the existing literature is limited in its exploration of deployment experiences apart from combat exposure that may influence post-deployment aggression.

In summary, the prevalence and correlates of aggression among Veterans dually-diagnosed with PTSD/SUD have not been explored. The current study aimed to address this gap in the literature by examining 1) the prevalence of recent (i.e., past 30 days) and lifetime aggression, and 2) differences between Veterans who reported recent and lifetime aggression and those who did not. We hypothesized that endorsement of aggressive behaviors would be associated with more severe mental health problems, greater substance

use quantity and frequency, history of physical and sexual abuse, and more severe deployment experiences.

Method

Procedure

Potential participants were initially screened by telephone and individuals meeting preliminary eligibility criteria came into the office for a baseline assessment. Participants were recruited from VA treatment clinics, newspaper and internet advertisements, and flyers posted at local mental health clinics and colleges. Data were collected as part of the baseline assessment of a NIDA-sponsored randomized clinical trial investigating the efficacy of an integrated psychosocial treatment for co-occurring PTSD and SUD among Veterans (Back et al., 2012). All study procedures were IRB-approved and all participants provided informed consent prior to participation.

Inclusion criteria included: 1) Veteran, Reservist, or member of the National Guard aged 18–65; 2) meet DSM-IV (American Psychiatric Association, 1994) diagnostic criteria for current (i.e., past 6 months) PTSD and current (i.e., past 6 months) substance use disorder and have used substances at least once in the past 90 days; and 3) speak fluent English. Exclusion criteria included:1) current or history of psychotic or bipolar affective disorders; 2) current suicidal or homicidal ideation and intent; 3) current eating disorder or dissociative identity disorder; 4) individuals already participating in ongoing PTSD or SUD treatment; and 5) organic mental syndrome as indicated by a Mini Mental Status Exam (citation) score ≤ 21. Participants received $60 for completing the baseline assessment.

Measures

Aggression—Recent (i.e. perpetrated during the past 30 days) and lifetime aggression were assessed using the Addiction Severity Index Lite (ASI; Cacciola, Alterman, McLellan, Lin, & Lynch, 2007). The ASI is a semi-structured interview that assesses various life domains commonly affected by substances including medical, employment, alcohol/ substance use, legal, family and social, and psychiatric problems. The item assessing violence is: “Have you had a significant period of time in which you have experienced trouble controlling violent behavior including episodes of rage, or violence?” Participants responded for the past 30 days and lifetime. Responses were coded dichotomously (1=*yes*, 0=*no*).

Mental Health—PTSD symptom severity was assessed using the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS is a standardized structured clinical interview that measures the frequency and intensity of PTSD symptoms. The CAPS has demonstrated excellent reliability and validity (Weathers, Ruscio, & Keane, 1999). Each item is scored on a 5-point Likert scale (0=*never*, 4=*daily or almost daily).* A total score is obtained by summing all responses (Cronbach’s α=.93). Scores for each symptom cluster were obtained by summing the five re-experiencing items (Cronbach’s α=.89), two avoidance symptoms (inter-item correlation =.78), five numbing symptoms (Cronbach’s α=. 80), and five hyperarousal symptoms (Cronbach’s α=.81).

Depression was measured using the 21-item self-report Beck Depression Inventory, 2nd edition (BDI-II; Beck, Steer, & Brown, 1996). Each item is rated on a 0–3 point Likert scale on which respondents evaluate the severity of their depression symptoms. Total scores were obtained by summing the responses to each item. Cronbach's α=.92. Recent (i.e. during the past 30 days) and lifetime suicidal ideation were assessed using two items from the ASI (Cacciola et al., 2007). The item assessing suicidal ideation is: "Have you had a significant period of time in which you have experienced serious thoughts of suicide?" (1=*yes*, 0=*no*). Participants responded to each item for the past 30 days and lifetime.

Substance Use—Quantity and frequency of alcohol, marijuana, stimulants, opiates, and prescription drugs were assessed using the Time Line Followback (TLFB; Sobell & Sobell, 1992), a calendar-based semi-structured interview. Participants reported the total number of days each substance was used and the amount per use (e.g., standard drink units for alcohol, number of joints for marijuana) during the 60 days prior to the baseline assessment.

Interpersonal Abuse—Recent and lifetime physical and sexual abuse by someone known to the participant were assessed using four items from the ASI (Cacciola et al., 2007). The ASI has demonstrated excellent reliability and validity across populations (Mäkelä, 2004). The item assessing physical abuse is: "Did any of these people abuse you physically? (Cause you physical harm); The item assessing sexual abuse is: "Did any of these people abuse you sexually (Force sexual advances/acts.)" Participants responded for the past 30 days and lifetime. Responses were coded dichotomously (1=*yes*, 0=*no*).

Deployment Experiences—The Deployment Risk and Resilience Inventory (DRRI-2; King, King, & Vogt, 2003) is a self-report measure consisting of 14 subscales evaluating pre-deployment, deployment, and post-deployment experiences. A full description of the scoring, content, and validity of each subscale is reported in King et al., (2003) and Vogt, Proctor, King, King, & Vasterling (2008). In the current sample, each subscale demonstrated adequate reliability: Prior stressors (Cronbach's α=.73);childhood family environment (Cronbach's α=.93);preparedness (Cronbach's α=.87); difficult living and working environment (Cronbach's α=.81); concerns about life and family disruptions (Cronbach's α=.88); unit support (Cronbach's α=.92); general harassment (Cronbach's α=.92); sexual harassment (Cronbach's α=.86); perceived threat (Cronbach's α=.82); combat exposure (Cronbach's α=.90); aftermath of battle (Cronbach's α=.91); biochemical exposures (Cronbach's α=.90); post-deployment social support (Cronbach's α=.83); post-deployment stressors (Cronbach's α=.85).

Data Analysis

Cross-tabulations were employed to examine co-occurrence of recent and lifetime aggression with other dichotomous variables, including recent and lifetime suicidal ideation, recent and lifetime physical abuse, and recent and lifetime sexual abuse. Pearson and point-biserial correlations were employed to examine bivariate associations between recent and lifetime aggression and other study variables. T-tests with post-hoc Bonferroni tests were employed to compare the characteristics of participants who endorsed recent aggression with those who had not as well as those who endorsed lifetime aggression with those who did not.

Variables demonstrating significant associations with recent or lifetime aggression in bivariate correlations or group comparisons were entered into a multivariate logistic regression using backward stepwise elimination to determine independent correlates of recent and lifetime aggression. Significance levels of $p<.05$ for analyses were assessed using SPSS Version 21.

Results

Sample Characteristics

Descriptive statistics of sample characteristics are presented in Table 1. While 112 participants completed informed consent, 15 did not complete their baseline assessments and thus were not included in the analyses, resulting in a total sample size of 97 Veterans. On average, participants were approximately 40 years old and had some college education, and Most participants were white, male, and had served in the Army. Many participants in our sample were unemployed (n=45, 46.4%). Similar numbers of participants were single, married, or divorced. Most participants in this sample had served in the conflicts in Iraq, Afghanistan, or both.

Assessment of recent and lifetime aggression revealed that 38 participants (36 males; 2 females; 39.2%) reported aggressive behavior during the past 30 days, and 56 participants (51 males; 5 females;57.7%) reported lifetime aggressive behavior. Thirty one participants (32.0%) reported both recent and lifetime aggression. Recent and lifetime aggression were positively correlated ($r=.39$, $p<.01$).

Correlations and Group Differences

Demographics—Recent and lifetime aggression were negatively correlated with age ($r=-.28$, $p<.01$; $r=-.26$, $p<.01$) and recent aggression was negatively correlated with years of education ($r=-.21$, $p<.05$). Participants who reported recent aggression were significantly younger (M = 36.45 [10.01]; M = 43.05 [11.95]; $t=2.83$, $p<.01$) and had slightly less education (M=13.32 [1.69]; M=14.08 [1.83]; $t=2.06$, $p<.05$) compared to those who did not. Similarly, participants who reported lifetime aggression were significantly younger (M = 37.86 [11.59]; M=44.02 [10.86]; $t=2.66$, $p<.01$) compared to those who did not.

Mental Health—Recent aggression was correlated with PTSD numbing severity ($r=.21$, $p<.05$). Lifetime aggression was positively correlated with PTSD re-experiencing symptom severity ($r=.23$, $p<.05$), and depression severity ($r=.28$, $p<.01$). Participants who reported recent aggression reported significantly greater PTSD numbing (M=21.29 [7.98]; M=17.57 [8.52]; $t=-2.10$, $p<.05$) and hyperarousal symptom severity (M=29.97 [7.70]; M=23.44 [8.88]; $t=-1.96$, $p<.05$) compared with those who did not. Participants who reported lifetime aggression reported significantly more total PTSD severity (M=77.72 [21.28]; M=67.58 [24.01]; $t=-1.97$, $p<.05$), PTSD re-experiencing severity (M=21.72 [8.77]; M=17.51 [9.43]; $t=-2.20$, $p<.05$), and depression severity (M=29.31 [11.73]; M=22.80 [10.23]; $t=-2.84$, $p<.01$) compared to those who did not.

Three participants (3.1%) endorsed suicidal ideation in the past 30 days while 34 (35.1%) reported lifetime suicidal ideation. Recent aggression was significantly associated with

recent suicidal ideation (X^2=4.87, p=.05). Lifetime aggression was not associated with recent or lifetime suicidal ideation, although nearly half (n=24, 42.9%) of the participants who reported lifetime aggression also reported lifetime suicidal ideation.

Substance Use—Recent aggression was correlated with the number of drinking days (r=.28, p<.01) and number of days of marijuana use (r=.28, p<.01). Participants who reported recent aggression reported significantly more drinking days (M=37.14 [26.17]; M=23.81 [20.08]; t=−2.61, p<.01) and days of marijuana use (M=20.03 [31.90]; M=5.95 [16.83]; t=−2.44, p<.05) compared to those who did not. Lifetime aggression was not associated with any substance use variables. No differences emerged for any substance use variables between participants who reported lifetime aggression compared to those who did not.

Physical and Sexual Abuse History—No participants reported recent physical or sexual abuse. Thirty-seven participants (38.1%; 29 men, 8 women) reported lifetime physical abuse. Twenty-three participants (23.7%; 15 men, 8 women) reported lifetime sexual abuse. Notably, seven of the ten women enrolled in this study reported a lifetime history of both physical and sexual abuse. Cross-tabulations indicated that recent aggression was significantly related to lifetime physical abuse (X^2 [1, N=97] =5.54, p<.05). No significant relationships emerged between lifetime aggression and lifetime physical or sexual abuse.

Deployment Experiences—Recent aggression was negatively correlated with the quality of childhood family environment (r=−.23, p<.05) and positively correlated with combat exposure (r=.30, p<.01) and severity of aftermath of battle experiences (r=.25, p<.05). Participants who endorsed recent aggression reported significantly worse quality of childhood family environment (M=55.40 [11.31]; M=49.52 [12.69]; t=−2.28, p<.05), greater combat exposure (M=10.33 [3.21]; M=7.49 [5.00]; t=−3.12, p<.01), and more severe aftermath of battle experiences (M=9.72 [4.20]; M=7.24 [4.94]; t=−2.36, p<.05) compared to those who did not. Lifetime aggression was negatively correlated with post-deployment stressors (r=−.24, p<.05), indicating that participants with lifetime aggression reported significantly less post-deployment stressors (M=6.51 [3.13]; M=8.11 [3.45]; t=2.19, p<.05) compared to those who did not.

Independent Correlates of Aggression

Logistic regression analyses examining independent correlates of recent aggression included age, education, PTSD numbing, PTSD hyperarousal, lifetime physical abuse, lifetime sexual abuse, number of drinking days, number of days of marijuana use, childhood family environment, combat exposure, and aftermath of battle experiences as independent variables. The final model examining recent aggression was significant (X^2 =24.15, p<.01). Education (OR .68, 95% CI=.48–.97) and number of drinking days (OR 1.04, 95% CI=1.01–1.06) remained as significant correlates of recent aggression. The final model examining lifetime aggression included age, PTSD re-experiencing, depression, and post deployment stress was also significant (X^2 =12.14, p<.01). In this model, depression (OR 1.06, 95% CI=1.01–1.12), and post-deployment stress (OR 1.78, 95% CI=.66–.93) remained as significant correlates of lifetime aggression.

Discussion

This study examined the prevalence and correlates of recent and lifetime aggression in a sample of 97 treatment-seeking Veterans diagnosed with PTSD and SUD. The prevalence of both recent and lifetime aggression was high (39% and 57%, respectively). The prevalence of recent aggression in this study was comparable to prevalence estimates among other samples of Veterans, which typically approximate one-third of participants (Hellmuth et al., 2012; Taft, Kaloupek, et al., 2007). However, vastly differing assessment measures, time frames, types of aggression (e.g., intimate partner aggression compared to general aggression) and samples (e.g., Veterans with or without psychiatric disorders) are examined across studies, which may account for differing prevalence estimates. Future studies would benefit from the development of more comprehensive measures of aggressive behaviors to more accurately characterize aggression in this population.

Only one other study to date has examined aggression among individuals with PTSD/SUD (Barrett et al., 2011). Notably, the prevalence of recent aggression was substantially larger in the current Veteran sample than in the civilian sample (N = 102) reported by Barrett and colleagues (2011). Among civilians with PTSD/SUD, 16% endorsed past month aggression. Rates of lifetime aggression across the two studies were comparable, both exceeding 50%. This suggests that the relative influence of military-related versus other types of traumatic events on aggressive behavior should be investigated in future studies, as military trauma exposure may have differential associations with aggression compared to civilian traumas.

The gender composition (i.e. primarily male participants) of our sample was similar to that of previous studies examining correlates of aggression among Veterans (e.g., Hellmuth et al., 2012). However, Barrett and colleagues' (2011) civilian sample was comprised primarily of women (62.7%). While the existing literature among Veterans, in addition to Barrett and colleagues' civilian (2011) study, have examined general interpersonal aggression, studies examining women's use of aggression has primarily focused on intimate partner aggression. These findings suggest high rates of bidirectional aggression among partners (Langhinrichsen-Rohling, Selwyn, & Rohling, 2012; Straus, 2008). However, literature examining general aggression among civilian women and women Veterans remains scant. The intimate partner aggression literature highlights some differential precipitants of men's and women's use of intimate partner aggression such as self-defense and patterns of substance use (Stuart et al., 2006; Testa et al., 2012). Future research elucidating the unique correlates of general aggression among women with co-occurring PTSD and SUD are essential to developing a more informed treatment response.

Bivariate correlations and t-tests suggested that recent aggression was associated with younger age, less education, greater PTSD numbing and hyperarousal severity, recent suicidal ideation, number of drinking or marijuana use days, lifetime physical abuse, quality of childhood family environment, combat exposure, and severity of aftermath of battle experiences. However, recent aggression was associated only with education and number of drinking days in the logistic regression analyses. Compared to recent aggression, lifetime aggression was associated with fewer variables in this sample. In bivariate correlations and t-tests, lifetime aggression was associated with younger age, total PTSD symptom severity,

PTSD re-experiencing severity, depression severity, more sever aftermath of battle experiences. Contrary to expectations, participants who endorsed lifetime aggression reported less severe post-deployment stressors. Only depression and post-deployment stressors remained significant correlates of lifetime aggression in the logistic regression analyses.

Although preliminary, the findings suggest that recent and lifetime aggression were associated with different factors in this sample. Recent aggression was associated with the number of drinking days. Extant literature indicates that substance use and substance use disorders are salient correlates of many types of aggression among veterans regardless of their era of service (Taft, Kaloupek, et al., 2007; Taft et al., 2009). However, in this sample, recent aggression was also associated primarily with deployment-related variables suggesting that these veterans may be currently struggling with their adverse deployment experiences. Lifetime aggression was associated primarily with depression which may reflect a more chronic problem. Future research is necessary to determine the extent to which the correlates of recent aggression versus aggression that has taken place in the veteran's more distant past relate to treatment engagement and outcome variables. For example, the treatment needs of those veterans who are currently experiencing aggressive behavior may require more acute interventions that focus on drinking and deployment experiences, whereas with lifetime aggression there may be other psychosocial factors that are more salient at treatment entry. These findings may also reflect the treatment needs of individuals who are seeking treatment and willing to participate in a randomized clinical trial. While not all participants met full eligibility requirements to receive treatment in this sample, this sample may reflect a subpopulation of veterans with substantial acute treatment needs.

Consistent with past literature (Chermack & Blow, 2002; Smith, Homish, Leonard, & Cornelius, 2012), alcohol and marijuana were the substances most likely to be related to recent aggression in the current sample. However, these effects may be attributed to the fact that alcohol and marijuana use disorders were the most commonly diagnosed in this sample. Alcohol and marijuana use disorders also commonly co-occurred in this sample. Abuse and dependence of other types of substances were less common. Thus, this finding should be replicated in samples of individuals with co-occurring PTSD and other drug use disorders. While quantity of use (e.g., number of drinks per drinking day and amount of marijuana used per using day) were not significantly correlated with recent aggression ($p<.10$) future studies should aim to assess both quantity and frequency of substance use in relation to aggression among veterans. Perhaps the fact that this sample was comprised of individuals seeking treatment for substance use problems led to a limited variability of amount of substance use in our sample, thereby limiting our ability to detect effects related to amount of substance use.

To date, effectively treating aggression among Veteran populations remains a challenge. As Moreland and colleagues (2012) illustrate, some reduction in aggression following PTSD treatment has been illustrated, but for some Veterans, aggression continues to remain a challenge following reduction of symptoms commonly correlated with aggression. For example, Rotunda and colleagues (2008) found that in a small preliminary study

investigating couples therapy for co-occurring PTSD and SUD among veterans, some couples experienced substantial reductions in male to female intimate partner violence following treatment, but the extent to which this intervention was effective was primarily associated with the Veteran's PTSD diagnosis. Among civilian populations, literature has illustrated vastly differing typologies and patterns of aggressive behavior (Capaldi & Kim, 2007; Holtzworth-Munroe & Stuart, 1994; Johnson, 2008). However, research on the potentially differing origins of aggression among Veterans, particularly Veterans with co-occurring PTSD and SUD, are scant. Integrated treatments for co-occurring PTSD and SUD are growing in their evidence base and continue to emerge (Back, 2010). Future research should examine the efficacy of these treatments for reducing aggression among Veterans with co-occurring PTSD and SUD, as well as the treatment interventions most strongly associated with changes in aggression.

Limitations

This study is limited by several factors. These findings should be interpreted with caution given the relatively small sample size employed in this study; these findings should be replicated in other, larger samples of veterans. For example, associations between aggression and some variables such as total PTSD symptom severity and PTSD hyperarousal narrowly missed traditional cutoffs for statistical significance in some of our analyses. Future studies with larger sample sizes may have greater statistical power to detect more modest effect sizes.

While the findings differentiate recent aggression from aggression that took place at other times in participants' lives, and suggest that important differences in dispositional aggression compared to situational aggression may exist among Veterans, the conclusions we are able to draw regarding these differences are limited due to the methods used to measure aggression in the current study. It is important for future studies to utilize more comprehensive aggression measurements that will more clearly define when, with whom, what type, and under what circumstances aggression took place. Past literature has noted the varying etiologies of different forms of aggression among Veterans (Stappenbeck, Hellmuth, Simpson, & Jakupcak, 2013). Thus, it is critical that the current findings be replicated using more comprehensive measurement tools and investigating correlates of different types and severities of aggressive behavior (e.g., physical vs. non-physical, interpersonal vs. non-interpersonal, intimate partner aggression vs. general aggression). While the specificity of the current sample lends strength to the generalizability of the findings to the population of Veterans who may be most at risk for aggression (treatment-seeking with PTSD/SUD), the extent to which these associations extend to the larger population of Veterans is unknown. For example, exclusion criteria inherent to a randomized clinical trial, such as suicidal or homicidal ideation and intent, may have influenced our findings. Thus, replicating these findings in the larger community of Veterans with co-occurring PTSD and SUD is warranted.

Conclusions

In our sample, recent aggression was associated with younger age, lower education, greater PTSD numbing and hyperarousal symptoms, suicidal ideation, alcohol and marijuana use,

higher rates of physical and sexual abuse, greater combat exposure, and more severe aftermath of battle experiences. Lifetime aggression was associated with younger age, greater total PTSD symptom severity, PTSD re-experiencing, depression, and fewer post-deployment stressors. However, in logistic regression analyses, only education and drinking days remained associated with recent aggression and while depression and post-deployment stressors were associated with lifetime aggression.

Our findings extend those of Barrett and colleagues (2011) by examining recent and lifetime aggression in a sample of military Veterans with co-occurring PTSD and SUD. Findings suggest that both recent and lifetime aggression were highly prevalent in our sample, and that aggression may be a significant treatment concern for Veterans dually-diagnosed with PTSD and SUD. Future studies should investigate the potentially differential effects of recent and lifetime aggression on treatment engagement and outcome, and the extent to which concurrent treatment for PTSD/SUD effectively reduces aggression among Veterans.

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References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. Washington, D.C.: American Psychiatric Publishing, Inc; 1994.

Back SE. Toward an improved model of treating co-occurring PTSD and substance use disorders. Am J Psychiatry. 2010; 167(1):11. [PubMed: 20068121]

Barrett EL, Mills KL, Teesson M. Hurt people who hurt people: violence amongst individuals with comorbid substance use disorder and post traumatic stress disorder. Addictive Behaviors. 2011; 36(7):721–728.10.1016/j.addbeh.2011.02.005 [PubMed: 21411235]

Beck, A.; Steer, R.; Brown, G. BDI-II, Beck depression inventory: manual. Psychological Corp; San Antonio, TX: 1996.

Beckham JC, Calhoun PS, Glenn M, Barefoot JC. Posttraumatic stress disorder, hostility, and health in women: A review of current research. Annals of Behavioral Medicine. 2002; 24(3):219–228. [PubMed: 12173679]

Blake DD, Weathers FW, Nagy LM, Kaloupek DG, Gusman FD, Charney DS, Keane TM. The development of a clinician-administered PTSD scale. Journal of Traumatic Stress. 1995; 8:75–90.10.1002/jts.2490080106 [PubMed: 7712061]

Budney AJ, Moore BA, Vandrey RG, Hughes JR. The time course and significance of cannabis withdrawal. Journal of abnormal psychology. 2003; 112(3):393.10.1037/0021-843X.112.3.393 [PubMed: 12943018]

Cacciola JS, Alterman AI, McLellan AT, Lin Y, Lynch KG. Initial evidence for the reliability and validity of a "Lite" version of the Addiction Severity Index. Drug and Alcohol Dependence. 2007; 87(2):297–302.10.1016/j.drugalcdep.2006.09.002 [PubMed: 17045423]

Capaldi DM, Kim HK. Typological approaches to violence in couples: A critique and alternative conceptual approach. Clin Psychol Rev. 2007; 27(3):253–265.10.1016/j.cpr.2006.09.001 [PubMed: 17084496]

Chemtob CM, Novaco RW, Hamada RS, Gross DM, Smith G. Anger regulation deficits in combat-related posttraumatic stress disorder. Journal of Traumatic Stress. 1997; 10(1):17–36.10.1002/jts.2490100104 [PubMed: 9018675]

Chermack ST, Blow FC. Violence among individuals in substance abuse treatment: the role of alcohol and cocaine consumption. Drug and Alcohol Dependence. 2002; 66(1)(01):29–37. 00180–6.10.1016/S0376-8716 [PubMed: 11850133]

Chida Y, Steptoe A. The association of anger and hostility with future coronary heart disease: A meta-analytic review of prospective evidence. Journal of the American College of Cardiology. 2009; 53(11):936–946. [PubMed: 19281923]

Clarke J, Stein MD, Sobota M, Marisi M, Hanna L. Victims as victimizers: physical aggression by persons with a history of childhood abuse. Archives of Internal Medicine. 1999; 159(16): 1920.10.1001/archinte.159.16.1920 [PubMed: 10493322]

Clements K, Schumacher JA. Perceptual biases in social cognition as potential moderators of the relationship between alcohol and intimate partner violence: A review. Aggression and Violent Behavior. 2010; 15(5):357–368.10.1016/j.avb.2010.06.004

Elbogen EB, Fuller S, Johnson SC, Brooks S, Kinneer P, Calhoun PS, Beckham JC. Improving risk assessment of violence among military Veterans: An evidence-based approach for clinical decision-making. Clinical Psychology Review. 2010; 30(6):595–607.10.1016/j.cpr.2010.03.009 [PubMed: 20627387]

Elbogen EB, Johnson SC, Newton VM, Timko C, Vasterling JJ, Van Male LM, Beckham JC. Protective Mechanisms and Prevention of Violence and Aggression in Veterans. 2014

Foran HM, O'Leary KD. Alcohol and intimate partner violence: a meta-analytic review. Clinical Psychology Review. 2008; 28(7):1222–1234.10.1016/j.cpr.2008.05.001 [PubMed: 18550239]

Glenn DM, Beckham JC, Feldman ME, Kirby AC, Hertzberg MA, Moore S. Violence and hostility among families of Vietnam veterans with combat-related posttraumatic stress disorder. Violence and Victims. 2002; 17(4):473–489.10.1891/vivi.17.4.473.33685 [PubMed: 12353593]

Hellmuth JC, Stappenbeck CA, Hoerster KD, Jakupcak M. Modeling PTSD Symptom Clusters, Alcohol Misuse, Anger, and Depression as They Relate to Aggression and Suicidality in Returning U.S. Veterans. Journal of Traumatic Stress. 2012; 25(5):527–534.10.1002/jts.21732 [PubMed: 23073972]

Hoaken P, Stewart SH. Drugs of abuse and the elicitation of human aggressive behavior. Addictive Behaviors. 2003; 28(9):1533–1554.10.1016/j.addbeh.2003.08.033 [PubMed: 14656544]

Hoge CW, Auchterlonie JL, Milliken CS. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to iraq or afghanistan. JAMA: The Journal of the American Medical Association. 2006; 295(9):1023–1032.10.1001/jama.295.9.1023

Holtzworth-Munroe A, Stuart GL. Typologies of Male Batterers: Three Subtypes and the Differences Among Them. [Review]. Psychological Bulletin. 1994; 116(3):476–497. [PubMed: 7809309]

Jakupcak M, Conybeare D, Phelps L, Hunt S, Holmes HA, Felker B, McFall ME. Anger, hostility, and aggression among Iraq and Afghanistan war veterans reporting PTSD and subthreshold PTSD. Journal of Traumatic Stress. 2007; 20(6):945–954.10.1002/jts.20258 [PubMed: 18157891]

Johnson, MP. A typology of domestic violence: Intimate terrorism, violent resistance, and situational couple violence. Lebanon, NH: Northeastern University; 2008.

King, DW.; King, LA.; Vogt, DS. Manual for the Deployment Risk and Resilience Inventory (DRRI): A collection of measures for studying deployment-related experiences of military veterans. Boston: National Center for PTSD; 2003.

Langhinrichsen-Rohling J, Selwyn C, Rohling ML. Rates of Bidirectional Versus Unidirectional Intimate Partner Violence Across Samples, Sexual Orientations, and Race/Ethnicities: A Comprehensive Review. Partner Abuse. 2012; 3(2):199–230.10.1891/1946-6560.3.2.199

Mäkelä K. Studies of the reliability and validity of the Addiction Severity Index. Addiction. 2004; 99(4):398–410.10.1111/j.1360-0443.2003.00665.x [PubMed: 15049734]

McFall M, Fontana A, Raskind M, Rosenheck R. Analysis of violent behavior in Vietnam combat veteran psychiatric inpatients with posttraumatic stress disorder. Journal of Traumatic Stress. 1999; 12:501–517.10.1023/A:1024771121189 [PubMed: 10467558]

Mills KL, Teesson M, Ross J, Peters L. Trauma, PTSD, and substance use disorders: findings from the Australian National Survey of Mental Health and Well-Being. American Journal of Psychiatry. 2006; 163(4):652–658.10.1176/appi.ajp.163.4.652 [PubMed: 16585440]

Moore TJ, Glenmullen J, Furberg CD. Prescription drugs associated with reports of violence towards others. PLoS One. 2010; 5(12):e15337.10.1371/journal.pone.0015337 [PubMed: 21179515]

Moore TM, Stuart GL, Meehan JC, Rhatigan DL, Hellmuth JC, Keen S. Drug abuse and aggression between intimate partners: A meta-analytic review. Clinical Psychology Review. 2008; 28(2):247–274.10.1016/j.cpr.2007.05.003 [PubMed: 17604891]

Morland LA, Love AR, Mackintosh MA, Greene CJ, Rosen CS. Treating Anger and Aggression in Military Populations: Research Updates and Clinical Implications. Clinical Psychology: Science and Practice. 2012; 19(3):305–322.10.1111/cpsp.12007

Orcutt HK, King LA, King DW. Male-perpetrated violence among Vietnam veteran couples: Relationships with veteran's early life characteristics, trauma history, and PTSD symptomatology. Journal of Traumatic Stress. 2003; 16(4):381–390.10.1023/a:1024470103325 [PubMed: 12895021]

Owens GP, Dashevsky B, Chard KM, Mohamed S, Haji U, Heppner PS, Baker DG. The relationship between childhood trauma, combat exposure, and posttraumatic stress disorder in male veterans. Military Psychology. 2009; 21(1):114–125.10.1080/08995600802574530

Petrakis IL, Rosenheck R, Desai R. Substance Use Comorbidity among Veterans with Posttraumatic Stress Disorder and Other Psychiatric Illness. The American Journal on Addictions. 2011; 20(3): 185–189.10.1111/j.1521-0391.2011.00126.x [PubMed: 21477045]

Rotunda RJ, O'Farrell TJ, Murphy M, Babey SH. Behavioral couples therapy for comorbid substance use disorders and combat-related posttraumatic stress disorder among male veterans: An initial evaluation. Addictive Behaviors. 2008; 33(1):180–187.10.1016/j.addbeh.2007.06.001 [PubMed: 17628345]

Shin HJ, Rosen CS, Greenbaum MA, Jain S. Longitudinal Correlates of Aggressive Behavior in Help-Seeking US Veterans With PTSD. Journal of traumatic stress. 2012; 25(6):649–656.10.1002/jts.21761 [PubMed: 23225031]

Smith PH, Homish GG, Leonard KE, Cornelius JR. Intimate partner violence and specific substance use disorders: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions. Psychology of Addictive Behaviors. 2012; 26(2):236. [PubMed: 21823768]

Sobell, LC.; Sobell, MB. Timeline follow-back: A technique for assessing self-reported alcohol consumption. Litten, RZ.; Allen, JP., editors. Totowa, NJ: Humana Press; 1992.

Stappenbeck CA, Hellmuth JC, Simpson T, Jakupcak M. The Effects of Alcohol Problems, PTSD, and Combat Exposure on Nonphysical and Physical Aggression Among Iraq and Afghanistan War Veterans. Psychological Trauma: Theory, Research, Practice, and Policy. 201310.1037/a0031468

Steele CM, Josephs RA. Alcohol myopia: Its prized and dangerous effects. American Psychologist. 1990; 45(8):921–933.10.1037/0003-066X.45.8.921 [PubMed: 2221564]

Straus MA. Dominance and symmetry in partner violence by male and female university students in 32 nations. Children and Youth Services Review. 2008; 30(3):252–275.10.1016/j.childyouth.2007.10.004

Stuart GL, Moore TM, Gordon KC, Hellmuth JC, Ramsey SE, Kahler CW. Reasons for intimate partner violence perpetration among arrested women. Violence Against Women. 2006; 12(7):609–621.10.1177/1077801206290173 [PubMed: 16777948]

Stuart GL, Temple JR, Follansbee KW, Bucossi MM, Hellmuth JC, Moore TM. The role of drug use in a conceptual model of intimate partner violence in men and women arrested for domestic violence. Psychology of Addictive Behaviors. 2008; 22(1):12.10.1037/0893-164X.22.1.12 [PubMed: 18298227]

Taft CT, Kaloupek DG, Schumm JA, Marshall AD, Panuzio J, King DW, Keane TM. Posttraumatic stress disorder symptoms, physiological reactivity, alcohol problems, and aggression among military veterans. Journal of Abnormal Psychology. 2007; 116(3):498–507.10.1037/0021-843X.116.3.498 [PubMed: 17696706]

Taft CT, Monson CM, Hebenstreit CL, King DW, King LA. Examining the correlates of aggression among male and female Vietnam veterans. Violence & Victims. 2009; 24(5):639–652.10.1891/0886-6708.24.5.639 [PubMed: 19852404]

Taft CT, Vogt DS, Marshall AD, Panuzio J, Niles BL. Aggression among combat veterans: relationships with combat exposure and symptoms of posttraumatic stress disorder, dysphoria, and

anxiety. Journal of Traumatic Stress. 2007; 20(2):135–145.10.1002/jts.20197 [PubMed: 17427912]

Testa M, Kubiak A, Quigley BM, Houston RJ, Derrick JL, Levitt A, Leonard KE. Husband and wife alcohol use as independent or interactive predictors of intimate partner violence. J Stud Alcohol Drugs. 2012; 73(2):268–276. [PubMed: 22333334]

Van Voorhees EE, Dedert EA, Calhoun PS, Brancu M, Runnals J, Beckham JC. Childhood trauma exposure in Iraq and Afghanistan war era veterans: Implications for posttraumatic stress disorder symptoms and adult functional social support. Child Abuse & Neglect. 2012; 36(5):423–432.10.1016/j.chiabu.2012.03.004 [PubMed: 22633055]

Vogt DS, Proctor SP, King DW, King LA, Vasterling JJ. Validation of scales from the Deployment Risk and Resilience Inventory in a sample of Operation Iraqi Freedom veterans. Assessment. 2008; 15:391–403.10.1177/1073191108316030 [PubMed: 18436857]

Weathers FW, Ruscio AM, Keane TM. Psychometric properties of nine scoring rules for the Clinician-Administered Posttraumatic Stress Disorder Scale. Psychological Assessment. 1999; 11(2):124.

Table 1

Sample Characteristics

	Overall Sample (N = 79)	Men (N=69)	Women (N=10)
	M (SD)	**M (SD)**	**M (SD)**
Age	40.46 (11.64)	40.74 (11.83)	38.10 (10.04)
Education, number of years	13.78 (1.81)	13.57 (1.70)	15.60 (1.78)
Race			
White	51 (53.1%)	47 (54.0%)	4 (40.0%)
Black	43 (44.3%)	38 (43.7%)	5 (50.0%)
More than one race/other	2 (2.1%)	1 (1.1%)	1 (10.0%)
Employment			
Unemployed	45 (46.4%)	41 (47.1%)	4 (40.0%)
Employed Part-Time	10 (10.3%)	8 (9.2%)	2 (20.0%)
Employed Full-Time	20 (20.6%)	18 (20.7%)	2 (20.0%)
Retired	2 (2.1%)	2 (2.3%)	0 (0.0%)
Disabled	14 (14.4%)	12 (13.8%)	2 (20.0%)
Student	6 (6.2%)	6 (6.9%)	0 (0.0%)
Marital Status			
Single	26 (26.8%)	23 (26.4%)	3 (30.0%)
Married	31 (32.0%)	30 (34.5%)	1 (10.0%)
Divorced	29 (29.9%)	26 (29.9%)	3 (30.0%)
Separated	9 (9.3%)	6 (6.9%)	3 (30.0%)
Widowed	2 (2.1%)	2 (2.3%)	0 (0.0%)
Branch of Military			
Army	63 (64.9%)	55 (63.2%)	8 (80.0%)
Navy	10 (10.3%)	9 (10.3%)	1 (10.0%)
Air Force	5 (5.2%)	5 (5.7%)	0 (0.0%)
Marines	14 (14.4%)	14 (16.1%)	0 (0.0%)
Coast Guard	1 (1.0%)	1 (1.1%)	0 (0.0%)
National Guard	3 (3.1%)	3 (3.4%)	0 (0.0%)
Years in Military	8.69 (7.18)	8.72 (7.28)	8.40 (6.60)
OIF/OEF	63 (64.9%)	58 (66.7%)	5 (50.0%)
Number of Deployments	1.25 (1.56)	1.30 (1.60)	.90 (1.10)

Note. Means and standard deviations or numbers of participants with percentages are presented. OIF/OEF=Operation Iraqi Freedom/Operation Enduring Freedom.