Risk Factors for Partner Violence Among a National Sample of Combat Veterans

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In this study, the authors identified potential risk factors for partner violence perpetration among a subsample ($n = 109$) of men who participated in a national study of Vietnam veterans. Partner violent (PV) men with posttraumatic stress disorder (PTSD) were compared with PV men without PTSD and nonviolent men with PTSD on family-of-origin variables, psychiatric problems, relationship problems, and war-zone factors. PV men with PTSD were the highest of the 3 groups on every risk factor other than childhood abuse. Group contrasts and a classification tree analysis suggest some potential markers and mechanisms for the association between PTSD and partner violence among military veterans and highlight the need for theory development in this area of inquiry.

Recent domestic homicides at Fort Bragg, North Carolina, among veterans who had served in Special Forces units in Afghanistan have increased public awareness of problems faced by some military families. A growing literature indicates that the relationship partners of military veterans with posttraumatic stress disorder (PTSD) are at heightened risk for partner violence victimization. In the nationally representative National Vietnam Veterans Readjustment Study (NVVRS; Kulka et al., 1990), an estimated one third of male veterans with PTSD engaged in partner violence during the previous year (Jordan et al., 1992). This rate is 2–3 times higher than those for non-PTSD veterans in the NVVRS and those found among other large, representative civilian community samples (Straus & Gelles, 1990). Large associations have also been reported between PTSD and physical violence and psychological abuse severity among veterans (e.g., Byrne & Riggs, 1996). In addition, veterans with PTSD exhibit more general marital problems, parental problems, and family adjustment difficulties than non-PTSD veterans (Carroll, Rueger, Foy, & Donahoe, 1985; Jordan et al., 1992).

Despite this evidence, few have examined other factors that might increase risk for partner violence perpetration among veterans with PTSD. In contrast, numerous studies among civilian samples have examined risk factors and characteristics of partner violent (PV) men (e.g., Maiuro, Cahn, Vitaliano, Wagner, & Zegree, 1988). The extent to which we may generalize findings from civilian samples to military veterans with PTSD remains unknown. The training and stressors experienced by those in the military are unique, and researchers have developed theories for anger and hostility specific to PTSD-positive veterans (see Beckham, Moore, & Reynolds, 2000). Therefore, risk factors elucidated among civilian samples should be tested among samples of veterans with PTSD. Research is also needed to uncover factors that distinguish violent veterans with PTSD and violent non-PTSD veterans so that we may better understand possible unique mechanisms and markers for violence among those with PTSD. The importance of such work is highlighted by the fact that over 1 million men are currently on active duty in the U.S. armed forces (Department of Defense, 2000) and are increasingly being exposed to trauma.

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The primary focus of civilian risk factor studies has been on the presence of psychopathology. These studies show that PV men elevate on scales assessing antisocial traits (e.g., Murphy, Meyer, & O'Leary, 1993), and both substance abuse (Bennett, Tolman, Rogalski, & Srinivasaraghavan, 1994) and depression (Maiuro et al., 1988) have consistently been associated with PV perpetration. Veterans with PTSD elevate on each of these risk factors, suggesting that psychiatric comorbidity may play a large role with respect to PV perpetration among this population. Bollinger, Riggs, Blake, and Ruzek (2000) documented an antisocial personality disorder prevalence rate of 15% among a sample of inpatients with PTSD. Substance abuse problems and PTSD are highly comorbid among veterans (Stewart, 1996). In the NVVRS (Kulka et al., 1990), 74% of male veterans with PTSD met lifetime criteria for alcohol abuse. Finally, approximately one third to two thirds of veterans with PTSD have lifetime rates of major depression (see Erickson, Wolfe, King, King, & Sharkansky, 2001).

Several studies among civilian samples have shown that exposure to violence in the family of origin, particularly childhood abuse and the witnessing of interparental violence, confers risk for abuse perpetration in adulthood (e.g., Murphy et al., 1993). Although family-of-origin variables have received scant attention with regard to partner violence perpetration among combat veterans, childhood abuse has been linked to the development of PTSD among both civilian (McCormack, Burgess, & Hartman, 1988) and veteran (Bremner, Southwick, Johnson, Yehuda, & Charney, 1993) samples.

War-zone specific risk factors also warrant attention. Gimbel and Booth (1994) found a significant relationship between combat exposure and a composite variable they termed *marital adversity*, which included partner violence, among a large, representative sample of Vietnam veterans. More recently, Orcutt, King, and King (2003) found that combat exposure was associated with partner violence indirectly through perceived threat in the war zone and PTSD. Beckham, Feldman, and Kirby (1998) obtained a significant but moderate bivariate correlation between exposure to atrocities in the war zone and general interpersonal violence among a sample of Vietnam combat veterans, though this association was nonsignificant when controlling for age and combat exposure.

Previous investigations have compared PTSD-positive veterans and veterans without the disorder on partner violence perpetration (Carroll et al., 1985; Jordan et al., 1992). We built on this literature by comparing risk factors across groups differing on dimensions of both PTSD and partner violence among an NVVRS (Kulka et al., 1990) subsample. Our goal was to examine general risk factors for partner violence perpetration among veterans with PTSD, and to distinguish these individuals from PV veterans without the disorder to elucidate potential unique markers and mechanisms for violence perpetration. We were mindful of Kraemer et al.'s (1997) risk factor typology that distinguishes *fixed markers* from *variable risk factors*. Fixed markers refer to factors that do not vary over time among individuals, are typically distal to the observed effect, and primarily serve to assist in identifying populations at risk. Fixed markers in this study included family-of-origin and war-zone factors. Variable risk factors change over time (either naturally or through manipulation), are typically more proximal to the observed effect, and represent potential causal etiological mechanisms and avenues for clinical intervention. In this study, variable risk factors included psychiatric and relationship problem variables. In addition to testing the hypothesis that PV veterans with PTSD would elevate on each risk factor of interest, we also examined potentially meaningful serial combinations of risk factors in the prediction of partner violence perpetration among veterans with PTSD using classification tree analysis.

Method

Data Source and Sample

Participants were a subsample (*n* = 109) of Vietnam veterans interviewed for the Congressionally mandated NVVRS (Kulka et al., 1990). Data were derived from the National Survey of the Vietnam Generation (NSVG) and the Family Interview (FI) components of the NVVRS. For the NSVG, 5-hr face-to-face interviews were conducted in the homes of 1,632 Vietnam veterans (1,200 men, 432 women) who had served in and around Vietnam sometime between August 5, 1964, and May 7, 1975. Of the 1,200 male NSVG participants, 376 veterans and their married or cohabiting partners were selected to participate in the FI, which consisted of 1-hr face-to-face interviews with the spouse–partner of the veteran. The response rate obtained for the FI was 80%. Participants were considered PTSD-positive if they scored 89 or higher on the Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988) and PV if their female partners reported at least one incident of partner violence on the Conflict Tactics Scale (CTS; Straus, 1979) over the previous year. Those with a lifetime history of partner violence but none reported over the past year were excluded. A total of 40 participants were classified as PTSD-positive PV, 41 were PTSD-negative PV, and 28 were PTSD-positive nonviolent (NV).

The current sample consisted of 70 (64%) Caucasian participants, 28 (26%) African American participants, 9 (8%) Native American participants, and 1 (1%) Asian participant. One (1%) participant classified himself as other with respect to race. Of these participants, 35 (32%) further identified themselves as Latino–Hispanic. The average age of the male veterans at the time of the survey was 39.79 years (*SD* = 3.15). Demographics for the female spouse–partners were very similar to those for the men. Most (89%) of the participating dyads were married.

Measures

PTSD was measured with the Mississippi Scale for Combat-Related PTSD (Keane et al., 1988). This 35-item, self-report instrument assesses the reexperiencing, avoidance and numbing, and hyperarousal criteria for PTSD, as well as the related features of substance abuse, depression, and suicidality. Keane et al. (1988) found the measure to exhibit high internal consistency and test-retest reliability. Regarding validity, the measure was associated with combat exposure and distinguished among groups of PTSD-positive veterans, PTSD-negative help-seeking veterans, and veterans with no mental disturbances. Kulka et al. (1990) examined the Mississippi Scale for Combat-Related PTSD and five other measures of PTSD in a preliminary validation study among veterans seeking services. The Mississippi Scale for Combat-Related PTSD exhibited superior diagnostic agreement with expert ratings on the basis of the Structured Clinical Interview for *DSM–III–R* (Spitzer, Williams, Gibbon, & First, 1990) and chart diagnoses. The measure also demonstrated good sensitivity (94.0%) and specificity (79.7%). A score of 89 or greater was considered indicative of a current positive diagnosis of PTSD. The internal consistency reliability estimate for this measure was .94 for male veterans in the FI.

Physical abuse. Physical abuse was measured with female partner ratings on the eight-item Violence subscale of the CTS (Straus, 1979). The CTS has been found to successfully detect partner violence among representative samples of the U.S. population (Straus & Gelles, 1990). Endorsement of any CTS Violence item over the previous year was indicative of

the presence of partner violence. The internal consistency reliability esti-mate of this scale was .90 for male veterans in the FI.

Childhood abuse. Childhood abuse was assessed by one item that asked the veteran whether anyone in his family or household had ever spanked or hit him hard enough to cause marks or bruises, to cause him to stay in bed, or to require a physician's attention.

Interparental violence. Interparental violence was measured with one item that asked the veteran whether he had seen his parents or guardians hit one another.

Comorbid problems. Comorbid problems were assessed with the Di-agnostic Interview Schedule (DIS; Robins, Helzer, Croughan, & Ratcliff, 1981). The DIS was developed to allow for lay interviewers to assess for the presence of a broad range of psychological disorders in large epide-miological studies. The reliability of lay interviewer DIS diagnoses has compared favorably with other diagnostic measures, and studies have shown high concordance between psychiatric diagnoses and lay inter-viewer diagnoses with the DIS (e.g., Robins et al., 1981). We focused on antisocial personality disorder, major depressive episode, alcohol abuse–dependence, and drug abuse–dependence.

Marital adjustment. Marital adjustment was measured with 15 self-report items that were selected from instruments used in national studies of American life (Campbell, Converse, & Rodgers, 1976; Veroff, Douvan, & Kulka, 1991), the Dyadic Adjustment Scale (Spanier, 1976), and the Marital Dissatisfaction Scale from the Psychiatric Epidemiological Re-search Interview (Dohrenwend, 1982). This composite measure of stan-dardized scores was previously derived by Street, King, King, and Riggs (2003) and reflects marital happiness, companionship, compatibility, and general relationship satisfaction. The internal consistency reliability esti-mate was .91 for male veterans in the FI.

Family adaptability and cohesion. Family adaptability and cohesion were measured with self-reported responses to the Family Adaptability and Cohesion Evaluation Scales (Olson, Bell, & Portner, 1978). The 11-item family adaptability measure refers to flexibility in family roles, responsi-bilities, and operating principles. The 13-item family cohesion measure reflects affiliation and closeness among family members. To preserve the distinctiveness of the variables, we removed items that might confound partner violence with dimensions of family functioning (Street et al., 2003). For male veterans in the FI, the internal consistency reliability estimate for family adaptability scores was .80, and the internal consistency reliability estimate for family cohesion scores was .87.

Combat exposure. Combat exposure was measured with 36 items selected from the NVVRS and validated by King, King, Gudanowski, and Vreven (1995). This measure assesses circumstances or events that are considered stereotypical, observable warfare experiences. Sample items included "receiving enemy fire," "going on special missions or patrols," and "firing weapons." Item scores were transformed to standard scores and summed to derive an overall combat exposure score. The internal consis-tency reliability of this measure was .94 for male veterans in the FI.

Atrocities exposure. Atrocities exposure was measured with nine items selected from the NVVRS and validated by King et al. (1995). This scale assesses reports of observable events or circumstances considered ex-tremely deviant or beyond routine war-zone experiences and includes experiences that might be considered particularly grotesque or raise ques-tions of morality. A sample item is "To what extent were you involved in terrorizing, wounding, or killing civilians?" Item scores were standardized and summed. The internal consistency reliability coefficient for this mea-sure was .93 for male veterans in the FI.

Perceived threat. Perceived threat was measured with a nine-item scale selected from the NVVRS and validated by King et al. (1995). Items reflect assessments by participants as to whether war-zone experiences were harmful to their personal safety, with an emphasis on interpretations of and feelings about these experiences. A sample item is "How often [if ever] did you find yourself in a combat situation in which you thought you would never survive?" Standardized scores were summed, and the measure

had an internal consistency reliability coefficient of .84 for male veterans in the FI.

Analyses

For all analyses, the sample design weights from the NVVRS were used to adjust for oversampling by the NVVRS researchers and to allow for the projection of study results to the larger population of male Vietnam veterans with a coresident spouse or partner. The sample design weights permitted unbiased estimates and correct standard errors for our group comparisons. For the quantitative variables of interest, weighted means were calculated, as well as standard errors and 90% confidence intervals. For categorical variables, weighted proportions, standard errors, and 90% confidence intervals were computed. Next, to ensure that obtained differ-ences between the two PTSD-positive groups were not a function of differences in PTSD symptom severity, we conducted a t test that com-pared these two groups on total Mississippi Scale for Combat-Related PTSD scores. Similarly, a t test was conducted to compare the two PV groups on partner violence severity, as assessed by total scores on the CTS Violence subscale. Then, planned contrasts compared levels of the risk factors between the PTSD-positive PV group and both the PTSD-negative PV group and the PTSD-positive NV group. For quantitative variables, t tests were performed; for categorical variables, chi-square tests were used. Effect sizes in the form of bivariate Pearson product–moment correlation coefficients for quantitative variables and phi coefficients for categorical variables were calculated for all contrasts (Rosenthal, 1991). Effect sizes were interpreted in terms of suggestions made by Cohen (1988). The calculation of all planned contrasts, Pearson correlations, and phi coeffi-cients were conducted with the STATA software package (StataCorp, 1999).

To conduct the classification tree analysis, we used optimal discriminant analysis (ODA; Yarnold, 1996; Yarnold & Soltysik, in press). ODA provides the maximum possible accuracy in classifying cases and is not based on assumptions about the distribution of the data. The methodology has been used in prior studies examining the predictors of intimate partner violence recidivism (Bennett, Goodman, & Dutton, 2000; Stalans, Yarnold, Seng, Olson, & Repp, in press) and medical outcomes (Yarnold, 1996; Yarnold & Soltysik, in press). To determine the relative performance of each significant predictor, ODA uses the percentage of total possible improvement in classification accuracy achieved with the predictor above the classification accuracy achieved through chance alone. This measure is a standardized test statistic called the *effect strength for sensitivity* (ESS), which is calculated with the following formula (Yarnold, Soltysik, & Bennett, 1997): ESS = [(Mean sensitivity across classes − 100) / 50] + 1. ESS can range between 0 and 100, where 0 means no improvement in classification accuracy greater than chance, and 100 means that the pre-dictor explains all variation (errorless classification). Assuming equal sample sizes in the groups to be discriminated, for a dichotomous variable, chance could achieve a mean sensitivity across classes of 50%; thus, this corresponds to an ESS of 0. A mean sensitivity (referring to the average of the percentage correctly classified for PTSD-positive NV veterans and the percentage correctly classified for PTSD-positive PV veterans) of 75% across classes lies halfway between chance and perfect performance and corresponds to an ESS of 50% in this example, which assumes equal distribution on the outcome variable (Yarnold, 1996). Predictors are ranked as weak, moderate, or strong on the basis of the ESS. The accuracy in classification greater than chance performance is considered weak when ESS is less than 25%, moderate when ESS is between 25% and 49%, and strong when ESS is 50% or greater.

We conducted a classification tree analysis to determine the combination of predictors that significantly discriminated PTSD-positive PV veterans and PTSD-positive NV veterans. Using all of the cases in the sample, we started the tree with a statistically significant predictor with the strongest weighted ESS. At each step thereafter, the variable with the strongest

weighted ESS was entered. Partitioning was stopped when there were no additional significant variables that entered the model.

Results

Group Comparisons of PTSD Symptom Severity and Partner Violence Severity

The two PTSD groups did not significantly differ on PTSD severity, $t(68) = -0.66$, ns. The weighted mean Mississippi Scale for Combat-Related PTSD score for PTSD-positive PV men was 107.04 ($SE = 2.23$), and the weighted mean for PTSD-positive NV men was 104.50 ($SE = 3.15$). Similarly, PV groups did not significantly differ on violence severity, $t(81) = 1.66$, ns. The weighted mean for the CTS Violence subscale was 6.12 ($SE = 1.00$) for PTSD-positive PV men and 3.97 ($SE = 0.82$) for PTSD-negative PV men. These initial analyses suggest that severity of the grouping factors did not account for the significant relationships obtained in this study.

Descriptive Statistics for Study Variables

Table 1 presents the weighted proportions, standard errors, and 90% confidence intervals for the categorical variables of interest, including the family-of-origin variables (childhood abuse and interparental violence) and psychiatric condition variables (the four DIS-based diagnoses). Table 2 presents the weighted means, stan-

Table 1
Descriptive Statistics for Categorical Variables

Variable	%	SE	90% CI
Family-of-origin variables			
Childhood abuse			
PTSD-positive PV	21.3	9.5	5.5, 37.0
PTSD-negative PV	22.7	9.7	6.6, 38.9
PTSD-positive NV	49.0	14.2	25.5, 72.6
Interparental violence			
PTSD-positive PV	31.2	10.4	13.8, 48.5
PTSD-negative PV	29.3	10.8	11.2, 47.3
PTSD-positive NV	16.6	8.0	3.2, 30.0
Psychiatric problems			
Antisocial personality disorder			
PTSD-positive PV	9.5	6.3	−1.0, 19.9
PTSD-negative PV	0.0	0.0	0.0, 0.0
PTSD-positive NV	7.9	6.9	−3.7, 19.4
Major depressive episode			
PTSD-positive PV	8.1	3.8	1.7, 14.4
PTSD-negative PV	0.0	0.0	0.0, 0.0
PTSD-positive NV	1.0	0.7	−0.3, 2.2
Alcohol abuse–dependence			
PTSD-positive PV	26.3	9.6	10.4, 42.2
PTSD-negative PV	11.0	6.5	0.2, 21.8
PTSD-positive NV	17.6	9.1	2.3, 32.8
Drug abuse–dependence			
PTSD-positive PV	4.5	2.6	0.2, 8.7
PTSD-negative PV	0.0	0.0	0.0, 0.0
PTSD-positive NV	0.5	0.5	−0.4, 1.4

Note. CI = confidence interval; PTSD = posttraumatic stress disorder; PV = partner violent; NV = nonviolent.

dard errors, and 90% confidence intervals for the quantitative variables (relationship problem measures and war-zone factors). As expected, the PTSD-positive PV group was highest on almost all of the risk factors, including all of the psychiatric condition variables, relationship problem variables, and war-zone variables, as well as exposure to interparental violence. Counter to our expectations, the PTSD-positive NV group was highest on childhood abuse, with a childhood abuse rate of 49%. Childhood abuse rates were 21% and 23% for those in the PTSD-positive PV group and PTSD-negative PV group, respectively.

Planned Contrasts

Family-of-origin variables. Table 3 presents the results of the planned contrasts for categorical variables between PTSD-positive PV and both PTSD-negative PV men and PTSD-positive NV men. Contrary to our hypotheses, no significant differences were found between the PTSD-positive PV group and the other two groups on either of the family-of-origin variables (i.e., childhood abuse and interparental violence), and the effect sizes (range = .01–.20) for these relationships were generally small.

Psychiatric problems. Results from the planned contrasts between the groups on the prevalences of psychiatric problems are also presented in Table 3. Consistent with our hypotheses, major depressive episode and drug abuse–dependence was significantly higher in the PTSD-positive PV group than in the PTSD-negative PV group and the PTSD-positive NV group, with medium effect sizes ranging from .27 to .34. The prevalence of antisocial personality disorder was also significantly higher in the PTSD-positive PV group than in the PTSD-negative PV group, with an effect size of .24 for this comparison.

Relationship problems. Table 4 displays the results from the planned contrasts on the quantitative variables in this study. As predicted, the PTSD-positive PV group reported significantly lower marital adjustment than the other two groups, with a slightly larger effect for the difference between this group and PTSD-negative PV men ($r = .43$) than the PTSD-positive NV men ($r = .35$). The PTSD-positive PV group also reported significantly lower family adaptability than the PTSD-negative PV group, with an effect size of .34. The differences between the PTSD-positive PV group and the other two groups on family cohesion did not reach statistical significance, though the effect sizes for both associations were in the expected direction in the small-to-medium range.

War-zone variables. Results from planned contrasts of the war-zone variables are also presented in Table 4. The PTSD-positive PV group reported significantly higher combat exposure ($r = .49$), atrocities exposure ($r = .59$), and perceived threat ($r = .46$) than the PTSD-negative PV group. As predicted, the PTSD-positive PV group was exposed to significantly more atrocities than the PTSD-positive NV group, with a medium effect size of .32. These two groups did not significantly differ on combat exposure or perceived threat, though the effect size for combat exposure (.25) fell within the medium range.

Classification Tree Analysis

The classification tree analysis that discriminated PTSD-positive PV veterans and PTSD-positive NV veterans found a

Table 2
Descriptive Statistics for Quantitative Variables

Variable	M	SE	90% CI
Relationship problem variables			
Marital adjustment[a]			
PTSD-positive PV	−8.27	2.48	−12.34, −4.19
PTSD-negative PV	1.52	1.92	−1.64, 4.68
PTSD-positive NV	−0.69	1.64	−3.37, 1.99
Family adaptability			
PTSD-positive PV	37.90	1.79	34.95, 40.84
PTSD-negative PV	42.95	1.23	40.93, 44.97
PTSD-positive NV	39.35	44.16	37.23, 41.48
Family cohesion			
PTSD-positive PV	47.58	2.56	43.37, 51.79
PTSD-negative PV	52.83	1.29	50.71, 54.95
PTSD-positive NV	51.77	2.56	47.58, 55.96
War-zone variables			
Combat exposure[a]			
PTSD-positive PV	0.31	0.12	.11, .51
PTSD-negative PV	−0.33	0.11	−.51, −.15
PTSD-positive NV	0.01	0.23	−.36, .38
Perceived threat[a]			
PTSD-positive PV	0.31	0.10	.14, .47
PTSD-negative PV	−0.22	0.10	−.38, −.06
PTSD-positive NV	0.23	0.16	−.04, .50
Atrocities exposure[a]			
PTSD-positive PV	6.70	1.48	4.26, 9.14
PTSD-negative PV	−2.34	0.99	−3.97, −.72
PTSD-positive NV	1.73	2.04	−1.61, 5.07

Note. CI = confidence interval; PTSD = posttraumatic stress disorder; PV = partner violent; NV = nonviolent.
[a] Items comprising score composite were transformed to standard scores because of variations in response format. Thus, overall means approximated zero.

three-variable model that showed strong performance (weighted ESS = 64.8%) and had an overall weighted classification accuracy of 84.6%. As Figure 1 illustrates, PTSD-positive veterans who had marital adjustment scores of −3.80 or greater had a low rate of intimate partner violence (16.2%), and no other variables predicted partner violence among these individuals. Among those with low marital adjustment, there were two groups of PTSD-positive veterans who had a low risk of intimate partner violence: (a) those who did not report alcohol abuse–dependence (7.5% were PV) and (b) those who reported alcohol abuse–dependence and had witnessed interparental violence in their family of origin (0% were PV). PTSD-positive veterans who had low marital adjustment and alcohol abuse–dependence had a high risk of violence if they did not witness interparental violence (79.5% were PV).

Discussion

The findings indicate that PTSD-positive PV men were elevated on several variables that have been identified as risk factors for partner violence among civilians. Other than childhood abuse in the family of origin, PTSD-positive PV men evidenced the highest levels of every risk factor of interest in the present study. In contrasts comparing the two PTSD groups, the PV group reported significantly higher rates of major depressive episode and drug abuse–dependence, poorer marital adjustment, and higher levels of atrocities exposure than the NV group. These results suggest that the trauma-related experiences, significant comorbid psychopathology, and relationship problems typically associated with PTSD serve as risk factors for partner violence perpetration in this population.

Results from this study suggest that war-zone traumas may be particularly salient with respect to the perpetration of partner

Table 3
Planned Contrasts and Effect Sizes for Categorical Variables

Contrast	χ^2	N	Effect size (r)	p
Family-of-origin variables				
Childhood abuse				
PTSD-positive PV versus PTSD-negative PV	0.01	79	.01	.91
PTSD-positive PV versus PTSD-positive NV	2.60	66	.20	.11
Interparental violence				
PTSD-positive PV versus PTSD-negative PV	0.02	81	.02	.90
PTSD-positive PV versus PTSD-positive NV	1.20	68	.13	.28
Psychiatric problems				
Antisocial personality disorder				
PTSD-positive PV versus PTSD-negative PV	4.84	81	.24	.03
PTSD-positive PV versus PTSD-positive NV	0.03	67	.02	.87
Major depressive episode				
PTSD-positive PV versus PTSD-negative PV	8.73	81	.33	.00
PTSD-positive PV versus PTSD-positive NV	7.87	68	.34	.01
Alcohol abuse–dependence				
PTSD-positive PV versus PTSD-negative PV	1.71	80	.15	.19
PTSD-positive PV versus PTSD-positive NV	0.41	67	.08	.52
Drug abuse–dependence				
PTSD-positive PV versus PTSD-negative PV	6.17	81	.28	.02
PTSD-positive PV versus PTSD-positive NV	4.81	67	.27	.03

Note. All chi-square tests have 1 degree of freedom. PTSD = posttraumatic stress disorder; PV = partner violent; NV = nonviolent.

Table 4
Planned Orthogonal Contrasts and Effect Sizes for Quantitative Variables

Contrast	*t*	*df*	Effect size (*r*)	*p*
Relationship problem variables				
Marital adjustment[a]				
PTSD-positive PV versus PTSD-negative PV	3.14	80	.43	.00
PTSD-positive PV versus PTSD-positive NV	2.57	67	.35	.01
Family adaptability				
PTSD-positive PV versus PTSD-negative PV	2.34	80	.34	.02
PTSD-positive PV versus PTSD-positive NV	0.66	67	.10	.51
Family cohesion				
PTSD-positive PV versus PTSD-negative PV	1.84	80	.29	.07
PTSD-positive PV versus PTSD-positive NV	1.17	67	.20	.25
War-zone variables				
Combat exposure[a]				
PTSD-positive PV versus PTSD-negative PV	−3.90	79	.49	.00
PTSD-positive PV versus PTSD-positive NV	−1.17	65	.24	.25
Perceived threat[a]				
PTSD-positive PV versus PTSD-negative PV	−3.79	79	.46	.00
PTSD-positive PV versus PTSD-positive NV	−0.41	65	.08	.69
Atrocities exposure[a]				
PTSD-positive PV versus PTSD-negative PV	−5.11	79	.59	.00
PTSD-positive PV versus PTSD-positive NV	−1.99	65	.32	.05

Note. PTSD = posttraumatic stress disorder; PV = partner violent; NV = nonviolent.
[a] Items comprising score composite were transformed to standard scores because of variations in response format. Thus, overall means approximated zero.

violence among those with PTSD. PTSD-positive PV men reported significantly more atrocities exposure than those in the other two groups, and a similar trend was found for combat exposure. These contrasts and the relatively lower levels of the war-zone variables among the non-PTSD violent group suggest that war-zone variables represent unique risk factors for partner violence perpetration among those with PTSD. As Gimbel and Booth (1994) noted, during military training and in the war zone, violent behavior is frequently reinforced and modeled and is often considered a necessary means for resolving disputes, particularly during armed conflict. These contingencies may lead to an increased propensity to use partner violence in conflicts within intimate relationships. We also find it plausible that precombat variables and dispositional factors may place individuals at heightened risk for both war-zone trauma exposure and partner violence perpetration.

Among civilian samples, researchers have consistently documented associations between psychopathology and partner violence perpetration (e.g., Murphy et al., 1993). Our findings of higher prevalences of comorbid psychiatric problems among the PTSD-positive PV group relative to the comparison groups suggest that psychiatric problems similarly place military veterans at heightened risk for partner violence perpetration. Findings of relatively higher prevalence rates among the PTSD-positive PV group relative to the PTSD-negative PV group is consistent with studies demonstrating high rates of comorbidity found among veterans suffering from PTSD (Orsillo et al., 1996).

Several prior studies have documented heightened relationship problems among combat veterans with PTSD (Byrne & Riggs, 1996; Carroll et al., 1985; Jordan et al., 1992). We similarly found

robust differences between those with PTSD and those without the disorder on relationship problem variables. Among civilian samples, researchers have shown that relationship problems and conflict are associated with partner violence perpetration (O'Leary, Malone, & Tyree, 1994). In addition, among a sample of Vietnam veterans recruited from the community, Byrne and Riggs (1996) found relationship problems to mediate the association between PTSD and relationship aggression. Our findings of more relationship problems among PTSD-positive PV men than PTSD-positive NV men similarly suggest that relationship problems represent an important risk factor for partner violence among veterans with PTSD.

We find it surprising that there were no significant differences between the PTSD-positive PV group and the PTSD-positive NV group on the family-of-origin variables (i.e., childhood abuse and exposure to interparental violence). These results are in contrast to several civilian studies showing that family-of-origin violence is related to partner abuse in adulthood (Murphy et al., 1993). These findings, however, are consistent with one study (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997) among a clinical sample of combat veterans that failed to document an association between childhood abuse in the family of origin and general interpersonal violence.

Conflicting findings regarding family-of-origin factors among study populations may reflect distinct etiologies for violence perpetration in civilian and veteran samples. The classification tree analysis underscores the possible complex relationship between family-of-origin violence and partner violence perpetration among veterans with PTSD. For those with PTSD who reported low marital adjustment and alcohol abuse–dependence, a history of
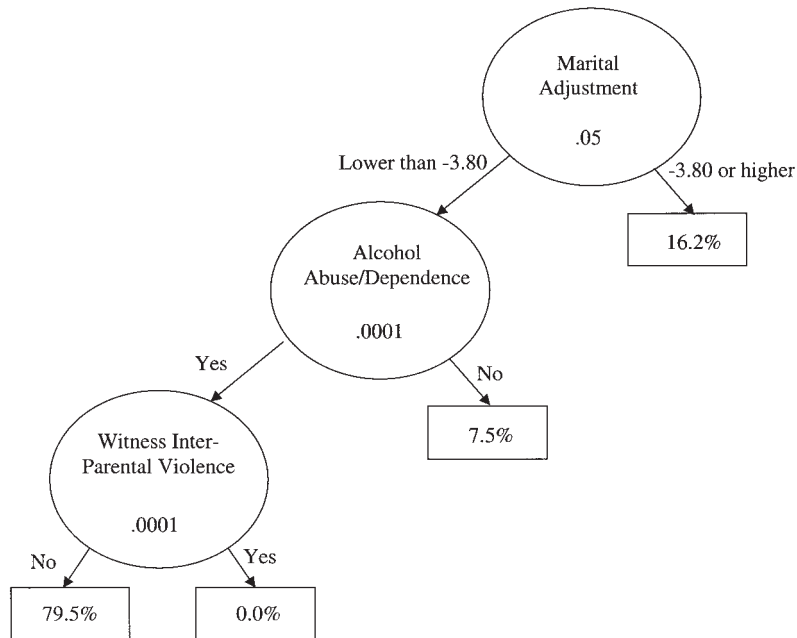
Figure 1. Classification tree analysis model predicting partner violent and nonviolent behavior among veterans with posttraumatic stress disorder. Within the ellipses are the significant predictors and their probability levels. Arrows indicate branches, and within each square is the percentage of veterans with that combination of characteristics who committed partner violence.

interparental violence was associated with a lack of partner violence perpetration. A possible explanation for these counterintuitive findings is that veterans who suffered from PTSD and comorbid problems and had exposure to interparental violence were more likely to identify and empathize with their battered parent, or determinedly shun later violence in their own relationships, thus reducing their risk for perpetrating abuse. These results require further investigation and replication in future studies and suggest that partner violence among combat veterans with PTSD is multidetermined, as has been shown repeatedly in studies of civilian samples (e.g., Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000). Additional work is needed to examine the interrelationships among risk factors and to develop more explanatory models for partner violence perpetration among this population.

The risk factor typology developed by Kraemer et al. (1997) is a useful framework for understanding the implications of study findings. War-zone factors, and atrocities exposure and combat exposure in particular, were the only discriminating fixed-marker variables. These distal risk factors appeared to serve as important index variables with respect to partner violence perpetration among veterans with PTSD. Therefore, PTSD-positive veterans with the highest standing on these war-zone stressor exposures should be targeted for preventative interventions for partner violence perpetration.

Among the variable risk factors, as discussed above, many of the relationship problem and psychiatric variables distinguished between the two PTSD-positive groups. These more proximal risk factors provide potentially important clues into possible mechanisms for the relationship between PTSD and partner violence perpetration among veterans. Such findings are suggestive of

points of intervention, as mechanism-based interventions tend to be the most successful and informative (e.g., Kraemer et al., 1997). For example, findings involving the relationship variables suggest the importance of interventions that include the provision of communication and problem-solving skills to enhance relationship quality and thus hopefully reduce violence. Similarly, our data suggest that substance abuse may be an intermediary variable between PTSD symptom severity and partner violence. The mechanisms here may involve cognitive disruption and disinhibition, which are both likely to be magnified in the context of PTSD among veterans, wherein anger and lack of control are thought to be core features. Hence, intervention might target substance abuse in an effort to reduce the occurrence of partner violence. Classification tree analysis findings further suggest that risk for partner violence perpetration is considerably higher among veterans with PTSD when both low marital satisfaction and alcohol abuse–dependence are present, suggesting the use of interventions that target both risk factors (see O'Farrell & Murphy, 1995).

Some limitations of this study bear note. The relatively modest sample size may have provided insufficient power to detect significant differences between groups. However, a number of significant and potentially meaningful associations were found despite the threat of low power, and effect sizes were emphasized in this study, as has been advocated by methodologists and quantitative psychologists (e.g., Cohen, 1994; Schmidt, 1996). Another limitation is our use of cross-sectional data and reliance on retrospective reports of many of the variables of interest. The difficulties inherent in the recall of events in the distant past and in encoding memories for events during times of stress have been previously noted (e.g., King et al., 1995). The psychological state

of the veterans in this study may also have influenced their reports of prior events and circumstances, and social desirability and other response biases may have affected associations between study variables (King & King, 1991). Finally, the family-of-origin factors were assessed with single-item indicators that may not have fully captured important aspects of childhood exposure to violence and abuse. Future investigations should more comprehensively assess childhood abuse and interparental violence to better understand how these factors may predict partner violence perpetration among veterans with PTSD.

With these cautions in mind, potential risk factors for partner violence perpetration across several domains were found. Obtained differences between PTSD-positive PV veterans and the other groups, and between present study findings and those from non-veteran samples, suggest that theory specific to this population should be more fully developed and empirically validated. Such work may ultimately prove essential in informing intervention and prevention efforts designed to target this important social and public health problem.

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