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# PTSD Symptoms and Family Versus Stranger Violence in Iraq and Afghanistan Veterans

Connor P. Sullivan

University of North Carolina at Chapel Hill

Eric B. Elbogen

University of North Carolina at Chapel Hill and Veterans Affairs Mid-Atlantic Mental Illness Research, Education, and Clinical Center, Durham, North Carolina

As a diagnosis, posttraumatic stress disorder (PTSD) has been associated with violence committed by veterans in many studies; however, a potential link to specific PTSD symptoms has received relatively less attention. This paper examines the relationship between PTSD symptoms and different types of violent behavior in Iraq and Afghanistan veterans. Participants were randomly sampled from a roster of all separated U.S. military service members or national guard/reservists who served after September 11, 2001. Data were collected at baseline and 1-year follow-up from a national sample of  $N = 1,090$  veterans, from 50 states and all military branches. Of these veterans, 13% reported aggression toward a family member and 9% toward a stranger during the 1-year study period. Anger symptoms at baseline predicted higher odds of family violence at follow-up, both severe (OR = 1.30, CI [1.13, 1.48],  $p < .0001$ ) and any (OR = 1.28, CI [1.19, 1.37],  $p < .0001$ ). PTSD flashback symptoms at baseline predicted higher odds of stranger violence at follow-up, both severe (OR = 1.26, CI [1.11, 1.42],  $p < .0001$ ) and any (OR = 1.16, CI [1.05, 1.28],  $p = .0029$ ). Analyses revealed that males were more likely to engage in stranger violence, whereas females were more likely to endorse aggression in the family context. The results provide limited support to the hypothesis that PTSD “flashbacks” in veterans are linked to violence. The differing multivariate models illustrate distinct veteran characteristics associated with specific types of violence.

*Keywords:* PTSD, veteran, violence, symptomology

Past research has shown that posttraumatic stress disorder (PTSD) is linked to aggression toward others among veterans (McFall, Fontana, Raskind, & Rosenheck, 1999; Savarese, Suvak, King, & King, 2001; Taft, Vogt, Marshall, Panuzio, & Niles, 2007). In one study, veterans with PTSD reported 13–22 acts of general violence/aggression in the preceding year compared to 0–3 violent acts among veterans without PTSD (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997). Preliminary research has also suggested that PTSD is linked to violence in the current cohort of Iraq and Afghanistan War veterans (Finley, Baker, Pugh, & Peterson, 2010; Hellmuth, Stappenbeck, Hoerster, & Jakupcak, 2012; Jakupcak et al., 2007), even among veterans in the United Kingdom and elsewhere (Galovski & Lyons, 2004; Macmanus et al., 2011).

Recently, PTSD has also gained attention in the legal sphere, which has noted an increasing rate of arrests, mental health problems, and the theoretical link between the two in veteran populations (Caine, 2009; Cavanaugh, 2011; McGrane, 2011). The need for veteran specialty courts has been addressed in multiple law reviews (Caine, 2009; Cavanaugh, 2011; McGrane, 2011), in particular because of issues veterans have with PTSD (Caine, 2009; Cavanaugh, 2011; McGrane, 2011). However, these courts in general are not intended for violent offenders (Caine, 2009). Clearly, as there has been a potential link between veterans with PTSD and criminal behavior (Caine, 2009; Cavanaugh, 2011; McGrane, 2011), there should also be some amount of services provided to violent offenders. PTSD has been noted as a mental disorder that can change the amount of culpability the defendant faces, especially in the case of combat veterans (Caine, 2009; McGrane, 2011; Walls, 2011). Some veterans charged with a capital crime may go undiagnosed until a mental health screening is given at the time of the court case (McGrane, 2011).

PTSD is a complex disorder, requiring a minimum of one symptom of intrusive recollection, three avoidance/numbing symptoms, and two hyperarousal symptoms (*Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text rev.*, American Psychiatric Association, 2000). With respect to violence, much of the literature examines the effects of the PTSD diagnosis as a whole. Some studies have gone so far as to examine violence as a function of PTSD symptom clusters, showing that hyperarousal symptom cluster in particular is positively related to aggression (Makin-Byrd, Bonn-Miller, Drescher, & Timko, 2012; Savarese et al., 2001; Taft, Street, Marshall, Dowdall, & Riggs, 2007). Still,

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Connor P. Sullivan, Department of Psychiatry, University of North Carolina–Chapel Hill School of Medicine; Eric B. Elbogen, Department of Psychiatry, University of North Carolina–Chapel Hill School of Medicine, and Veterans Affairs Mid-Atlantic Mental Illness Research, Education, and Clinical Center, Durham, North Carolina.

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Correspondence concerning this article should be addressed to Eric B. Elbogen, University of North Carolina–Chapel Hill School of Medicine, Forensic Psychiatry Program and Clinic, Department of Psychiatry, CB 7167, Chapel Hill, NC 27599. E-mail: eric.elbogen@unc.edu

investigating symptoms rather than clusters may provide even more clinically useful information and may enable clinicians to more closely target a potential contributing factor increasing a veteran's risk of aggression.

There are several PTSD symptoms that might be particularly relevant for understanding violence risk. First, reexperiencing symptoms may be associated with aggression. Many of these symptoms are dissociative in nature, or cause a detachment from reality. The theory behind reexperiencing symptoms leading to violence is based on this dissociation. Due to a dissociative experience, a sufferer of PTSD might commit an act of aggression while reexperiencing the trauma. Case study evidence has been provided to support this theory (Finley et al., 2010). While this is a popular concept, little empirical research has been conducted on the dissociative episode–violence linkage (Moskowitz, 2004), until recent literature. Reexperiencing symptoms have recently been reported to be positively related to aggressive impulses or behaviors (Friel, White, & Hull, 2008; Hellmuth et al., 2012; Moskowitz, 2004).

A specific dissociative symptom, popularly called a *flashback*, has often been suggested as being related to violence. This involves “acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated)” (APA, 2000). During a dissociative state, the sufferer of PTSD may or may not be aware of their actions or even may have difficulty being able to control them (Hafemeister & Stockey, 2010). Thus, a number of court cases involving violence and probable PTSD diagnosis use a flashback as a legal defense. The defendants in these cases sometimes claim to be not guilty by reason of insanity (Hafemeister & Stockey, 2010; *Parnell v. Galaza*, 2011; *People v. Weaver, Jr.*, 2001) or claim diminished capacity (*Morgan v. Krenke*, 1999; *Washington v. Bottrell*, 2000; *Washington v. Velcota*, 2008). Experiencing the dissociative flashback is implicated in causing violent behavior in the literature as well (Moskowitz, 2004; Silva, Derecho, Leong, Weinstock, & Ferrari, 2001).

Second, symptoms of avoidance or numbing constitute cluster C of PTSD. McFall et al. (1999) reported that numbing/avoidance symptoms were the strongest predictors of violence in their results; numbing/avoidance was almost twice as strong a predictor as hyperarousal symptoms. Numbing symptoms often cause distress in a close relationship, which may increase the chance for conflict (Galovski & Lyons, 2004; Krause, Kaltman, Goodman, & Dutton, 2006; Renshaw & Campbell, 2011). Escape avoidance and distancing have been shown to be positively related to aggression and hostility (McCormick & Smith, 1995). In situations of abuse, only the numbing symptoms predicted further abuse (Krause et al., 2006).

Third, excitation response-like symptoms may be related to violence as well. Buckley and Kaloupek (2001) have shown that veterans with PTSD have higher basal heart rates than both those affected by trauma with no PTSD diagnosis and those without any trauma experience. These trauma victims, who in a normal state are already physiologically aroused, will have intensified experiences of anger or aggression (Zillman, 1971). Lorber and O'Leary (2004) illustrated how this hyperarousal is related to violence and aggression with his findings that higher electrodermal activity was positively correlated with adult aggression, and higher heart rate

was a credible predictor of conduct problems and aggression. The hyperarousal cluster has been associated with higher levels of violence in previous literature (Makin-Byrd et al., 2012; Savarese et al., 2001; Taft, Street et al., 2007), emphasizing the importance of investigating the relationship between symptoms of hyperarousal with violence. Correspondingly, one of the reexperiencing symptoms, a physical reaction to a reminder of the trauma, can be experienced with an elevated heart rate, sweating, or feeling tense and jittery. If the physiological issues behind the hyperarousal symptoms are the true causes of violence, then the effects of this reexperiencing symptom should elicit the same aggression as hyperarousal symptoms.

The hypervigilance symptom may also be associated with violence. A state of hypervigilance may present itself similarly to a paranoid delusion in a subset of those with PTSD. Combat veterans with PTSD have been shown to have psychotic symptoms (Kaštelan et al., 2007; Pepper & Agius, 2009), particularly those with severe hyperarousal symptoms (Kaštelan et al., 2007). These psychotic-like symptoms may affect a veteran's chance to commit an act of violence because these symptoms could manifest similarly to the threat/control override symptoms that appear in psychotic disorders. Perceived threats in general have been shown to be linked to violence (Elbogen & Johnson, 2009; Nederlof, Muris, & Hovens, 2011; Pepper & Agius, 2009), and have been shown to predict violence better than other psychotic symptoms, even when controlling for these other symptoms (Link & Stueve, 1994). The focus of these psychotic symptoms is perceived deliberate harm/danger by a perceived aggressor or the domination/implanting of thoughts by a perceived aggressor.

At the same time PTSD symptoms have yet to be examined with respect to violence in veterans, empirical research aimed at understanding different types of violence in veterans has also been somewhat limited. Virtually all research in this area of scholarship has examined only one type of violence (either general interpersonal or family/domestic). For example, many researchers have shown that PTSD is a predictor of intimate partner violence (Jordan et al., 1992; Meis, Erbes, Polusny & Compton, 2010; Orcutt, King, & King, 2003). These studies only delved into one victim group of violence and cannot show what aspect of PTSD best predicts family violence because they did not control for stranger violence. It is these findings that pose an empirical question that needs to be addressed: what leads to general/stranger violence versus family violence? The need for this kind of data has been documented by multiple researchers (Makin-Byrd et al., 2012; Taft, Street et al., 2007), and would certainly have clinical implications; namely, this information would provide clinicians information to target specific symptoms to reduce specific types of violent behavior.

Using the existing literature as a guide, the current study aims to explore whether the theoretical linkages to violence implied in the cluster-based results are confirmed in the actual symptoms. We have formed multiple hypotheses based on the aforementioned research. Each hypothesis contains a symptom of interest and the type of violence expected. If there is no expected type of violence noted, this will be investigated. These hypotheses are (a) “flashbacks” endorsed as severe will be associated with higher violence rates in veterans, (b) intense emotional numbing will be associated with higher violence rates in veterans, (c) intense emotional numbing is also hypothesized to be related to higher levels of family violence, (d) hyperarousal

symptoms of anger will be associated with higher rates of violence, (e) physical reaction to a reminder is hypothesized to be related to violence in veterans, and (f) hypervigilance is hypothesized to be associated with violence in veterans.

## Method

### Participants

The National Post-Deployment Adjustment Survey (NPDAS) is part of a larger study funded by the National Institute of Mental Health to develop tools to screen for adjustment problems such as violence and aggression in veterans. The current national survey sample was drawn from a random selection of over one million U.S. separated veterans who had served on or after September 11, 2001 by the VA Environmental Epidemiological Service (EES) in May, 2009. The sample was stratified by gender in order to ensure adequate representation of women veterans, who were over-sampled. Of 3,000 names randomly selected, 63 had incomplete addresses or were deceased. Of those remaining,  $n = 1,388$  completed the baseline survey, yielding a 56% corrected-response rate ( $n = 438$  had incorrect addresses). This rate is among the highest achieved in recent national surveys of U.S. troops (Beckham et al., 2008). Close examination revealed no significant bias in the final sample. Gender did not differ significantly between responders and nonresponders. Average age for responders was 36.1 years; average age for the entire random sample was 34.8 years. States with the largest military populations showed similar patterns in response groups and corresponded to known military demographics.

$N = 1,090$  completed the same survey at 1-year follow-up, yielding a 79% retention rate. The majority of the sample (82%) had been deployed to Iraq or Afghanistan; time since last deployment ranged from 1 to 8 years with a median of 4 years. The remainder of the sample was composed of veterans who served in Operation Iraqi Freedom or Operation Enduring Freedom but were not stationed in the theater of combat. The distribution of responders according to military branch (55% Army, 20% Air Force, 15% Navy, 10% Marines, and <1% Coast Guard; 27% non-White; 48% National Guard/Reserves) approximated the actual composition of the U.S. Armed Forces (Defense Manpower Data Center, 2010). The final sample was geographically representative of the military, corresponded to known military demographics, and represented 50 states, Washington DC, and four territories in approximately the same proportion as the actual military.

### Procedure

After obtaining IRB approval, we used the Dillman method (Dillman, Smyth, & Christian, 2009) to conduct a survey involving multiple contacts to maximize response rate, varied contacts to increase effectiveness with nonrespondents, and mailings containing elements to connect personally. Both baseline and 1-year follow-up of data collection involved similar procedures, and participants were reimbursed after completing each wave.

At baseline, participants were first sent an introductory letter about the upcoming survey. Four days later, they were sent an invitation by mail, which contained commemorative postage stamps as an incentive and instructions on how to complete a 35-min confidential web-based survey. Sixteen days after the

invitations were sent out, potential participants were sent postcards thanking them for completing the survey or reminding them to do so. Two weeks after the postcard mailing, those who had not taken the survey received a paper version of the survey with a postage-paid return envelope. Two months after the print survey had been mailed, a final letter was sent out in order to encourage participation and explained that the survey would close the following week.

At 1-year follow-up, participants who completed the baseline survey received the same letters, incentives, reminders, and reimbursements with the exception of the introductory letter which was deemed unnecessary since participants had already completed the survey 1 year earlier. In terms of survey medium, 83% of the sample completed data collection online and 17% completed the paper version. There were no differences between web and paper versions with respect to demographic and clinical variables.

### Measures

Baseline variables were selected based on robust risk factors of violence in veterans populations (Elbogen, Fuller et al., 2010). Veterans' age, gender, ethnicity, and income were gathered by self-report. The Alcohol Use Disorder Identification Test (AUDIT) (Bradley, Bush, McDonell, Malone, & Fihn, 1998) was used to measure alcohol misuse (0 = AUDIT  $\leq$ 7; 1 = AUDIT >7). Combat exposure was measured with a scale from the Deployment Risk and Resilience Inventory (King, King, & Vogt, 2003) (1 = at or above median/high combat; 0 = below median/less combat).

Probable PTSD was measured with the Davidson Trauma Scale which rates past-week frequency and severity of *DSM-IV* PTSD symptoms (i.e., reexperiencing, avoidance/numbing, hyperarousal) related to a specific trauma; scores over 48 have demonstrated .82 sensitivity, .94 specificity, and .87 diagnostic efficiency for Structured Clinical Interview for *DSM-IV* diagnosis of PTSD among Iraq and Afghanistan Veterans (McDonald, Beckham, Morey, & Calhoun, 2009). Questions on the Davidson Trauma Scale are asked in the context of the participant first endorsing and describing a traumatic event consistent with *DSM-IV* PTSD Criteria A. The items used in this study were a) *flashback*: "Have you felt as though the event was recurring? Was it as if you were reliving it?" b) *emotional numbing*: "Have you been unable to have sad or loving feelings, or have you generally felt numb?" c) *anger*: "Have you been irritable or had outbursts of anger?" d) *hypervigilance*: "Have you felt on edge, been easily distracted, or had to stay 'on guard'?" and e) *physical reaction to reminder*: "Have you been physically upset by reminders of the event? (This includes sweating, trembling, racing heart, shortness of breath, nausea, diarrhea)." Frequency of each was measured from 0–4 (*Not at all to Every day*); Severity was also measured from 0–4 (*Not at all distressing to Extremely distressing*). The sum of the frequency and severity scores was computed to create composite variables for the aforementioned PTSD symptoms of interest.

At 1-year follow-up, participants were prompted to report on other-directed, non-combat-related violence/aggression within the past year. Specific items were used to measure the variable *severe violence* on the Conflict Tactics Scale (Straus, 1979) (i.e., "Used a knife or gun," "Beat up the other person," or "Threatened the other person with a knife or gun") or on the MacArthur Community Violence Scale (Steadman et al., 2000) (i.e., "Did you threaten anyone with a gun or knife or other lethal weapon in your hand?")

“Did you use a knife or fire a gun at anyone?,” “Did you try to physically force anyone to have sex against his or her will?”) (0 = no severe violence; 1 = severe violence). *Other physical aggression* in the past 12 months was assessed using additional items on these scales that addressed physical aggression (i.e., kicking, slapping, using fists, and getting into fights); thus, *any violence* was defined as any report of severe violence and/or other physical aggression based on the aforementioned criteria (0 = no; 1 = yes).

A specific item asked veterans “If you responded that you hurt someone in the past year, check the person/people who were hurt.” Participants then indicated whether the victim was a family member/friend or stranger. Any type of aggression against these victim groups became the variables *family aggression* and *stranger aggression*. Acts of severe violence against these victim groups thus became the variables *severe family violence* and *severe stranger violence*.

An item that measured general symptoms of irritability asked across the entire sample is referenced in a post hoc analysis. This item asked respondents “Have you had any of the following symptoms in the past week?” This *irritability* item was reported by all participants as opposed to *anger* measured by the Davidson Trauma Scale, which requires, and is asked about in the context of, a *DSM-IV* PTSD Criteria A traumatic event.

## Results

SAS 9.2 was used for all statistical analyses. Because women constituted 33% of the current sample due to oversampling but represent an estimated 15.6% of the military (Defense Manpower Data Center, 2010), the sample of  $N = 1,090$  Iraq and Afghanistan War Veterans was adjusted to a weighted  $n = 866$ . Univariate analyses were used to describe frequencies symptoms and demographics. Correlational analyses were used to evaluate bivariate associations between PTSD symptoms and risk factors on family aggression, stranger aggression, severe family violence, and severe stranger violence. Regression analyses were performed to examine bivariate relationships between independent variables at baseline measurement and aggression at follow-up. A stepwise multiple logistic regression was run predicting aggression. Variables were included in the regression if significant at the  $p < .05$  level.

The characteristics of the sample are shown in Table 1. Among these veterans, 84.48% were male, 64.20% were married and 82.34% had more than a high school degree, and about one fourth endorsed alcohol misuse (24.34%). The median age was 34.4 years. 10.62% witnessed family violence, 17.66% had a prior arrest, and 6.03% endorsed drug misuse. About half of the sample experienced high levels of combat (49.10%). One hundred fifty-five veterans in the sample were diagnosed with PTSD (17.89%). These statistics are concordant with existing prevalence rates (Ramchand et al., 2010; Sundin, Fear, Iverson, Rona, & Wessely, 2010). However, veterans who reported a trauma were asked to rate symptoms on the Davidson Trauma Scale. Thus, the composite symptom variables defined previously include any veteran who experienced a trauma and reported any amount of symptoms. The most endorsed symptom measured in this sample was the anger hyperarousal symptom; 290 veterans reported outbursts of anger or irritability within the past week (33.45%). The second most frequent symptom was being on guard (32.19%). Being emotionally

Table 1  
*Description of Sample*

	Sample (Weighted $N = 866$ )	
	<i>n</i>	%
Female	134	15.52
Married	556	64.20
Education post high school	713	82.34
High combat (split at median)	425	49.10
Witnessed family violence	92	10.62
History of arrest	153	17.66
Drug misuse	52	6.03
Alcohol misuse	211	24.34
Probable PTSD	155	17.89
PTSD Symptoms		
Flashback	157	18.10
Anger	290	33.45
Numb	231	26.70
On guard	279	32.19
Physically upset from reminder	166	19.13
Family aggression in next year	111	12.79
Severe family violence in next year	27	3.13
Stranger Aggression in next year	82	9.44
Severe stranger violence in next year	42	4.80

numb, being physically upset by a reminder, and experiencing flashbacks followed, respectively. Family aggression was endorsed by 12.79% of the sample, with 27 of these cases being severely violent (3.13%). Stranger aggression was not as highly endorsed; 82 veterans (9.44%) committed an act of aggression toward a stranger, and 42 (4.8%) of these were severely violent.

Table 2 displays the bivariate associations between the selected PTSD symptoms and covariates on the different types of violence. All of the PTSD symptoms were significant at the  $p < .0001$  level with all types of violence. Younger age and high combat were also positively related to all types of violence. Witnessing family violence was positively correlated to family aggression and severe family violence. Conversely, history of arrest was positively related to stranger aggression and severe stranger violence. Females were found to be significantly more likely to perpetrate family aggression and severe family violence. Men were significantly more likely to commit an act of aggression or severe violence toward a stranger. Drug misuse was not related to family aggression, but was positively related to all other types of violence. By converting the Pearson's  $r$  to Cohen's  $d$ , we found that the strongest effect was for both anger and being on guard when relating to family aggression,  $d = .47$ . The weakest effect size for a significant finding was for witnessing family violence when relating to severe family violence,  $d = .12$ . It may also be important to note that the weakest effect size for PTSD variables was becoming physically upset from a reminder,  $d = .22$ .

Logistic regression analyses are shown in Tables 3 and 4. Analyses of multivariable models examined whether specific PTSD symptoms predicted certain victim groups of violence among veterans at the follow-up measurement. Variables were added by stepwise selection, entering only if they were statistically significant. Older veterans had significantly lower odds of family aggression, severe family aggression, and stranger aggression compared to younger veterans, OR = 0.98 CI [0.95, 1.00],  $p = .0221$ ; OR = 0.94, CI [0.89, 0.99],  $p = .0046$ ; OR = 0.97, CI

Table 2  
Spearman Correlations Between Aggression/Violence and Independent Variables

Variable	Family aggression		Severe family violence		Stranger aggression		Severe stranger violence	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Younger age (<median)	.10	.0014	.09	.0041	0.08	.0058	.10	.0008
Gender <sup>a</sup>	-.09	.0027	-.07	.0316	.14	<.0001	.08	.0093
Witnessed family violence	.09	.0045	.06	.0325		ns		ns
Substance misuse		ns	.10	.0006	.16	<.0001	.15	<.0001
High combat	.13	<.0001	.09	.002	.19	<.0001	.14	<.0001
History of arrest		ns		ns	.14	<.0001	.14	<.0001
PTSD	.20	<.0001	.18	<.0001	.14	<.0001	.15	<.0001
Numb	.21	<.0001	.15	<.0001	.16	<.0001	.13	<.0001
Flashback	.15	<.0001	.14	<.0001	.17	<.0001	.18	<.0001
Anger	.23	<.0001	.15	<.0001	.15	<.0001	.14	<.0001
On guard	.23	<.0001	.13	<.0001	.16	<.0001	.13	<.0001
Physically upset from reminder	.19	<.0001	.18	<.0001	.11	.0001	.15	<.0001

<sup>a</sup> Female = 0, Male = 1.

[0.94, 0.99],  $p = .0106$ , respectively. Females were found to have 2.77 times the odds to commit severe family violence compared to males, OR = .36, CI [.14, .96],  $p = .0347$ . However, no gender effect was found in family aggression. Conversely, males were found to be 3.41 times more likely to commit stranger aggression than females, OR = 3.41, CI [1.16, 10.08],  $p = .0264$ . Again, however, no gender effect was found for severe stranger violence.

Veterans with high combat exposure had about 2.5 times more odds of committing stranger aggression, OR = 2.47, CI [1.39, 4.37],  $p = .002$ . Substance use similarly increased the odds of stranger aggression at follow-up, OR = 2.52, CI [1.53, 4.16],  $p < .001$ , respectively. Both variables also predicted higher odds of severe stranger violence at follow-up. Substance abuse had the highest impact of the two; substance users had 2.93 times the odds of being severely violent toward an unknown target, OR = 2.93, CI [1.45, 5.88],  $p < .0001$ . High combat exposure had 2.58 times the odds of being severely violent toward a stranger, OR = 2.58, CI [1.14, 5.85],  $p = .0234$ . The largest effect of high combat exposure was found in severe family aggression, increasing the

odds of being severely violent by almost four times, OR = 3.96, CI [1.30, 12.02],  $p = .0153$ .

Anger symptom intensity increased the odds of both family aggression and severe family violence, OR = 1.28, CI [1.19, 1.37],  $p < .0001$ ; OR = 1.30, CI [1.13, 1.48],  $p < .0001$ , respectively, controlling for younger age in both types of violence and controlling for gender and younger age in severe family violence. PTSD flashback symptom intensity increased the odds of both stranger aggression and severe stranger violence, OR = 1.16, CI [1.05, 1.28],  $p = .0029$ ; OR = 1.26, CI [1.11, 1.42],  $p < .0001$ , respectively, controlling for gender, younger age, high combat, and substance use in stranger aggression and controlling for high combat and substance use in severe stranger aggression. No other symptoms were significant predictors of violent behaviors. These highly significant  $p$  values guard against alpha inflation associated with multiple tests.

A post hoc analysis was conducted to investigate whether anger/irritability not specifically tied to PTSD would suppress the effects of the anger symptom measured by the Davidson Trauma Scale.

Table 3  
Effect of PTSD Symptoms and Covariates on Family Aggression

Variable	Family aggression			Severe family violence		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Age	0.98	[0.95, 1.00]	.0221	0.94	[0.89, 0.99]	.0046
Gender <sup>a</sup>			ns	0.36	[0.14, 0.96]	.0347
High combat			ns	3.96	[1.30–12.02]	.0153
Substance misuse			ns			ns
Witnessed family violence			ns			ns
History of arrest			ns			ns
PTSD Anger	1.28	[1.19, 1.37]	<.0001	1.30	[1.13, 1.48]	<.0001
PTSD Flashback			ns			ns
PTSD On guard			ns			ns
PTSD Numb			ns			ns
PTSD Physically upset			ns			ns

$R^2 = .11$ , AUC = .71  
 $\chi^2 = 53.85$ ,  $df = 2$ ,  $p < .0001$

$R^2 = .19$ , AUC = .80  
 $\chi^2 = 41.34$ ,  $df = 4$ ,  $p < .0001$

<sup>a</sup> Female = 0, Male = 1.

Table 4  
Effect of PTSD Symptoms and Covariates on Stranger Aggression

Variable	Stranger aggression			Severe stranger violence		
	OR	95% CI	p	OR	95% CI	p
Age	0.97	[0.94, 0.99]	.0106			ns
Gender <sup>a</sup>	3.41	[1.16, 10.08]	.0264			ns
High combat	2.47	[1.39, 4.37]	.002	2.58	[1.14, 5.85]	.0234
Substance misuse	2.52	[1.53, 4.16]	.0003	2.93	[1.45, 5.88]	<.0001
Witnessed family violence			ns			ns
History of arrest			ns			ns
PTSD Anger			ns			ns
PTSD Flashback	1.16	[1.05, 1.28]	.0029	1.26	[1.11, 1.42]	<.0001
PTSD On guard			ns			ns
PTSD Numb			ns			ns
PTSD Physically upset			ns			ns
$R^2 = .17$ , AUC = .79			$R^2 = .20$ , AUC = .82			
$\chi^2 = 75.38$ , $df = 5$ , $p < .0001$			$\chi^2 = 54.36$ , $df = 3$ , $p < .0001$			

<sup>a</sup>Female = 0, Male = 1.

Irritability not tied to PTSD was measured in the entire sample, not just those with PTSD. Multivariate analysis revealed that both irritability measured in the entire sample, OR = 1.34, CI [1.25, 1.43],  $p < .0001$ , and anger linked to PTSD, OR = 1.12, CI [1.05, 1.20],  $p = .0006$ , each significantly increased the odds of any aggression or violence at follow-up. In this model, high combat also increased the odds of any aggression or violence at follow-up compared to those who did not have high combat exposure, OR = 1.71, CI [1.20, 2.45],  $p = .0034$ . Older age was associated with decreased odds for aggression or violence compared to younger age, OR = 0.97, CI [0.96, 0.99],  $p = .0022$ .

A second post hoc analysis investigated the same phenomenon, but this time including the general irritability variable in modeling of family aggression. In this analysis, general irritability was not related to family aggression; the regression yielded the same results found in Table 3. Similarly, general irritability was not related to severe family aggression; again, the regression was the same found in Table 3.

## Discussion

This paper examined the link between posttraumatic stress disorder (PTSD) symptoms and different types of violent behavior in Iraq and Afghanistan War veterans. We found that the selected PTSD symptoms and the overall diagnosis were significantly related with violence at the bivariate level, supporting hypotheses that the symptoms of flashbacks, numbing, anger, being physically reactive to a reminder, and being on guard/hypervigilant would be positively related to higher rates of violence. However, in multiple regression analyses, flashbacks and anger were the only two symptoms to predict higher odds of aggressive behavior at follow-up. These findings suggest that when covariates are included (e.g., age, substance misuse), other symptoms no longer independently contribute to predicting outcomes. Lack of significant findings on emotional numbing is inconsistent with literature showing that the avoidance/numbing cluster is associated with aggression (Hellmuth et al., 2012; Krause et al., 2006; McCormick & Smith, 1995).

We found that females were more likely to engage in family aggression violence, whereas being male was positively related to stranger aggression. This is consistent with, and builds upon,

research by Dutra and her colleagues (Dutra, de Blank, Scheiderer, & Taft, 2012), which revealed that women veterans were more likely to perpetrate intimate partner violence, supporting our current findings on this gender effect. One possible explanation is that males and females have been shown to use different social coping skills (Olf, Langeland, Draijer, & Gersons, 2007), which may be why males are more likely to be aggressive toward a stranger and females are more likely to be aggressive toward family. Males might use more instrumental behaviors (Olf et al., 2007), making it easier for males to have more contact with strangers than females, thus increasing the chances for aggression toward a stranger. Future studies are needed to further clarify the gender differences in violence among veterans.

Additionally, we found that individual symptoms from distinct clusters and their intensity at baseline measurements related to violence at follow-up. Anger symptoms predicted higher odds of both severe and general family aggression at follow-up measurements. No other symptoms had higher odds of family violence within the next year. Also, anger as measured by the Davidson Trauma Scale was not suppressed by irritability in the whole sample, possibly indicating that the two items indeed tap into separate constructs and underscore a possible need to conceptually separate PTSD anger from general anger. Irritability was excluded from the regression predicting family aggression at follow-up, possibly showing that anger as measured by the Davidson Trauma Scale is more relevant to family aggression than general irritability.

Results here seem to indicate that hyperarousal symptoms are indeed associated with violence as past literature has delineated (Elbogen, Wagner et al., 2010; Taft, Street et al., 2007). The anger symptom in particular might overshadow the effects that the other hyperarousal symptoms may have in relation to violence. An interaction analysis may be warranted to see whether this anger symptom specifically mediates the relationship between other symptoms and aggression. Based on previous research on this cluster, it seems that the anger symptom is a strong predictor for violence. Stranger aggression and stranger violence were both predicted by high combat, drug misuse, and PTSD flashbacks. Other than flashbacks, no other PTSD symptoms had higher odds

of stranger violence within the next year in multivariate analyses. Reexperiencing symptoms have received little to no attention in previous empirical studies of violence in veterans, but these results reveal that, at the very least, self-reported PTSD flashbacks are related to violent acts toward an unknown target.

There are clinical implications stemming from these findings. First, if a clinician wanted to identify risk factors of general interpersonal violence in veterans, evaluating the exposure to combat, substance use disorders, or intensity of PTSD flashback symptoms would be among the relevant information to consider, based on current results. These factors may also affect one another, as people experiencing flashbacks may use substances to alleviate and “self-medicate” symptoms, which in turn may also cause these symptoms to intensify (Stewart, 1996).

Second, if a clinician were to identify risk factors for family violence, intensity of anger symptoms may be very useful information if a veteran has indicated they have PTSD. Veterans with PTSD have been shown to endorse hyperarousal symptoms more than any other clusters (Buckley & Kaloupek, 2001; Holowka, Marx, Kaloupek, & Keane, 2012; Renshaw & Campbell, 2011), further strengthening the importance of these and other findings. Clinicians can use this data to focus their treatment efforts on the most relevant factors in hope of preventing violence.

Prolonged exposure therapy may already be an effective method of treatment for reducing PTSD symptoms that have been associated with aggression (Rauch, Eftekhari, & Ruzek, 2012; Yoder et al., 2012). This existing method has already shown to reduce PTSD symptoms in military veterans from different conflicts (Yoder et al., 2012). Moreover, successful results have been found in prolonged exposure therapy via remote conferencing and other technology such as virtual reality (Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Reger et al., 2011; Tuerk et al., 2011). Such results provide hope for reducing PTSD symptomology in veterans before reintegration into society. Equally, these results may also provide a new remote treatment option for penitentiaries or holding facilities.

These findings could assist legal counsel and legislators in their decisions regarding veterans and PTSD, with the caveat that the data do not allow for definitive causal interpretations about criminal behavior. Instead, these results provide data on which PTSD symptoms appear to contribute to increased odds of specific types of violence in veterans. Even though a PTSD flashback heightened the odds for violence within the next year, the data cannot show the symptom was a direct cause of violent behavior because it was unspecified when the violence occurred during the year of the study. The study does suggest it would be worthwhile for attorneys to examine what type of violence a defendant engaged in and how the individual’s PTSD may have affected their behavior. With respect to specialty veterans courts, even if a defendant is arrested for a nonviolent crime, early screening may be beneficial in providing the opportunity to prevent violent behavior by connecting veterans with early treatment.

The relationship between the different types of violence at follow-up with individual symptoms may help explain why PTSD as a diagnostic category has been shown to be associated with violence. There are many ways to experience PTSD, and the diagnosis as a whole has often been shown to predict higher violence and aggression (Beckham et al., 1997; McFall et al., 1999; Taft, Street et al., 2007). However, the current data imply that the diagnosis as a whole predicts violence in large part because the violence and symptoms are not differentiated. The diagnosis still predicted the different types of

violence, but it was the specific symptoms that began to show the specific pathways between PTSD and violence.

In terms of the empirical study of violence in veterans, the current data help advance research by demonstrating that distinct types of violence have evident patterns of unique characteristics that define each type of violence in all levels of severity. This does not necessarily mean there is a profile of a specific type of individual likely to commit family or stranger violence; rather, individual characteristics predict the types of violence while holding the others constant, despite assumed individual differences in the sample population. Composite violence measures are still relevant in finding what predicts violence as a whole, but the characteristics that predict any violence will be different from the characteristics that predict violence against separate victims; specific type of violence will be predicted by unique variables, with an assumed overlap between the different types found in variables that predict violence as a whole. For example, in our sample younger age was in virtually all analyses significantly related to all types of violence, confirming past risk factor research (Elbogen, Fuller et al., 2010; Jakupcak et al., 2007). A clear need arises from this study to disentangle victims and to recognize the limitations inherent in creating aggregate violence variables while ignoring subtypes of aggression.

There are some limitations to this study. Based on the data available, there was not enough information available to investigate the characteristics that define the group of violence against both a family member and a stranger, not to be confused with overall violence. Reliance on self-report data may be a limitation by either underestimating or exaggerating mental health problems. Thus, diagnoses are not definitive. Along these lines, using specific symptoms from the Davidson Trauma Scale may not be perfectly accurate either. Thus, these results must be taken with appropriate caution. While generalizability cannot be guaranteed, the sample closely characterized the branches of the military, the reserves, and the race and ethnicity breakdown found in the true population of veterans. Traumatic brain injury (TBI) was also not included as a covariate, which could be a limitation; the irritability found in TBI cases could account for some of the impulsive aggression. Other life events were also not explored, such as loss of employment, homelessness, and other factors.

Continued research needs to be done on these different types of violence. Further research could identify what characteristics are associated with family violence, stranger violence, and the characteristics that are associated with both or the group that commits both. Severity of violence should also be explored further. If there are separate characteristics for the victim groups of violent behavior, one would imagine that this disparity might also be found in changes in the severity of violence. In this regard, caution must be used to apply these findings to homicide, as this was not measured in the current study.

Future studies are needed to examine specific PTSD symptoms to see if the results found here can be replicated. General anger versus anger tied to PTSD should also be investigated further. Other symptoms could be investigated in the context of other theoretical linkages to violence. The diagnoses of mental disorders may not predict behaviors or outcomes well enough; the combination of symptoms and other factors may perform better than the general diagnoses with respect to predictive modeling. Information from this study and future studies could provide vital information to support the utilization of

existing treatments to increase functioning and decrease maladaptive behavior. Instead of feeling stigmatized by having a diagnosis, veterans could be informed that it appears to be a certain combination of symptoms and contextual factors that increase the risk for violence.

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