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Personality Disorders Associated with Full and Partial Posttraumatic Stress Disorder in the U.S. Population: Results from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions

Robert H. Pietrzak, Ph.D., M.P.H.^{1,2}, Risë B. Goldstein, Ph.D., M.P.H.³, Steven M. Southwick, M.D.^{1,2}, and Bridget F. Grant, Ph.D., Ph.D.³

¹ National Center for Posttraumatic Stress Disorder, VA Connecticut Healthcare System, West Haven, CT, USA

² Department of Psychiatry, Yale University School of Medicine, New Haven, CT, USA

³ Laboratory of Epidemiology and Biometry, Division of Intramural Clinical and Biological Research, National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health, Bethesda, MD, USA

Abstract

Background—While it is well known that personality disorders are associated with trauma exposure and PTSD, limited nationally representative data are available on DSM-IV personality disorders that co-occur with posttraumatic stress disorder (PTSD) and partial PTSD.

Methods—Face-to-face interviews were conducted with 34,653 adults participating in the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. Logistic regression analyses controlling for sociodemographics and additional psychiatric comorbidity evaluated associations of PTSD and partial PTSD with personality disorders.

Results—Prevalence rates of lifetime PTSD and partial PTSD were 6.4% and 6.6%, respectively. After adjustment for sociodemographic characteristics and additional psychiatric comorbidity, respondents with full PTSD were more likely than trauma controls to meet criteria for schizotypal, narcissistic, and borderline personality disorders (ORs=2.1–2.5); and respondents with partial PTSD were more likely than trauma controls to meet diagnostic criteria for borderline (OR=2.0), schizotypal (OR=1.8), and narcissistic (OR=1.6) PDs. Women with PTSD were more likely than controls to have obsessive-compulsive PD. Women with partial PTSD were more likely than controls to have antisocial PD; and men with partial PTSD were less likely than women with partial PTSD to have avoidant PD.

Conclusions—PTSD and partial PTSD are associated with borderline, schizotypal, and narcissistic personality disorders. Modestly higher rates of obsessive-compulsive PD were observed among women with full PTSD, and of antisocial PD among women with partial PTSD.

Corresponding Author: Robert H. Pietrzak, Ph.D., M.P.H., National Center for Posttraumatic Stress Disorder, VA Connecticut Healthcare System, Department of Psychiatry, Yale University School of Medicine, 950 Campbell Avenue 151/E, West Haven, CT 06516, Phone: (860) 638-7467, Fax: (203) 937-3481, robert.pietrzak@yale.edu.

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Keywords

Posttraumatic stress disorder; personality disorders; epidemiology; comorbidity

INTRODUCTION

Posttraumatic stress disorder (PTSD) is associated with high rates of co-occurring Axis I psychopathology, including mood, anxiety, and substance use disorders (Jeon et al., 2007; Kessler et al., 1995; Pietrzak et al., under review; Sareen et al., 2007). Axis II psychopathology is also common in PTSD (Bollinger et al., 2000; Dunn et al., 2004; Gomez-Beneyto et al., 2006; Malta et al., 2002; Shea et al., 2000; b; Southwick et al., 1993). For example, Dunn et al. (2004) examined PDs in 115 male combat veterans with DSM-IV PTSD and depression and found that 52 (45.2%) had 1 or more personality disorders (PDs), most commonly paranoid (17.4%), obsessive-compulsive (16.5%), avoidant (12.2%), and borderline (8.7%) PDs. Similarly, elevated rates of DSM-IV avoidant, paranoid, and dependent PDs have been observed in a sample of 111 primary care patients with PTSD (Gomez-Beneyto et al., 2006).

National surveys investigating the prevalence of PDs in the general population have been conducted in the United States (Grant et al., 2004b; Grant et al., 2004c; Lenzenweger et al., 2007), Great Britain (Coid et al., 2006), Australia (Jackson & Burgess, 2004), Norway (Alnaes et al., 1990), and Mexico (Benjet et al., 2008). However, to our knowledge, only 1 nationally representative survey has reported on the prevalence and correlates of a broad range of PDs among individuals diagnosed with PTSD based on direct assessment of the entire respondent sample. McFarlane (2004) found elevated rates of PDs including anankastic (i.e., obsessive-compulsive; 22.2%), schizoid (20.3%), borderline (14.7%), and paranoid (12.8%) PDs in a nationally representative sample of Australian adults with PTSD. While this study contributed substantially to the understanding of Axis II comorbidity of PTSD, its limitations included the assessment of Axis II disorders using a screening measure as opposed to a diagnostic assessment instrument and no examination of associations between PTSD and individual PDs with statistical adjustment for sociodemographics or other psychiatric comorbidities. Consequently, the magnitudes of unique associations between PTSD and specific PDs are not known.

Most other studies of PDs that co-occur with PTSD have included relatively small samples from geographically restricted regions or specific treatment settings, have employed older versions of the DSM [e.g., DSM-III-R (American Psychiatric Association, 1987)], and have typically examined selected PDs associated with PTSD. (Bollinger et al., 2000; Dunn et al., 2004; Gomez-Beneyto et al., 2006; Malta et al., 2002; Oldham et al., 1995; Skodol et al., 1996; Southwick et al., 1993). Consequently, it is not clear whether results of these studies apply to the general population and DSM-IV-defined PTSD and PDs. Given reports that PDs may affect the course, severity, and prognosis of PTSD (Horowitz et al., 1980; Malta et al., 2002; Reich, 1990) and related disorders (Holma et al., 2008; Mennin & Heimberg, 2000), an examination of PD comorbidity in large, population-based samples of individuals with PTSD has clinically important implications.

Partial PTSD describes clinically significant, chronic PTSD symptoms among trauma-exposed individuals who do not meet full diagnostic criteria for the disorder (Mylle & Maes, 2004; Schnurr et al., 2003; Weiss, 1992). Studies of partial PTSD in various trauma-exposed populations have found intermediate levels of psychiatric comorbidity and functional impairment relative to trauma controls and individuals with full PTSD (Berger et al., 2007; Favaro et al., 2006; Friedman et al., 1997; Grubaugh et al., 2005; Jakupcak et al., 2007;

Kulka, 1990; Pietrzak et al., 2009; Schnurr et al., 2000; Watson & Daniels, 2008). To our knowledge, however, only 1 study has examined personality characteristics of individuals with partial PTSD. This study found that recently traumatized civilian burn patients (n=70) who had subthreshold PTSD symptoms reported higher levels of neuroticism and lower levels of extraversion than individuals with fewer symptoms (Fauerbach et al., 2000). While this study provides some insight into personality correlates of partial PTSD, more research is needed to examine specific PDs in this population, as characterization of Axis II psychopathology in partial PTSD may help identify targets for prevention and early intervention.

The purpose of the present study was to examine the full range of DSM-IV PDs associated with full and partial PTSD in a large, nationally representative sample of U.S. adults. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) is one of the largest studies of psychiatric comorbidity ever conducted (n=43,093 in Wave 1; n=34,653 in Wave 2). This large sample permits a detailed analysis of PTSD and PD comorbidity with careful adjustment for potentially confounding sociodemographic characteristics and other psychiatric comorbidities. We hypothesized that (a) PTSD would be associated with increased rates of most PDs, particularly borderline, schizoid, narcissistic, paranoid, and schizotypal PDs; and (b) partial PTSD would be associated with intermediate rates of Axis II disorders.

MATERIALS AND METHODS

Sample

The 2004–2005 Wave 2 NESARC (Grant et al., 2005c) is the second wave follow-up of the Wave 1 NESARC that was conducted in 2001–2002 and described elsewhere (Grant et al., 2003b; Grant et al., 2004c). The Wave 1 NESARC surveyed a representative sample of the civilian, noninstitutionalized U. S. population aged 18 years and older residing in households and group quarters. Face-to-face interviews were conducted with 43,093 respondents, with oversampling of blacks, Hispanics, and young adults 18 to 24 years old. The overall response rate was 81.0%.

Attempts were made in Wave 2 to reinterview all 43,093 Wave 1 respondents face-to-face. Excluding those ineligible for the Wave 2 interview because they were deceased, mentally or physically incapacitated, deported, or on active military duty throughout the follow-up period, the Wave 2 response rate was 86.7%, reflecting 34,653 completed interviews. The cumulative response rate at Wave 2 equals the product of the Wave 1 and Wave 2 response rates, or 70.2%. As in Wave 1, the Wave 2 NESARC data were weighted to reflect design characteristics of the survey and account for oversampling. Adjustment for nonresponse across sociodemographic characteristics and the presence of any lifetime Wave 1 substance use or psychiatric disorder was performed at the household and person levels to ensure that the sample approximated the target population, i.e., the original sample minus attrition from Wave 1 to wave 2 because of death, incapacitation or institutionalization, deportation or permanent departure from the United States, and military service for the entire Wave 2 interviewing period. When Wave 2 respondents were compared with the target population (Wave 2 respondents and eligible nonrespondents) on Wave 1 sociodemographic and diagnostic measures, there were no significant differences on age, race or ethnicity, sex, socioeconomic status or the presence of any lifetime anxiety, mood, substance use, or personality disorder (each examined separately). Weighted Wave 2 data were then adjusted to represent the civilian population on sociodemographic variables including region, age, race or ethnicity, and sex, based on the 2000 Decennial Census.

All potential NESARC respondents were informed in writing about the nature of the survey, the statistical uses of the survey data, the voluntary aspect of their participation, and the Federal laws that rigorously provide for the strict confidentiality of identifiable survey information. Respondents consenting to participate after receiving this information were interviewed. The entire research protocol, including informed consent procedures, received full ethical review and approval from the U.S. Office of Management and Budget and the U.S. Census Bureau.

Posttraumatic Stress Disorder (PTSD)

The diagnostic interview used in the Wave 2 NESARC was the NIAAA Wave 2 Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version [(AUDADIS-IV (Grant et al., 2004a)], a computerized, fully structured instrument designed for experienced lay interviewers. PTSD was assessed on a lifetime basis. The PTSD section begins with an enumeration of 27 types of potentially traumatic events, described elsewhere (Pietrzak et al., under review), operationalizing the DSM-IV (American Psychiatric Association, 1994) Criterion A stressor definition. Included were 6 event types that involved terrorism, each of which was subdivided by whether it occurred on September 11, 2001. Respondents endorsing multiple event types were asked to designate the event they considered most stressful (Breslau et al., 2004b); consistent with DSM-IV PTSD Criterion A, they were further asked whether they felt extremely frightened, helpless, or horrified about that worst event, and whether they thought they or someone very close to them might die, be seriously injured, or become permanently disabled at the time the worst event happened.

Full PTSD was diagnosed when respondents endorsed at least 1 symptom within Criterion B (persistent reexperiencing), at least 3 within Criterion C (persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness), and at least 2 within Criterion D (persistent hyperarousal), lasting at least 1 month (Criterion E), *subsequent to* the worst event they experienced that involved intense fear, helplessness, or horror, and the belief that they or someone close to them might die or be seriously injured or permanently disabled. Diagnoses of full PTSD also required the DSM-IV clinical significance criterion of impairment or subjective distress (Criterion F) to be met. Test-retest reliability of lifetime PTSD was good ($\kappa=0.64$; Ruan et al., 2008).

Partial PTSD was defined on the basis of a modification of the algorithm of Breslau et al. (Breslau et al., 2004a). It was operationalized as having at least 1 symptom within each of Criteria B, C, and D, and lasting at least 1 month in response to the worst event they experienced that involved intense fear, helplessness, or horror; or actual or threatened death or serious injury or a threat to their own or someone else's physical integrity. Respondents who experienced a potentially traumatic event but met criteria for neither full nor partial PTSD were classified as trauma controls.

Personality Disorders

All DSM-IV personality disorders (PDs) were diagnosed on a lifetime basis as described in detail elsewhere (Grant et al., 2008; Grant et al., 2004b; Stinson et al., 2008). Paranoid, schizoid, histrionic, avoidant, dependent, and obsessive-compulsive PDs were assessed in Wave 1 (Compton et al., 2005; Grant et al., 2004b; Grant et al., 2005a) antisocial PD was assessed at both waves (Goldstein & Grant, 2009) and schizotypal, narcissistic, and borderline PDs were assessed in Wave 2 (Grant et al., 2008; Stinson et al., 2008). The diagnosis of PDs requires evaluation of long-term functioning (American Psychiatric Association, 1994). To receive a PD diagnosis, respondents were required to endorse the specified number of DSM-IV symptom criteria, at least 1 of which must have caused social

or occupational impairment. For antisocial PD, respondents were required to endorse the specified number of both conduct disorder symptoms before age 15 and symptoms of antisociality since age 15. PD symptom items were similar to those appearing in the Structured Clinical Interview for DSM-IV Personality Disorders, (First et al., 1997) the International Personality Disorder Examination (Loranger, 1999), and the Diagnostic Interview for DSM-IV Personality Disorders (Zanarini et al., 1996). Reliability ($\kappa = 0.40$ to 0.71) of AUDADIS-IV PD diagnoses was fair to good, comparing favorably with short-term test-retest studies using semistructured interviews in treated samples of patients (Zimmerman, 1994).

Other Psychiatric Disorders

Wave 2 lifetime mood, anxiety, attention-deficit/hyperactivity, and substance use disorders are included as covariates in analyses of comorbidity that are described below. Wave 2 AUDADIS-IV assessments of substance use, mood, and anxiety disorders were identical to those conducted in Wave 1 except for time frames. Attention-deficit/hyperactivity disorder (ADHD) was assessed at Wave 2 on a lifetime basis. Wave 2 lifetime diagnoses reflect disorders occurring at any time in respondents' lives as assessed over the 2 waves.

Mood disorders included DSM-IV primary major depressive (MDD), dysthymic, and bipolar I and bipolar II disorders. In addition to PTSD, anxiety disorders included DSM-IV primary panic disorder with and without agoraphobia, agoraphobia without panic disorder, social and specific phobias, and generalized anxiety disorder. AUDADIS-IV methods to diagnoses these disorders are described in detail elsewhere (Grant et al., 2005a; Grant et al., 2006; Grant et al., 2005a; Grant et al., 2004c; Grant et al., 2005d; Hasin et al., 2005; Stinson et al., 2007). DSM-IV (American Psychiatric Association, 1994) "primary" diagnoses exclude substance-induced disorders and those due to general medical conditions. MDD diagnoses also exclude bereavement.

Reliability (Canino et al., 1999; Grant et al., 2003a; Ruan et al., 2008) and validity (Canino et al., 1999; Grant et al., 2005a; Grant et al., 2004b; Grant et al., 2006; Grant et al., 2005b; Grant et al., 2005d; Hasin et al., 2005) of AUDADIS-IV mood, anxiety, and ADHD diagnoses were fair to good in both clinical and general population samples. Selected mood and anxiety disorder diagnoses showed good agreement with psychiatrist reappraisals (Canino et al., 1999).

Extensive questions operationalized DSM-IV criteria for alcohol and drug-specific abuse and dependence, including sedatives, tranquilizers, opioids other than heroin, cannabis, cocaine or crack, stimulants, hallucinogens, inhalants and solvents, heroin, and other illicit drugs. Wave 2 lifetime abuse diagnoses required 1 or more of 4 abuse criteria, and dependence required 3 or more of 7 dependence criteria, to be met in the same 12-month period for the same substance (alcohol or the same drug category) at any time over respondents' lives. Nicotine dependence was diagnosed similarly. Drug-specific abuse and dependence were aggregated in the present study to yield diagnoses of any drug abuse and any drug dependence. The reliability (Canino et al., 1999; Chatterji et al., 1997; Grant et al., 2003a; Grant et al., 1995; Hasin et al., 1997) and validity (Canino et al., 1999; Cottler et al., 1997; Hasin & Paykin, 1999; Hasin et al., 1994; Hasin et al., 2003; Pull et al., 1997) of AUDADIS-IV alcohol and drug use disorder diagnoses are documented in general population and clinical samples, including in the World Health Organization/National Institutes of Health International Study on Reliability and Validity, which showed good validity of DSM-IV alcohol and drug use disorder diagnoses in clinical reappraisals (Canino et al., 1999; Cottler et al., 1997).

Statistical Analysis

The analysis sample for the present report consists of all Wave 2 NESARC respondents with full (n=2,463) and partial PTSD (n=2,471), and trauma controls (n= 26,716). To examine PDs associated uniquely with full and partial PTSD relative to traumatized individuals who did not meet criteria for these conditions, respondents endorsing no exposures to potentially traumatic events at the beginning of the PTSD section of the AUDADIS-IV (n=3003) were excluded from the analysis (Breslau et al., 2004a; Breslau et al., 2004b; Kessler et al., 1995).

Weighted frequencies and crosstabulations were computed, and their significance tested using chi-square statistics, to compare sociodemographics and lifetime prevalences of comorbid PD diagnoses by PTSD status (Agresti, 1990). Associations of PTSD with PDs were examined using 2 sets of logistic regression analyses (Hosmer & Lemeshow, 2000). The first analysis controlled for sociodemographics. The second controlled for sociodemographics and all other Axis I and II psychiatric disorders, addressing the fact that control only for sociodemographics yields no information on unique relationships of PTSD to other disorders that also have considerable comorbidity. Control for other psychiatric disorders is necessary as these conditions may confound pairwise relationships between PTSD and each target diagnosis (Compton et al., 2007; Hasin et al., 2007). To assess whether comorbid associations of full and partial PTSD with PDs varied between men and women, sex x PTSD status product terms were tested for statistical significance in all multivariable models, with an alpha to stay of 0.05. All standard errors and 95% confidence intervals were estimated using SUDAAN (2006), which uses Taylor series linearization to adjust for design characteristics of complex surveys.

RESULTS

Sociodemographic characteristics

Prevalences of full and partial PTSD in the total sample of 34,653 respondents were 6.4% and 6.6%, respectively. As shown in Table 1, respondents differed by PTSD status on all demographic characteristics assessed. Respondents who had full and partial PTSD were more likely than trauma controls to be younger, female, less educated, previously married, and with lower household income.

Trauma exposure

As described in detail in another report (Pietrzak et al., under review), the unexpected death of someone close (24.1%–26.2%) and serious illness or injury to someone close (15.0%–15.7%), and sexual assault (9.2%–12.7%) were the 3 most frequently reported worst events in the PTSD and partial PTSD groups. Additional details regarding rates of lifetime traumas and worst stressful events are provided elsewhere (Pietrzak et al., under review)

Axis II comorbidity

DSM-IV PDs by PTSD status are shown in Table 2. After adjustment for sociodemographic characteristics, respondents with PTSD were more likely than trauma controls to meet criteria for all PDs (ORs=2.5–6.7). After adjustment for sociodemographic characteristics plus additional psychiatric comorbidity, PTSD remained significantly and positively associated with schizotypal, narcissistic, and borderline PDs (ORs=2.1–2.5). PTSD was positively associated with obsessive-compulsive PD in women. After adjustment for sociodemographic characteristics, respondents with partial PTSD were more likely than trauma controls to meet criteria for all PDs (ORs=1.7–4.1).

After further adjustment for additional psychiatric comorbidity, only associations with schizotypal (OR=1.8), narcissistic (OR=1.6), and borderline (OR=2.0) PDs remained

significant. Partial PTSD was positively associated with antisocial PD among women but negatively associated with avoidant PD among men.

Mood, anxiety, and additional PD comorbidity were significantly and independently associated with each specific PD in multivariable models (data not shown). ORs for independent associations of mood disorder comorbidity with specific PDs ranged from 1.2 for narcissistic PD to 4.2 for dependent PD. For anxiety disorder comorbidity, ORs ranged from 1.4 for narcissistic and antisocial PDs to 3.8 for avoidant PD. ORs for additional Axis II comorbidity ranged from 2.2 for antisocial PD to 60.5 for dependent PD. Alcohol use disorders (AUDs), drug use disorders (DUDs), nicotine dependence, and ADHD bore more modest and less consistently significant independent associations with specific PDs. ORs for AUDs ranged from 0.7 for dependent PD to 2.7 for antisocial PD, those for DUDs ranged from 1.0 for paranoid and obsessive-compulsive PDs to 3.0 for antisocial PD, and those for nicotine dependence ranged from 0.8 for avoidant PD to 1.8 for antisocial PD. For ADHD, ORs ranged from 0.9 for schizoid PD to 2.5 for borderline PD.

DISCUSSION

This study provides the first comprehensive examination of DSM-IV PDs associated with PTSD and partial PTSD in a nationally representative sample of U.S. adults. The lifetime prevalence of PTSD (6.4%) was similar to the rate of 6.8% found in the National Comorbidity Survey Replication (Kessler et al., 2005). Results of this study extend the literature on the comorbidity of PDs and PTSD (Bollinger et al., 2000; Dunn et al., 2004; Fauerbach et al., 2000; Golier et al., 2003; Gomez-Beneyto et al., 2006; Lenzenweger et al., 2007; Malta et al., 2002; McFarlane, 2004; Shea et al., 2000; Southwick et al., 1993; Yen et al., 2002; Zanarini et al., 1998; Zanarini et al., 2004) to suggest that, in the U.S. adult population, both full and partial PTSD are uniquely associated among both sexes with borderline, schizotypal, and narcissistic PDs. The significant, independent associations of Axis I and II comorbidity covariates with specific PD diagnoses, and reductions in magnitude of associations of PTSD status with PDs after control for additional comorbidity, also suggest the contributions of factors common to these additional disorders to the co-occurrence of full and partial PTSD with specific PDs (e.g., Compton et al., 2007; Hasin et al., 2007; Pietrzak et al., under review)

A number of factors may account for high rates of Axis II psychopathology in PTSD and partial PTSD. First, pre-trauma personality characteristics may increase the likelihood of trauma exposure and/or predispose an individual to develop PTSD (Axelrod et al., 2005; Bachar et al., 2005; Bramsen et al., 2000; Gunderson et al., 1993; Marzillier & Steel, 2007). For example, pretrauma borderline (Axelrod et al., 2005), neurotic (Bramsen et al., 2000), narcissistic (Bachar et al., 2005), and schizotypal (Berenbaum et al., 2008; Berenbaum et al., 2003; Marzillier & Steel, 2007) personality characteristics have been identified as vulnerability factors for PTSD. Second, severe trauma may itself cause enduring symptoms that are associated with PDs. For example, for some trauma survivors, PDs may reflect adaptations to trauma, as symptoms of some of these disorders (e.g., social isolation, rigidity/inflexibility) may serve as attempts to regulate and control potential dangers or triggers of symptoms (Axelrod et al., 2005; Hendin & Haas, 1984; Southwick et al., 1993). Third, symptoms associated with PDs may develop in response to PTSD rather than trauma *per se*. That is, living with highly disruptive symptoms of PTSD, such as intrusive traumatic thoughts, nightmares, and insomnia, may lead to symptoms characteristic of PDs, including unstable and intense interpersonal relationships, impulsivity, affective instability, suspicious or paranoid behavior, or choosing solitary activities. Finally, there is overlap between diagnostic criteria for PTSD and certain PDs. Symptoms of schizotypal PD are similar to those of PTSD (e.g., constricted affect vs. emotional numbing; social withdrawal vs.

avoidance). Further, symptoms of borderline and narcissistic PDs, which are characterized by difficulties with internal control and emotional regulation (Putnam & Silk, 2005; Ronningstam, 2010; Russ et al., 2008; Simon, 2002), may overlap with PTSD symptoms of physiological reactivity and irritability/anger outbursts.

Importantly, some researchers have questioned the validity of DSM-IV criteria for narcissistic PD, suggesting that they may underemphasize characteristic features of this disorder, including interpersonal vulnerability, emotional distress, affect dysregulation, and competitiveness (Ronningstam, 2010; Ronningstam et al., 1995; Russ et al., 2008). A recent study identified three different subtypes of narcissistic PD—"fragile," "grandiose/malignant," and "high functioning/exhibitionistic" (Russ et al., 2008). According to this model, individuals with PTSD and comorbid narcissistic PD may be most appropriately classified as having the "fragile" subtype of this PD, which is characterized by defensive grandiosity that helps reduce painful feelings of inadequacy, anxiety, and loneliness, as opposed to the "grandiose/malignant" (i.e., interpersonally manipulative, lacking remorse, and pursuing power) and "high functioning/exhibitionistic" (i.e., exaggerated sense of self importance, articulate, and outgoing) subtypes of this PD. Further research using more descriptive measures of personality pathology is needed to characterize a broader range of narcissistic and related personality characteristics associated with full and partial PTSD.

Sex by PTSD status interactions, while modest, were significant for antisocial, avoidant, and obsessive-compulsive PDs. Associations with antisocial PD were significant and positive for women with partial PTSD but nonsignificant in men with both full and partial PTSD. Only women with full PTSD showed a significant (positive) comorbid association with obsessive-compulsive, and only men with partial PTSD showed a significant (negative) comorbid association with avoidant, PD. Differences in gender role orientation/socialization; age of onset of traumas; types, number, and severity of traumas; cognitive appraisals of threat and loss of control; peritraumatic dissociation; social support; and psychobiological reactions to trauma may account for differential patterns of associations between PTSD and PDs in men and women (Olff et al., 2007). In the NESARC, women with PTSD and partial PTSD were significantly more likely to report sexual assault and being beaten up by their intimate partner as their worst traumatic event, whereas men with PTSD and partial PTSD were more likely to report military combat and seeing someone badly injured or dead as their worst event (Pietrzak et al., under review). Previous research has suggested that female sex, in general, does not increase risk of developing PTSD, but rather that specific types of traumas, particularly rape and sexual abuse, as well as pre-existing psychiatric conditions such as anxiety disorders, increase risk of PTSD (Hapke et al., 2006). Susceptibility to developing PTSD in females is also greater if exposure occurs in childhood (Breslau et al., 1997) and involves interpersonal traumas (Copeland et al., 2007; Zlotnick et al., 2008). Indeed, previously published studies that also used data from the NESARC found that comorbid PTSD and borderline PD was associated with greater rates of repeated childhood traumas compared to PTSD or borderline PD alone (Pagura et al., 2010), and that childhood traumas were associated with increased vulnerability to developing PTSD, other anxiety disorders, and major depression later in life (McLaughlin et al., 2009). Conduct disorder, which is required for a diagnosis of antisocial PD, is also associated with increased risk of PTSD, particularly following traumas such as sexual assault (Bagley et al., 1995; Reebye et al., 2000). Early physical and emotional traumatization, is linked to the development of psychopathy, although in females, family-related variables such as non-parental living arrangements may also be contributory (Krischer & Sevecke, 2008). Why the association with ASPD was significant only among women with partial, but not full, PTSD remains unclear; of note, however, women with partial PTSD were significantly ($p < 0.05$) more likely to report sexual assault as their worst lifetime trauma ($17.6 \pm 1.21\%$) than either women with full PTSD ($12.8 \pm 1.04\%$) or female trauma controls ($2.8 \pm 0.18\%$). More

research using longitudinal approaches is needed to evaluate sex differences and developmental trajectories of Axis I and II psychopathology in trauma-exposed individuals.

Cluster B PDs, which include antisocial PD, have been linked to early traumas such as child physical and sexual abuse (Johnson et al., 1999). Elevated rates of obsessive-compulsive PDs in women with PTSD may be related to early childhood trauma (Johnson et al., 1999), as well as increased internalization and avoidance behaviors in adulthood (Lecic-Tosevski et al., 2003; Miller & Resick, 2007). Preexisting PDs characterized by internalization (e.g., obsessive-compulsive PD) may increase the risk of developing PTSD and impede remission (Malta et al., 2002). Taken together, these findings suggest that personality disorders characterized by both externalization (i.e., antisocial PD) and internalization (i.e., obsessive-compulsive PDs) among women with clinically significant PTSD symptomatology may be related to the nature of traumatic exposure in this population. More generally, these results suggest that risk and protective factors that contribute to prevalence of psychiatric disorders may differ from those related to comorbidity.

Results of this study have important clinical and research implications. First, when working with trauma survivors, clinicians and researchers often focus their attention on PTSD alone. However, PTSD is associated with a broad range of Axis I (Kessler et al., 1995; Pietrzak et al., under review) and Axis II (Bollinger et al., 2000; Dunn et al., 2004; Gomez-Beneyto et al., 2006; Malta et al., 2002; Shea et al., 2000; Southwick et al., 1993) disorders. Further, Axis II disorders that co-occur with PTSD have been associated with increased anger, dissociation, and interpersonal problems (Heffernan & Cloitre, 2000), greater risk of suicidal behavior (Oquendo et al., 2005), impaired health status and greater utilization of health care services and psychotropic medications (Connor et al., 2002), and reduced compliance with therapy (Heffernan & Cloitre, 2000). Thus, when assessing psychopathology in trauma survivors, it is important to examine not only PTSD, but the full range of comorbid disorders. Second, it is well known that PDs affect the severity, course and treatment response of PTSD (Heffernan & Cloitre, 2000; Horowitz et al., 1980; Malta et al., 2002; Reich, 1990). For some trauma survivors, treatments that combine empirically-supported treatments for PTSD with those used to treat commonly comorbid PDs (e.g., dialectical behavior, supportive-expressive, schema, and/or psychodynamic therapies), may be helpful in addressing the full range of symptoms in this population (McMain & Pos, 2007; Nadort et al., 2009; Paris, 2010; Svartberg et al., 2004; Vinnars et al., 2005; Wagner et al., 2007). Third, clinicians should be sensitive to sex differences in PD comorbidity. While our findings were modest, these differences include elevated odds of antisocial PD in women with partial PTSD, and obsessive-compulsive PD in women with full PTSD, as well as reduced odds of avoidant PD in men with partial PTSD. Differential associations with these PDs may help explain differing clinical presentations (Lecic-Tosevski et al., 2003; Miller & Resick, 2007) and might negatively affect the prognosis of individuals with PTSD (Malta et al., 2002). Fourth, because partial PTSD is not a diagnosis in DSM-IV, it may easily be missed or ignored in clinical and research settings. However, partial PTSD is associated with significant psychosocial impairment (Berger et al., 2007; Favaro et al., 2006; Friedman et al., 1997; Grubaugh et al., 2005; Jakupcak et al., 2007; Kulka, 1990; Pietrzak et al., 2009; Schnurr et al., 2000; Watson & Daniels, 2008), and increased prevalence of Axis I disorders (Jeon et al., 2007; Pietrzak et al., under review). The present study extends these findings to suggest that partial PTSD is also associated with elevated rates of borderline, schizotypal, and narcissistic PDs, and in women, antisocial PD.

Methodological limitations of this study include its retrospective, cross-sectional design. Recall bias may have affected the recollection of trauma or symptoms related to PTSD and PDs. Although respondents in the current study may have differed in their interpretation of their “worst stressful event” (i.e., the severity of event impact on themselves or on

significant others), several previous studies, which have assessed PTSD symptomatology with reference both to respondent-reported "worst" and to another randomly selected traumatic event, have found that the prevalence of PTSD is only modestly higher with the "worst event" method but that clinical characteristics were comparable (Breslau et al., 2004b). Partial PTSD was also defined conservatively. Some previous epidemiologic studies employed less conservative definitions (Breslau et al., 2004a; Jeon et al., 2007; Mylle & Maes, 2004). Nevertheless, a conservative definition of partial PTSD may be less affected by "conceptual bracket creep," in which normative stress reactions may be labeled as clinically significant PTSD symptoms (McNally, 2003). More research is needed to validate the classification of partial PTSD; develop a standard definition of this classification; and compare its clinical presentation to other trauma-related psychiatric disorders such as depression, generalized anxiety, and somatoform disorders.

CONCLUSIONS

This study provides the most up-to-date and comprehensive examination of PD comorbidity with PTSD and partial PTSD in a large, nationally representative sample of U.S. adults. Results highlight the range of PDs bearing significant, unique associations with full and partial PTSD.

As noted in a previous report (Golier et al., 2003), this diversity does not support singling out borderline PD as a unique trauma-spectrum disorder or PTSD variant. Additional research is needed to evaluate nosologic and treatment implications of these results, including the clinical and prognostic utility of subtyping PTSD patients based on Axis II psychopathology, and of modifying existing PTSD treatments to target both core symptoms of PTSD and commonly comorbid PDs.

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Table 1

Sociodemographic characteristics of NESARC respondents by PTSD status

	No PTSD (Trauma Control) ^a	Partial PTSD ^b	Full PTSD	χ^2 (df)	P
	(n=26,716)	(n=2,471)	(n=2,463)		
	% or mean (SE)	% or mean (SE)	% or mean (SE)		
Age				81.25 (6)	<0.0001
20–29	16.4 (0.37)	14.7 (0.94)	14.8 (0.91)		
30–44	29.0 (0.39)	34.5 (1.25)	31.8 (1.04)		
45–64	34.6 (0.37)	36.0 (1.36)	41.3 (1.20)		
65+	19.9 (0.38)	14.9 (0.87)	12.2 (0.82)		
Sex				166.24 (2)	<0.0001
Male	50.8 (0.38)	32.6 (1.20)	30.7 (1.10)		
Female	49.2 (0.38)	67.4 (1.20)	69.4 (1.10)		
Race/ethnicity				32.36 (8)	0.0001
White	72.4 (1.56)	72.9 (1.51)	69.6 (1.63)		
Black	10.3 (0.62)	11.4 (0.93)	13.6 (0.97)		
Hispanic	10.9 (1.19)	10.3 (1.14)	11.4 (1.27)		
Asian/Hawaiian/Pacific Islander	4.3 (0.56)	2.8 (0.50)	2.2 (0.45)		
Native American	2.1 (0.17)	2.7 (0.42)	3.2 (0.51)		
Education				21.65 (4)	0.0002
Less than high school	12.7 (0.43)	15.2 (0.98)	16.3 (0.97)		
High school	27.3 (0.58)	26.8 (1.11)	26.1 (1.30)		
Postsecondary	60.0 (0.66)	58.0 (1.20)	57.7 (1.46)		
Marital status				65.43 (4)	<0.0001
Married/cohabiting	65.0 (0.48)	60.9 (1.18)	57.1 (1.25)		
Widowed/separated/divorced	17.6 (0.28)	23.6 (0.94)	27.9 (1.03)		
Never married	17.4 (0.49)	15.6 (0.88)	15.0 (0.91)		
Household income				94.18 (6)	<0.0001
\$0–\$19,999	16.8 (0.44)	20.0 (0.96)	26.8 (1.18)		
\$20,000–\$34,999	17.7 (0.40)	19.1 (1.00)	21.5 (1.05)		

	No PTSD (Trauma Control) ^a	Partial PTSD ^b	Full PTSD	χ^2 (df)	P
	(n=26,716)	(n=2,471)	(n=2,463)		
	% or mean (SE)	% or mean (SE)	% or mean (SE)		
\$35,000–\$69,999	33.5 (0.47)	33.7 (1.16)	28.5 (1.14)		
\$70,000+	32.0 (0.82)	27.2 (1.21)	23.1 (1.38)		

^aR espondents in this group reported experiencing a traumatic event but had neither full nor partial PTSD.

^bDefined as experiencing a traumatic event; helplessness, horror, or fear of death or severe injury or disability; and at least one symptom each from Criteria B, C, and D and duration of at least one month (Criterion E).

^cAdjusted odds ratios were derived from a single logistic regression model into which all sociodemographic variables were entered simultaneously.

Table 2

DSM-IV personality disorders among NESARC respondents by PTSD status

	Prevalence [% (SE)]			Odds Ratios (95% Confidence Intervals) Controlling for Sociodemographic Characteristics		Odds Ratios (95% Confidence Intervals) Controlling for Sociodemographic Characteristics and Other Psychiatric Disorders	
	No PTSD (Trauma Control) ^a	Partial PTSD ^b	Full PTSD	Partial PTSD vs. No PTSD	PTSD vs. No PTSD	Partial PTSD vs. No PTSD	PTSD vs. No PTSD
	(n=26,716)	(n=2,471)	(n=2,463)	AOR ^c , (95%CI)	AOR ^c , (95%CI)	AOR ^c , (95%CI)	AOR ^c , (95%CI)
Any personality disorder	18.7 (0.37)	39.0 (1.31)	50.0 (1.39)	2.9 (2.55–3.23)	4.3 (3.86–4.88)	1.7 (1.49–1.97)	2.2 (1.90–2.50)
Paranoid personality disorder	3.3 (0.16)	9.2 (0.78)	13.1 (1.00)	2.6 (2.07–3.17)	3.5 (2.89–4.26)	1.1 (0.86–1.43)	1.1 (0.89–1.38)
Schizoid personality disorder	2.4 (0.13)	5.9 (0.60)	9.4 (0.71)	2.4 (1.88–3.06)	3.7 (3.00–4.52)	1.1 (0.83–1.40)	1.3 (1.00–1.62)
Schizotypal personality disorder	2.8 (0.14)	10.0 (0.69)	15.2 (0.85)	3.8 (3.22–4.57)	5.7 (4.83–6.77)	1.8 (1.47–2.17)	2.1 (1.72–2.48)
Histrionic personality disorder	1.5 (0.09)	3.4 (0.43)	4.8 (0.56)	2.2 (1.64–3.01)	3.1 (2.39–4.09)	0.9 (0.63–1.20)	1.0 (0.73–1.25)
Narcissistic personality disorder	5.1 (0.18)	11.8 (0.84)	17.6 (1.04)	2.8 (2.33–3.29)	4.3 (3.65–5.09)	1.6 (1.34–2.02)	2.1 (1.73–2.51)
Borderline personality disorder	4.0 (0.16)	15.5 (0.92)	24.1 (1.18)	4.1 (3.48–4.86)	6.7 (5.73–7.84)	2.0 (1.63–2.38)	2.5 (2.09–3.02)
Antisocial personality disorder	3.5 (0.17)	6.4 (0.62)	7.5 (0.69)	2.1 (1.67–2.71)	2.5 (1.96–3.17)	Men 0.8 (0.55–1.13) Women 1.5 (1.02–2.18)	Men 0.8 (0.57–1.23) Women 1.1 (0.73–1.54)
Avoidant personality disorder	1.8 (0.12)	5.1 (0.58)	7.0 (0.65)	Men 1.7 (1.05–2.63) Women 3.0 (2.19–4.22)	Men 2.5 (1.59–3.93) Women 3.8 (2.90–4.96)	Men 0.6 (0.35–0.87) Women 1.3 (0.91–1.81)	Men 0.7 (0.41–1.09) Women 1.1 (0.83–1.49)
Dependent personality disorder	0.3 (0.04)	0.8 (0.24)	2.0 (0.32)	2.6 (1.33–5.06)	6.0 (3.97–9.11)	0.9 (0.44–1.72)	1.5 (0.96–2.26)
Obsessive–compulsive personality disorder	7.2 (0.22)	12.9 (0.84)	18.6 (1.09)	1.9 (1.62–2.25)	2.9 (2.52–3.32)	Men 0.8 (0.59–1.05) Women 1.1 (0.88–1.35)	Men 0.9 (0.70–1.25) Women 1.4 (1.13–1.69)

^a Respondents in this group reported experiencing a traumatic event but had neither full nor partial PTSD.

^b Defined as experiencing a traumatic event; helplessness, horror, or fear of death or severe injury or disability; and at least one symptom each from Criteria B, C, and D and duration of at least one month (Criterion E).

^c Sex-specific odds ratios are reported where statistically significant ($p < 0.05$) sex by PTSD status interactions were identified. In the absence of statistically significant sex by PTSD status interactions, odds ratios are reported for the entire sample, controlling for sex and other covariates.

Statistically significant odds ratios are highlighted in bold.